NOIDA INTERNATIONAL UNIVERSITY

Model Curriculum For

MEDICAL LABORATORY TECHNOLOGY

w.e.f. 2021-2022

MUKESH KUMAR PARASHAR

Digitally signed by MUKESH KUMAR PARASHAR
Date: 2023.04.16 16:48:13 +05'30'

Introduction

The report _From Paramedics to Allied Health Professionals: Landscaping the Journey and Way Forward' that was published in 2012, marked the variance in education and training practices for the allied health courses offered by institutions across the country. This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathwaysof allied health professionals, with a structured curriculum based on skills and competencies. Thus, this handbook has been designed to familiarize universities, colleges, healthcare providers as well as educators offering allied health courses with these national standards.

Individually, created for different professional groups of allied health, this handbook aims to reduce the variation in education by comprising of a standardized curriculum, career pathways, nomenclature and other details for each profession. The change from a purely didactic approach will create better skilled professionals and improve the quality of overall patient care. In the absence of a national standard-setting authority, this handbook can also guide the thousands of young adults who choose healthcare as a profession – not as doctors or nurses but to play several other critical roles – on the appropriate course of action to enable them to be skilled allied health professionals of the future.

Who is an Allied Health Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied health professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

„Allied health professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person(„s) physical, mental, social, emotional, environmental health and holistic well-being. [1]

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of ―allied health professionals‖ . In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied healthsystem. However, this is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and need for allied health professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.[1] Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is

now so dependent on technology, that allied health professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance, in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia 's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.[2,3]

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied health professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long-term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.[2] Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied health practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Learning goals and objectives for allied health professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals (why we teach this) and learning objectives (what the students will learn). Using the framework,

students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

1. Clinical Care[4]

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services. Program objectives should enable the students to:

- Apply the principles of basic science and evidence-based practice
- Use relevant investigations as needed
- Identify the indications for basic procedures and perform them in an appropriate manner
- Provide care to patients – efficiently and in a cost-effective way – in a range of settings, and maintain foremost the interests of individual patients
- Identify the influence of biological, psychosocial, economic, and spiritual factors on patients'well-being and act in an appropriate manner
- Incorporate strategies for health promotion and disease prevention with their patients

2. Communication[4,5]

The student will learn how to communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately. Communication is a fundamental requirement in the provision of health care services. Program objectives should enable the students to:

- Provide sufficient information to ensure that the patient/client can participate as actively as possible and respond appropriately to the information
- Clearly discuss the diagnosis and options with the patient, and negotiate appropriate treatment plans in a sensitive manner that is in the patient 's and society 's best interests
- Explain the proposed healthcare service – its nature, purpose, possible positive and adverse consequences, its limitations, and reasonable alternatives wherever they exist
- Use effective communication skills to gather data and share information including attentive listening, open-ended inquiry, empathy and clarification to ensure understanding
- Appropriately communicate with, and provide relevant information to, other stakeholders including members of the healthcare team

- Use communication effectively and flexibly in a manner that is appropriate for the reader or listener
- Explore and consider the influence that the patient 's ideas, beliefs and expectations have during interactions with them, along with varying factors such as age, ethnicity, culture and socioeconomic background
- Develop efficient techniques for all forms of written and verbal communication including accurate and timely record keeping
- Assess their own communication skills, develop self-awareness and be able to improve their relationships with others
- Possess skills to counsel for lifestyle changes and advocate health promotion

3. Membership of a multidisciplinary health team[6]

The student will put a high value on effective communication within the team, including transparency about aims, decisions, uncertainty and mistakes. Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively to accomplish shared goals within and across settings to achieve coordinated, high-quality care. Program objectives will aim at making the students being able to:

- Recognize, clearly articulate, understand and support shared goals in the team that reflect patient and family priorities
- Possess distinct roles within the team; to have clear expectations for each member 's functions, responsibilities, and accountabilities, which in turn optimizes the team 's efficiency and makes it possible for them to use division of labor advantageously, and accomplish more than the sum of its parts
- Develop mutual trust within the team to create strong norms of reciprocity and greater opportunities for shared achievement
- Communicate effectively so that the team prioritizes and continuously refines its communication channels creating an environment of general and specific understanding
- Recognize measurable processes and outcomes, so that the individual and team can agree on and implement reliable and timely feedback on successes and failures in both the team 's functioning and the achievement of their goals. These can then be used to track and improve performance immediately and over time.

4. Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice
- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships

- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

5. Commitment to professional excellence[7]

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare. Program objectives will aim at making the students being able to:

- Demonstrate distinctive, meritorious and high-quality practice that leads to excellence and that depicts commitment to competence, standards, ethical principles and values, within the legal boundaries of practice
- Demonstrate the quality of being answerable for all actions and omissions to all, including service users, peers, employers, standard-setting/regulatory bodies or oneself
- Demonstrate humanity in the course of everyday practice by virtue of having respect (and dignity), compassion, empathy, honour and integrity
- Ensure that self-interest does not influence actions or omissions, and demonstrate regards for service-users and colleagues

6. Leadership and mentorship[8]

The student must take on a leadership role where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services. Program objectives should enable the students to:

- Act as agents of change and be leaders in quality improvement and service development, so that they contribute and enhance people 's wellbeing and their healthcare experience
- Systematically evaluate care; ensure the use of these findings to help improve people 's experience and care outcomes, and to shape clinical treatment protocols and services
- Identify priorities and effectively manage time and resources to ensure the maintenance or enhancement of the quality of care
- Recognize and be self-aware of the effect their own values, principles and assumptions may have on their practice. They must take charge of their own personal and professional development and should learn from experience (through supervision, feedback, reflection and evaluation)
- Facilitate themselves and others in the development of their competence, by using a range of professional and personal development skills
- Work independently and in teams. They must be able to take a leadership role to coordinate, delegate and supervise care safely, manage risk and remain accountable for the care given; actively involve and respect others'contributions to integrated person-centered care; yet work in an effective manner across professional and agency boundaries. They must know when and how to communicate with patients and refer them to other professionals and agencies, to respect the choices of service users and

others, to promote shared decision-making, to deliver positive outcomes, and to coordinate smooth and effective transition within and between services and agencies.

7. Social Accountability and Responsibility[9]

The students will recognize that allied health professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability.[10]They have a mandate to serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns. Program objectives should enable the students to:

- Demonstrate knowledge of the determinants of health at local, regional and national levels and respond to the population needs
- Establish and promote innovative practice patterns by providing evidence-based care and testing new models of practice that will translate the results of research into practice, and thus meet individual and community needs in a more effective manner
- Develop a shared vision of an evolving and sustainable health care system for the future by working in collaboration with and reinforcing partnerships with other stakeholders, including academic health centres, governments, communities and other relevant professional and non-professional organizations
- Advocate for the services and resources needed for optimal patient care

8. Scientific attitude and Scholarship[10]

The student will utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives. Program objectives should enable the students to:

- Engage in ongoing self-assessment and structure their continuing professional education to address the specific needs of the population
- Conduct evidence-based practices by applying principles of scientific methods
- Take responsibility for their educational experiences
- Acquire basic skills such as presentation skills, giving feedback, patient education and the design and dissemination of research knowledge; for their application to teaching encounters

9. Lifelong learning[11]

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to:

- Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills
- Apply newly gained knowledge or skills to patient care
- Enhance their personal and professional growth and learning by constant introspection and utilizing experiences
- Search (including through electronic means), and critically evaluate medical literature to enable its application to patient care
- Develop a research question and be familiar with basic, clinical and translational research in its application to patient care

- Identify and select an appropriate, professionally rewarding and personally fulfilling career pathway

Introduction of new elements in allied health education

Competency-based curriculum

A significant skill gap has been observed in the professionals offering healthcare services irrespective of the hierarchy and level of responsibility in the healthcare settings. The large variation in the quality of services is due to the diverse methodologies opted for healthcare education and the difference in expectations from a graduate after completion of a course and at work. What one is expected ‗to perform 'at work is assumed to be learned during the course, however, the course design focuses on what one is expected ‗to know '. The competency-based curriculum thus connects the dots between the ‗know what 'and ‗do how '.

The efficiency and effectiveness of any educational programme largely depends on the curriculum design that is being followed. With emerging medical and scientific knowledge, educators have realized that learning is no more limited to memorizing specific lists of facts and data; in fact, by the time the professional aims to practice in the healthcare setting, the acquired knowledge may stand outdated. Thus, competency-based education is the answer; a curricular concept designed to provide the skills that professionals need. A competency-based program is a mix of skills and competencies based on individual or population needs (such as clinical knowledge, patient care, or communication approaches), which is then developed to teach relevant content across a range of courses and settings. While the traditional system of education focuses on objectives, content, teacher-centric approach and summative evaluation; competency-based education has a focus on competencies, outcomes, performance and accomplishments. In such a case, teaching activities are learner-centered, and evaluation is continuous and formative in structure. The competency- based credentials depend on the demonstration of a defined set of competencies which enables a professional to achieve targeted goals. Competency frameworks comprise of a clearly articulated statement of a person 's abilities on the completion of the credential, which allows students, employers, and other stakeholders to set their expectations appropriately.[1213]

Considering the need of the present and future healthcare delivery system, the curriculum design depicted in this handbook thus will be based on skills and competencies.

Promoting self-directed learning of the professionals

The shift in the focus from traditional to competency-based education has made it pertinent that the learning processes may also be revisited for suitable changes. It is a known fact that learning is no more restricted to the boundaries of a classroom or the lessons taught by a teacher. The new tools and technologies have widened the platform and introduced innovative modes of how students can learn and gain skills and knowledge. One of the innovative approaches is learner-centric and follows the concept of **self-directed learning.**

Self-directed learning, in its broadest meaning, describes a process in which individuals take the initiative with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing learning strategies and evaluating learning outcomes (Knowles, 1975).[14]

In self-directed learning, learners themselves take the initiative to use resources rather than simply reacting to transmissions from resources, which helps them learn more in a better way.[15] Lifelong,

self-directed learning (SDL) has been identified as an important ability for medical graduates (Harvey, 2003)[16] and so is applicable to other health professionals including AHPs. It has been proven through many studies worldwide that the self-directed method is better than the teacher-centric method of learning. Teacher-directed learning makes learners more dependent and the orientation to learning becomes subject-centered. If a teacher provides the learning material, the student is usually satisfied with the available material, whereas if a student is asked to work on the same assignment, he or she invariably has to explore extensive resources on the subject.[15]

Thus the handbook promotes self-directed learning, apart from the usual classroom teaching and opens the platform for students who wish to engage in lifelong learning.

Credit hours vs traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner 's performance.[17] All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the _National Qualifications Framework 'in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities.

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

Integrated structure of the curriculum

Vertical integration, in its truest sense, is the interweaving of teaching clinical skills and knowledge into the basic science years and, reinforcing and continuing to teach the applications of basic science concepts during the clinical years. (Many efforts called _vertical integration 'include only the first half of the process).

Horizontal integration is the identification of concepts or skills, especially those that are clinically relevant, that cut across (for example, the basic sciences), and then putting these to use as an integrated focus for presentations, clinical examples, and course materials. e.g. Integration of some of the basic science courses around organ systems, e.g., human anatomy, physiology, pathology; or incorporating ethics, legal issues, finance, political issues, humanities, culture and computer skills

into different aspects of a course like the Clinical Continuum.

The aim of an integrated curriculum is to lead students to a level of scientific fluency that is beyond mere fact and concept acquisition, by the use of a common language of medical science, with which they can begin to think creatively about medical problems.[19]

This innovative new curriculum has been structured in a way such that it facilitates horizontal and vertical integration between disciplines; and bridges the gaps between both theory & practice, and between hospital-based practice and community practice. The amount of time devoted to basic and laboratory sciences (integrated with their clinical relevance) would be the maximum in the first year, progressively decreasing in the second and third year of the training, making clinical exposure and learning more dominant.[11]However it may differ from course to course depending on the professional group.

Introduction of foundation course in the curriculum

The foundation course for allied health professions is an immersive programme designed to impart the required knowledge, skills and confidence for seamless transition to the second semester of a professional allied health course. Post admission, the foundation course is designed for a period of 6 months to prepare a student to study the respective allied healthcourse effectively and to understand the basics of healthcare system. This aims to orient the student to the national health system and the basics of public health, medical ethics, medical terminologies, communication skills, basic life support, computer learning, infection prevention and control, environmental issues and disaster management, as well as orientation to the community with focus on issues such as gender sensitivity, disability, human rights, civil rights, etc. However, the course is flexible in terms of the required numbers of hours for each subject of the foundation course and its appropriate placement across various semesters.

Learning methodologies

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic clinical skills and professionalism; and will incorporate clinical training from the first year itself. It is recommended that the primary care level should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There should also be an emphasis on the introduction of case scenarios for classroom discussion/case- based learning.

Healthcare education and training is the backbone of an efficient healthcare system and India's education infrastructure is yet to gain from the ongoing international technological revolution. The report ‗*From Paramedics to Allied Health: Landscaping the Journey and way ahead*", indicates that teaching and learning of clinical skills occur at the patient 's bedside or other clinical areas such as laboratories, augmented by didactic teaching in classrooms and lecture theatres. In addition to keeping up with the pace of technological advancement, there has been a paradigm shift to outcome-based education with the adoption of effective assessment patterns. However, the demand for demonstration of competence in institutions where it is currently limited needs to be promoted. The report also mentions some of the allied health schools in India that have instituted clinical skill centres, laboratories and high-fidelity simulation laboratories to enhance the practice and training allied

health students and professionals. The report reiterates the fact that simulation is the replication of part or all of a clinical encounter through the use of mannequins, computer- assisted resources and simulated patients. The use of simulators addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills

assessment methods among others.[1] The table mentioned below lists various modes of teaching and learning opportunities that harness advanced tools and technologies.

Table 1 Clinical learning opportunities imparted through the use of advanced techniques[1,20]

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios
	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills
	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	Preparation of the patient, slides, etc.

Assessment methods

Traditional assessment of students consists of the yearly system of assessments. In most institutions, assessments consist of internal and external assessments, and a theory examination at the end of the year or semester. This basically assesses knowledge instead of assessing skills or competencies. In competency-based training, the evaluation of the students is based on the performance of the skills as per their competencies. Hence, all the three attributes – knowledge, skills, and attitudes – are assessed as required for the particular competency.

Several new methods and tools are now readily accessible, the use of which requires special training. Some of these are given below:

- Objective Structured Clinical Examination (OSCE), Objective Structured Practical Examination (OSPE), Objective Structured Long Examination Record (OSLER)
- Mini Case Evaluation Exercise (CEX)
- Case-based discussion (CBD)
- Direct observation of procedures (DOPs)
- Portfolio
- Multi-source feedback
- Patient satisfaction questionnaire

An objective structured clinical examination (OSCE) is used these days in a number of allied health courses, e.g., Optometry, Physiotherapy and Radiography. It tests the performance and competence in communication, clinical examination, and medical procedures/prescriptions. In physiotherapy, orthotics, and occupational therapy, it tests exercise prescription, joint mobilization/manipulation techniques; and in radiography it tests radiographic positioning, radiographic image evaluation, and interpretation of results. The basic essential elements consist

of functional analysis of the occupational roles, translation of these roles (—competencies‖) into outcomes, and assessment of trainees' progress in these outcomes on the basis of demonstrated performance. Progress is defined solely by the competencies achieved and not the underlying processes or time served in formal educational settings. Most methods use predetermined, agreed assessment criteria (such as observation check-lists or rating scales for scoring) to emphasize on frequent assessment of learning outcomes. Hence, it is imperative for teachers to be aware of these developments and they should suitably adopt them in the allied health education system.[21]

Methodology of curriculum development

With the release of the report ‗From Paramedics to Allied Health: Landscaping the journey and the way ahead ', the Ministry of Health and Family Welfare prioritized the key recommendations and concerns raised by various allied health professionals groups and experts as indicated in the report. One of the major recommendations in the report was the need for standardization of curriculum and pedagogic requirements for the major allied health professional courses.

The MoHFW has identified 12 priority professional streams in the phase-I for the purpose of standardization. The expertise of over 50 leading public and private allied health educational institutions for 12 different disciplines has been sought as part of this exercise. Additionally, international experts from Canada, Sweden, USA and UK are also being roped in, to arrive at a comprehensive and globally acceptable set of educational standards based on a skills and competencies approach.The opinions were sought from experts for all the courses, though curricula for the following two professions were not redesigned as they fall under the ambit of an existing regulatory body –the Rehabilitation Council of India governed by the Ministry of Social Justice and Empowerment –

- Audiology and Speech Pathology
- Orthotics and Prosthetics

The National Skills Development Agency has also developed the National Skills Qualification Framework (NSQF). Under the aegis of the NSDA, the Healthcare Sector Skill Council (HSSC) has undertaken a similar process for a few entries level allied health courses (Certificate and Diploma level). The focus of the Ministry of Health and Family Welfare is thus to preempt duplication of efforts and arrive at a comprehensive set of minimum standards for the allied health professions but for higher level professional qualifications. This would ensure that the key considerations and obligations of both the public and the private sector are adequately addressed.

In view of the above, the Ministry of Health and Family Welfare instituted 12 National Curricula Redesign Taskforce groups comprising of academicians and professionals from the best institutes

and colleges across the country. These people served as subject experts and redesigned the curricula based on a standardized framework developed by the NIAHS TSU (National Initiative for Allied Health Sciences-Technical Support Unit), which is the technical arm supporting this project. The final curriculum has been reviewed and approved by the National Curricula Review Committee (NCRC), (constituted by the MoHFW), that consists of experts with versatile and immense experience in their respective streams, to assess the applicability of the curricula drafted in view of the healthcare system as a whole.

Steps undertaken in the curricula review process –

1. Curricula were sought from various States and institutions across the country in response to which the NIAHS TSU reviewed:
    a. 118 curricula of allied health courses (different levels and different professions) from 10 states across the country;
    b. 133 curricula of various allied health courses collected during phase-I of the NIAHS project.

2. Literature review –a comprehensive literature review was undertaken resulting in a detailed curriculum of the allied health courses, which included competency and skills- based models followed nationally as well as internationally, methodologies of curriculum development, assessment protocols, and many such aspects of curriculum development. The literature review helped the TSU to develop a reference document that comprised of a standard framework for a competency-based curriculum to be followed for the curricula review and redesign. A detailed mapping of all the resources was undertaken and shared with the taskgroup experts via email.
3. Constitution of the National Curricula Redesign Taskforces for various professional groups – Specific task forces were then instituted comprising of technical as well as subject experts who were engaged in the process of redesigning the curriculum.
4. Constitution of the National Curricula Review Committee (NCRC) – The NCRC (comprising of experts with versatile and immense experience in their respective domains) was then constituted for final review and approval on the curriculum drafted by the taskforce and NIAHS TSU.
5. National Curricula Redesign Taskforce Consultations– a series of consultations were conducted with subject experts including both regional and national task group experts to develop a ‗skill and competency 'framework for education and career pathways. The consultations were facilitated by the NIAHS TSU members and were led by the chairpersons of the respective groups. Post this, the draft version and recommendations were compiled by the TSU members and sent to the experts for final review and consent.
6. Local consultations – These were also conducted in different hospitals and other healthcare settings to get suggestions, feedback and ideas from the subject experts for their respective curricula.
7. Response draft – Comments and suggestions were received on the draft and a response draft curriculum was prepared, which was then re-circulated for final consent and validation by the task group experts.
8. Submission and approval of draft curriculum – The final draft of the curriculum handbook

was then submitted by the taskforce chairman to the National Curricula Review Committee for approval and final sign-off.

9. Public opinion – The handbook was uploaded to seek public opinion from national and international experts, students, faculty, and practitioners of the respective professional groups.
10. Final approval by the NCRC – The comments and suggestions of the public were then reviewed and considered for possible modifications by the taskforce groups. The final approval and sign off for the overall structure were then sought from NCRC.
11. Dissemination – The final handbook (guidelines) is disseminated by the Ministry of Health and Family Welfare for further adoption and incorporation by institutes/universities as applicable to ensure standardization.

Background of the profession

Statement of Philosophy– Why this profession holds so much importance?

Medical Laboratory Professionals work in all areas of a clinical laboratory including blood banking, clinical bio-chemistry, haematology, immunology, histopathology and medical microbiology. They perform a full range of laboratory tests – from simple prenatal blood tests, to more complex tests to uncover diseases such as HIV/AIDS, diabetes, and cancer. They are also responsible for confirming the accuracy of test results, and reporting laboratory findings. The information obtained from a Medical Laboratory Scientist helps the physician influence the medical treatment a patient will receive. Medical Laboratory Scientists operate complex electronic equipment, computers and precision instruments costing millions of dollars.

Medical Laboratory Professionals analyze human fluid samples using techniques available to the clinical laboratory, such as manual white blood cell differentials, bone marrow counts, analysis via microscopy, and advanced analytical equipment. They help physicians in choosing the correct laboratory tests and ensure proper collection methods. They receive patient specimens, analyze and interpret them, and report results.

Medical Laboratory Professionals must recognize anomalies in their test results and know how to correct problems with the instrumentation. They monitor, screen, and troubleshoot analyzers featuring the latest technology available in the market. They perform equipment validations, calibrations, quality controls, —STAT‖ or run-by-run assessment, statistical control of observed data, and recording of normal operations. To maintain the integrity of the laboratory process, medical laboratory scientists recognize factors that could introduce error and reject contaminated or substandard specimens, as well as investigate discrepant results.

Common tests performed by Medical Laboratory Professionals are complete blood count (CBC), comprehensive metabolic panel (CMP), electrolyte panel, liver function tests (LFT), renal function tests (RFT), thyroid function test (TFT), urinalysis, coagulation profile, lipid profile, blood type, semen analysis (for fertility and post-vasectomy studies), serological studies and routine cultures. In some facilities that have few phlebotomists, or none at all, (such as in rural areas) Medical Laboratory Professionals may perform phlebotomy on patients, as this skill is part of their clinical training.

The practical experience required to obtain a Bachelor's degree in Medical Laboratory Science gives these professionals a unique understanding of the inter-relationship between microbiological and chemical testing and the resulting clinical manifestations in clinical, scientific and industrial settings.

About Medical Laboratory Science

Medical laboratory science is the branch of science which deals with all the clinical laboratory investigations on clinical samples for laboratory diagnosis of various diseases. Blood, tissue and body fluids are analyzed and examined for various types of foreign organisms and abnormalities. This information is then used by the medical team to make decisions regarding a patient's medical care. 85% of all medical decisions are based on the results of clinical laboratory investigation reports.

Medical Laboratory Science is an important subject in the field of Medicine. In each system of Medicine, diagnosis of disease is a primary step because no treatment is possible without a proper diagnosis. It is the Medical Laboratory Technocrat, who performs this important task by various scientific tools and techniques.

In today 's modern world of technology, the diagnosis, treatment & prognosis of various diseases depends upon the results of investigations carried out in a clinical laboratory. Thus, these professionals play a key role in the field of health care. Medical Laboratory Science has played a significant role in the advancement in the field of Medicine, especially in past few decades. As modern medicine becomes more of a team effort, the Medical Laboratory Scientist/Technologist is an important member and integral part of the medical team.

Scope of practice

- Collection and receiving of specimens (infectious samples i.e., blood, urine, stool, sputum, pus, semen, tissues and body fluids) for various biochemical, pathological, microbiological, haematological and blood bank investigations, etc.
- To perform and validate various investigations for the purpose of differential diagnosis
- Calibration and standardization of glassware 's and other laboratory equipment
- Standardization and selection of test analytical procedures
- Maintenance of supplies of laboratory reagents / diagnostic kits
- Evaluation of reagents and diagnostic kit for diagnostic suitability
- Maintenance of quality control for reliability of laboratory reports
- Preparation of chemical and biological reagents
- Supervision, organization of work and personnel management
- Maintenance of records and preparation of statistics
- They look for bacteria, parasites, and other microorganisms; analyze the biochemical content of fluids; match blood for transfusions; and test for drug levels in the blood to show how a patient is responding to treatment
- Technologists also prepare specimens for examination, count cells, and look for abnormal cells in blood and body fluids
- They use automated equipment and computerized instruments capable of performing a number of tests simultaneously, as well as microscopes, cell counters, and other sophisticated laboratory equipment
- Then they analyze the results and relay them to physicians
- With increasing automation and the use of computer technology, the work of Technologists has become less hands-on and more analytical
- The complexity of tests performed, the level of judgment needed, and the amount of responsibility workers assume depend largely on the amount of education and experience they possess
- They make cultures of body fluid and tissue samples, to determine the presence of bacteria, fungi, parasites, viruses or other microorganisms
- Clinical laboratory technologists analyze samples for chemical content or a chemical reaction and determine concentrations of compounds such as blood glucose and cholesterol, enzymes and hormones levels

- They also type and cross match blood samples for transfusions. Clinical laboratory staff evaluate test results, develop and modify procedures, and establish and monitor programs, to ensure the accuracy of tests. Senior technologists supervise junior laboratory technologists.
- Medical Laboratory Tech. staffs in small laboratories perform many types of tests, whereas those in large laboratories generally specialize
- Laboratory Technology staff prepare specimens and analyze the chemical, hormonal and enzyme contents of body fluids
- They also examine and identify bacteria and other microorganisms
- In blood bank or Immuno-Haematology, technologists collect, type and cross match blood and prepare its components for transfusions. They also analyze the blood for safe and infection free transfusion (Like HIV, Hepatitis, Syphilis, TPHA, Malaria Parasite etc.)
- In Immunology, technologists examine elements of the human immune system and its response to foreign bodies
- In Molecular Biology, technologists perform complex protein and nucleic acid testing on human cell samples

Table 2: Career Pathway and Nomenclature for Medical Laboratory Professionals

Levels	**Nomenclature in various sectors**			**Qualification and experience**
	Clinical	**Academic**	**Industry/ Management**	
Level 4	Medical Laboratory Technologist	NA	NA	• **BMLT – 3.5-year course (3 years + 6 months internship)** OR • Diploma MLT (2 years + 6 months internship) + 2 years 'experience

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	**Academic**	**Industry/ Management**	
Level 5	● Technical Officer (MLS) ● Senior Technical Officer (MLS) ● Chief Technical Officer .	NA	NA	● **BMLT – 3-year course (3.5 years + 6 months internship) + 5 years' experience at level 4** OR ● Diploma MLS (2 years + 6 months Internship) + **5 years' experience at level 4** Further promotion suggested after every 5 years in a horizontal manner. 1. From level 4, the professional will be promoted to Technical Officer, then Sr. Technical Officer followed by Chief Technical Officer after 5 years on previous level. (Cadre already functional in Central Hospitals/Institutions under MoHFW) 2. The person will be eligible for Level 6 only if he/she increases his/her qualification to MMLS.
Level 6	Medical Laboratory Scientist **(Grade-B)**	Clinical Laboratory Demonstrator	Deputy Technical Manager	● MMLS with respective specialization. **(Similar Scientist Cadre already exist in ICMR/DHR under MoHFW)** ***(25% vacancies should be filled from existing eligible staff, fulfilling desired qualification criteria without any age bar)***
Level 7	Medical Laboratory Scientist **(Grade C)**	Assistant Professor	Technical Manager	● **For Medical Lab. Scientist Grade-C/ Technical Manager**: MMLS with 3 years of experience at Level 6 ● **For Academics**: MMLS in respective specialization with 3 years of experience at Level 6 as Clinical Laboratory Demonstrator
Level 8	Medical Laboratory Scientist **(Grade D)**	Associate Professor	Deputy Quality Manager	● **For Medical Lab. Scientist Grade-D/Deputy Quality Manager:** MMLS with 3 years of experience at Level 7 ● **For Academics**:MMLS in respective specialization with 3 years of experience at Level 7 as Asst. Professor **OR** Ph.D. with MMLS in the respective specialization

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	**Academic**	**Industry/ Management**	
Level 9	Medical Laboratory Scientist **(Grade E)**	Additional Professor	Quality Manager	● **For Medical Laboratory Scientist (Grade E)/ Quality Manager:** MMLS with 3 years of experience at Level 8 ● **For Academics**: Ph.D. with MMLS and 3 years of experience at Level 8 as Assoc. Professor in respective specialization.
Level 10	● Medical Laboratory Scientist **(Grade F)** ● Medical Laboratory Scientist **(Grade G)** ● Medical Laboratory Scientist **(Grade H)**	Professor / Principal	Director Laboratory Services/ HOD	● **For Medical Laboratory Scientist (Grade F,G,H)/Director – Laboratory Services/HOD**: MMLS with 3 year of experience at Level 9 / ● **For Academics**: Ph.D. with MMLS and 3 years of experience at Level 9 as Professor in respective specialization. (Promotion after every 4 years as FCS scheme**"Flexible Complementing Scheme"** of ICMR)

IMPORTANT NOTES:

1. **Diploma MLT, B.Sc. MLT and M.Sc. MLT completed before implementation of this scheme shall be considered at par with the current scheme of Diploma MLS, Bachelors MLS and Masters MLS respectively, irrespective of their course duration for concerned level.**
2. **Existing in-service Medical Laboratory staff should be considered at par in the present scheme at their respective levels.**
3. ***Diploma should be phased out in the future and the minimum required qualification should be BMLS 4-year course (3.5 years + 6 months internship).**

Definition of Medical Laboratory Technology

"A medical laboratory professional (also referred to as a Medical Laboratory Technologist, a Clinical Laboratory Scientist or Clinical Laboratory Technologist) is a healthcare professional who performs chemical, hematological, immunologic, microscopic and microbiological diagnostic analyses on body fluids such as blood, urine, sputum, stool, cerebrospinal fluid (CSF), peritoneal fluid, pericardial fluid, and synovial fluid, as well as other specimens. Medical laboratory scientists work in clinical laboratories at hospitals, reference laboratories, biotechnology laboratories and non-clinical industrial labs."

Education of the medical laboratory professional

When developing any education programme, it is necessary that programme planning should be outcome-based and should meet local and national manpower requirements. It should also provide personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge, to a skills-and competencies-based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.
Thus, the following curriculum is prescriptive, aims to focus on a skill- and competencies-based approach for learning and is designed accordingly to standardize the content across the nation.

Entry requirements

- Candidates should have passed 10 + 2 with biology or vocational course in MLS/MLT at 10+2 level
- Minimum percentage of marks: 50% aggregate
- Separate entrance exam should be incorporated for these students who want to purse allied health course

Course duration

It is recommended that any programme developed from this curriculum should have the following minimum duration for students to qualify as entry level professionals in laboratory Science –

- 2.5-year programme (including 6 months of internship) – Diploma level
- 4-year programme (including 6 months of internship) – Bachelors 'degree level
- 2-year programme (including dissertation)- Masters 'degree level
- Ph.D. programme (including thesis)

The emphasis initially should be on the academic content establishing a strong scientific basis and in the last six months on the application of theory to clinical/reflective practice. In the Bachelors 'degree programme, six months shall be devoted to clinical practice, on a continuum of rotation from theory to practice over the programme. The aim of the 4 year degree programme is to enable the development of the laboratory professional as a key member of the healthcare system With the change in disease dynamics and multifold increase in cases needing medical laboratory science for the purpose of diagnosis, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession and to produce well trained teaching faculty from within the profession. Thus, a **Master's degree programme** is recommended with minimum of two years of education including dissertation/thesis, to specialize in the field of Medical Laboratory Science. Postgraduate students can contribute significantly in research and academics.

Ph.D. also plays a significant role in the academic system of Medical Laboratory Science; however, the curriculum has not indicated any prescriptive guidelines for that level apart from mapping it on the career and qualification map. The same needs to be promoted, for strengthening the faculty development and significant contribution of Med. Lab. Professionals in the field of Research and development.

Teaching faculty and infrastructure

The importance of providing an adequate learning environment for students needs be emphasized. Both the physical infrastructure and the teaching staff must be adequate.

Teaching areas should facilitate different teaching methods. Where students share didactic lectures with other disciplines (e.g. diagnostic radiographers, nurses) large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues where students are placed the health and safety standards must be adhered to.

It is recommended that a faculty and student ratio of 1:10 is to be followed for the Post graduate programmes and 1:25 for the under graduate programmes.

Job availability

As per ILO documentation, employers worldwide are looking for job applicants who not only have technical skills that can be applied in the workplace, but who also can communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.[23] Graduates can expect to be employed in hospitals and private laboratories. A career in research, following the completion of a higher degree such as a Ph. D., is an option chosen by some graduates. Graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded. Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years and will keep on increasing due to chronic emerging conditions.

Model Curriculum

Background

Various qualifications in medical laboratory science can be accomplished with a course duration ranging from 2.5 years of Diploma (inclusive of 6 months of internship), 4 years of Bachelor's degree (BMLS) (inclusive of 6 months of internship) and 2 years of Master's program (inclusive of Research Project/Dissertations) and Ph.D.

The aim of the recommended curricula is to produce professionals who are technically and clinically competent and are well versed with importance of quality assurance in MLS. They should understand the theoretical basis for evidence-based practice and be effective members of the multidisciplinary team. They should always be prepared to participate in or initiate research into practice. They should able to work according to registration requirements of the respective country/ state.

All aspects of Medical laboratory Science have been considered in the development of this curriculum together with the identification of the roles expected for different levels of medical laboratory professionals based on their qualification and experience. The need for connecting the dots between the education and employment practices has been the road map for devising this curriculum.

The National Curriculum Taskforce on Medical Laboratory Science has successfully designed the career and qualification map indicating the growth opportunities for a professional in the career pathway based on the level as indicated in the National Skills Qualification Framework (NSQF). The career pathway indicates level 4 as the entry level after the completion of a minimum 2.5 years of Diploma level programme including 6 months internship in medical laboratory science (Diploma in Medical Laboratory Science) and level 5 as the entry level after completion of a minimum 4 years of Baccalaureate level programme including 6 months internship in medical laboratory science (Bachelor in Medical Laboratory Science – BMLS). The components of the programmes starting from diploma and above have been detailed out in the coming chapters.

A foundation course has also been designed to bring all the students at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation course is mandatory for all the allied health professional courses and for both entry level courses – diploma as well as degree. If a diploma holder has completed the foundation course and is willing to pursue the degree course, the candidate will directly get entry for next semester, however a pre- qualifier skill test will have to be satisfactorily completed, if not, then the candidate will have to undergo the first semester of foundation course again.

Bachelors in Medical Laboratory Technology

Introduction

Objectives/aim of the course:

1. Proficiently perform a full range of clinical laboratory tests
2. Develop and evaluate test systems and interpretive algorithms
3. Manage information to enable effective, timely, accurate, and cost-effective reporting of laboratory-generated information

Expectation from the future graduate in providing patient care:

At the end of the course the student should be able to:

1. Perform routine clinical laboratory testing.
2. Make specimen-oriented decisions on predetermined criteria including working knowledge of critical values.
3. Communicate with other members of healthcare team, customers and patients in an effective manner.
4. Process information and ensure quality control as appropriate to routine laboratory procedures.
5. Train students in routine laboratory procedure.
6. Upgrade knowledge and skills in a changing healthcare scenario.
7. Should know the logical interpretation of clinical lab investigations.
8. Should be able to extrapolate data acquired
9. Should be able to working on automated machine

Eligibility for admission

Selection procedure

1. Candidate should have passed 10 + 2 with Biology or vocational course in MLS/MLT.
2. Minimum percentage of marks: 50% aggregate.
3. Separate entrance exam should be incorporated for these students who want to purse allied health course.

Provision of Lateral Entry:

Students who have successfully completed DMLS and would like to pursue BMLS can directly enter into the second year or 3rd Semester, subject to availability of vacancy on merit of entrance test.

Duration of the course

Duration of the course: Total 4 Years (8 semesters or 4528 hours) with 3.5 Years didactic and practical (3808 hours) + 6 months (720 hours) internship after successful completion of all the 7 semesters of BMLS.

Medium of instruction

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Provision of internship & project

Six months of internship should be mandatory in a government recognized Hospital/Institution as partial fulfillment for the award of Bachelor in MLS Degree to candidates, as per government norms. Minimum 720 hours of internship should be completed by the candidate to be awarded the degree.

Attendance

A candidate has to secure minimum-

1) 75% attendance in theoretical

2) 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Assessment:

Assessments should be completed by the academic staff, based on the compilation of the student 's theoretical &clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated. Students must attain a cumulative score of at least 50% marks in both theory and practical for each individual subject and internal assessment separately.

Model Curriculum Outline

FIRST YEAR

Subject Code	Course Titles	Credit			HOURS/YEAR			IA	UE	T(IA+UE)	EXAM DURATION
		Th	P	T	Th	P	T				
BMLT-101	Microbiology I	4		4	120		120	25	75	100	3 Hour
BMLT-102	Pathology I	4		4	120		120	25	75	100	3 Hour
BMLT-103	Biochemistry I	4		4	120		120	25	75	100	3 Hour
BMLT-104	Human Anatomy and Physiology	4		4	120		120	25	75	100	3 Hour
BMLT-105	Microbiology I (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-106	Pathology I (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-107	Biochemistry I (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-108	Human Anatomy and Physiology		2	2		120	120	25	75	100	3 Hour
	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	1		1	30		30	25	75	100	3 Hour
	Medical Terminology, Record keeping (including anatomical terms) and Orientation to Medical Laboratory Science (MLS)	1		1	30		30	25	75	100	3 Hour
	Guest Lecture/Tutorial/Seminar/visit to any medical research institution or reputed clinical laboratory				60		60				
	TOTAL			28			1080				

NOTE:

1. **Abbreviations: Th-Theory, T - Total and P – Practical**

Total Hours-1080
IA-Internal Assessment
UE- University Examination
Clinical Posting & INTERNSHP- Not Included in University Examination
NOTE: -CODE ALLOTTED PRACTCAL WILL BE Included in University Examination

SECOND YEAR

Subject Code	Course Titles	Credit/week			HOURS/YEAR			IA	UE	T(IA+ UE)	EXAM DURATION
		Th	P	T	Th	P	T				
BMLT-201	Microbiology II	4		4	120		120	25	75	100	3 Hour
BMLT-202	Pathology II	4		4	120		120	25	75	100	3 Hour
BMLT-203	Biochemistry II	4		4	120		120	25	75	100	3 Hour
BMLT-204	Evs	4		4	120		120	25	75	100	3 Hour
BMLT-205	Microbiology II (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-206	Pathology II (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-207	Biochemistry II (practical)		2	2		120	120	25	75	100	3 Hour
BMLT-208	Applied Histopathology (practical)		2	2		120	120	25	75	100	3 Hour
	Guest Lecture/Tutorial/Seminar/visit to any medical research institution or reputed clinical laboratory		1	1		120	120	25	75	100	3 Hour
	TOTAL			25	480	608	1080				

NOTE:

1. **Abbreviations: Th-Theory, T - Total and P – Practical**

Total Hours-1080
IA-Internal Assessment
UE- University Examination
Clinical Posting & INTERNSHP- Not Included in University Examination
NOTE: -CODE ALLOTTED PRACTCAL WILL BE Included in University Examination

Subject Code	Course Titles	Credit/week			HOURS/YEAR			IA	UE	T(IA+ UE)	EXAM DURATION
		T	P	T	T	P	T				
BMLT-301	Microbiology III	4		4	120		120	25	75	100	3 Hour
BMLT-302	Pathology III	4		4	120		120	25	75	100	3 Hour
BMLT-303	Biochemistry III	4		4	120		120	25	75	100	3 Hour
BMLT-304	Research methodology and Biostatistics	4		4	120		120	25	75	100	3 Hour
BMLT-305	Microbiology III (practical)		2	2		120	120				
BMLT-306	Pathology III (practical)		2	2		120	120				
BMLT-307	Biochemistry III (practical)		2	2		120	120				
BMLT-308	Research methodology and Biostatistics(practical)		2	2		120	120				
	Guest Lecture/Tutorial/Seminar/visit to any medical,research institution or reputed clinical laboratory		1	1		120	120	25	75	100	3 Hour
	TOTAL			25	480	608	1080				

THIRD YEAR

NOTE:

1. **Abbreviations: Th-Theory, T - Total and P – Practical**

Total Hours-1080
IA-Internal Assessment
UE- University Examination
Clinical Posting & INTERNSHP- Not Included in University Examination
NOTE: -CODE ALLOTTED PRACTCAL WILL BE Included in University Examination

Subject Code	Course Titles	Credit/week			HOURS/YEAR		
		T	P	T	T	P	T
BMLT-801	MLT Internship***	26					720

INTERNSHIP – After completion of seven semesters of Bachelor MLS the candidates shall undergo six months internship in a Government recognized hospital/Institution as partial fulfillment for the award of Bachelor in MLT as per government norms.

Clinical Posting & INTERNSHP- Not Included in University Examination

FIRST YEAR

BMLT-101: Microbiology I

COURSE OBJECTIVE: - This subject gives a general insight into the history and basics of medical microbiology, imparts knowledge about equipment used in Medical Microbiology and basic procedures done in a medical microbiology laboratory i.e., microscopy, sterilization, disinfection, culture methods required to perform different microbiological tests in clinical microbiology lab and biomedical waste management. This subject will give information about the different types of bacterial culture procedures, staining procedures and biochemical tests used for identification of bacteria. The students will learn the morphology cultural characteristics, biochemical characteristics & laboratory diagnosis of various bacteria.

1. Introduction to Medical Microbiology:
   - 1.1. Definition
   - 1.2. History
   - 1.3. Host - Microbe relationship
2. Safety measures in Clinical Microbiology
3. Glassware used in Clinical Microbiology Laboratory:
   - 3.1. Introduction
   - 3.2. Care and handling of glassware
   - 3.3. Cleaning of glassware
   - 3.4. Equipment used in clinical Microbiology Laboratory:
     - 3.4.1.Introduction
     - 3.4.2.Care and maintenance including calibration
4. Microscopy
   - 4.1. Introduction and history
   - 4.2. Types, principle and operation mechanism of following microscopes
     - 4.2.1.Light microscope
     - 4.2.2.DGI
     - 4.2.3.Fluorescent
     - 4.2.4.Phase contrast
     - 4.2.5.Electron microscope: Transmission/ Scanning
5. Sterilization:
   - 5.1. Definition
   - 5.2. Types and principles of sterilization methods
     - 5.2.1.Heat (dry heat, moist heat with special Reference to autoclave)
     - 5.2.2.Radiation
     - 5.2.3.Filtration
     - 5.2.4.Efficiency testing to various sterilizers
6. Antiseptics and disinfectants:
   - 6.1. Definition.
   - 6.2. Types and properties
   - 6.3. Mode of action - Uses of various disinfectants

6.4. Precautions while using the disinfectants - Qualities of a good disinfectant
6.5. Testing efficiency of various disinfectants

7. Biomedical waste management in a Medical Microbiology laboratory:
   7.1. Types of the waste generated – Segregation – Treatment – Disposal
8. General characteristics & classification of Microbes: (Bacteria &fungi)
   8.1. Classification of microbes with special reference to prokaryotes & eukaryotes
   8.2. Morphological classification of bacteria
   8.3. Bacterial anatomy (Bacterial cell structures)
9. Growth and Nutrition of Microbes:
   9.1. General nutritional & other requirements of the bacteria
   9.2. Classification of bacteria on the basis of their nutritional requirements
   9.3. Physical conditions required for growth.
   9.4. Normal growth cycle of bacteria (growth curve)
   9.5. Types of microbial cultures: Synchronous, Static, continuous culture.
10. Culture media:
   10.1. Introduction
   10.2. Classification of culture media (Example & Uses) solid media, liquid media, semisolid, Media, routine/synthetic/defined media, basal media, enriched, enrichment, Selective differential media, sugar fermentation media, transport media, preservation media and anaerobic culture media
   10.3. Quality control in culture media
   10.4. Automation in culture media preparation

11. Aerobic & anaerobic culture methods:
   11.1. Concepts
   11.2. Methods Used for aerobic cultures
   11.3. Methods used for anaerobic cultures
12. Introductions to Immunology
   12.1. Immunity
   12.2. Antigens and Antibodies
13. Care & handling of laboratory animals:
   13.1. Introduction
   13.2. General care & handling
   13.3. Ethics & legality in use of laboratory animals
14. Bacterial culture
   14.1. Instruments used to seed culture media
   14.2. Culture procedures – seeding a plate
15. Staining techniques in bacteriology
   15.1. Significance of staining in bacteriology
   15.2. Principle, Reagent preparation, procedures and interpretation of the following
      15.2.1. Simple staining
      15.2.2. Negative staining
      15.2.3. Gram stain
      15.2.4. Albert‘s stain
      15.2.5. Neisser‘s stain
      15.2.6. Ziehl –Neelsen staining
      15.2.7. Capsule staining

15.2.8. Flagella staining
15.2.9. Spore staining
15.2.10. Fontana stain for spirochetes

16. Principle, procedures and interpretation of the following biochemical tests for identification of different bacteria.
    16.1. Catalase
    16.2. Coagulase
    16.3. Indole
    16.4. Methyl Red
    16.5. VogesProskauer
    16.6. Urease
    16.7. Citrate
    16.8. Oxidase
    16.9. TSIA
    16.10. Nitrate reduction
    16.11. Carbohydrate fermentation
    16.12. Huge and Leifson
    16.13. Bile solubility
    16.14. H 2 S production
    16.15. Demonstration of motility
    16.16. Decarboxylases
    16.17. CAMP
    16.18. Hippurate hydrolysis
    16.19. Nagler's reaction
    16.20. Cholera-red reaction
17. Definition, Classification, Various characteristics (morphological, cultural and biochemical), pathogenesis and laboratory diagnosis of the following bacteria
    17.1. Staphylococcus
    17.2. Streptococcus
    17.3. Pneumococcus
    17.4. Neisseria gonorrhea and Neisseria meningitis
    17.5. Haemophilis
    17.6. Corynebacterium
    17.7. Enterobacteriaceae: Escherichia coli, Klebsiella, Citrobacter, Enterobacter, Proteus, Salmonella, Shigella, Yersinia enterocolitica and Yersinia pestis
    17.8. Vibrio, Aeromones and Plesiomonas
    17.9. Clostridia of wound infection
    17.10. Mycobacterium tuberculosis complex, Atypical Mycobacteria and M. leprae
    17.11. Spirochetes – Treponema, Borrellia and leptospira
    17.12. Bordetella and brucella
    17.13. Mycoplasma and Ureaplasma
    17.14. Rickettsia
    17.15. Chlamydia
    17.16. Actinomyces
    17.17. Pseudomonas and Burkholderia
    17.18. Brief introduction about non sporing anaerobic cocci and bacilli

Suggested Readings:

1. Practical Medical Microbiology by Mackie & McCartney Volume 1 and 2
2. Text book of Microbiology by Ananthanarayanan
3. Medical Microbiology by Paniker& Satish Gupte
4. Medical laboratory Technology Vol. I, II, III by Mukherjee

Practical

1. To demonstrate safe code of practice for a Microbiology laboratory
2. To prepare cleaning agents & to study the technique for cleaning & sterilization of glassware.
3. To demonstrate the working & handling of Compound microscope.
4. To demonstrate the method of sterilization by autoclave including its efficacy testing.
5. To demonstrate the method of sterilization by hot air oven including its efficacy testing.
6. To demonstrate the method of sterilization of media/solution by filtration.
7. Demonstration of Antiseptics, Spirit, Cetrimide& Povidone-Iodine.
8. To demonstrate the use of disinfectants.
9. Demonstrate the precaution while using disinfectants.
10. To prepare working dilution of commonly used disinfectants.
11. In-use test
12. Rideal-walker phenol co-efficient test.
13. Kelsey-Sykes test
14. To demonstrate the different morphological types of bacteria
15. Preparation of one culture media from each type
16. To demonstrate aerobic culture
17. To demonstrate anaerobic culture
18. Visit to animal house & demonstrate about care of laboratory animals
19. To demonstrate the instruments used to seed culture media
20. To learn techniques for Inoculation of bacteria on culture media
21. To isolate specific bacteria from a mixture of organisms.
22. To demonstrate simple staining (Methylene blue)
23. To prepare India ink preparation to demonstrate negative staining.
24. Bacterial identification: To demonstrate reagent preparation, procedure and interpretation for
    - 24.1. Gram stain
    - 24.2. Albert stain
    - 24.3. Neisser‘s staining
    - 24.4. Z-N staining
    - 24.5. Capsule staining
    - 24.6. Demonstration of flagella by staining methods
    - 24.7. Spore staining
    - 24.8. To demonstrate spirochetes by Fontana staining procedure
25. To prepare the reagent and demonstrate following biochemical tests with positive and negative control bacteria:
    - 25.1. Catalase
    - 25.2. Coagulase
    - 25.3. Indole
    - 25.4. Methyl Red (MR)
    - 25.5. VogesProskauer (VP)

25.6. Urease
25.7. Citrate
25.8. Oxidase
25.9. TSIA
25.10. Nitrate reduction
25.11. Carbohydrate fermentation
25.12. Huge and Leifson
25.13. Bile solubility
25.14. H2S production
25.15. Demonstration and motility
25.16. Decarboxylases
25.17. CAMP
25.18. Hippurate hydrolysis
25.19. Nagler's reaction

26. To demonstrate various characteristics (morphological, cultural and biochemical) of bacteria commonly isolated from clinical samples i.e.
26.1. Staphylococcus
26.2. Streptococcus
26.3. Corynebacterium
26.4. Escherichia coli
26.5. Klebsiella
26.6. Citrobacter
26.7. Enterobacter
26.8. Proteus
26.9. Salmonella
26.10. Shigella
26.11. Vibrio cholera
26.12. Mycobacterium tuberculosis
26.13. Pseudomonas

BMLT-102- Pathology I

COURSE OBJECTIVE: - will be made aware of the composition of blood and methods of estimating different components of blood. Students will learn the basic concepts of Haematology& routine clinical investigations of Haematology laboratory. The students will be made aware of various diseases like anemia, quantitative disorders of Leucocytes, morphological alterations in blood cells, bleeding disorders.

1. Introduction to Haematology
   1.1 Definition
   1.2 Importance
   1.3 Important equipment used
2. Laboratory organization and safety measures in Haematology Laboratory
3. Introduction to blood, its composition, function and normal cellular components
4. Anticoagulants: types, mode of action and preference of anticoagulants for different hematological studies
5. Collection and preservation of blood sample for various hematological investigations
6. Formation of cellular components of blood (Haemopoiesis)

6.1 Erythropoiesis
6.2 Leucopoiesis
6.3 Thrombopoiesis

7. Hemoglobin: definition, types, structure, synthesis and degradation
8. Morphology of normal blood cells
9. Normal Hemostasis & physiological properties of coagulation factors
10. Radioactivity: definition, half-life, physical decay and units
11. Urine analysis
12. Quality assurance in Haematology
    12.1 Internal and external quality control including reference preparation
    12.2 Routine quality assurance protocol
    12.3 Statistical analysis i.e. Standard deviation, Co-efficient of variation, accuracy and precision

13. Anemia
    13.1 Introduction
    13.2 Classification
        - Microcytic hypochromic anemia
        - Macrocytic anemia
        - Normocytic normochromic anemia
14. Quantitative disorders of Leukocytes Cause and significance
    14.1 Granulocytic and Monocytic Disorders
    14.2 Lymphocytic Disorders
15. Morphologic Alterations in Neutrophils
    15.1 Toxic granulation
    15.2 Cytoplasmic vacuoles
    15.3 Döhle bodies
    15.4 May–Hegglin anomaly
    15.5 Alder–Reilly anomaly
    15.6 Pelger–Huët anomaly
    15.7 Chédiak–Higashi syndrome
16. Bleeding disorders
    16.1 Introduction Causes of bleeding disorders
    16.2 Vascular defect
        - Platelet defect
        - Factor deficiency
        - Inhibitors
        - Hyper fibrinolysis
    16.3 Types of bleeding disorders
        - Inherited bleeding disorders
        - Acquired bleeding disorders
17. Thrombosis
    17.1 Introduction
    17.2 Causes of thrombosis
18. Monitoring of Anticoagulants
    18.1 Oral anticoagulants by INR
    18.2 Heparin

Suggested Readings

1. Text book of Medical Laboratory Technology by Praful B. Godkar
2. Medical laboratory Technology by K.L. Mukherjee Volume-I
3. Practical Haematology by J.B. Dacie
4. Clinical Diagnosis &Management by Laboratory methods (20th edition) by John Bernard Henry
5. Atlas of Haematology (5th edition) by G.A. McDonald
6. De Gruchy's Clinical Haematology in Medical Practice

Practical

1. Preparation of various anticoagulants :
   - 1.1 EDTA
   - 1.2 Sodium Citrate,
   - 1.3 Oxalate with Fluoride
2. Collection of blood sample for various Lab Investigations
3. Familiarization and working of routine Haematology Lab. Instruments
   - 3.1 Microscopes
   - 3.2 Haemocytometers
   - 3.3 Colorimeter
   - 3.4 Spectrophotometer
   - 3.5 Glass pipettes & Auto pipettes
   - 3.6 Glassware
   - 3.7 Sahli's Apparatus
4. Identification of Normal blood cells
5. Urine Analysis:
   - 5.1 Routine biochemistry of Urine for:
     - 5.1.1 pH
     - 5.1.2 Specific Gravity
     - 5.1.3 Glucose
     - 5.1.4 Ketones
     - 5.1.5 Bilirubin
     - 5.1.6 Albumin
   - 5.2 Microscopic Examination of Urine
6. Parts of microscope; its functioning and care
7. Parts of centrifuge; its functioning and care
8. Cleaning and drying of glassware
9. Preparation of various anticoagulants
10. Collection of venous and capillary blood
11. Cleaning of glass-syringes and its sterilization
12. Preparation of the stains and other reagents
13. Preparation of peripheral blood film (PBF)
14. Staining of PBF
15. Haemoglobin estimation methods (Sahli's, Oxyhaemoglobin, and cyanmethaemoglobin)

16. Differential leukocyte count (DLC)
17. Recognition and staining of various types of blood cells (normal and abnormal)
18. Preparation of thick and thin blood smear for malarial parasite (Leishman/Giemsa/JSB)
19. RBC counting
20. WBC counting
21. Platelet counting
22. Routine Examination of urine

BMLT-103 Biochemistry I

COURSE OBJECTIVE: - The main objective of the subject is to impart the knowledge of apparatus, units, equipment, and volumetric analysis in the laboratory of clinical Biochemistry.

1. Introduction to Medical lab. Technology
   - 1.1 Role of Medical lab Technologist
   - 1.2 Ethics and responsibility
   - 1.3 Safety measures
   - 1.4 First aid
2. Cleaning and care of general laboratory glass ware and equipment
   - 2.1 Steps involved in cleaning soda lime glass
   - 2.2 Steps involved in cleaning borosil glass
   - 2.3 Preparation of chromic acid solution
   - 2.4 Storage
3. Distilled water
   - 3.1 Method of preparation of distilled water
   - 3.2 Type of water distillation plants
   - 3.3 Storage of distilled water
4. Units of Measurement.
   - 4.1 S.I unit and CGS units
   - 4.2 Conversion
   - 4.3 Strength, molecular weight, equivalent weight
   - 4.4 Normality, Molarity, Molality
   - 4.5 Numerical
5. Calibration of volumetric apparatus
   - 5.1 Flask
   - 5.2 Pipettes
   - 5.3 Burettes
   - 5.4 Cylinders
6. Analytical balance
   - 6.1 Principle
   - 6.2 Working
   - 6.3 Maintenance
7. Concept of pH
   - 7.1 Definition
   - 7.2 Henderson Hassel batch equation

- 7.3 Pka value
- 7.4 pH indicator
- 7.5 Methods of measurement of pH
  - 7.5.1 pH paper
  - 7.5.2 pH meter
  - 7.5.3 Principle, working, maintenance and calibration of pH meter

8. Volumetric analysis
   - 8.1 Normal and molar solutions
   - 8.2 Standard solutions
   - 8.3 Preparation of reagents
   - 8.4 Storage of chemicals
9. Osmosis
   - 9.1 Definition
   - 9.2 Types of osmosis
   - 9.3 Factors affecting osmotic pressure
   - 9.4 Vant Hoff's equation
   - 9.5 Applications of osmosis
   - 9.6 Dialysis

10. Carbohydrate Metabolism
    - 10.1 Introduction, Importance and Classification
    - 10.2 Digestion and Absorption
    - 10.3 Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis
    - 10.4 Disorders of carbohydrate metabolism.
11. Protein Metabolism
    - 11.1 Introduction, Importance and classification
    - 11.2 Important properties of proteins
    - 11.3 Digestion & absorption of Proteins
    - 11.4 Protein synthesis
    - 11.5 Metabolism of proteins
    - 11.6 Disorders of protein metabolism and Urea Cycle
12. Lipid
    - 12.1 Introduction & Classification
    - 12.2 Digestion & absorption of fats
    - 12.3 Lipoproteins
    - 12.4 Fatty acid biosynthesis & fatty acid oxidation
13. Nucleic Acid
    - 13.1 Introduction
    - 13.2 Functions of Nucleic acid
    - 13.3 Functions of energy carriers
14. Enzymes
    - 14.1 Introductions, Importance & Classifications
    - 14.2 Properties of enzymes

14.3Mechanism of enzyme action
14.4Factors affecting enzyme action
14.5Enzyme kinetics & enzyme inhibiters

COURSE OBJECTIVE: - This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

Suggested Readings

1. Practical Clinical Biochemistry by Harold Varley
2. Text book of Medical Laboratory Technology by P. B. Godker
3. Medical Laboratory Technology by Mukherjee
4. Principal of Biochemistry by M. A. Siddiqi
5. Instrumental Analysis by Chatwal Anand
6. Text book of Medical Biochemistry by Chaterjee, Shinde
7. Principal of Biochemistry by Lehninger
8. Biochemistry by Voet&Voet
9. Biochemistry by Stryer

Practical

1. Cleaning of the laboratory glass ware (Volumetric and non-volumetric)
2. Preparation of distilled water
3. Principle, working and maintenance of pH meter.
4. To prepare 0.1 N NaOH solution.
5. To prepare 0.2N HCl solution.
6. To prepare 0.1 molar H2SO4
7. To prepare 0.2 Molar Sodium carbonate solution.
8. Demonstration of osmosis and dialysis.
9. To determine the presence of carbohydrates by Molisch test.
10. To determine the presence of reducing sugar by Fehling solutions
11. To determine the presence of reducing sugar by Benedicts method.
12. To determine starch by Iodine test.
13. Determination of Glucose in serum & plasma
14. Estimates of blood Glucose by Folin& Wu method
15. Determination of Urea in serum, plasma & urine.
16. Determination of Creatinine in serum or plasma
17. Determination of serum Albumin
18. Determination of Cholesterol in serum or plasma

BMLT 104: Human Anatomy and Physiology

COURSE OBJECTIVE: - Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, blood and to understand anatomy and physiology of human body. This subject will develop an understanding of the structure and function of organs and organ systems in normal human body.

1. Introduction to human Anatomy and Physiology
2. Cell and cell organelles
   - 2.1 Structure and classification
   - 2.2 Function
   - 2.3 Cell division (Mitosis and Meiosis)
3. Tissues
   - 3.1 Definition
   - 3.2 Classification with structure and Functions
     - 3.2.1 Epithelial tissues
     - 3.2.2 Connective tissues
     - 3.2.3 Muscular tissues
     - 3.2.4 Nervous tissue
4. Blood
   - 4.1 Composition
   - 4.2 Function of blood
5. Muscular skeletal system
   - 5.1 Introduction
   - 5.2 Classification
   - 5.3 Structure and function of skeletal system, muscles and joints
   - 5.4 Various movements of body

6. Respiratory system
   - 6.1 Introduction
   - 6.2 Structure
   - 6.3 Function
   - 6.4 Mechanism of breathing and respiration
   - 6.5 Various terms involved in respiratory System
     - 6.5.1 Vital capacity
     - 6.5.2 Total Volume
     - 6.5.3 Reserve volume
     - 6.5.4 Total lung capacity
7. Cardiovascular system
   - 7.1 Anatomy and physiology of heart
   - 7.2 Blood circulation
   - 7.3 Arteries and veins
   - 7.4 Conductive system of heart
   - 7.5 Cardiac cycle
   - 7.6 Introduction to ECG
8. Lymphatic system
   - 8.1 Introduction
   - 8.2 Structure and function
     - 8.2.1 Lymph nodes

8.2.2 Spleen
8.2.3 Thymus gland, Tonsils

9. Structure and function of sense organ
   9.1 Eye
   9.2 Ear
   9.3 Nose
   9.4 Tongue
10. Body fluids and their significance: Important terms, types of body fluid, total body water, avenues by which water leaves and enters body, general principles for fluid balance, cardinal principle, How body fluids maintain Homeostasis, Electrolytes & ions Function of electrolytes, How electrolyte imbalance leads to fluid imbalance
11. Digestive system: Organization; accessory organs; structure & function (Mouth, Tongue, Teeth, Esophagus, Pharynx, Stomach, Intestine, Rectum, Anus); Digestive glands; physiology of digestion of carbohydrates, lipids & proteins
12. Liver: structure and function
13. Urinarysystem:Mainparts,Structure&functionofkidney,structureof nephron, physiology of excretion & urine formation,urine,additional excretory organs
14. Genital system: Structure of male and female reproductive system, Gametogenesis in male & female, menstrual cycle. Placenta and extra embryonic membranes.
15. Nervous system: Parts, function & structure; brain, spinal cord, spinal & cranial nerves; all & none principle, role of neurotransmitters in transmission of nerve impulse
16. Endocrine system: Endocrine & exocrine glands, their location, structure & functions

Suggested readings:

1. Anatomy & Physiology- Ross and Wilson
2. Anatomy and Physiology: Understanding the Human Body by Clark
3. Anatomy and Physiology for nurses by Evelyn Pearce
4. Anatomy and Physiology for nurses by Sears
5. Anatomy and Physiology for nurses by Pearson
6. Anatomy and Physiology by N Murgesh

Human Anatomy & Physiology – Practical

1. Demonstration of various parts of body
2. Demonstration of tissues of body
3. Demonstration of parts of digestive system
4. Demonstration of parts of respiratory system
5. Demonstration of parts of skin
6. Demonstration of parts of excretory system
7. Demonstration of various parts of circulatory system (Demonstration from models)
8. Examination of blood film for various blood cells from stained slides
9. Blood pressure estimation
10. Demonstration of various parts of nervous system (brain and spinal cord)(Model)
11. Structure of eye and ear (demonstration from models)
12. Demonstration of reflex action
13. Demonstration of structural differences between skeletal, smooth and cardiac muscles (permanent mounts)

14. Demonstration of various bones and joints
15. Demonstration of various parts of reproductive system (Male and female from models and charts)
16. To study circulatory system from charts and transverse section (TS) of artery and vein from permanent slides.
17. To study digestive system from charts and TS of liver, spleen and pancreas from permanent slides.
18. Study of Urinary system (charts)
19. Study of Genital system (male & female) from charts and TS of testis and ovary from permanent slides.
20. To study nervous system (From models / charts)
21. To study various body fluids.

Note: Demonstrations can be done with the help of models, charts and histological slides

BMLT-105: Fundamentals of Histology

COURSE OBJECTIVE: - The student will study diseases associated with different body organs and systems. Topics include:

1. Alimentary System: Diseases of mouth, Diseases of Esophagus- Esophageal varices.
2. Digestive System: Gastritis, Peptic ulceration, Appendicitis microbial diseases, food poisoning, hernia, Intestinal obstructions & mal absorption.
3. Accessory Digestive glands: Salivary glands- mumps
   3.1 Liver – hepatitis, liver failure, cirrhosis.
   3.2 Pancreas- pancreatitis.
   3.3 Gall Bladder- Gall stones, jaundice and cardiovascular diseases.
4. Circulatory System: Diseases of Blood vessels- Atheroma, Arteriosclerosis, heart block. Disorders of Blood Pressure-Hyper & Hypotension.
5. Respiratory System: Upper respiratory tract infection, Bronchi, Asthma, Pneumonia, Lung abscess, Tuberculosis, Lung Collapse.
6. Urinary System: Glomerulonephritis, Nephrotic syndrome, renal failure, renal calculi, Urinary obstruction, Urinary tract infection.
7. Reproductive system: Sexually transmitted diseases, Pelvic inflammatory disease, disorder of cervix (CIN), Disease of ovaries, ectopic pregnancy, prostatitis, Infertility
8. Nervous System: Neuronal damage, ICP, Cerebral Infarction, head injury, Alzheimer's disease, dementia.
9. Endocrine System:
   9.1 Pituitary: Hyper & Hypo secretions
   9.2 Thyroid: Goiter
   9.3 Adrenal: Cushing Syndrome, Addison Disease
   9.4 Pancreas: Diabetes
10. Sense Organs:
    10.1 Ear: Otitis
    10.2 Eye: Cataract

Suggested readings

1. Anatomy &Physiology – Ross and Wilson
2. Human Anatomy and Physiology by Pearce
3. Di Fiore's Atlas of Histology

4. Medical Laboratory Technology by KL Mukherjee-Volume III
5. Text book of Pathology by Robbins

Fundamentals of Histology – Practical

1. To study squamous cell from cheek cells (Buccal mucosa)
2. To study stained slide preparation from organs of digestive system
3. Study of stained slides of liver, pancreas, gall bladder
4. Study of various types of microscopes and draw diagram in practical notebook
5. To study stained slide preparation from organs of circulatory system
6. To study stained slide preparation from organs of Respiratory system
7. To study stained slide preparation from organs of Nervous system
8. To study stained slide preparation from organs of Urinary system
9. To study stained slide preparation from organs of Endocrine system

BMLT-106: Environmental Science

COURSE OBJECTIVE: - The student will be made aware of the environment in general, natural resources, ecosystems, environmental pollution, and social issues related to environment, human population and the environment and understanding the hospital environment.

1. Introduction: Definition and scope and importance of multidisciplinary nature of environment. Need for public awareness.
2. Natural Resources: Natural Resources and associated problems, use and over exploitation, case studies of forest resources and water resources.
3. Ecosystems: Concept of Ecosystem, Structure, interrelationship, producers, consumers and decomposers, ecological pyramids-biodiversity and importance. Hotspots of biodiversity
4. Environmental Pollution: - Definition, Causes, effects and control measures of air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards
   4.1 Solid waste management: Causes, effects and control measure of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies.
   4.2 Disaster management: Floods, earthquake, cyclone and landslides.
5. Social blemishes and the Environment From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, water shed management Resettlement and rehabilitation of people; its pros and concerns.
   5.1 Case studies. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
   5.2 Case studies, Wasteland reclamation.
   5.3 Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act. Water (Prevention and control of pollution) Act. Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation Public awareness.
   5.4 Human Population and the Environment, Population growth, variation among nations. Population explosion–Family Welfare Programme. Environment and human health, Human Rights, Value Education, HIV/AIDS. Women and child Welfare. Role of Information Technology in Environment and human health. Case studies.
6. Understanding the Hospital Environment

7. Understanding the environment in the following clinical laboratories:
   - 7.1 Microbiology
   - 7.2 Biochemistry
   - 7.3 Histopathology
   - 7.4 Haematology
8. Clinical laboratory hazards to the environment from the following and means to prevent:
   - 8.1 Infectious material
   - 8.2 Toxic Chemicals
   - 8.3 Radioactive Material
   - 8.4 Other miscellaneous wastes

Suggested Readings

1. Agarwal, K. C. 2001 Environment Biology, Nidi Publ. Ltd. Bikaner.
2. Jadhav, H &Bhosale, V.M. 1995. Environment Protection and Laws. Himalaya Pub House, Delhi 284 p.
3. Rao M. N. &Datta A.K. 1987. Waste water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345 p.
4. Daniel D. Chiras 2010. Environmental Science. 1st Indian Edition, Jones and Bartlett India Pvt. Ltd. 4262/3, Ansar Road, Daryaganj, New Delhi.
5. Principle of Environment Science by Cunninghan, W.P.
6. Essentials of Environment Science by Joseph.
7. Environment Pollution Control Engineering By Rao, C.S.
8. Perspectives in Environmental Studies by Kaushik, A.
9. Elements of Environment Science &Eng. By Meenakshi.
10. Elements of environment Eng. by Duggal.

Environmental Science-Practical

1. Any Activity related to the public awareness about the environment:
   - 1.1 Preparation of Charts/Models
   - 1.2 Visit to any effluent treatment plant
   - 1.3 Seeding a plant/s and take care of it/them.
2. Preparation of models/charts in relation to natural resources of drinking water.
3. Preparation of Models of Ecosystem on biodiversity.
4. Effects of environmental pollution on humans through poster presentation.
5. Any Activity related to wild life preservation.
6. Visit to any hospital/ clinical laboratory and understanding the environment therein.
7. Any activity related biomedical waste management in a hospital or clinical laboratory

Medical Law and Ethics

COURSE OBJECTIVE: - Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical science, growing sophistication of the modern society 's legal framework, increasing awareness of human rights and changing moral

principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical ethics has developed into a well-based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Physicians are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to be focused on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.
12. Ethics in the profession of Medical Laboratory Science

Suggested readings:

1. Medical Law and Ethics by Bonnie F Fremgen
2. Medical Law and Ethics by Jonathan Herring

BMLT-107-Basic computers and information science

COURSE OBJECTIVE: - The students will be able to appreciate the role of computer technology. The course focuses on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.
12. Application of Computers in clinical settings.

Suggested Readings:

1. Information technology by Anshuman Sharma (Lakhanpal Publisher)
2. Computer Fundamentals (Concepts. Systems and applications) by P. K. Sinha (University of Tokyo, Japan) BPB Publications

Basic computers and Information Science-Practical

Practical on fundamentals of computers -

1. Demonstration of basic hardware of the computers and laptops
2. Learning to use MS office: MS word, MS PowerPoint, MS Excel
3. To install different software
4. Data entry efficiency

BMLT-108 Communication and soft skills

COURSE OBJECTIVE: - The students will be able to appreciate communication skills as these are important to everyone - they are how we give and receive information and convey our ideas and opinions with those around us.

Soft skills is a term often associated with a person's "EQ" (Emotional Intelligence Quotient), which is the cluster of personality traits that characterize one's relationships with other people. These skills can include social graces, communication abilities, language skills, personal habits, cognitive or emotional empathy, and leadership traits.

A person's soft skill EQ is an important part of their individual contribution to the success of an organization. Organizations which deal with customers face-to-face are generally more successful

if they train their staff to use these skills. Screening or training for personal habits or traits such as dependability and conscientiousness can yield significant return on investment for an organization. For this reason, soft skills are increasingly sought out by employers in addition to standard qualifications.

Topics taught in this module include:

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

Soft Skills - with important sub-elements:

1. Communication Styles
2. Team work
3. Leadership Skills
4. Effective & Excellent Customer Service
5. Decision Making & Problem Solving
6. Managing Time and Pressures
7. Self-Management & Attitude

Suggested readings:

1. Effective Communication and Soft Skills by Nitin Bhatnagar Pearson Education India, 2011
2. Communication N Soft Skills Paperback – 2014 by Niraj Kumar, Chetan Srivastava

Medical Terminology, Record keeping (including anatomical terms) and Orientation to Medical Laboratory (ML)

COURSE OBJECTIVE: - This subject introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student‘s field of study. Spelling is critical and will be counted when grading tests. The students will be

oriented to the role of medical laboratory professional in healthcare system, scope, purpose, career opportunities in Medical Laboratory science. They will also be introduced to healthcare system and public health in India.

Topics to be covered under the subject are as follows: **Medical Terminology, Record keeping**

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.

Orientation to Medical Laboratory Science (MLS)

1. Medical Lab Science – Introduction
2. Career opportunities in MLS
3. Role of a Medical lab. professional in Health care system
4. Common laboratory associated hazards and biosafety measures including radiation hazards
5. Subject specific role of a Medical lab. professional:
6. Microbiology
   - 6.1. Role of microbes in human health
   - 6.2. Overview of the role of Medical Laboratory Professional in Medical Microbiology
   - 6.3. Bio-safety in Microbiology
7. Haematology
   - 7.1. Introduction to Haematological diseases
   - 7.2. Overview of the role of Medical lab. professional in Haematology
   - 7.3. Bio-safety in Haematology
8. Histopathology
   - 8.1. Introduction to Tumor pathology
   - 8.2. Overview of the role of Medical lab. professional in Histopathology
   - 8.3. Bio-safety in Histopathology
9. Biochemistry
   - 9.1. Introduction to metabolic disorders
   - 9.2. Overview of the role of Medical lab. professional in Clinical Biochemistry
   - 9.3. Bio-safety in Clinical Biochemistry

Suggested readings:

1. An Introduction to Medical Lab Technology by F J Baker and Silverton

2. Medical Laboratories Management- Cost effective methods by Sangeeta Sharma, Rachna Agarwal, Sujata Chaturvedi and Rajiv Thakur

Medical Terminology, Record keeping (including anatomical terms) and Orientation to Medical Laboratory (ML)-Practical

1. General discussion on Medical Terminology and understanding basics of various diseases.
2. Coding
3. Assembling of patient files
4. Sensitization on career opportunities and role of MLS in Hospital Care
5. Visit to working;
   5.1 Microbiology
   5.2 Haematology
   5.3 Biochemistry and
   5.4 Histopathology laboratories

Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)

COURSE OBJECTIVE: - The subject will introduce the students to the basic concepts of quality in health care and develop skills to implement sustainable quality assurance program in the health system. It will sensitize themin basic emergency care, infection prevention & control with knowledge of bio- medical waste management and antibiotic resistance.

1. Quality assurance and management - The objective of the subject is to help students understand the basic concepts of quality in health care and develop skills to implement sustainable quality assurance program in the health system.
   1.1 Concepts of Quality of Care
   1.2 Quality Improvement Approaches
   1.3 Standards and Norms

   1.4 Quality Improvement Tools
   1.5 Introduction to NABH guidelines

2. Basics of emergency care and life support skills – Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:
   2.1 Vital signs and primary assessment
   2.2 Basic emergency care – first aid and triage
   2.3 Ventilations including use of bag-valve-masks (BVMs)
   2.4 Choking, rescue breathing methods

2.5 One- and Two-rescuer CPR

2.6 Using an AED (Automated external defibrillator).

2.7 Managing an emergency including moving a patient

At the end of this topic, the students should be ableto perform the maneuvers in a simulation lab and test their skills focusing on airway management and chest compressions.

At the end of the foundation course, each student should be able to perform and execute/operate on the above-mentioned modalities.

3. Bio medical waste management and environment safety – The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:

3.1 Definition of Biomedical Waste

3.2 Waste minimization

3.3 BMW – Segregation, collection, transportation, treatment and disposal (including color coding)

3.4 Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste

3.5 BMW Management & methods of disinfection

3.6 Modern Technology for handling BMW

3.7 Use of Personal protective equipment (PPE)

3.8 Monitoring & controlling of cross infection (Protective devices)

4. Infection prevention and control – The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –

4.1 Evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective Equipment (PPE)],

4.2 Prevention & control of common healthcare associated infections,

4.3 Components of an effective infection control program, and

4.4 Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance-

5.1 History of antibiotics

5.2 How resistance happens and spreads

5.3 Types of resistance- intrinsic, acquired, passive

5.4 Trends in drug resistance

5.5 Actions to fight resistance

5.6 Bacterial persistence

5.7 Antibiotic sensitivity

5.8 Consequences of antibiotic resistance

5.9 Antimicrobial Stewardship – Barriers and opportunities, tools and models in hospitals

6. Disaster preparedness and management – The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-

6.1 Fundamentals of emergency management,

6.2 Psychological impact management,

6.3 Resource management,

6.4 Preparedness and risk reduction,

6.5 Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Suggested readings:

1. The Essentials of Patient Safety by Charles Vincent
2. Laboratory quality control and patient safety by De Gruyter

Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)-Practical

Quality and Patient safety:

1. Discussion on Concepts of Quality of Care
2. Approaches to Quality Improvement
3. Quality Improvement Tools
4. Discussion on NABH guidelines and its exercises

Basics of emergency care and life support skills:

1. Vital signs and primary assessment
2. Basic emergency care – first aid and triage
3. Ventilations including use of bag-valve-masks (BVMs)
4. Choking, rescue breathing methods
5. One- and Two-rescuer CPR
6. Using an AED (Automated external defibrillator).
7. Managing an emergency including moving a patient

Students should perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions.

Bio medical waste management and environment safety-

1. Visit to Central Sterile Supply Department (CSSD)
2. Visit to incinerator complex
3. Visit to Immunization section
4. Discussion on Biomedical Waste,
5. Demonstration of Types of waste generated from Health Care Facility
6. Discussion on waste minimization
7. Poster presentation of BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
8. Discussion on Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
9. Visit to Central Sterile Supply Department for demonstration of BMW Management & methods of disinfection
10. Modern Technology for handling BMW e.g. Incenerator, Shredder etc.
11. Demonstration of proper use of Personal protective equipment (PPE)
12. Demonstration of monitoring & controlling of cross infection (Protective devices)

Infection prevention and control:

1. Demonstration of evidence-based infection control principles and practices [such as Sterilization, Disinfection, Effective hand hygiene and use of Personal Protective

Equipment (PPE)],
2. Discussion on prevention & control of common healthcare associated infections,
3. Preparing Charts & Posters of Components of an effective infection control program, and
4. Guidelines (NABH and JCI) for Hospital Infection Control

Antibiotic Resistance-

1. Discussion on various types of Antibiotics
2. Demonstration of how Resistance Happens and Spreads
3. Discussion on types of resistance- Intrinsic, Acquired, Passive
4. Antibiotic sensitivity testing
5. Display of Consequences of antibiotic resistance
6. Demonstration of Antimicrobial Barriers and opportunities, Tools and models in hospitals

Disaster preparedness and management:

1. Discussion on fundamentals of emergency management,
2. Management psychological impact
3. Discussion on:
   3.1 Resource management,
   3.2 Preparedness and risk reduction,

Job Description for all levels

Nature, job, duties, responsibilities and requisite competencies of medical laboratory professionals

Overview of Medical Laboratory Science & Technology

A branch of medical science and technology deals with- collection, receiving, processing, performing and analysis of various biological samples of Blood, Urine Stool, Cerebrospinal fluid (CSF), synovial fluid and PUS, and other body fluids etc., for timely delivery of qualitative laboratory results for an early and accurate diagnosis and treatment of the diseases. Medical Laboratory science and its application have key role in present health care system as nowadays; more than 70% of medical decisions are based on clinical lab investigations. This branch of science isknown by various names worldwide as- Medical Laboratory Science & Technology-MLT, Clinical Laboratory Science-CLS, Biomedical Laboratory science-BLS and Laboratory Medicine etc.

Introduction of Medical Laboratory Professionals:

Medical Laboratory Professionals play indispensable role in diagnosis and treatment of diseases. They perform the duties of collecting, receiving, and performing of the various Pathological, Biochemical, Bacteriological, Virological, Molecular, Biological Experimental and blood banks investigations in various contagious body fluids under more than 30 different clinical Laboratory divisions/ Departments.

They have to deal with various sophisticated scientific machines and also various manual tools and techniques for diagnosis, treatment, prevention and monitoring of diseases. As diagnosis of diseases is the primary step to cure, they play a crucial role in the early and accurate diagnosis and treatment of diseases other matters connected with pure and applied research, experimental development of products in teaching, training, quality testing, and quality control etc. in all relevant fields of Laboratory Medicine.

Besides they also perform many other important tasks in functioning of Laboratory Services like laboratory management and supervision at various levels, quality assurance in testing, lab storage of chemical, reagents and kits, inventory stock management, Biomedical hazards and lab safety, Biomedical waste management as per standard procedure and regulations. They require a sound professional knowledge, continuing education, expertise and independent judgment capabilities even in odd hour emergency duties. Medical Laboratory Professionals form an integral part of the medical profession from basic health care to super specialty care in health care system in every established and recognized system of medicine. Duties and responsibilities of medical laboratory technical staff is highly specialized, sophisticated and very sensitive. Clinical laboratory personnel need good analytical judgment and the ability to work independently in odd hours/night duties. Close attention to detail is essential, because small differences or changes in test results or numerical readouts can be crucial for patient care. Manual dexterity and normal color vision are highly desirable. With the widespread use of automated laboratory equipment, computer skills are important. In addition, Medical Laboratory technical staff in particular is expected to be good at problem solving.

Designation wise General Nature of Job, Duties, and Responsibilities& Desired Competencies of all posts are as under-

Level 4 - Junior Medical Lab. Technologist-(Jr. MLT)*

General Description of the Post: Jr. Medical Lab Technologist (Jr. MLT) is proposed as an entry level technical post of the Lab Cadre. He/She is an integral member of health care system and is responsible and accountable for professional act & practices according to scope of his/her practices as well as per the Laws and Regulations governing the profession, if any. He/She has to coordinate and participate in a variety of routine technical tasks such as sample collection & receiving, performance and analysis of routine laboratory investigations to obtain data for use in the diagnosis and treatment of disease.

***Present entry level post in central Government Hospitals proposed to be upgraded & merged with Medical Laboratory Technologist after implementing of BMLS as minimum entry qualification in lab cadre

General Nature of Job, Duties, Responsibilities & Desired Competencies:

1. **Sample receiving:** Identification, receiving and registering of various biological samples received from all sample collection units (Phlebotomy sections) according to standard operating procedures.
2. **Sample handling & accessioning:**
    - Ensures relevant required information is on the requisition form received with the test request.
    - Verifies specimen suitability including adequate amount/volume and integrity. Registered specimens into laboratory information system i.e. register/computerized system.
    - Complies with existing guidelines for specimen collection, retention, storage and disposal.
    - Takes corrective action when errors in pre-analytical phase are identified.
3. **Preservation & transportation of samples:** Delivery of specimens to sample processing area in a safe and timely manner taking into account priority and specimen stability. Preserve and transport various biological samples to different divisions of lab as per standard operating procedures, if required.
4. **Sample processing for testing:**
    - Check the specimen received for testing against requisition form for name, requisition number and test to be performed.
    - Prepare specimen for analysis i.e. centrifuging, aliquoting, preserving.
    - Priorities analyses in system, e.g. stat, urgent, routine sample stability.
    - Prepares and uses calibrators, standards, quality control materials.
    - Preparation of glasswares and other desire material for sample analysis.
    - Arrange specimen reagents and solutions for testing.
    - Register and process sample for investigations by operating various auto-analyzers and for manual system & microscopic examinations.
5. **Sample testing:** Perform all the routine investigations in various departments/divisions of laboratories i.e., Haematology Biochemistry, Clinical Pathology, Histopathology, Microbiology and Blood Banks under the supervision of Senior Laboratory Professionals.
6. **Analysis and reporting of results**: Under supervision of senior medical laboratory professionals, an incumbent of this class performs routine tests and may give reports of routine tests as and when required for the speedy treatment of the patients.

7. **Assist senior lab technical staff.** In addition to lab technical procedures, they have to assist other senior technical staff in various specialized work of laboratories in all departments/divisions.
8. Should apply principles of standard precautions in lab & use personal protective equipments e.g. gloves mask gown etc.
9. **Sterilization and autoclaving** of various laboratory materials.
10. **Records keeping** of lab results and other records.
11. Cleaning and maintenance of various sophisticated medical laboratory-testing instruments like semi-auto analyzers and fully auto analyzers.
12. Look after of Bio-medical hazards and Bio-medical waste management at work place.
13. Supervision of subordinate auxiliary staff (MTS) in laboratory.
14. Any other duty including emergency or Shift duties independently round _o'clock assigned by the Head of the department.

Desirable Competencies

1. Proper knowledge of theory and practices and Practical skill of all diagnostic tools, techniques and procedures as per standard procedures and his/her scope of practices and a patient friendly communication skill.
2. Competent to take proper analytical decisions independently even in odd hour duties and managerial abilities as per given scope of practices.
3. Knowledge of Computer
4. Assisting in phlebotomy procedure with nursing /assigned personnel.

Level 4 - Medical Laboratory Technologist

General Description of the Post: Medical Laboratory Technologist (MLT) is anintegral member of health care system and is responsible and accountable for professional act & practices according to standards of practice as well as Laws and Regulations governing the profession, if any. He /She has to Coordinate and participate in a variety of lab technical work in various departments/divisions.

In addition to the routine duties and responsibilities of the Jr. Medical Technologist, the Medical Lab. Technologist will also perform the following specialized work as per their place of posting –

Should know the correct phlebotomy procedure

In Clinical Pathology and Haematology-

Heamogram-

- Should be able to perform Hb, TLC, DLC, ESR, platelets count and indices, Peripheral smear staining-for RBC morphology, DLC and parasites e.g. Malarial parasite microfilaria etc.
- They have to identify staining problems and to initiate corrective action and
- Should be able to run Heamatology analyzers.

Coagulation studies- Proper collection, storage and analysis, use of auto-analyzers,

Should be able to do

- Iron profile,
- Hb Electrophoresis, Hb HPLC,
- Flow cytometry,use and maintenance light Microscope.
- Semen analysis- Making of smear, PAP, Staining and microscopic examinations.

Quality Assurance-

- Perform Calibration of auto-analysers through various calibrators. Recognizes when results of patient analyses are outside expected findings and responds appropriately. Investigates unusual findings prior to reporting.
- Communicates information regarding laboratory analyses to clients in an appropriate manner.
- Ensures that laboratory results are accurately documented and retained in accordance with existing legislation.
- Maintains appropriate documentation, e.g., document laboratory reporting errors and corrective measures taken.
- Recognizes malfunctions in equipment/ instruments and initiates appropriate corrective action.

In Blood Banks:

- Should be able to perform blood grouping by tube/ gel card method and cross match
- Direct & indirect coombs test
- Antibody screening & identification
- Tests for transfusion transmitted infections by ELISA/ appropriate method.
- Making blood components
- Performing Apheresis
- Ensures proper storage and quality of blood products Also evaluates the appropriateness of blood product for patient clinical condition.
- QC of all tests and ,
- Record maintenance
- Also screening of donor before blood donation.
- Giving reports with his or her own signature for the treatment of patient.
- Able to recognize and investigates the adverse effects of transfusion according to established protocol & initiates follow-up action.
- Should have patient friendly communication skill.

In Clinical Biochemistry- They perform kidney function Test to rule out various Kidney diseases, Liver function Tests to rule out various liver disease, various type of Diabetes monitoring tests (in Blood and urine), ketoacidosis, Iron profile, Cardiac Enzymes, Lipid profile for preventing cardiac arrest, various hormonal assay, likeThyroid, FSH, LH, Prolactin, Cortisol, Testosterone and other function test, etc., for controlling and rule out of diseases.

- Blood gas analysis ,Serum electrolytes
- Giving reports with his or her own signature for the treatment of patient in emergency.
- Should have knowledge of autoanalysers, Chemiluminescence
- To run quality assurance programme

In Histo-cyto Pathology-

- Receiving samples from operation theatre like gall bladder, uterus, intestine, stones, other body organs or tissues and deferent types of body fluids etc.

- Participating in grossing, embedding, and section cutting, processing for slide making, mounting,
- Making of buffered formalin
- Frozen sectioning
- Special stains –AFB Lepra,PAS, mucicarmine, Silver methamine, VG, Reticulin PTAH etc. Providing data concerned for reporting of results to pathologist,
- Maintains records of slides and reports,
- Operating & maintaining common lab equipments
- Prepares blood, body fluids and other clinical specimens for microscopy
- Running of Cytospin and,
- Also act as museum curator in histopathology lab. Work including preparing surgical specimens for display, helping in photo-micrographic work, indexing surgical specimens, maintaining and furnishing the museum. Compiling statistical data etc.]

Immunology

- Applies principles of immunology to detection of antigens & antibodies
- Able to perform ELISA, FISH
- Immunohistochemistry

In Clinical Microbiology- various hazardous specimens receiving and keeping them in appropriate temperatures, making deferent types of agar (media for bacterial growth). Sterilization of various equipments used in testing, making culture and sensitivity for specimen, Participating in the reporting and identification of deferent type of infections (bacterial growth), Micros- coping examination where-ever it is applicable, to rule out various type of infectious diseases like Septicemia, Meningitis, Tuberculosis, Typhoid, Cholera, Leprosy, etc. Also doing tests based on antigens antibody reaction, ELISA, to rule out HIV, HbsAg, HCV, various STD Causative organisms, TORCH, and many IgM, IgG antibodies, Dengue serology etc. Giving reports with his or her own signature for the treatment of patient. Coordinate the preparation and quality assurance of culture media, chemicals, reagents, stains and solutions as appropriate. Evaluate collected laboratory data and prepare reports assessing accuracy, completeness, timeliness, progress, adverse trend and appropriate recommendation or conclusions. Maintain sufficient inventory of material supplies and equipment for performance of duties; clean and maintain standard laboratory equipments. Participate in the development of new medical procedure and techniques.

Teaching- Assists in training teachings of UG/PG Medical Students. Utilize various laboratory and hospital information system and software. Maintenance of departmental records. Participation in the development and implementation of clinical evaluation. Provide technical guidance and instruction to DMLT students, interns and MD students. Participate in the lab. Inspection and work with inspectors as needed, and look after of Bio-medical hazards and Bio- medical waste management at work place. **Supervise the work of Junior Technical Staff** of Group _C‘&_D‘ in his own section.

Any other department duty including emergency or Shift duties independently round _o‘clock assigned by the Head of the department.

Desirable Competencies

Proper knowledge of theory and practices and Practical skill of all diagnostic tools, techniques and procedures as per standard procedures and his/her scope of practices and a patient

friendly communication skill. Competent to take proper analytical decision independently even in odd hour duties and managerial abilities as per given scope of practices. **Knowledge of Computer**

Level 5 - Technical Officer (MLS)

General Description of the Post: Technical Officer (MLT) is a an integral member of health care system and is responsible and accountable for professional act & practices according to standards of practice as well as Laws and Regulations governing the profession, if any. He /She has to Coordinate and participate in a variety of specialized lab work and will be the technical in-charge of their Lab division/section under a particular department of lab.

Job, Duties, Responsibilities:

In addition to all the duties handled by the Medical Laboratory Technologist (MLT), the Technical Officer (MLT) will perform the following duties: -

1) Act as person in charge (PIC) of a division of a laboratory department as well as a resource person as per guideline determined by laboratory management system. Monitor Quality Control, Quality assurance, safety and Infection Control practices to assure compliance with internal and external regulations.
2) Supervise in specimen collection area: He/She is responsible and accountable for functioning pre-analytical area of patient identification, specimen labeling and collection verification, or instructing patient or other healthcare providers in collection and preservation techniques for serum, blood, urine, sputum, stool, scraping, directed donations, or other biological specimens for analysis.
3) Supervised in operating and maintenance of different types of instrument: and equipment used in Medical testing Laboratories e.g. semi-auto analyzers and fully auto analyzer based (*FlowCytometry, HPLC, Chemolumimisence, Radio-immunoassay, Immunophenotyping etc.*)
4) Processing and analysis of samples for highly special investigations.
5) Maintenance of laboratory manuals, SOPs and supervision of maintenance and upkeep of laboratories.
6) Monitor workflow, assessment of staffing levels and reassignment as needed. Follow up to ensure work is completed.
7) Participation in the development and implementation of clinical evaluation.
8) Utilize various laboratory and hospital information system and software. Maintenance of departmental records.
9) Provide advance problem solving, troubleshooting, and interpretation/consultation. Verification of specimen quality and test results.
10) Any other duty as assigned by the Head of the department.
11) Preparation and standardization of reagents of specialized test.
12) To assist the senior staff in the supervising the work of Technical staff in different divisions/sections of the department. Vigilance against misuse of laboratory materials, equipments or reagents.
13) Provide advance problem solving, troubleshooting, and interpretation/ consultation. Verification of specimen quality and test results.
14) Monitor workflow, assessment of staffing levels and reassignment as needed. Follow up to ensure work is completed.
15) Communicate and coordinates with patient, family and other medical personnel as necessary to obtain information for laboratory records, explain procedures, clarify orders and communicate status.
16) Any other duty including posting in Emergency duties as assigned by the Head of the department.

Level 5 - Senior Technical Officer (MLS)

General Description of the Post: Sr. Technical Officer (MLT) is a supervisory post responsible and accountable for professional act & practices according to standards of practice as well as Laws and Regulations governing the profession, if any. He /She has to Coordinate and participate in a variety of specialized lab work and will be the overall technical in-charge of their department of lab for assisting head of the department for various managerial function of the laboratory.

In addition to all the duties handled by the Technical officer (MLT), STO will also perform the following duties: -

1) To Work as a Technical In-charge in particular Department of Lab.
2) To maintain the inventory and assist the Head of the department in procurement of Lab. Department requirements and correspondence regarding maintenance, repair and upkeep of equipments.
3) Assist the Head of the Department for maintenance of leave records, posting of staff etc.
4) To ensure punctuality and regularity of all staff posted under him or her.
5) To assist the Head of Department in the supervising the work of Technical staff in different divisions/sections of the department. Vigilance against misuse of laboratory materials, equipments or reagents.
6) Interact with doctors, nurses and health unit coordinators (HUC) and other health providers when answering questions or providing other information about a patient results.
7) To ensure safety against theft and pilferage in the laboratories.
8) Supervision in the lab. Inspection and work with inspectors as needed and Supervision of Bio-medical hazards and Bio-medical waste management at work place.
9) To work as an In-charge of Departmental store for storage of chemical and reagents.
10) To coordinate and manage the supply of reagent and chemical for lab departments supply of chemical kits and chemicals.
11) Maintenance of laboratory manuals and supervision of maintenance and upkeep of laboratories.
12) Any other duty including posting in Emergency duties as assigned by the Head of the department.

Level 5 - Chief Technical Officer (MLS)

General Description of the Post: Chief Technical Officer (MLT) is a supervisory post for technical supervision and coordination of all laboratory services of different departments in a hospital/institution, an integral member of health care system and is responsible and accountable for professional act & practices according to standards of practice as well as Laws and Regulations governing the profession, if any. He /She has to Coordinate and participate in a variety of specialized lab work and will be the overall technical in-charge of their department of lab for assisting head of the department for various managerial function of the laboratory.

1) The Post of Chief Technical Officer (MLT) is created as Group A post of Lab Technical Cadre for total quality management and a nodal post for coordination of different division/ departments of Lab in a hospital.
2) He/ She will be the overall technical in-charge of laboratory services in hospital and will be responsible for quality assurance programmes and implementation of other policy decisions of authorities related to lab services.
3) Total quality Management and Quality assurance is an emerging area and are the present challenges of laboratory services so highly qualified lab professionals are required for qualitative lab services to work as a quality manager of laboratories.

4) Post is proposed for highly qualified lab professionals with master professional degree or PhD. in relevant stream of Lab sciences.
5) He will be a resource person for various academic activities/scientific activities-seminar/conferences of lab departments in a hospital.
6) Responsible for Maintaining quality policy and Procedures.
7) Responsible for implementation of all policy decision of management for smooth functioning of lab departments.

Level 6 - Job responsibilities of Medical Laboratory Scientist (Grade B)/ Clinical Laboratory Demonstrator

For Non-Teaching: Performs tasks, duties and/or complex tests in all areas of the laboratory assigned (Haematology, Immuno-Haematology, Immunology, Bacteriology, Microscopy, routine Chemistry, Therapeutic drug monitoring) according to established laboratory protocols and procedures.

- Processes specimens for advanced/special investigations utilizing protocols and scientific knowledge.
- Calibrates, standardize and maintains instruments as per established procedures.
- Performs quality control, preventive maintenance, troubleshooting protocols to ensure proper functioning of instruments, reagents, procedures.
- Validates and report results of tests performed.
- To ensure delivering patients reports as per prescribed Turn Around Time (TAT)
- Orientation and teaching students and new employees.
- Researches and develops new procedures as assigned.
- Follows established safety practices including biohazards, exposure control plan (blood- borne pathogens), infection control to include universal precautions, employee right to know (hazardous chemicals), and chemical hygiene standard.
- Promotes effective working relationships and works effectively as part of a department / unit /team inter and intra departmentally to facilitate the department/unit‘s ability to meet its goals and objectives.
- Attends all in service education required as per hospital policy.
- Demonstrates respect and regard for the dignity of all patients, families, visitors and fellow employees to ensure a professional, responsible and courteous environment.
- To supervise and allocate responsibilities to level 4 and level 5.

For Teaching Institutes only

- Teaching & training Undergraduate Medical Laboratory Science students including Interns/ and short-term trainees, so as to achieve the Educational Objectives i.e. to develop their knowledge, skills & attitude.
- To assist the Asstt., Assoc., Add. Professors / Professors / Heads of the department to do periodic evaluation / assessment through examination/to conduct examination/to maintain attendance & academic (including Internship) record of individual Undergraduate, Interns & short-term trainees for the minimum period as per Govt. rules.
- To organize/participate in teaching programmes like Lectures /Tutorials/Group Discussions Demonstrations/ Practical and other academic activities like Seminars / Symposia / Panel Discussions/Workshops/Guest Lectures/Conferences/Continuing

Medical Education Programmes etc. and to maintain a Departmental Library for students as well as teaching staff.

- To conduct Research Projects and contribute to medical knowledge by scientific paper publications in indexed journals & their presentation at various local / state / international Conferences.
- To work on various Students 'Welfare-related Committees like —Anti-Ragging Committee and to enforce discipline among medical students.

Level 6 - Job responsibilities of Deputy Technical Manager:

- To ensure the implementation of QMS parameters in routine service of the laboratory. These are as follows:
- To keep Technical Manager updated regarding annual maintenance colander of laboratory equipment particularly about calibration due date and AMC/CMC etc.
- To maintain their laboratory equipment in working condition
- If any equipment goes out of order then to arrange alternative and its repair as soon as possible and to record the relevant data regarding its down time.
- To maintain consumable inventory record
- To ensure First-in and first-out policy in consumables
- To maintain proper stock of consumables
- To observe and record daily NCRs if any, to report it to respective SIC and to ensure CAPA is taken and recorded.
- To maintain all other data relevant to QMS on formats approved by Quality management to ensure daily housekeeping of their respective sections and record data. In case of any problem, to contact incharge Housekeeping.

Level 7-Job responsibilities of medical laboratory Scientist (Grade C)/Assistant Professor

For Non-Teaching

In addition to level 6 responsibilities, level 7 (MLS Gr. C) will perform as under:

- To ensure implementation of internal quality control and quality assurance programmes.
- Ensures tasks, duties and/or complex tests in all areas of the laboratory as mentioned at level 6, according to established laboratory protocols and procedures.
- Ensures processing of specimens for advanced/special investigations utilizing protocols and scientific knowledge.
- Ensures Calibration, standardization and maintenance of instruments as per established procedures.
- Validates and cross checks report results of tests performed.
- To ensure release of patient reports as per prescribed Turn Around Time (TAT)
- Orientation and teaching students and new employees.
- Researches and develops new procedures.
- Ensures established safety practices and chemical hygiene standard.
- Ensures unit 's ability to meet its goals and objectives.
- Attends all in service education required as per hospital policy.
- Responsible to maintain courteous environment.
- To supervise and allocate responsibilities to level 6.

- To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.

For Teaching Institutes only

- Teaching & training Undergraduate Medical Laboratory Science students including Interns/ and short-term trainees, so as to achieve the Educational Objectives i.e. to develop their knowledge, skills & attitude.
- To assist the Assoc., Add. Professors / Professors / heads of the department to do periodic evaluation / assessment through examination/to conduct examination/to maintain attendance & academic (including Internship) record of individual Undergraduate, Interns & Postgraduate student for the minimum period as per Govt. rules.
- To work on the College Council, Undergraduate & Postgraduate Academic Committees, Medical Education Teaching Technology Cell, Library Committee of the College and to organize / participate in teaching programmes like Lectures / Tutorials/Group Discussions Demonstrations/ Practical and other academic activities like Seminars / Symposia / Panel
- Discussions / Workshops / Guest Lectures / Conferences / Continuing Medical Education Programmes etc. and to maintain a Departmental Library for students as well as teaching staff.
- If Eligible for Examiner-ship, To participate in conduct of academic and practical Examinations as an External Examiner/ undertake any task on —Inspection Committee‖ for inspection of institutes in other States / Universities / National Board / —Local Inquiry Committee under the Dean /Principal availing the facility of Special Leave .
- To conduct Research Projects and contribute to medical knowledge by scientific paper publications in indexed journals & their presentation at various local / state / international Conferences.
- To work on various Students‘ Welfare-related Committees like —Anti-Ragging Committee and to enforce discipline among medical students.

For Teaching Institutes and Hospitals

In addition to the teaching as mentioned above Assistant Professor shall perform as under:

- To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.
- To assist the associate professors/professors/heads of the department in Complete management of a full-time Unit in such a way that there is no —Medical Negligence‖ in patient care service as a result of breach / violation / infringement of any Act / code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
- It is binding to attend to emergency calls as and when required even beyond duty hours.
- To provide the laboratory records as and when required by the administration.
- To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
- To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.

Administrative Responsibilities: In addition to the teaching and hospital services as mentioned above Assistant Professor shall perform as under:

- To assist the HOD/Professor, Assistant Prof. shall perform all such duties to ensure continued enhancement in the quality of performance of teaching as well as non-teaching staff of the department.
- Planning, proposing, processing the proposals, procuring & maintaining plant & machinery, equipment & instruments, Furniture & Fixtures (Dead Stock) and to maintain record of all such items in the custody of the Department.
- To work on various Hospital Committees like Local Tender Committee, Theatre Committee, Hospital Infection Control Committee, Grievance Committee, Sexual Harassment Committee etc.
- To exercise authority in Administrative control of the Department:
- To recommend or refuse any kind of Leave (Casual Leave/Special Leave /Earned Leave) to any staff member of the Dept. as per rules or punctuality in respect of a defaulting employee.
- To serve a memorandum to the undisciplined employee giving him / her a chance to improve.
- To organize / conduct / encourage ―Core Competency Development Programmes‖ for Faculty Development; also training programmes for other non-teaching staff of the Dept.
- Whenever ordered by the higher authorities, to conduct ―Preliminary Inquiry‖ into a particular untoward incidence or in respect of a particular employee and to submit report in time as per the rules.

Level 7 - Job responsibilities of Technical Manager:

Technical Manager shall supervise the responsibilities of Deputy Technical manager, take corrective and preventive action as and when required and will report to Deputy Quality Manager.

Level 8- Job responsibilities of Medical Laboratory Scientist (Grade D)/Associate Professor

For Non-Teaching

In addition to supervisory responsibilities of level 7, level 8 (MLS Gr. D) will perform as under:

- To ensure implementation of external quality control procedures as per WHO/ International accreditation norms.
- Sorting of anomalies and Discrepancies if any in Validation and cross checking report results of tests performed.
- Ensures orientation and training of students/ new recruits.
- Participation in Research and development.
- Attend all in service refresher courses/ Workshops.
- To supervise and allocate responsibilities to level 7.

For Teaching Institutes only

To perform all such duties to ensure continued improvement in the quality of Medical Education & Research.

- Teaching & training Undergraduate students including Interns/ Postgraduate students so as to achieve the Educational Objectives i.e. to develop their knowledge, skills & attitude.
- To do periodic evaluation / assessment through examination/to conduct examination/to maintain attendance & academic (including Internship) record of individual Undergraduate & Postgraduate student for the minimum period as per Govt. rules.
- To work on the College Council , Undergraduate & Postgraduate Academic Committees , Medical Education , Library Committee , to organize / participate in teaching programmes

like Lectures / Tutorials/Group Discussions Demonstrations/ Practical and other academic activities like Seminars / Symposia / Panel Discussions / Workshops / Guest Lectures / Conferences / Continuing Medical Education Programmes etc. and to maintain a

- Departmental Library for students as well as teaching staff.
- To participate in conduct academic Examinations of other State Health Universities / National Board as an External Examiner with the permission / under the direction of the Dean availing the facility of Special leave.
- To undertake any task entrusted by AHP Board like working on —Inspection Committee‖ for inspection of Colleges in other States with the permission of the Principal/Dean/Director.
- To undertake any other task entrusted by University/ Institute like working on —Local Inquiry Committee for inspection of Colleges.
- To conduct Research Projects – clinical research, and contribute to medical knowledge by scientific paper publications in indexed journals & their presentation at various local / state / international Conferences.
- To work on various Research-related Committees like Ethics Committee , Research Society of the institute
- To work on various Students' Welfare-related Committees like —Anti-Ragging Committee and to enforce discipline among medical students.

For Teaching Institutes/ Hospitals

In addition to the teaching as mentioned above Associate Professor shall perform as under:

- To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.
- In Complete management of a Full-time Unit in such a way that there is no —Negligence‖ in patient care service as a result of breach / violation / infringement of any Act / Code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
- It is binding to attend to Emergency calls as and when required even beyond duty hours.
- To provide the laboratory records as and when required by the Administration.
- To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
- To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.
- Supervise the Work of Assistant Professors, Students

Administrative Responsibilities: In addition to the teaching and hospital services as mentioned above Associate Professor shall perform as under:

- To assist the head of the department perform all such duties to ensure continued enhancement in the quality of performance of teaching as well as non-teaching staff of the Department.
- Planning, proposing, processing the proposals, procuring & to supervise maintenance of equipment & instruments.
- To work on various Hospital/Institute Committees like Local Tender Committee, Hospital Infection Control Committee, Grievance Committee, Sexual Harassment Committee etc.
- To exercise authority in Administrative control of the Department:
- To maintain _Personal Files' of all teaching as well as non-teaching staff of the Dept.

- To recommend or refuse any kind of Leave (Casual Leave/Special Leave/Earned Leave to any staff member of the Dept. as per rules in that regard.
- To maintain Muster Roll of teaching as well as non-teaching staff of the Department; to conduct periodic audit of the timings of arrival / departure of the staff; to mark any Sanctioned Leave or Absence Without Leave (AWL) – which is Unauthorized Absence – of the employee as the case may be and to report to the Competent Leave sanctioning Authority i.e. Dean, any irregularity in attendance or punctuality in respect of a defaulting employee.
- To serve a memorandum to the undisciplined employee giving him / her a chance to improve.
- To write annual ‗Confidential Report' (Performance Appraisal /Work Audit) of the employees working in the Dept. as well as your own ―Self-Appraisal / Assessment as per the guiding principles in that regard; to inform the erring member about the adverse remarks, if any, immediately through a memorandum.
- To organize / conduct / encourage ―Core Competency Development Programmes‖ for Faculty Development; also training programmes for other non-teaching staff of the Dept.
- Whenever ordered by the higher authorities , to conduct ―Preliminary Inquiry‖ into a particular untoward incidence or in respect of a particular employee and to submit report in time as per the rules in that regard.

Level 8 - Job responsibilities of Deputy Quality Manager:

Deputy Quality Manager shall supervise the responsibilities of Technical manager, ensure corrective and preventive action as and when required and will report to Quality Manager. Some specific responsibilities of Deputy Quality Manager shall be as follows:

- To ensure timely calibration, preventive maintenance of equipment and check daily user maintenance of equipment.
- To promote policies for adopting alternative measures in case of equipment breakdown or runs out of calibration.
- To look after document control under supervision of Quality manager.
- Monitoring the house keeping activity to check the compliance of universal safety precautions.
- To plan and co-ordinate internal quality audits every six months and submit a periodic report to QM.
- To establish policies and procedures for control of laboratory documents as per quality system for documentation.
- To assist DQM-1 in document control
- To ensure competency evaluation, training and retraining of the personnel if the corrective action results in change of policies or procedures.

Level 9 - Job responsibilities of Medical Laboratory Scientist (Grade E)/Additional Professor

For Non-Teaching

In addition to level 8 responsibilities, level 9 (MLS Gr. E) will perform as under:

- Sorting of anomalies and Discrepancies if any in Breakdown of Instruments and Maintenance Contracts.
- Ensures overall performance of Laboratory as per Good Laboratory Practice (GLP).

- Attend and organize various in-service Workshops and up gradation required from time to time.
- To direct and allocate responsibilities to staff through level 8.
- To undertake any task entrusted by AHP Board like working on —Inspection Committee‖ for Laboratories in other Institutes/Hospitals with the permission of the Principal/Dean /Director or any other competent authority.
- Participation and to ensure Research and development i.e. Research Projects & their presentation at various National/ international Conferences and its publication and to participate in various —Research committees.‖
- To undertake any other task entrusted by University/ Institute like working on —Local Inquiry Committee , —Ethics Committee‖ , and —Staff Welfare-related Committees and to enforce discipline among departmental staff.

For Teaching Institutes only

- To perform all such duties to ensure continued improvement in the quality of Medical Education & Research.
- Teaching & training Undergraduate students including Interns/ Postgraduate students so as to achieve the Educational Objectives i.e. to develop their knowledge, skills & attitude.
- To do periodic evaluation / assessment through examination/to conduct examination/to maintain attendance & academic (including Internship) record of individual Undergraduate & Postgraduate student for the minimum period as per Govt. rules.
- To work on the College Council , Undergraduate & Postgraduate Academic Committees , Medical Education , Library Committee , to organize / participate in teaching programmes like Lectures / Tutorials/Group Discussions Demonstrations/ practical and other academic activities like Seminars / Symposia / Panel Discussions / Workshops / Guest Lectures / Conferences / Continuing Medical Education Programmes etc. and to maintain a
- Departmental Library for students as well as teaching staff.
- To participate in conduct academic Examinations of other State Health Universities / National Board as an External Examiner with the permission / under the direction of the Dean availing the facility of Special leave.
- To undertake any task entrusted by AHP Board like working on —Inspection Committee‖ for inspection of Colleges in other States with the permission of the Principal/Dean/Director.
- To undertake any other task entrusted by University/ Institute like working on —Local Inquiry Committee for inspection of Colleges.
- To conduct Research Projects – clinical research, and contribute to medical knowledge by scientific paper publications in indexed journals & their presentation at various local / state / international Conferences.
- To work on various Research-related Committees like Ethics Committee, Research Society of the institute.
- To work on various Students‘ Welfare-related Committees like —Anti-Ragging Committee and to enforce discipline among medical students.

For Teaching Institutes/ Hospitals

In addition to teaching, as mentioned above, Professor shall perform as under:

- To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.

- In Complete management of a Full-time Unit in such a way that there is no ―Negligence‖ in patient care service as a result of breach / violation / infringement of any Act / Code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
- It is binding to attend to Emergency calls as and when required even beyond duty hours.
- To provide the laboratory records as and when required by the Administration.
- To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
- To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.
- Supervise the Work of Assistant Professors, Students

Administrative Responsibilities: In addition to the teaching and hospital services as mentioned above Professor shall perform as under:

- To assist the head of the department perform all such duties to ensure continued enhancement in the quality of performance of teaching as well as non-teaching staff of the Department.
- Planning, proposing, processing the proposals, procuring & to supervise maintenance of equipment & instruments.
- To work on various Hospital/Institute Committees like Local Tender Committee, Hospital Infection Control Committee, Grievance Committee, Sexual Harassment Committee etc.
- To exercise authority in Administrative control of the Department :
- To maintain ‗Personal Files' of all teaching as well as non-teaching staff of the Dept.
- To recommend or refuse any kind of Leave (Casual Leave/Special Leave/Earned Leave to any staff member of the Dept. as per rules in that regard.
- To maintain Muster Roll of teaching as well as non-teaching staff of the Department; to conduct periodic audit of the timings of arrival / departure of the staff; to mark any Sanctioned Leave or Absence Without Leave (AWL) – which is Unauthorized Absence – of the employee as the case may be and to report to the Competent Leave sanctioning Authority i.e. Dean, any irregularity in attendance or punctuality in respect of a defaulting employee.
- To serve a memorandum to the undisciplined employee giving him / her a chance to improve.
- To write annual ‗Confidential Report' (Performance Appraisal / Work Audit) of the employees working in the Dept. as well as your own ―Self-Appraisal / Assessment as per the guiding principles in that regard; to inform the erring member about the adverse remarks, if any, immediately through a memorandum.
- To organize / conduct / encourage ―Core Competency Development Programmes‖ for Faculty Development; also training programmes for other non-teaching staff of the Dept.
- Whenever ordered by the higher authorities, to conduct ―Preliminary Inquiry‖ into a particular untoward incidence or in respect of a particular employee and to submit report in time as per the rules in that regard.

Level 9 - Job responsibilities of Quality Manager:

Quality Manager shall supervise the responsibilities of Deputy Quality Manager and shall be responsible for implementation of total quality management system in Medical Laboratory Services

and will report to Laboratory Director/HOD. Some specific responsibilities of Quality Manager shall be as follows:

- Ensuring that processes needed for the quality management system are established, implemented, and maintained;
- Communicating Managements commitment for the development and implementation of the QMS and their importance of meeting patients/clinicians requirements as well as statuary and regulatory requirements to the staff.
- Reporting to laboratory management, at the level at which decisions are made on laboratory policy, objectives, and resources, on the performance of the quality management system and any need for improvement;
- Ensuring the promotion of awareness of users' needs and requirements throughout the laboratory organization.
- Ensure that the integrity of management system is maintained when changes to the management system are planned and implemented
- Implement Good Laboratory Practice (GLP) by providing instructions and training as needed, develops work plan and procedures and requires that these be followed in all day to day operations of the laboratory
- To ensure client confidentiality.
- Preparation and review of scope for accreditation
- Preparation and review of quality manual for accreditation
- To prepare the format of SOPs
- To ensure continued accreditation of the laboratory
- Formulating new procedures as may be necessary; to review or approve the review of the existing procedures followed by their update and amendment
- To co-ordinate with SICs for EQAS and Inter-laboratory comparisons
- Application to and in general co-ordination with NABL
- To arrange and prepare for Management Review Meetings (MRMs)
- Attests, by signature, to the validity of all laboratory tests and reports or maintain a list of approved or authorized signatories of the laboratory.
- To ensure completion of corrective actions on Non-conformities raised during internal and/or external audits. To ensure the review and periodical compliance of these corrective actions.
- To document client complaints and address them in MRM and seek opinion for repetition of the same.
- To ensure and coordinate with HOD, the training, supervision, evaluation and recording the assessment.
- To establish policies and procedures for control of laboratory documents as per quality system for documentation.
- To ensure competency evaluation, training and retraining of the personnel if the corrective action results in change of policies or procedures.

Level 10 - Job responsibilities of Medical Laboratory Scientist (Grade F, G and H)/ Director Professor/Principal/ HOD/Director Laboratory Services

- **Overall operation and administration-** Take responsibility for overall operation and administration of lab, including employment of personnel competent to perform test procedures, record.

- **Definition/retention of others' duties-** If desired, delegate / Specify / reapportion, in writing responsibilities, authorities and duties of each consultant/Medical Laboratory Scientist and person engaged in any phase of testing.
- **Licensure and accreditation -** Assure compliance with applicable regulations.
- Personnel Management & Authorization
- Identify which examinations and procedures each individual is authorized to perform.
- Training & Competency Assessment
- Ensure all personnel have appropriate education, experience and training for type & complexity of services, in order to perform testing reliably and report accurate results.
- Supervision
- Ensure on-site supervision of high complexity testing. Identify supervision required for specimen processing, test performance or result reporting. Identify supervisory or director review required prior to reporting patient test results.
- Adequate and Appropriate Staffing
- Employ sufficient/appropriate personnel with education, training, and experience to provide consultation, supervise and perform tests, and report test results.
- Monitoring Competency
- Ensure policies and procedures for monitoring individuals to assure competency and to assure identification of needs for remedial training or continuing education.
- Facilities & Safety
- Ensure physical and environmental conditions are appropriate and provide a safe environment in which employees are protected from physical, chemical, and biological hazards.
- Quality Management System
- Ensure that all the services of the laboratory are as per Quality Management system which includes: Quality control, Quality assurance, Quality improvement, proficiency testing etc. etc.
- Interaction with others
- Relate and function effectively with accrediting regulatory agencies, administrative officials, medical community, medical device industry, and patient population.
- Strategic Planning
- Perform planning for setting goals and developing and allocating resources appropriate to Institute/hospital/laboratory environment i.e. Operational Management + Financial Management + Administrative Management.
- Administration and Management
- Provide effective and efficient administration, including budget planning and control with responsible financial management. Define, implement, and monitor standards of performance in cost-effectiveness of lab services.
- Research and Development
- Plan and direct research and development appropriate to the facility.
- Education
- Ensure proper planning and implementation of teaching system for Medical laboratory students/staff, and participate in educational programs of the institution.

Annex- 1

List of Allied Health Professionals

1. Anesthesia assistants and technologist
2. Behavioral therapist
3. Biomedical engineers and technologist
4. Biostatisticians (non-medical)
5. Cardiovascular technologist
6. Clinical social worker
7. Counselor- Integrated behavioral health counselors, Palliative counselors, mental health support workers etc.
8. Critical care/ICU technologist
9. Dialysis therapy technologist
10. Dietitian
11. ECG technologist
12. ECHO technologist
13. EEG/END technologist
14. Emergency medical technologist (Paramedic)
15. EMG technologist
16. Endoscopy technologist
17. Environmental health specialists (non-medical)
18. Epidemiologists (non-medical)
19. Forensic technologist
20. Geriatric aide
21. Health educators (disease counselors, diabetes educators, lactation consultants etc.)
22. Health management information system managers (Medical records)
23. Home health aide
24. Hospital managers
25. Kinesiotherapist
26. Medical Laboratory Professionals
    a) Medical Laboratory Technologist (Graduate in MLS)
    b) Medical Laboratory Scientist (Master & Doctorate in MLS)
27. Medical assistant
28. Medical dosimetrist
29. Medical illustrator
30. Medical physicist
31. Medical secretaries
32. Medical transcriptionist
33. Neuro lab technologist
34. Neurophysiologist
35. Nuclear medicine technologist
36. Nutritionist
37. Occupational therapist
38. Oncology care assistant
39. Ophthalmic assistants
40. Optometrist
41. OT technologist

42. Perfusionist
43. Phlebotomist
44. Physician associates and assistants
45. Physiotherapist
46. Podiatry assistants
47. Pulmonary function (PFT) technologist
48. Radiologic /Imaging technologist (including Medical Sonography, Radiographer, MRI,CT, Mammography technologists)
49. Radiotherapy technologist
50. Respiratory therapist
51. Sanitary health inspectors
52. Sleep lab technologist
53. Sterilization aide (CSSD technician)
54. Urology technologist

References:

[1]Narayan, K Kar, S Gupta, N. From 'Paramedics' to 'Allied Health Professionals': Landscaping the Journey and Way Forward. Public Health Foundation of India: New Delhi, India, 2012.
[2] Allied Health Professions Federation. AHPs involvement in health and social care 2011. Available from: http://www.ahpf.org.uk/files/ahpf_gov_briefing_v7_09-05-11.pdf.
[3] Narayan. K. How many doctors it takes to fix India's healthcare glitches? Deccan Herald [Internet]. 2014. Available from: http://www.deccanherald.com/content/381371/how-many-doctors-takes-fix.html.
[4] Introduction to clerkship 1999. Available from: https://umanitoba.ca/faculties/medicine/media/missiion_goals_object_class_2011.pdf.

[5] Standards of practice for ACT Allied Health Professionals 2005. Available from: http://health.act.gov.au/c/health?a=dlpubpoldoc&document=863.
[6] Pamela Mitchell et al. Core principles and values of effective team based healthcare2012. Available from: https://www.nationalahec.org/pdfs/VSRT-Team-Based-Care-Principles-values.pdf.
[7] Professionalism in nursing, midwifery and the allied health professions in Scotland. Scottish Government, 2012 978-1-78045-925-7.
[8] Nursing & Midwifery Council .Standards for competence for registered nurses. Available from: http://www.nmc-uk.org/Documents/Standards/Standards%20for%20competence.pdf.
[9] Social Accountability- A vision for Canadian medical schools Available from: https://www.afmc.ca/fmec/pdf/sa_vision_canadian_medical_schools_en.pdf.
[10] University of Manitoba. Faculty of medicine teaching handbook2004. Available from: umanitoba.ca/faculties/medicine/media/teaching_handbook04.doc.
[11] Medical Council of India. Vision 2015. Published March 2011. Available from: http://www.mciindia.org/tools/announcement/MCI_booklet.pdf.
[12] Sherwin J. Competency-Based Medical Education Takes Shape2011. Available from: https://www.aamc.org/newsroom/reporter/april11/184286/competency-based_medical_education.html.
[13] Bushway D, Everhart D. Investing in Quality Competency-Based Education2014. Available from: http://www.educause.edu/ero/article/investing-quality-competency-based-education.
[14] Brookfield, S. D. Self-Directed Learning In: YMCA George Williams College ICE301 Lifelong learning Unit 1 Approaching lifelong learning. London: YMCA George Williams College; 1994.
[15] Ramnarayan K, Hande S. Thoughts on Self-Directed Learning in Medical Schools: Making Students More Responsible 2005. Available from: http://education.jhu.edu/PD/newhorizons/lifelonglearning/higher-education/medical-schools/.
[16] Harvey, B. J., Rothman, A. I., Frecker, R.C. Effect of an undergraduate medical curriculum on students' self-directed learning. Academic Medicine. 2003; 78(12): 1259-65.
[17] Credit-Based-Grading-System for Assessment of Students. Available from: http://www.presiuniv.ac.in/web/exam_assessment.php.
[18] Manual on semester based, credit and grading system Mumbai: University of Mumbai 2011. Available from: http://www.mu.ac.in/1_Manual_SCGS_Arts_09-06-2011.pdf.
[19] Vertical Integration2015. Available from: http://www.mcw.edu/Medical-School/Curriculum/Traditional-Curriculum/Vertical-Integration.htm.
[20] Baker D, Day R, Salas E. Teamwork as an essential component of high reliability organisations. Health Services Research. 2006; 41(4):1576-98.
[21]Srinivas, D.K. Adkoli, B.V. Faculty Development in Medical Education in India: The Need of the Day. Al Ameen J Med Sci (2009)2 (1):6-13. Available at: http://www.alameenmedical.org/ajms/ArticlePDFs/AJMS3.6-13.pdf

ADDITIONAL REFERENCES FOR THE TECHNICAL CONTENT DRAWN FROM THE FOLLOWING:

22. Objective structured clinical examination2010. Available from: http://en.wikipedia.org/wiki/Objective_structured_clinical_examination
23. Enhancing youth employability: the importance of core work skills. Skills for employment: policy brief [Internet]. 2013. Available from: http://www.ilo.org/wcmsp5/groups/public/---ed_emp/--ifp_skills/documents/publication/wcms_234467.pdf
24. Diploma in Medical Laboratory Technology [internet] [cited 2014 Sep 20]. Available from:http://web.tnmgrmu.ac.in/syllabus/alliedhealth/dmltsyllabus.pdf
25. Diploma in Medical Laboratory Technology [internet] [cited 2014 Sep 18]. Available from: http://www.iaseuniversity.org.in/syllabus/de_syl/DMLT.pdf.

26. Fremgen B, Frucht S. Medical Terminology: A Living Language: Pearson Education, Inc. Available from: http://www.ogeecheetech.edu/docs/d_Programs/AlliedHealth/Syllabi/ALHS1090.pdf
27. Kong-lung H. Law and ethics in medical practice: An Overview. 2003; 8. Available from: www.fmshk.org/article/746.pdf.
28. Texas Intensive English Program2014. Available from: https://www.tiep.edu/intensive-programs/.
29. Mittal R, Mahajan R, Mittal N. Foundation programme: A student's perspective. International Journal of Applied and Basic Medical Research. 2013; 3(1):52-4. Epub 10.4103/2229-516X.112241.
30. Curriculum for Medical Laboratory Technology. Available from: Directorate General of Health Services.
31. Regulations & curriculum for Bachelor of Science degree courses in allied health science [internet] [cited 2014 Sep 25]. Available from: http://www.rguhs.ac.in/cdc/alliedhealth/bmlt.pdf
32. Syllabus for Bachelor of Science degree courses [internet] [cited 2014 Sep 25]. Available from: http://de.nimsuniversity.org/wp-content/uploads/2012/12/BMLT_SYLLABUS.pdf?51550b
33. Detailed syllabus for distance education under graduate degree program Bachelor of Science – medical laboratory technology (bmlt) [internet] [cited 2014 Sep 22]. Available from: http://www.iaseuniversity.org.in/syllabus/de_syl/BMLT.pdf
34. Curriculum for medical laboratory technology course [internet] [cited 2014 Sep 24]. Available from: https://www.drexelmed.edu/Home/AbouttheCollege/DepartmentsCentersandInstitutes/ClinicalDepts/PathologyandLaboratoryMedicine.aspx
35. University of Pune Three Year B. Sc. Degree Course in MICROBIOLOGY Syllabus [internet]. [Cited 2014 Sep 15]. Available from:http://www.unipune.ac.in/Syllabi_PDF/revised_2013/sci/18_F.Y.B.Sc.%20Microbiology.pdf
36. Amity Institute of Virology and Immunology Curriculum [internet] [cited 2014 Sep 21]. Available from: http://www.amity.edu/aivi/Curriculum.asp
37. www.jfmti.com
38. www.pgimer.edu.in
39. www.ibms.org
40. www.ifbls.org
41. www.lpu.inLovely Professional University, Phagwara, Punjab
42. Indian Confederation of Medical Laboratory Science (ICMLS) weblink
43. International Committee for Standardization & Augmentation of Clinical Lab Professions (InCoSALP)
44. Rajasthan University of Health Science-website
45. https://www.ptu.ac.in/Punjab Technical University, Kapurthala, Punjab

DETAILS OF INVOLVED/RESPONSIBLE OFFICERS AT THE MINISTRY OF HEALTH AND FAMILY WELFARE (MOHFW)

1. Mr. Arun Singhal, Joint Secretary (Human Resource)
2. Mr Ali R.Rizvi, Joint Secretary (Human Resource)- Former
3. Mr B. Sriramachandra Murthy, Director (Allied Health Section)
4. Mr Satish Kumar, Under Secretary (Allied Health Section)

National Initiative for Allied Health Sciences – Technical Support Unit (NIAHS – TSU)

1. Ms Kavita Narayan, *FACHE*, Director, NIAHS-TSU at MoHFW, GoI
2. Ms Shivangini Kar Dave , Project Lead Coordinator
3. Ms Natasha D'Lima, Program Coordinator
4. Ms Namita Gupta, Consultant
5. Mr Sutirtha Mazumder, Senior Research Assistant
6. Mr Ashish Arora, Senior Research Assistant (former)
7. Ms Tanu Sri Sahu, Senior Research Assistant
8. Mr Akhilendra Trivedi, Senior Research Assistant
9. Mr Vivek Bhatnagar, Senior Research Assistant
10. Mr Anirooddha Mukherjee, Research Assistant

For additional details or queries, please contact:

1. Mr Uttam Sengupta, SO (AHS),
   Room 539 – A,
   Nirman Bhavan, New Delhi 110001.
   Phone: 23061182, Email: ahssection@gmail.com

2. NIAHS TSU,
   Facilitation Centre, Near Gate No 5,
   Nirman Bhavan, New Delhi 110001.
   Phone: 011-23061751, Email: ahpsforindia@gmail.com

MINISTRY OF HEALTH AND FAMILY WELFARE
National Initiative for Allied Health Sciences (NIAHS)
Technical Support Unit (NIAHS – TSU)
Nirman Bhawan, New Delhi 110001.

NOIDA INTERNATIONAL UNIVERSITY

SYLLABUS BACHELOR OF PHYSIOTHERAPY (BPT) DEGREE COURSE

Academic year 2019-20 and Progressively

Department of Physiotherapy School of Nursing Health Sciences, NIU

Plot No. 1, Sector-17 A, Yamuna Expressway, Gautam Budh Nagar, U.P. India Toll free no.

1800-102-404

www.niu.edu.in

NOIDA INTERNATIONAL UNIVERSITY

BACHELOR OF PHYSIOTHERAPY (B.P.T.) DEGREE COURSE

Dr. N. H. Simon

Director of SON & HS

Department of Physiotherapy

VISION, MISSION & GOALS OF THE UNIVERSITY

VISION

To provide quality in all spheres of higher learning in general and Health Services in particular to all including those in the rural and urban areas of the nation, keeping in view the societal needs in the global context.

MISSION

To impart and disseminate knowledge, develop competencies and also to provide for Research and Development in the emerging areas of Health Sciences, Science and Technology, Business Management, Hospitality Management, Law, Liberal Education,Teacher‘s Education, Sports etc.

GOALS

To be recognized as one of the leading institutes of higher learning in India within the next 5 years and gain recognition in the global arena of Physiotherapy.

AIMS AND OBJECTIVES OF B.P.T DEGREE COURSE

On completion of the course of study having successfully passed the examination, the candidate would be able to achieve a satisfactory level of efficiency in theory and practical as well:-

- To Detect and evaluate the anatomical, patho-physiological impairments, resulting in dysfunction of various age groups & occupation; as well as epidemiological sectors in the population & arrive at appropriate diagnosis.
- To understand the rationale & basic investigative approach to the medical system and surgical intervention regimens & accordingly plan & implement specific Physio-Therapy measures effectively.
- To be able to select strategies for cure and care; adopt restorative & rehabilitative measures for maximum possible independence of a client at home, work place & in the community.
- To maintain healthy relationship & Co-partnership with various professionals in the health delivery system in the primary interest of a client.
- To ensure quality assurance & motivate the client & her/his family for a desirable client compliance.
- To develop communication skills for the purpose of transfer of suitable technique to be used creatively at various stages of treatment, compatible with psychological status of the beneficiary.
- To promote health in general in Geriatrics, Women‘s health, Industrial medicine as well as at competitive level, such as sports, keeping in mind National Health Policies

- To practice professional autonomy & ethical principles with referral as well as first contact clients in conformity with ethical code for physiotherapists.

REGULATIONS RELATING TO BACHELOR OF PHYSIOTHERAPY (B.P.T) DEGREE COURSE

PREAMBLE:

This syllabus is framed under the provision of U.G.C.
The Bachelor of Physiotherapy programme shall be under the University.
The name of the Degree programme shall be Bachelor of Physiotherapy (B.P.T)

ELIGIBILITY

1.1 Qualifying Examination

A Candidate seeking admission to first year Bachelor in Physiotherapy (BPT):

i) Should have passed two year Pre University examination conducted by Department of Pre-University Education, Uttar Pradesh state, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually also.

OR

ii) Shall have passed any other examination conducted by Boards/Councils/Intermediate examination established by State Government/Central Government and recognized as equivalent to a two year Pre University Examination by Noida International University, with English as one of the subjects and Physics, Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics,Chemistry and Biology as optional subjects. The candidate shall have passed subjects of English, Physics, Chemistry and Biology individually also.

OR

iii) Candidates who have completed Pre-university course with Vocational Physiotherapy as their optional subject are eligible for admission to BPT course.

1.2 Marks

The selection of students to a course of Physiotherapy shall be based on merit provided that in case of admission on the basis of qualifying examination, a candidate for admission to BPT course must

have passed individually in the subjects of Physics, Chemistry, Biology and English and must have obtained not less than 45% marks taken together in Physics, Chemistry and Biology in the qualifying examination.

In respect of candidates belonging to Scheduled Castes, Scheduled Tribes or Category I, the marks obtained in Physics, Chemistry and Biology together in qualifying examination is not less than 40% instead of 45% as above.

1.3 Age:

A candidate seeking admission to Bachelor of Physiotherapy course should have completed 17 years of age, as on 31st December of the year of admission.
Every candidate before admission to the course shall furnish to Principal of the Institution a certificate of Medical Fitness from an authorized Government Medical Officer to the effect, that the candidate is physically fit to undergo Physiotherapy course.

Meritorious Students would be given scholarship as per NIU, Norms.

MIGRATION/TRANSFER OF CANDIDATES:

Students studying in the Physiotherapy College of this University may be allowed to migrate or transfer to any other University/Institution provided a similar curriculum should be followed by the two Universities. The migration/transfer will not be entertained in the middle of academic year.

DURATION OF THE COURSE:

Duration of the BPT course will be four calendar years followed by compulsory six months Rotatory Internship.

PROCEDURE OF SELECTION:

Candidates who secure the minimum 50 % marks at NIUET i.e. Noida International University Entrance Test conducted by the University shall be eligible for admission to BPT course.

PHYSIOTHERAPY CURRICULUM:

The aims and objectives of the B.P.T curriculum is to educate and train a student as a qualified Physiotherapist who will be able to impart health services safely and effectively to community in terms of health promotion, functional diagnosis, prevention and treatment of dysfunction in different fields of medical science.

The teaching and training programme shall be evolving one and there shall be more emphasis on demonstration, clinical work, seminars and group discussion than on classroom teaching. The student shall have clinical experience in different fields like Orthopedics, Neurology, Chest and Cardiac conditions, Pediatrics and Surgery. Students shall visit and work at Hospitals and

community centers like primary health centers, geriatric homes, paraplegic homes, orphanages etc. as a part of training for community rehabilitation.

The progress of the student shall be monitored through the sessional examinations. A record of student‘s work shall be maintained which would form the base for internal assessment. The students shall be encouraged to do clinical presentations, to participate in group discussions and seminars, to prepare community related projects to enable them to develop personality, expression and acquire depth of knowledge.

REGULATIONS AND SCHEME OF EXAMINATION (BPT COURSE):

The scheme of examination for the B.P.T. course shall be divided into 4 professional examinations, namely, 1st B.P.T. examination at the end of 1st academic year, 2nd at the end of 2nd academic year, 3rd at the end of 3rd academic year and 4th and final B.P.T examination at the end of 4th academic year.

The examination shall be open to a candidate who satisfies the requirement of attendance, progress and conduct as stipulated by the University.

Certificate to the above effect be procured from the Head of the Institute by the candidate along with the application for examination and the prescribed fee. Examination shall be held twice in a year. There will be 3 internal test in each year (class) and 20% of the total marks in each subject‘s theory and practical / clinical individually will be assigned to these internal tests.

RULES FOR A.T.K.T (ALLOW TO KEEP TERMS) SHOULD READ AS:

A candidate who has passed in all the subjects but two (maximum) at the 1st B.P.T. examination shall be allowed to keep terms for 2nd B.P.T. first term only, but the candidate shall not be permitted to keep 2nd B.P.T. 2nd term and to appear at 2nd B.P.T. examination unless such candidate passes 1st B.P.T. examination completely, one clear academic term prior to appearing for the 2nd B.P.T. examination and only after keeping required terms of 3rd B.P.T.

A candidate who has passed in all the subjects but two (maximum) at the 2nd B.P.T. examination shall be allowed to keep terms for 3rd B.P.T. first term only, but the candidate shall not be permitted to keep 3rd B.P.T 2nd term and to appear at 3rd B.P.T examination unless such candidate passes 2nd B.P.T. examination completely, one clear academic term prior to appearing for the 3rd B.P.T.examination & only after keeping required terms of 3rd B.P.T.

A candidate who has passed in all the subjects but two (maximum) at the 3rd B.P.T. examination shall be allowed to keep terms for 4th B.P.T. first term only, but the candidate shall not be permitted to keep 4th B.P.T 2nd term and to appear at 4th B.P.T examination unless such candidate passes 3rd

B.P.T. examination completely, one clear academic term prior to appearing for the 4th B.P.T. examination& only after keeping required terms of 4th B.P.T.

MAXIMUM MARKS IN EXAMINATION:

Subject-wise marks are mentioned in the syllabus. For passing the examination, the candidate must secure a minimum of 50% marks of total marks each in theory and practical, i.e. 50% marks in the aggregate of University examination and internal assessment of theory and practical/ Clinical separately.

DURATION OF EXAMINATION:

Each written paper of 75 marks shall be of 3 hours duration and of 50 marks shall be of 2 hours duration.

ATTENDANCE:

75% in theory and 100% in practical/clinical in each subject in each year.

FIELD PROGRAMME IN COMMUNITY PHYSIOTHERAPY:

There shall be participation of students in health camps and projects in final year and during internship with a view to expose the students to problems of rural and semi urban areas.

CRITERIA FOR PASSING:

A candidate is declared to have passed University examination in a subject, if he/she secures 50% of the marks in theory and 50% in practical's separately. For computation of 50% marks in theory, the marks scored in the internal assessment (theory) shall be added to the University conducted written examination and for passing in practical the marks scored in University conducted practical examination and internal assessment (practical) shall be added together.

GRACE MARKS:

- If a candidate fails in one subject (theory only) in the annual University examination,2-3 grace marks will be given to the candidate by the university before the declaration of result depending on the internal Marks scored by the Student during the annual program.
- Candidate failing in practical examination will be considered as failed.
  SUPPLEMENTARY EXAMINATION:
- A candidate failing in a subject but securing at least 30% aggregate marks will be required to appear in the university examination after 6 months in that subject/ subjects while attending classes of next year.
- If the candidate fails in supplementary examination his/her session will be shifted by one year. The candidate will have taken admission in the previous year and pay the tuition fee for the academic year. He/She will have to appear in all the subjects in the examination.

- Supplementary examination will be held not earlier than 6 months and later than 6 months from the date of annual University examination.

DIVISION:

Candidate will be awarded division at the end of fourth academic year as follows:

CGPA	EQUIVALENT DIVISION
8. and above	First division with distinction
6.5 but less than 8 5	First division
5 but less than 6	Second division

DEGREE:

The degree of B.P.T. course of the university shall be conferred on the candidates who have pursued the prescribed course of study for not less than four academic years and have passed examinations as prescribed under the relevant scheme and completed 6 months of compulsory rotatory internship.

SCHEME OF EVALUATION AND GRADING

Evaluation of student‘s performance in each course unit has two components; (a) internal continuous assessment and (b) the end-term examinations which are held at the end of semester/ academic year.

The level of student‘s academic performance as the aggregate of internal continuous assessment and the end term examination is reflected by letter grades on a ten point scale according to the connotations given below:

Grade	Qualitative Value	Range	Grade Points
A+	Excellent	90-100	10
A	Very Good	80-89	9
B+	Good	70-79	8
B	Reasonably Good	60-69	7
C	Average	50-59	6
Re	Reappear	49 and less	0

Course credit units are integer number indicating the weightage assigned the weightage assigned to a course unit, project, research work, summer internship etc. on the basis of contact per hours per week on all learning activities.

MINIMUM ACADEMIC REQUIREMENTS

1. The students must score a minimum Grade C+‘ in each course unit.

2. The student should secure a minimum overall CGPA of 5 at the end of final year.

CUMULATIVE GRADE POINT AVERAGE (CGPA):
The CGPA is used to describe overall performance in all courses in letter grades which a student has obtained. It is weightage average of grade points obtained by him/her in all the semester/years.

$$CGPA = \frac{\sum_{j=1}^{m} C_j p_j}{\sum_{j=1}^{m} C_j}$$

- Where “C_i” is number of credits of a course and “P_i” is the grade point in that course, m is the number of successfully completed course credited till that semester excluding “Re” grade.

CONVERSION OF CGPA TO PERCENTAGE OF MARKS:

Conversion from CGPA to percentage of marks do not have rigor or rationale. However an approximated and indicative equivalence between CGPA and percentage of marks can be assessed by multiplying CGPA with 9.5

DIVISION:

CGPA	EQUIVALENT DIVISION
8. and above	First division with distinction
6.5 but less than 8	First division
5. but less than 6.5	Second division

C.G.P.A = GRADE POINTS * CREDIT HOURS/TOTAL CREDITS

INTERNAL ASSESSMENT

- It will be for theory and practical both.
- It will be done through the whole year.
- Candidate must obtain at least 50% marks in theory and practical‘s separately in internal assessment to be eligible for the annual university examination
- Internal assessment (Theory) will be done as follows :

a)	Mid- term and term examinations	=10 marks
b)	Assignments / Projects / Class test / Clinical Presentation	= 10 marks
c)	Attendance	= 05marks
	Total	**=25marks**

Internal assessment (Practical) will be done as follows :

a)	Laboratory manual	=10 marks
b)	Assignments /Projects / Class test / Clinical Presentation	= 10 marks
c)	Attendance	=05 marks
	Total	**=25marks**

Internal assessment of subjects without practical‘s will be done as :

a)	Mid-term and term examinations	=10 marks
b)	Assignments/Projects/Class test/Clinical Presentations	=10 marks
c)	Attendance	=05 marks
	Total	**=25 marks**

THE COURSE STRUCTURE

First Year

Course code	Subject	Hours	Credits
BPT 101	Anatomy	210	7
BPT 102	Anatomy -Lab Hours	90	2
BPT 103	Physiology	150	5
BPT 104	Physiology Lab Hours	60	1
BPT 105	Biochemistry	60	2
BPT 106	Psychology (General and Clinical Psychology)	60	2
BPT 107	Introduction to Physiotherapy	150	5
BPT 108	Introduction to Physiotherapy Lab Hours	90	3
BPT 109*	Introduction to Basic Nursing	30	1
BPT 110*	English	30	1
BPT 111*	Introduction to National Healthcare Delivery System in India	30	1

*Not included for university examination

Total = 960Hrs (Th 720, Lab Hrs 240)

Second Year

Course code	Subject	Hours	Credits
BPT 201	Biomechanics and Kinesiology	120	4
BPT 202	Biomechanics and Kinesiology Lab Hours	60	2
BPT 203	Pharmacology	90	3
BPT 204	Sociology	60	2
BPT 205	Pathology and Microbiology	90	3
BPT 206	Electrotherapy and Actinotherapy	150	5
BPT 207	Electrotherapy and Actinotherapy - Lab Hours	90	3
BPT 208	Exercise and Manual Therapy	150	5
BPT 209	Exercise and Manual Therapy - Lab Hours	90	3
BPT 210*	Introduction to quality and patient safety	30	1

*Not included for university examination

Total = 930Hrs (Th 690, Lab Hrs 240)

Third Year

Course code	Subject	Hours	Credits
BPT 301	Orthopedics and Sports Medicine	120	4
BPT 302	Orthopedics and Sports Medicine Lab Hours	60	1
BPT 303	Neurology, Neurosurgery and Pediatrics	120	4
BPT 304	Community Medicine and Rehabilitation	60	2
BPT 305	Computer Application	60	2
BPT 306	General Medicine, First Aid and Emergency	120	4
BPT 307	General Surgery	90	3
BPT 308	PT in General Medicine and General Surgery	120	4
BPT 309	PT in General Medicine and General Surgery Lab Hours	60	1
BPT 310	Bioengineering	60	2
BPT 311*	Diagnostic Imaging for Physiotherapy	30	1
	Clinical Training	400	

*Not included for university examination

Total = 1300 Hrs (Th Hrs 780, Lab Hrs 120, clinical training =

400) Fourth Year

Course code	Subject	Hours	Credits
BPT 401	Research Methodology & Biostatistics	60	2
BPT 402	Organization & Administration: Law and Ethics	60	2
BPT 403	Orthopedics and Sports Physiotherapy	90	3
BPT 404	Orthopedics and Sports Physiotherapy Lab Hours	90	2
BPT 405	Neurophysiotherapy	90	3
BPT 406	Neurophysiotherapy Lab Hours	90	2
BPT 407	Cardiopulmonary Physiotherapy	90	3
BPT 408	Cardiopulmonary Physiotherapy Lab Hours	90	2
BPT 409	Research Project	60	2
BPT 410*	Health Promotion and Fitness	30	1
	Clinical Training	425	

*Not included for university examination

Total = 1150 Hrs (Th 480, Lab Hrs 270, clinical training= 425)

Chapter -5
Internship:

All candidates undergo a full time (950hr) supervised PT clinical practice for not less than 6 months in institutions/ hospitals/ centers recognized by Noida International University.

BPT 101 ANATOMY

SUBJECT DESCRIPTION - It is designed to provide students with the working knowledge of the structure of the human body which is essential foundation for their clinical studies.

1) Histology : General Histology, study of the basic tissues of the body; Microscope, Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS, Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue, Skin and its appendages.

2) Embryology

   a) Ovum, Spermatozoa, fertilization and formation of the Germ layers and their derivations.

   b) Development of skin, Fascia, blood vessels, lymphatic,

   c) Development of bones, axial and appendicular skeleton and muscles,

   d) Neural tube, brain vessels and spinal cord,

   e) Development of brain and brain stem tructures

3) Regional Anatomy

   a) Thorax:

   - Cardio – Vascular System Mediastinum: Divisions and contents Pericardium: Thoracic Wall: position, shape and parts of the heart; conducting System; blood Supply and nerve supply of the heart; names of the blood vessels and their distribution in the body – region wise.
   - Respiratory system - Outline of respiratory passages: Pleura and lungs: position, parts, relations, blood supply and nerve supply; Lungs – emphasize on bronco-pulmonary segments.
   - Diaphragm: Origin, insertion, nerve supply and action, openings in the diaphragm.
   - Intercostal muscles and Accessory muscles of respiration: Origin, insertion, nerve supply and action.

   b) Abdomen:

   - Peritoneum: Parietal peritoneum, visceral peritoneum, folds of peritoneum, functions of peritoneum.
   - Large blood vessels of the gut.

- Location, size, shape, features, blood supply, nerve supply and functions of the following: stomach, liver, spleen, pancreas, kidney, urinary bladder, intestines, gall bladder.

c) Pelvis: Position, shape, size, features, blood supply and nerve supply of the male and female reproductive system.

d) Endocrine glands: Position, shape, size, function, blood supply and nerve supply of the following glands: Hypothalamus and pituitary gland, thyroid glands, parathyroid glands, Adrenal glands, pancreatic islets, ovaries and testes, pineal glands, thymus.

4) Musculo Skeletal Anatomy -

a. Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc)

b. Connective tissue classification.

c. Bones- Composition & functions, classification and types according to morphology and development.

d. Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply and nerve supply of joints.

e. Muscles – origin, insertion, nerve supply and actions.

f. Upper Extremity

- Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
- Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of fore arm, back of fore arm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
- Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
- Arches of hand, skin of the palm and dorsum of hand.

g. Lower Extremity

- Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metartarsals and phalanges.
- Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.

- Joints: Hip Joint, Knee joint, Ankle joint, joints of the foot.

h. Trunk & Pelvis:

- Osteology: Cervical, thoracic, lumbar, sacral and coccygeal vertebrae and ribs.
- Soft tissue: Pre and Para vertebral muscles, intercostals muscles, anterior abdominal wall muscles, Inter-vertebral disc.
- Pelvic girdle and muscles of the pelvic floor.

i. Head and Neck:

- Osteology: Mandible and bones of the skull.
- Soft parts: Muscles of the face and neck and their nerve and blood supply-extra ocular muscles, triangles of the neck.
- Gross anatomy of eyeball, nose, ears and tongue.

j. Neuro Anatomy - Organization of Central Nervous system - Spinal nerves and autonomic nervous system mainly pertaining to cardiovascular, respiratory and urogenital system

- Cranial nerves
- Peripheral nervous system
- Peripheral nerve
- Neuromuscular junction
- Sensory end organs
- Central Nervous System
- Spinal segments and areas
- Brain Stem
- Cerebellum
- Inferior colliculi
- Superior Colliculi
- Thalamus

- Hypothalamus
- Corpus striatum
- Cerebral hemisphere

- Lateral ventricles
- Blood supply to brain
- Basal Ganglia
- The pyramidal system
- Pons, medulla, extra pyramidal systems
- Anatomical integration

BPT 102 ANATOMY PRACTICAL

Course Description: This course involves a detailed study of the microscopic, macroscopic and surface anatomy of the various systems of the body with a particular emphasis on the musculoskeletal, neurological and cardiopulmonary systems. Students will be instructed using dissected cadavers and organ specimens.

List of Practical / Demonstrations

1. Upper extremity including surface Anatomy.

2. Lower extremity including surface Anatomy.

3. Head & Spinal cord and Neck and Brain including surface Anatomy.

4. Thorax including surface anatomy, abdominal muscles.

5. Histology-Elementary tissue including surface Anatomy.

6. Embryology-models, charts & X-rays.

BPT 103 HUMAN PHYSIOLOGY

SUBJECT DESCRIPTION: The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

1. General Physiology

   a. Cell: Morphology. Organelles: their structure and functions

   b. Transport Mechanisms across the cell membrane

c. Body fluids: Distribution, composition.

2. Blood

a. Introduction: Composition and functions of blood.

b. Plasma: Composition, formation, functions. Plasma proteins.

c. RBC: count and its variations. Erythropoiesis- stages, factors regulating. Reticuloendothelial system (in brief) Haemoglobin –structure, function and derivatives Anemia (in detail), types of Jaundice. Blood indices, PCV, ESR.

d. WBC: Classification. Morphology, functions, count, its variation of each. Immunity

e. Platelets: Morphology, functions, count, its variations

f. Hemostatic mechanisms: Blood coagulation–factors, mechanisms. Their disorders. Anticoagulants.

g. Blood Groups: Landsteiner's law. Types, significance, determination, Erythroblastosis foetalis.

h. Blood Transfusion: Cross matching. Indications and complications.

i. Lymph: Composition, formation, circulation and functions.

3. Nerve Muscle Physiology

a. Introduction: Resting membrane potential. Action potential – ionic basis and properties.

b. Nerve: Structure and functions of neurons. Classification, Properties and impulse transmission of nerve fibers. Nerve injury – degeneration and regeneration. c. Neuroglia: Types and functions.

c. Muscle: Classification. Skeletal muscle: Structure. Neuromuscular junction: Structure. Neuromuscular transmission, myasthenia gravis. Excitation- Contraction coupling. Rigomortis.

4. Cardiovascular System

a. Introduction: Physiological anatomy and nerve supply of the heart and blood vessels. Organisation of CVS. Cardiac muscles: Structure. Ionic basis of action potential and pacemaker potential. Properties.

b. Conducting system: Components. Impulse conduction Cardiac Cycle: Definition. Phases of cardiac cycle. Pressure and volume curves. Heart sounds – causes, character. ECG: Definition. Different types of leads. Waves and their causes. P-R interval. Heart block.

c. Cardiac Output: Definition. Normal value. Determinants. Stroke volume and its regulation. Heart rate and its regulation. Their variations

d. Arterial Blood Pressure: Definition. Normal values and its variations. Determinants. Peripheral resistance. Regulation of BP.

e. Arterial pulse.

f. Shock – Definition. Classification–causes and features g. Regional Circulation: Coronary, Cerebral and Cutaneous circulation.

g. Cardiovascular changes during exercise.

5. Respiratory System -

a. Introduction: Physiological anatomy – Pleura, tracheo-bronchial tree, alveolus, respiratory membrane and their nerve supply. Functions of respiratory system. Respiratory muscles.

b. Mechanics of breathing: Intrapleural and Intrapulmonary pressure changes during respiration. Chest expansion. Lung compliance: Normal value, pressure-volume curve, factors affecting compliance and its variations. Surfactant – Composition, production, functions. RDS

c. Spirometry: Lung volumes and capacities. Timed vital capacity and its clinical significance. Maximum ventilation volume. Respiratory minute volume.

d. Dead Space: Types and their definition.

e. Pulmonary Circulation. Ventilation-perfusion ratio and its importance.

f. Transport of respiratory gases: Diffusion across the respiratory membrane. Oxygen transport – Different forms, oxygen-haemoglobin dissociation curve. Factors affecting it. P50, Haldane and Bohr effect. Carbon dioxide transport: Different forms, chloride shift.

g. Regulation of Respiration: Neural Regulation. Hering-breuer's reflex. Voluntary control. Chemical Regulation.

h. Hypoxia: Effects of hypoxia. Types of hypoxia. Hyperbaric oxygen therapy. Acclimatization Hypercapnoea. Asphyxia. Cyanosis – types and features. Dysbarism i. Disorders of Respiration: Dyspnoea. Orthopnoea. Hyperpnoea, hyperventilation, apnoea, tachypnoea. periodic breathing – types Artificial respiration

i. Respiratory changes during exercise.

6. Digestive System -

a. Introduction: Physiological anatomy and nerve supply of alimentary canal. Enteric nervous system

b. Salivary Secretion: Saliva: Composition. Functions. Regulation. Mastication (in brief)

c. Swallowing: Definition. Different stages. Function.

d. Stomach: Functions. Gastric juice: Gland, composition, function, regulation. Gastrin: Production, function and regulation. Peptic ulcer. Gastric motility. Gastric emptying. Vomiting.

e. Pancreatic Secretion: Composition, production, function. Regulation.

f. Liver: Functions of liver. Bile secretion: Composition, functions and regulation. Gallbladder: Functions.

g. Intestine: Succus entericus: Composition, function and regulation of secretion. Intestinal motility and its function and regulation.

h. Mechanism of Defecation.

7. Endocrine System -

a. Introduction: Major endocrine glands. Hormone: classification, mechanism of action. Functions of hormones

b. Pituitary Gland: Anterior Pituitary and Posterior Pituitary hormones: Secretory cells, action on target cells, regulation of secretion of each hormone. Disorders: Gigantism, Acromegaly, Dwarfism, Diabetes insipidus. Physiology of growth and development: hormonal and other influences.

c. Pituitary-Hypothalamic Relationship.

d. Thyroid Gland: Thyroid hormone and calcitonin: secretory cells, synthesis, storage, action and regulation of secretion. Disorders: Myxedema, Cretinism, Grave's disease.

e. Parathyroid hormones: secretory cell, action, regulation of secretion. Disorders: Hypoparathyroidism. Hyperthyroidism. Calcium metabolism and its regulation.

f. Adrenal Gland: Adrenal Cortex: Secretory cells, synthesis, action, regulation of secretion of Aldosterone, Cortisol, and Androgens. Disorders: Addison's disease, Cushing's syndrome, Conn's syndrome, Adrenogenital syndrome.

g. Adrenal Medulla: Secretory cells, action, regulation of secretion of adrenaline and noradrenaline. Disorders: Phoechromocytoma.

h. Endocrine Pancreas: Secretory cells, action, regulation of secretion of insulin and glucagon. Glucose metabolism and its regulation. Disorder: Diabetes mellitus.

i. Calcitrol, Thymus and Pineal gland (very brief).

j. j. Local Hormones.

8. Special Senses -

a. Vision: Introduction: Functional anatomy of eye ball. Functions of cornea, iris, pupil, aqueous humor – glaucoma, lens – cataract, vitreous humor, rods and cones. Photopic vision. Scotopic vision.

b. Visual Pathway and the effects of lesions.

c. Refractive Errors: myopia, hypermetropia, presbyopia and astigmatism.

d. Visual Reflexes: Accommodation, Pupillary and Light. Visual acuity and Visual field. Light adaptation. Dark adaptation.Color vision – color blindness. Nyctalopia.

e. Audition: Physiological anatomy of the ear. Functions of external ear, middle ear and inner ear. Structure of Cochlea and organ of corti. Auditory pathway. Types of Deafness. Tests for hearing. Audiometry.

f. Taste: Taste buds. Primary tastes. Gustatory pathway.

g. Smell: Olfactory membrane. Olfactory pathway.

h. Vestibular Apparatus: Crista ampullaris and macula. Funcions. Disorders

9. Nervous System -

a. Introduction: Organisation of CNS – central and peripheral nervous system. Functions of nervous system. Synapse: Functional anatomy, classification, Synaptic transmission. Properties.

b. Sensory Mechanism: Sensory receptors: function, classification and properties. Sensory pathway: The ascending tracts – Posterior column tracts, lateral spinothalamic tract and the anterior spinothalamic tract – their origin, course, termination and functions. The trigeminal pathway. Sensory cortex. Somatic sensations: crude touch, fine touch, tactile localization, tactile discrimination, stereognosis, vibration sense, kinesthetic sensations. Pain sensation: mechanism of pain. Cutaneous pain –slow and fast pain, hyperalgesia. Deep pain. Visceral pain – referred pain. Gate control theory of pain. tabes dorsalis, sensory ataxia.

c. Motor Mechanism: Motor Cortex. Motor pathway: The descending tracts – pyramidal tracts, extrapyramidal tracts – origin, course, termination and functions. Upper motor neuron and lower motor neuron. Paralysis, monoplegia, paraplegia, hemiplegia and quadriplegia.

d. Reflex Action: components, Bell-Magendie law, classification and Properties. Monosynaptic and polysynaptic reflexes, superficial reflexes, deep reflexes.Stretch reflex– structure of muscle spindle, pathway, higher control and functions. Inverse stretch reflex. Muscle tone – definition, and properties hypotonia, atonia and hypertonia. UMNL and LMNL

e. Spinal cord Lesions: Complete transection and Hemisection of the spinal cord.

f. Cerebellum: Functions. Cerebellar ataxia. g. Posture and Equilibrium: Postural reflexes – spinal, medullary, midbrain and cerebral reflexes.

g. Thalamus and Hypothalamus: Nuclei. Functions. Thalamic syndrome

h. Reticular Formation and Limbic System: Components and Functions.

i. Basal Ganglia: Structures included and functions. Parkinson's disease.

j. Cerebral Cortex: Lobes. Brodmann's areas and their functions. Higher functions of cerebral cortex – learning, memory and speech.

k. EEG: Waves and features. Sleep: REM and NREM sleep.

l. CSF: Formation, composition, circulation and functions. Lumbar puncture and its significance. Blood brain barrier. Hydrocephalus.

m. ANS: Features and actions of parasymapathetic and sympathetic nervous system.

10. Renal System -

a. Introduction: Physiological anatomy. Nephrons – cortical and juxtamedullary. Juxtaglomerular apparatus. Glomerular membrane. Renal blood flow and its regulation. Functions of kidneys.

b. Mechanism of Urine Formation: Glomerular Filtration: Mechanism of glomerular filtration. GFR – normal value and factors affecting. Renal clearance. Inulin clearance. Creatinine clearance.

c. Tubular Reabsorption: Reabsorption of Na+, glucose, HCO3-, urea and water. Filtered load. Renal tubular transport maximum. Glucose clearance: TmG. Renal threshold for glucose.

d. Tubular Secretion: Secretion of H+ and K+. PAH clearance.

e. Mechanism of concentrating and diluting the Urine: Counter-current mechanism. Regulation of water excretion. Diuresis. Diuretics.

f. Micturition: Mechanism of micturition. Cystometrogram. Atonic bladder, automatic bladder.

g. Acid-Base balance (very brief)

h. Artificial Kidney: Principle of haemodialysis.

i. Skin and temperature regulation.

11. Reproductive System -

a. Introduction: Physiological anatomy reproductive organs. Sex determination. Sex differentiation. Disorder

b. Male Reproductive System: Functions of testes. Pubertal changes in males. Spermatogenesis. Testosterone: action. Regulation of secretion. Semen.

c. Female Reproductive System: Functions of ovaries and uterus. Pubertal changes in females. Oogenesis. Hormones: estrogen and progesterone-action. Regulation of secretion. Mentrual Cycle: Phases. Ovarian cycle. Uterine cycle. Hormonal basis. Menarche. Menopause. Pregnancy: Pregnancy tests. Physiological changes during pregnancy. Functions of placenta. Lactation. Contraception methods

12. Physiology of exercise –

a. Effects of acute and chronic exercise on

- O2 transport
- Muscle strength/power/endurance
- B.M.R. /R.Q.
- Hormonal and metabolic effect
- Cardiovascular system
- Respiratory system
- Body fluids and electrolyte

b. Effect of gravity / altitude /acceleration / pressure on physical parameters

c. Physiology of Age

APPLIED PHYSIOLOGY - More detailed study of the physiology and practical applications of the following selected topics with emphasis on aspects, which should help in understanding the nature and treatment of common clinical situations of interest in Physiotherapy.

1. Pulmonary Functions

a. Properties of gases, Mechanics of respiration, Diffusion capacity, special features of pulmonary circulation and their application.

b. Respiratory adjustments in exercises.

c. Artificial respiration d. Breath sounds.

2. Cardio vascular Functions

a. Blood flow through arteries, arterioles, capillaries, veins and venuoles.

b. Circulation of Lymph, Oedema

c. Factors affecting cardiac output.

d. Circulatory adjustment in exercise and in postural and gravitational changes,

e. Pathophysiology of fainting and heart failure.

3. Muscles and Nervous System Functions

a. Peripheral nervous system, neuromuscular transmission, Types of nerve fibers.

b. Action potential, Strength-duration curve, ECG, EMG, VEP, NCV

c. Degeneration and regeneration of nerve, Reactions of denervations.

d. Synaptic transmission, Stretch reflex- Mechanism and factors affecting it.

e. Posture, Balance and Equilibrium/Coordination of voluntary movement.

f. Voluntary motor action, clonus, Rigidity, incoordination.

g. Special senses- Vision, taste, hearing, vestibular, Olfaction

h. Sympathetic and Parasympathetic regulation, Thermoregulation.

4. Blood functions

a. Thalassemia Syndrome, Hemophilia, VWF

b. Anemia, Leukocytosis

c. Bone marrow transplant

5. Metabolic Functions

a. Diabetes Mellitus, Physiological basis of Peptic Ulcer, Jaundice, GIT disorders and Dietary fiber, Thyroid functions, Vitamins deficiency.

BPT 104 HUMAN PHYSIOLOGY PRACTICAL

Course Description: Practical classes include hematology experiments, clinical examinations, amphibian chart, and recommended demonstrations.

1. Haematology: To be done by the students a. Study of Microscope and its uses b. Determination of RBC count c. Determination of WBC count d. Differential leukocyte count e. Estimation of hemoglobin f. Calculation of blood indices g. Determination of blood groups h. Determination of bleeding time i. Determination of clotting time Demonstrations only j. Determination of ESR k. Determination of PCV

2. Amphibian Experiments – Demonstration and Dry charts Explanation. Instruments used for frog experiments. Kymograph, heart liver, Muscle trough, stimulator.

   a. Simple muscle curve.

   b. Effect of increasing the strength of the stimuli

c. Effect of temperature on muscle contraction

d. Effect of two successive stimuli.

e. Effect of Fatigue.

f. Effect of load on muscle contraction

g. Genesis of tetanus and clonus.

h. Velocity of impulse transmission.

3. Clinical Examination

a. Examination of Radial pulse.

b. Recording of blood pressure

c. Examination of CVS

d. Examination of Respiratory system

e. Examination of Sensory system

f. Examination of Motor System

g. Examination of reflexes

h. Examination of cranial nerves

4. Amphibian Experiments – Demonstration and Dry charts Explanation.

a. Normal cardiogram of amphibian heart.

i. Properties of Cardiac muscle

ii. Effect of temperature on cardiogram.

3. Recommended Demonstrations

a. Spirometry

b. Artificial Respiration

c. ECG

d. Perimetry

e. Mosso's Ergometry

a. Simple muscle curve.

b. Effect of increasing the strength of the stimuli

c. Effect of temperature on muscle contraction

d. Effect of two successive stimuli.

e. Effect of Fatigue.

f. Effect of load on muscle contraction

g. Genesis of tetanus and clonus.

h. Velocity of impulse transmission.

BPT 105 BIOCHEMISTRY

Course Description : This course involves a study of the metabolism of carbohydrates, proteins, fats, minerals, vitamins and essential enzymes. The role of these in the functioning of the human body will be discussed.

1. Nutrition –

   a. Introduction, Importance of nutrition Calorific values, Respiratory quotient – Definition, and its significance Energy requirement of a person - Basal metabolic rate: Definition, Normal values, factor affecting BMR Special dynamic action of food.

   b. Physical activities - Energy expenditure for various activities. Calculation of energy requirement of a person

   c. Balanced diet

      - Recommended dietary allowances
      - Role of carbohydrates in diet: Digestible carbohydrates and dietary fibers
      - Role of lipids in diet
      - Role of proteins in diet: Quality of proteins - Biological value, net protein utilization, Nutritional aspects of proteins-essential and non- essential amino acids. N itrogen balance
      - Nutritional disorders.

2. Carbohydrate Chemistry –

   a. Definition, general classification with examples, Glycosidic bond

b. Structures, composition, sources, properties and functions of Monosaccharides, Disaccharides, Oligosaccharides and Polysaccharides. c. Glycosaminoglycan (mucopolysaccharides)

3. Lipid Chemistry –

a. Definition, general classification

b. Definition, classification, properties and functions of Fatty acids, Triacylglycerol, Phospholipids, Cholesterol

c. Essential fatty acids and their importance

d. Lipoproteins: Definition, classification, properties, Sources and function Ketone bodies

4. Amino-acid Chemistry –

a. Amino acid chemistry: Definition, Classification, Peptide bonds

b. Peptides: Definition, Biologically important peptides

c. Protein chemistry: Definition, Classification, Functions of proteins,

5. Enzymes –

a. Definition, Active site, Cofactor (Coenzyme, Activator), Proenzyme. Classification with examples, Factors effecting enzyme activity, Enzyme inhibition and significance, Isoenzymes, Diagnostic enzymology (clinical significance of enzymes)

6. Nucleotide and Nucleic acid Chemistry -

a. Nucleotide chemistry: Nucleotide composition, functions of free nucleotides in body.

b. Nucleic acid (DNA and RNA) chemistry: Difference between DNA and RNA, Structure of DNA (Watson and Crick model), Functions of DNA. Structure and functions of tRNA, rRNA, mRNA.

7. Digestion and Absorption -

a. General characteristics of digestion and absorption, Digestion and absorption of carbohydrates, proteins and lipids. Disorders of digestion and absorption – Lactose intolerance.

8. Carbohydrate Metabolism -

a. Introduction, Glycolysis – Aerobic, Anaerobic Citric acid cycle, Substrate level phosphorylation.

b. Glycogen metabolism – Glycogenesis, Glycogenolysis, Metabolic disorders glycogen, Gluconeogenesis, Cori cycle

c. Hormonal regulation of glucose, Glycosuria, Diabetes mellitus.

9. Lipid Metabolism -

a. Introduction to lipid metabolism, Lipolysis, Oxidation of fatty acids - oxidation of fatty acids,

b. Lipogenesis - Denovo synthesis of fatty acids, chain elongation, desaturation, triacylglycerol synthesis, fat metabolism in adipose tissues

c. Ketone body metabolism: Ketone body formation (ketogenesis), utilization (ketolysis), ketosis, Rothera's test.

d. Cholesterol metabolism: synthesis, degradation, cholesterol transport

e. Hypercholesterolemia and its effects (atherosclerosis and coronary heart diseases) Hypocholesterolemic agents, Common hyperlipoproteinemia, Fatty liver

10. Amino acid and Protein Metabolism -

a. Catabolism of amino acids - Introduction, transamination, deamination, Fate of ammonia, transport of ammonia, Urea cycle

b. Specialized products formed from amino acids - from glycine, arginine, methionine, phenylalanine and tyrosine.

11. Vitamins -

a. Definition, classification according to solubility,

b. Individual vitamins - Sources, Coenzyme forms, functions, RDA, digestion, absorption and transport, deficiency and toxicity.

12. Mineral Metabolism-

a. Definition, Sources, RDA, Digestion, absorption, transport, excretion, functions, disorder of Individual minerals - Calcium, phosphate, iron, Magnesium, fluoride, selenium, molybdenum, copper. Phosphate, calcium and iron in detail.

13. Cell Biology -

a. Introduction, Cell structure, Cell membrane structure and function, various types of absorption. Intracellular organelles and their functions, briefly on cytoskeleton.

14. Muscle Contraction -

a. Contractile elements in muscle, briefly on the process of muscle contraction, Energy for muscle contraction.

15. Biochemistry of Connective tissue –

a. Introduction, various connective tissue proteins: Collagen, elastin - Structure and associated disorders. Glycoproteins, Proteoglycans.

16. Hormone Action -

a. Definition, classification, Mechanism of hormone action. Receptors, signal transduction, second messengers and cell function.

17. Acid-Base balance -

a. Acids, bases and buffers, pH. Buffer systems of the body, bicarbonate buffer system Role of lungs and kidneys in acid base balance, Acid base imbalance.

18. Water balance -

a. Water distribution in the body, Body water, water turnover, Regulation of water balance: role of ADH and thirst centre.

19. Electrolyte balance -

a. Osmolarity. Distribution of electrolytes.

b. Electrolyte balance: Role of aldosterone, rennin angiotensin system and ANF.

20. Clinical Biochemistry -

a. Normal levels of blood and urine constituents, Relevance of blood and urine levels of Glucose, Urea, Uric acid, Creatinine, Calcium, Phosphates, pH and Bicarbonate. Liver function tests, Renal function tests.

ENGLISH, COMMUNICATION AND SOFT SKILLS

Major topics to be covered under Communication course –

1. Basic Language Skills: Grammar and Usage.

2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.

3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.

4. Basic concepts & principles of good communication

5. Special characteristics of health communication

6. Types & process of communication – verbal, non-verbal and written communication. Upward, downward and lateral communication.

7. Therapeutic communication: empathy versus sympathy.

8. Communication methods for teaching and learning.

9. Communication methods for patient education.

10. Barriers of communication & how to overcome.

BPT 106 GENERAL & CLINICAL PSYCHOLOGY

SUBJECT DESCRIPTION -

Human Psychology involves the study of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups.

The study of these subjects will help the student to understand their clients while assessment and while planning appropriate treatment methods.

1. Introduction to Psychology a. Schools: Structuralism, functionalism, behaviorism, Psychoanalysis. b. Methods: Introspection, observation, inventory and experimental method. c. Branches: pure psychology and applied psychology d. Psychology and physiotherapy

2. Growth and Development a. Life span: Different stages of development (Infancy, childhood, adolescence, adulthood, middle age, old age). b. Heredity and environment: role of heredity and environment in physical and psychological development, “Nature v/s Nurture controversy”.

3. Sensation, attention and perception a. Sensation: Vision, Hearing, Olfactory, Gustatory and Cutaneous sensation, movement, equilibrium and visceral sense. b. Attention: Types of attention, Determinants of attention (subjective determinants and objective determinants). c. Perception: Gestalt principles of organization of perception (principle of figure ground and principles of grouping), factors influencing perception (past experience and context). d. Illusion and hallucination: different types.

4. Motivation a. Motivation cycle (need, drive, incentive, reward). b. Classification of motives. c. Abraham Maslow’s theory of need hierarchy 5. Frustration and conflict

a. Frustration: sources of frustration. b. Conflict: types of conflict. c. Management of frustration and conflict

6. Emotions a. Three levels of analysis of emotion (physiological level, subjective state, and overt behavior). b. Theories of emotion c. Stress and management of stress.

7. Intelligence a. Theories of intelligence. b. Distribution of intelligence. c. Assessment of intelligence

8. Thinking a. Reasoning: deductive and inductive reasoning b. Problem solving: rules in problem solving (algorithm and heuristic) c. Creative thinking: steps in creative thinking, traits of creative people

9. Learning a. Factors effecting learning. b. Theories of learning: trial and error learning, classical conditioning, Operant conditioning, insight learning, social learning theory. c. The effective ways to learn: Massed/Spaced, Whole/Part, Recitation/Reading, Serial/Free recall, Incidental/Intentional learning, Knowledge of results, association, organization, and mnemonic methods.

10. Personality a. Approaches to personality: type & trait, behavioristic, psychoanalytic and humanistic approach. b. Personality assessment: observation, situational test, questionnaire, rating scale, interview, and projective techniques. c. Defense Mechanisms: denial of reality, rationalization, projection, reaction formation, identification, repression, regression, intellectualization, undoing, introjection, acting out.

11. Social psychology a. Leadership: Different types of leaders. Different theoretical approaches to leadership. b. Attitude: development of attitude. Change of attitude.

12. Clinical psychology – Models of training, abnormal behavior assessment, clinical judgement, psychotherapy, self-management methods, physiotherapist patient interaction, aggression, selfimaging, stress management, assertive training, Group therapy, Body awareness, Pediatric, child and geriatric clinical psychology.

BPT 107 INTRODUCTION TO PHYSIOTHERAPY

Course Description (Exercise Therapy): This course involves a study of the basic physical principles as they relate to the application of Exercise Therapy.

1.OrientationTo Physiotherapy

1. Introduction to Physiotherapy

2. Components of Physiotherapy Profession:
   a. History of Medical Therapeutics
   b. History of Physiotherapy
   c. Overview of Health Science Professions

3. Role of Physiotherapy in meeting Health Care
   a. Needs in India.
   b. Needs versus Demands
   c. Physiotherapist as 'Educator'
   d. Typical Job settings

e. Common problems and solutions

2. OrientationTo Electrotherapy

SUBJECT DESCRIPTION - In this course the student will learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function. The objective of this course is that after 240hrs of lectures, demonstration, practical and clinics the student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

A - Low frequency Currents

1. Basic types of current

a. Direct Current: types, physiological &therapeutic effects.

b. Alternating Current

2. Types of Current used in Therapeutics

a. Modified D.C

- Faradic Current
- Galvanic Current

a. Modified A.C

- Sinusoidal Current
- Diadynamic Current.

3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.

4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.

5. Sinusoidal Current & Diadynamic Current in Brief.

6. HVPGS – Parameters & its uses

7. Ionization / Iontophoresis: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing.

8. Cathodal / Anodal galvanism.

9. Micro Current & Macro Current

10. Types of Electrical Stimulators

a. NMES- Construction component.

b. Neuro muscular diagnostic stimulator- construction component.

c. Components and working Principles

11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.

12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair.

13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.

14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

Section II B - Electro-diagnosis

1. FG Test

2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.

3. Nerve conduction velocity studies

4. EMG: Construction of EMG equipment.

5. Bio-feed back.

PRACTICAL The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.

1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.

2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.

3. Demonstrate placement of electrodes for various electrotherapy modalities

4. Electrical stimulation for the muscles supplied by the peripheral nerves

5. Faradism under Pressure for UL and LL

6. Plotting of SD curve with chronaxie and rheobase

7. Demonstrate FG test

3.OrientationTo Exercise Therapy

SUBJECT DESCRIPTION - In this course, the students will learn the principles and effects of exercise as a therapeutic modality and will learn the techniques in the restoration of physical functions.

THEORY

1. Introduction to Exercise Therapy - The aims of Exercise Therapy, The techniques of Exercise Therapy, Approach to patient's problems, Assessment of patient's condition
   – Measurements of Vital parameters, Starting Positions – Fundamental positions & derived Positions, Planning of Treatment

2. Methods of Testing

   a. Functional tests

   b. Measurement of Joint range: ROM-Definition, Normal ROM for all peripheral joints & spine, Goniometer-parts, types, principles, uses, Limitations of goniometry, Techniques for measurement of ROM for all peripheral joints

   c. Tests for neuromuscular efficiency

      - Electrical tests

      - Manual Muscle Testing: Introduction to MMT, Principles & Aims, Indications & Limitations, Techniques of MMT for group &

individual: Techniques of MMT for upper limb / Techniques of MMT for lower limb / Techniques of MMT for spine.

- Anthropometric Measurements: Muscle girth – biceps, triceps, forearm, quadriceps, calf
- Static power Test
- Dynamic power Test
- Endurance test
- Speed test

d. Tests for Co-ordination

e. Tests for sensation

f. Pulmonary Function tests

g. Measurement of Limb Length: true limb length, apparent limb length, segmental limb length

h. Measurement of the angle of Pelvic Inclination

3. Relaxation

   a. Definitions: Muscle Tone, Postural tone, Voluntary Movement, Degrees of relaxation,

   b. muscal tension in muscle, Stress mechanics, types of stresses, Effects of stress on the body mechanism, Indications of relaxation, Methods & techniques of relaxationPrinciples & uses: General, Local, Jacobson's, Mitchel's, additional methods.

4. Passive Movements a. Causes of immobility, Classification of Passive movements, Specific definitions related to passive movements, Principles of giving passive movements, Indications, contraindications, effects of uses , Techniques of giving passive movements.

5. Active Movements

   a. Definition of strength, power & work, endurance, muscle actions.

   b. Physiology of muscle performance: structure of skeletal muscle, chemical & mechanical events during contraction &relaxation, muscle fiber type, motor unit, force gradation.

   c. Causes of decreased muscle performance

d. Physiologic adaptation to training: Strength & Power, Endurance.

e. Types of active movements

6. Free exercise: Classification, principles, techniques, indications, contraindications, effects and uses

7. Active Assisted Exercise: principles, techniques, indications, contraindications, effects and uses Assisted-Resisted Exercise: principles, techniques, indications, contraindications, effects and uses Resisted Exercise: Definition, principles, indications, contraindications, precautions & techniques, effects and uses

8. Types of resisted exercises: Manual and Mechanical resistance exercise, Isometric exercise, Dynamic exercise: Concentric and Eccentric, Dynamic exercise: Constant versus variable resistance, Isokinetic exercise, Open-Chain and Closed-Chain exercise.

BPT 108 INTRODUCTION TO PHYSIOTHERAPY LAB HOURS

The course involves a study of the basic physical principles as they relate to the application of Exercise Therapy. The student should be able to explain the physical rationale for the selection of appropriate exercises.

1. Mechanical principles applied applied in physiotherapy like force,centre of gravity etc

2. Demonstration of different types of levers in human body.

3. Demonstration of archedes principle of floatation and bernauli's theorem in hydrotherapy.

4. Demonstration of axial and pendular suspension.

5. Clinical observation

BPT 109 BASIC NURSING

(Not for university Examination)

HOURS : 30 Hrs

CREDIT: 1

1. Introduction to Nursing.

Nursing principles.Inter-Personnel relationships.Bandaging : Basic turns;Bandaging extremities; Triangular Bandages and their application.

2. Nursing Position:

Environment safety; Bed making, prone, lateral, dorsal, dorsal recumbent,Flower's positions, comfort measures, Aids and rest and sleep.

3. Lifting and Transporting Patients :

Lifting Patients up in the bed.Transferring from bed towheelchair."Transferring from bed to stretcher".

4. Bed side Management :

Giving and taking Bed pan, Urinal : Observation of stools, urine.Observation of sputum, Understand use and care of catheters, enema giving.

5. Methods of Giving Nourishment:

Feeding, Tube feeding, drips, transfusion

6. Care of Rubber Goods:

Obervation, Reporting and Recording Temperature, Respiration andPulse, Simple aseptic Technique, Sterlisation and Disinfection.

7. Surgical Dressing:

Observation of dressing procedures

BPT 110 ENGLISH

(Not for university Examination)

HOURS : 30 Hrs

1. Introduction:

   Study techniques, Organisation of effective note taking and logical processes of analysis and synthesis, the use of the dictionary, enlargement of vocabulary&effective diction.

2. Applied Grammar:

   Correct usage, the structure of sentences, the structure of paragraphs.

3. Written Composition:

   Precise writing and summarising, writing of bibliography, enlargement of vocabulary.

4. Reading and comprehension

   Review of selected materials and express oneself in one's words, enlargement of vocabulary.

5. The study of various forms of composition :Paragraph, essay, letter, summary, practice in writing.

6. Verbal communication:

   Discussions and summarization, debates, oral reports, use in teaching.

BPT 111 INTRODUCTION TO NATIONAL HEALTHCARE DELIVERY SYSTEM IN INDIA

(Not for university Examination)

SUBJECT DESCRIPTION: The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system

   a. Healthcare delivery system in India at primary, secondary and tertiary care

   b. Community participation in healthcare delivery system

   c. Health system in developed countries.

   d. Private Sector

   e. National Health Mission

   f. National Health Policy

   g. Issues in Health Care Delivery System in India

2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.

3. Introduction to AYUSH system of medicine

   a. Introduction to Ayurveda.

   b. Yoga and Naturopathy

   c. Unani

   d. Siddha

   e. Homeopathy

   f. Need for integration of various system of medicine

4. Health scenario of India- past, present and future

5. Demography & Vital Statistics-

   a. Demography – its concept

   b. Vital events of life & its impact on demography

c. Significance and recording of vital statistics

d. Census & its impact on health policy

6. Epidemiology

a. Principles of Epidemiology

b. Natural History of disease

c. Methods of Epidemiological studies

d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

BPT 201 BIOMECHANICS & KINESIOLOGY

Course Description: Biomechanics involves the study of basic concepts of human movement, and application of various biomechanical principles in the evaluation and treatment of disorders of musculoskeletal system. Students are taught to understand the various quantitative and qualitative methods of movement. Mechanical principles of various treatment methods are studied. Study of posture and gait are also included.

Course Objectives: The student will be able to tailor an effective treatment programme using biomechanical principle.

THEORY

1. Basic Concepts in Biomechanics: Kinematics and Kinetics

a. Types of Motion
b. Location of Motion
c. Direction of Motion
d. Magnitude of Motion
e. Definition of Forces
f. Force of Gravity
g. Reaction forces
h. Equilibrium
i. Objects in Motion
j. Force of friction
k. Concurrent force systems
l. Parallel force system
m. Work

n. Moment arm of force
o. Force components
p. Equilibrium of levers

2. Joint structure and Function -

a. Joint design
b. Materials used in human joints
c. General properties of connective tissues
d. Human joint design
e. Joint function
f. Joint motion
g. General effects of disease, injury and immobilization.

3. Muscle structure and function -

a. Mobility and stability functions of muscles
b. Elements of muscle structure
c. Muscle function
d. Effects of immobilization, injury and aging

4. Biomechanics of the Thorax and Chest wall -

a. General structure and function
b. Rib cage and the muscles associated with the rib cage
c. Ventilatory motions: its coordination and integration
d. Developmental aspects of structure and function
e. Changes in normal structure and function I relation to pregnancy, scoliosis and COPD

5. The Temporomandibular Joint-

a. General features, structure, function and dysfunction

6. Biomechanics of the vertebral column -

a. General structure and function
b. Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region
c. Muscles of the vertebral column
d. General effects of injury and aging

7. Biomechanics of the peripheral joints -

a. The shoulder complex: Structure and components of the shoulder complex and their integrated function

b. The elbow complex: Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury.

c. The wrist and hand complex: Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand.

d. The hip complex: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur:

e. The knee complex: structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease.

f. The ankle and foot complex.: structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus

8. Analysis of Posture and Gait – Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation; general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and malalignments in gait;Movement Analysis : ADL activities like sitting – to standing, lifting, various grips , pinches.

9. BIOMECHANICS & CLINICAL KINESIOLOGY

1. Biomechanics of Tissues and structures of the musculoskeletal system and clinical application.

2. Normal and applied Biomechanics of Spine, Upper extremity and Lower extremity.

3. Clinical kinesiology of posture.

4. Biomechanics and patho mechanics of respiration, circulation, hand function and gait.

5. Methods of kinetics and kinematics investigation

6. Patient Positioning, Body Mechanics and Transfer Techniques

7. Ergonomic Approach to lifting and handling, workspace and Environment

BPT 202 BIOMECHANICS AND KINESIOLOGY- LAB. HOURS

Course Description: This course involves a description of biomechanical principles.

Course Objectives: The student will be able to tailor an effective treatment programme using biomechanical principle.

PRACTICAL- shall be conducted for various joint movements and analysis of the same. Demonstration may also be given as how to analyze posture and gait. The student shall be taught and demonstrated to analysis for activities of daily living – ADL – (like sitting to standing, throwing, lifting etc.) The student should be able to explain and demonstrate the movements occurring at the joints, the muscles involved, the movements or muscle action produced, and mention the axis and planes through which the movements occur. The demonstrations may be done on models or skeleton.

1. Study the effects of forces on objects.
2. Determination of the C.G. of an object.
3. Identification of axes and planes of motion at the joints of spine, shoulder girdle, joints of upper extremity, pelvic girdle and joints of lower extremity.
4. Study the effects of different types of muscle contraction, muscle work group action of muscles and coordinated movement.
5. Analysis of normal posture respect to L.O.G. and the optimal position of joints in Antero-posterior and Medio-lateral views.
6. Analysis of normal gait and measurement of spatio- temporal features.

Recommended Books

1. Joint Structure and Function- Norkin
2. Biomechhanics of Human Motion- Leveau

BPT 203 PHARMACOLOGY

SUBJECT DESCRIPTION - This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

1. General Pharmacology –

    a. Introduction, Definitions, Classification of drugs, Sources of drugs, Routes of drug administration, Distribution of drugs, Metabolism and Excretion of drugs Pharmacokinetics, Pharmacodynamics, Factors modifying drug response, Adverse effects.

2. Autonomic Nervous system –

a. General considerations – The Sympathetic and Parasympathetic Systems, Receptors, Somatic Nervous System

b. Cholinergic and Anti-Cholinergic drugs, Adrenergic and Adrenergic blocking drugs, Peripheral muscle relaxants.

3. Cardiovascular Pharmacology –

a. Drugs used in the treatment of heart failure: Digitalis, Diuretics, Vasodilators, ACE inhibitors Antihypertensive Drugs: Diuretics, Beta Blockers, Calcium Channel Blockers, ACE Inhibitors, Central Acting Alpha Agonists, Peripheral Alpha Antagonists, Direct acting Vasodilators

b. Antiarrhythmic Drugs

c. Drugs used in the treatment of vascular disease and tissue ischemia : Vascular Disease, Hemostasis Lipid-Lowering agents, Antithrombotics, Anticoagulants and Thrombolytics Ischemic Heart Disease – Nitrates, Beta-Blockers, Calcium Channel Blockers, Cerebral Ischemia Peripheral Vascular Disease.

4. Neuropharmacology –

a. Sedative-Hypnotic Drugs: Barbiturates, Benzodiazepines

b. Antianxiety Drugs: Benzodiazepines, Other Anxiolytics

c. Drugs Used in Treatment of Mood Disorders: Monoamine Oxidase Inhibitors, Tricyclic Antidepressants, Atypical Antidepressants, Lithium

d. Antipsychotic drugs

5. Disorders of Movement -

a. Drugs used in Treatment of Parkinson ’s disease

b. Antiepileptic Drugs

c. Spasticity and Skeletal Muscle Relaxants

6. Inflammatory/Immune Diseases -

a. Non-narcotic Analgesics and Nonsteroidal Anti-Inflammatory Drugs: Acetaminophen, NSAIDs, Aspirin, Nonaspirin NSAIDs, drug Interactins with NSAIDs

b. Glucocorticoids: Pharmacological Uses of Glucocorticoids, adverse effects, Physiologic Use of Glucocorticoids

c. Drugs Used in Treatment of Arthritic Diseases: Rheumatoid Arthritis, Osteoarthritis, Gout

- Drugs Used in the Treatment of Neuromuscular Immune/Inflammatory Diseases: Myasthenia gravis, Idiopathic Inflammatory Myopathies, systemic lupus Erythematous, Scleroderma, Demyelinating Disease

- Respiratory Pharmacology: Obstructive Airway Diseases, Drugs used in Treatment of Obstructive airway Diseases, Allergic Rhinitis

7. Digestion and Metabolism -
   a. Gastrointestinal Pharmacology: Peptic Ulcer Disease, Constipation, Diarrhea Drugs Used in Treatment of Diabetes Mellitus: Insulin, Oral Hypoglycemic

8. Geriatrics -
   a. Pharmacology and the geriatric Population: Adverse effects of special concern in the Elderly, Dementia, Postural hypotension.

Recommended Books

1. Essential of Medical Pharmacology- K. D. Tripathi
2. Pharmacology in Rehabilitations- Ciccone

BPT 204 SOCIOLOGY

SUBJECT DESCRIPTION - Sociology will introduce student to the basic sociology concepts, principles and social process, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

THEORY

1. Introduction:

a. Meaning- Definition and scope of sociology

b. Its relation to Anthropology, Psychology, Social Psychology.

c. Methods of Sociological investigations- Case study, social survey, questionnaire, Interview and opinion poll methods.

d. Importance of its study with special reference to Health Care Professionals.

2. Social Factors in Health and disease situations:

a. Meaning of social factors

b. Role of social factors in health and illness

3. Socialization:

a. Meaning and nature of socialization.

b. Primary, Secondary and Anticipatory socialization.

c. Agencies of socialization.

4. Social Groups:

a. Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

5. Family:

a. The family, meaning and definitions.

b. Functions of types of family

c. Changing family patterns

d. Influence of family on the individuals health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy.

6. Community:

a. Rural community: Meaning and features –Health hazards of ruralities, health hazards to tribal community.

b. Urban community: Meaning and features- Health hazards of urbanities.

7. Culture and Health:

a. Concept of Health

b. Concept of Culture

c. Culture and Health

d. Culture and Health Disorders

8. Social change:

a. Meaning of social changes.

b. Factors of social changes.

c. Human adaptation and social change

d. Social change and stress.

e. Social change and deviance.

f. Social change and health programme

g. The role of social planning in the improvement of health and rehabilitation.

9. Social Problems of disabled: Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.

a. Population explosion

b. Poverty and unemployment

c. Beggary

d. Juvenile delinquency

e. Prostitution

f. Alchoholism

g. Problems of women in employment

h. Geriatric problems

i. Problems of underprivileged.

10. Social Security:

a. Social security and social legislation in relation to the disabled.

11. Social worker:

a. Meaning of Social Work

b. The role of a Medical Social Worker.

Recommended Books

1. Introduction to Sociology- VidyaBhushan
2. The Structure of Sociological Theory- Turner
3. Perspectives in Sociology- Cuff, Shaerock

BPT205 PATHOLOGY AND MICROBIOLOGY

SUBJECT DESCRIPTION: This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Pathology involves the study of causes and mechanisms of diseases. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding of Microbiology & Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

THEORY – General Pathology

1. Introduction to Pathology

2. Cell injuries –

a. Aetiology and Pathogenesis with a brief recall of important aspects of normal cell structure. Reversible cell injury: Types, Sequential changes, Cellular swellings, vacuolation, Hyaline changes, Mucoid changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Pathologic calcification: Dystrophic and Metastatic. Intracellular Accumulations - Fatty changes, Protein accumulations, Glycogen accumulations,

b. Pigments - Melanin / Hemosiderin.

c. Extra cellular accumulations: Amyloidosis - Classification, Pathogenesis, Pathology including special stains.

3. Inflammation and Repair –

a. Acute inflammation: features, causes, vascular and cellular events.

b. Inflammatory cells and Mediators. Chronic inflammation: Causes, Types, Classification nonspecific and granulomatous with examples.

c. Repair, Wound healing by primary and secondary union, factors promoting and delaying the process.

d. Healing in specific site including bone healing.

4. Immunopathology –

a. Immune system: General concepts.

b. Hypersensitivity: type and examples, antibody and cell mediated tissue injury with examples. . Secondary immunodeficiency including HIV infection. Auto-immune disorders: Basic concepts and classification, SLE.

c. AIDS-Aetiology, Modes of transmission, Diagnostic procedures, handling of infected material and health education.

5. Infectious diseases –

a. Mycobacterial diseases: Tuberculosis, Leprosy and Syphilis.

b. Bacterial disease: Pyogenic, Diphtheria, Gram negative infection, Bacillary dysentery.

c. Viral diseases: Poliomyelitis, Herpes, Rabies, Measles, Rickttsia, Chlamydial infection, HIV infection.

d. Fungal disease and opportunistic infections.

e. Parasitic diseases: Malaria, Filaria, Amoebiasis, Kala-azar, Cysticercosis, Hydatid cyst.

6. Circulatory Disturbances –

a. Hyperemia/Ischemia and Haemorrhage Edema: Pathogenesis and types. Chronic venous congestion: Lung, Liver, Spleen, Systemic Pathology Thrombosis and Embolism: Formation, Fate and Effects.

b. Infarction: Types, Common sites.

c. Shock: Pathogenesis, types, morphologic changes.

7. Growth Disturbances and Neoplasia

a. Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia.

b. Precancerous lesions.

c. Neoplasia: Definition, classification, Biological behaviour : Benign and Malignant, Carcinoma and Sarcoma.

d. Malignant Neoplasia: Grades and Stages, Local & Distant spread.

e. Carcinogenesis: Environmental carcinogens, chemical, viral, occupational. Heredity and cellular oncogenes and prevention of cancer.

f. Benign & Malignant epithelial tumours Eg. Squamous papilloma, Squamous cell carcinoma, Malignant melanoma. Benign & Malignant mesenchymal tumours Eg: Fibroma, Lipoma, Neurofibroma, Fibrosarcoma, Liposarcoma, Rhabdo-myosarcoma, Teratoma.

8. Nutritional Disorders –

a. Protein energy malnutrition: Marasmus, Kwashiorkor, and Vitamin deficiency disorders, classification with specific examples.

9. Genetic Disorders –

a. Basic concepts of genetic disorders and some common examples and congenital malformation.

THEORY – Systemic pathology

10. Hematology –

a. Constituents of blood and bone marrow, Regulation of hematopoiesis. Anemia: Classification, clinical features & lab diagnosis.

b. Nutritional anemias: Iron deficiency anemia, Folic acid,Vit. B 12 deficiency anemia including pernicious anemia. Hemolytic Anaemias: Classification and Investigations. Hereditary hemolytic anaemias: Thalessemia, Sickle cell anemia, Spherocytosis and Enzyme deficiencies.

c. Acquired hemolytic anaemias

i. Alloimmune, Autoimmune

ii. Drug induced, Microangiopathic Pancytopenia - Aplastic anemia.

d. Hemostatic disorders, Vascular and Platelet disorders & lab diagnosis. Coagulopathies –

i. Inherited

ii. Acquired with lab diagnosis.

e. Leukocytic disorders: Leukocytosis, Leukopenis, Leukemoid reaction.

f. Leukemia: Classification, clinical manifestation, pathology and Diagnosis. Multiple myeloma and disproteinemias.

g. Blood transfusion; Grouping and cross matching, untoward reactions, transmissible infections including HIV & hepatitis, Blood-components & plasma-pheresis.

11. Respiratory System

a. Pneumonia, Bronchitis, Bronchiectasis, Asthma, Tuberculosis, Carcinoma of lungs, Occupational lung diseases

12. Cardiovascular Pathology

a. Congenital Heart disease: Atrial septal defect, Ventricular septal defect, Fallot's tetralogy, Patent ductus arteriosus.

b. Endocarditis. Rheumatic Heart disease.

c. Vascular diseases: Atherosclerosis, monckeberg's medial calcification, Aneurysm and Arteritis and tumours of Blood vessels.

d. Ischemic heart Disease: Myocardial infarction. Hypertension and hypertensive heart Disease.

13. Alimentary tract:

a. Oral Pathology: Ulcers, leukoplakia, Carcinoma, oral cavity diseases and tumour of salivary gland & esophagus and precancerous lesions, Esophagus inflammatory, functional disorders and tumours.

b. Stomach: Gastritis, Ulcer & Tumours.

c. Tumours and tumour like condition of the small and large Intestine: Polyps, carcinoid, carcinoma, Lymphoma.

d. Pancreatitis and pancreatic tumours : i) Exocrine, ii) Endocrine Salivary gland tumours : Mixed, Warthin's

14. Hepato – biliary pathology.

a. Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal.

b. Alcoholic liver disease

c. Cirrhosis: Postnecrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver

15. Lymphatic System

a. Diseases of the gall bladder: Cholecystitis, Cholelithiasis, Carcinoma. Lymphadenitis - Nonspecific and granulomatous. Causes of Lymph Node enlargements. Reactive Hyperplasia, Primary Tumours - Hodgkin's and Non hodgkin's Lymphomas, Metastatic Tumours.

b. Causes of Splenic Enlargements.

16. Musculoskeletal System

a. Osteomyelitis, acute, chronic, tuberculous, mycetoma

b. Metabolic diseases: Rickets/Osteomalacia, osteoporosis, Hyperparathyroidism, Paget's disease.

c. Tumours Classification: Benign, Malignant, Metastatic and synovial sarcoma. Arthritis: Suppurative, Rheumatoid. Osteoarthritis, Gout, Tuberculous.

17. Endocrine pathology

a. Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis Non-neoplastic lesions of Thyroid: Iodine deficiency goiter, autoimmune Thyroiditis, Thyrotoxicosis, myxedema, Hashimoto's thyroiditis.

b. Tumours of Thyroid: Adenoma, Carcinoma: Papillary, Follicular, Medullary, Anaplastic. Adrenal diseases: cortical hyperplasia, atrophy, tuberculosis, tumours of cortex and medulla.

18. Neuropathology

a. Inflammations and Infections: TB Meningitis, Pyogenic Meningitis, viral meningitis and Brain Abscess

b. Tuberculosis, Cysticercosis

c. CNS Tumors, Astrocytoma, Neuroblastoma, Meningioma, Medulloblastoma

19. Dermatopathology

a. Skin tumors: Squamos cell carcinoma, Basal cell carcinoma, Melanoma

PRACTICAL

Demonstration of Slides – The students may be demonstrated the common histopathological, hematological and cytological slides and specimens and charts and their interpretations.

MICROBIOLOGY

THEORY

1. General Microbiology -

a. Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic, Zoonosis, Epizootic, Attack rate.

b. Normal flora of the human body.

c. Routes of infection and spread; endogenous and exogenous infections; source at reservoir of infections.

d. Bacterial cell. Morphology limited to recognizing bacteria in clinical samples Shape, motility and arrangement. Structures, which are virulence, associated.

e. Physiology: Essentials of bacterial growth requirements.

f. Sterilization, disinfection and universal precautions in relation to patient care and disease prevention. Definition of asepsis, sterilization, disinfection.

g. Antimicrobials: Mode of action, interpretation of susceptibility tests, resistance spectrum of activity.

2. Immunology –

a. Basic principles of immunity immunobiology: lymphoid organs and tissues. Antigen, Antibodies, antigen and antibody reactions with relevance to pathogenesis and serological diagnosis.

b. Humoral immunity and its role in immunity Cell mediated immunity and its role in immunity. Imunology of hypersensitivity, Measuring immune functions.

3. Bacteriology -

a. To be considered under the following headings

b. Morphology, classification according to pathogenicity, mode of transmission, methods of prevention, collection and transport of samples for laboratory diagnosis, interpretation of laboratory reports.

c. Staphylococci, Streptococci and Pneumococci.

d. Mycobacteria: Tuberculosis, M.leprae, atypical mycobacteria, Enterobacteriaceae,

e. Vibrois: V. cholerae and other medically important vibrios, Campylobacters and Helicobacters, Pseudomonas.

f. Bacillus anthracis, Sporing and non-sporing anaerobes: Clostridia, Bacteroides and Fusobacteria.

4. General Virology -

a. General properties: Basic structure and broad classification of viruses. Pathogenesis and pathology of viral infections. Immunity and prophylaxis of viral diseases. Principles of laboratory diagnosis of viral diseases. List of commonly used antiviral agents.

5. Mycology -

a. General properties of fungi. Classification based on disease: superficial, subcutaneous, deep mycosel opportunistic infections including Mycotoxins, systemic mycoses. General

principles of fungal diagnosis, Rapid diagnosis. Method of collection of samples. Antifungal agents.

6. Clinical/Applied Microbiology -

a. Streptococcal infections: Rheumatic fever and Rheumatic heart disease, Meningitis.

b. Tuberculosis,

c. Pyrexia of unknown origin, leprosy,

d. Sexually transmitted diseases, Poliomyelitis,

e. Hepatitis,

f. Acute-respiratory infections, Central nervous System infections, Urinary tract infections,

g. Pelvic inflammatory disease, Wound infection, Opportunistic infections, HlV infection,

h. Malaria, Filariasis, Zoonotic diseases.

PRACTICAL

1. Demonstration of Microscopes and its uses
2. Principles, uses and demonstration of common sterilization equipment
3. Demonstration of common culture media
4. Demonstration of motility by hanging drops method
5. Demonstration of Gram Stain, ZN Stain
6. Demonstration of Serological test: ELISA
7. Demonstration of Fungus

Recommended Books

1. Textbook of Microbiology- P. Chakraborty
2. Textbook of Microbiology- Ananthnarayan
3. Basic Pathology- Kumar
4. Textbook of Pathology- Nagalotima
5. Textbook of Pathology- Boyd

BPT 206: ELECTROTHERAPY AND ACTINOTHERAPY

SUBJECT DESCRIPTION - In this course the student will learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function. The objective of this course is that after 240hrs of lectures, demonstration, practical and clinics the student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

Course Objectives: Student should be able to operate all physical agent modalities safely and effectively.

. Physical principles

- Structure and properties of matter-solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity.
- Structure of atom, molecules, elements and compound
- Electricity: Definition and types. Therapeutic uses. Basic physics of construction. Working
- Importance of currents in treatment.
- Static Electricity: Production of electric charge. Characteristic of a charged body.
- Characteristics of lines of forces. Potential energy and factors on which it depends. Potential difference and EMF.
- Current Electricity: Units of Electricity: farad, Volt, Ampere, Coulomb, Watt
- Condensers: Definition, principle, Types- construction and working, capacity & uses.
- Magnetism: Definition. Properties of magnets. Electromagnetic induction. Transmission by contact. Magnetic field and magnetic forces. Magnetic effects of an electric field.
- Conductors, Insulators, Potential difference, Resistance and intensity
- Ohm's law and its application to DC and AC currents. Fuse: construction, working and application.
- Transmission of electrical energy through solids, liquids, gases and vacuum.
- Rectifying Devices-Thermionic valves, Semiconductors, Transistors, Amplifiers, transducer and Oscillator circuits.
- Display devices and indicators-analogue and digital.
- Transformer: Definition, Types, Principle, Construction, Eddy current, working uses
- Chokes: Principle, Construction and working, Uses

2. Effects of current electricity

- Chemical effects-lons and electrolytes, lonisation, Production of an EMF by chemical actions.

- Ionization: Principles, effects of various technique of medical ionization.
- Electromagnetic Induction.

d. Electromagnetic spectrum.

3. Electrical Supply

- Brief outline of main supply of electric current
- Dangers-short circuit, electric shocks: Micro/ Macro shocks
- Precaution-safety devices, earthing, fuses etc.
- First aid and initial management of electric shock
- Burns: electrical & chemical burns, prevention and management

4. Various agents

- Thermal agents: Physical Principles of cold, Superficial and deep heat.
- Ultrasound: Physical Principles of Sound
- Electro- magnetic Radiation: Physical Principles and their Relevance to Physiotherapy Practice
- Electric Currents: Physical Principles and their Relevance to Physiotherapy Practice.

5. Section II – Therapeutic Electricity

Section II A - Low frequency Currents

1. Basic types of current

- Direct Current: types, physiological &therapeutic effects.
- Alternating Current

2. Types of Current used in Therapeutics

- Modified D.C
    i. Faradic Current
    ii. Galvanic Current
- Modified A.C
    i. Sinusoidal Current
    ii. Diadynamic Current.

3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers.

4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles.

5. Sinusoidal Current & Diadynamic Current in Brief.

6. HVPGS – Parameters & its uses

7. Ionization /Iontophoresis: Techniques of Application of Iontophoresis, Indications,Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing.

8. Cathodal / Anodal galvanism.

9. Micro Current & Macro Current

10. Types of Electrical Stimulators
    - NMES- Construction component.
    - Neuro muscular diagnostic stimulator- construction component.
    - Components and working Principles

11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance.

12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair.

13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.

14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

Section II B - Electro-diagnosis

1. FG Test

2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.

3. Nerve conduction velocity studies

4. EMG: Construction of EMG equipment.

5. Bio-feed back.

Medium Frequency

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications.

2. Russian Current

3. Rebox type Current

Thermo & Actinotherapy (High Frequency Currents)

1. Electro Magnetic Spectrum.

2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters.

3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME.

4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD. [2 Hours]

5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous& Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US. [8 Hours]

6. IRR: Define IRR,wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication. [2 Hours]

7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp.

8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density.

Superficial heating Modalities

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers.

2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications.

3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications.

4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications.

5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications.

6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications.

7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication.

8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages.

BPT 207 ELECTROTHERAPY AND ACTINOTHERAPY-LAB HOURS

Course description: This course involves a detailed study of production, physiological

PRACTICAL

The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety

1. Basic operation of electric supply to the equipment and safety device.

1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.

2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.

3. Demonstrate placement of electrodes for various electrotherapy modalities

4. Electrical stimulation for the muscles supplied by the peripheral nerves

5. Faradism under Pressure for UL and LL

6. Plotting of SD curve with chronaxie and rheobase

7. Demonstrate FG test

8. Application of Ultrasound for different regions-various methods of application

9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy

10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose

11. Demonstrate treatment method using IFT for various regions

12. Calculation of dosage and technique of application of LASER

13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy

14. Demonstrate the treatment method using whirl pool bath

15. Winding up procedure after any electrotherapy treatment method.

Equipment care -

1. Checking of equipments

2. Arrangement of exercise therapy and electro therapy equipment.

3. Calibration of equipment

4. Purchase, billing, document of equipment.

5. Safety handling of equipments.

6. Research lab equipment maintenance.

7. Stock register, movement register maintenance

Recommended Books

1. Clayton's Electrotherapy
2. Clinical Electrotherapy- Nelson and Currier
3. Electrotherapy Explained- Low and Reed

BPT 208 EXERCISE AND MANUAL THERAPY

SUBJECT DESCRIPTION- After the course on exercise therapy student will be able to understand the different types of exercise for the benefit of patient in different situations and conditions both in health and disease or disorder.

1. Specific exercise regimens

a. Isotonic: de Lormes, Oxford, MacQueen, Circiut weight training
b. Isometric: BRIME (Brief Resisted Isometric Exercise), Multiple Angle

c. Isometrics Isokinetic regimens

2. Proprioceptive Neuromuscular Facilitation

a. Definitions & goals

b. Basic neurophysiologic principles of PNF: Muscular activity, Diagonals patterns of movement: upper limb, lower limb

c. Procedure: components of PNF

d. Techniques of facilitation

e. Mobility: Contract relax, Hold relax, Rhythmic initiation

f. Strengthening: Slow reversals, repeated contractions, timing for emphasis, rhythmic stabilization Stability: Alternating isometric, rhythmic stabilization

g. Skill: timing for emphasis, resisted progression Endurance: slow reversals, agonist reversal

3. Suspension Therapy

a. Definition, principles, equipments & accessories, Indications & contraindications, Benefits of suspension therapy

b. Types of suspension therapy: axial, vertical, pendular Techniques of suspension therapy for upper limb Techniques of suspension therapy for lower limb

4. Functional Re-education

a. Lying to sitting: Activities on the Mat/Bed, Movement and stability at floor level; Sitting activities and gait; Lower limb and Upper limb activities.

5. Aerobic Exercise

a. Definition and key terms; Physiological response to aerobic exercise, Examination and evaluation of aerobic capacity – Exercise Testing, Determinants of an Exercise Program, The Exercise Program, Normal and abnormal response to acute aerobic exercise, Physiological changes that occur with training, Application of Principles of an Aerobic conditioning program for patients – types and phases of aerobic training.

6. Stretching

a. Definition of terms related to stretching; Tissue response towards immobilization and elongation, Determinants of stretching exercise, Effects of stretching, Inhibition and relaxation procedures, Precautions and contraindications of stretching, Techniques of stretching.

7. Manual Therapy & Peripheral Joint Mobilization

a. Schools of Manual Therapy, Principles, Grades, Indications and Contraindications, Effects and Uses – Maitland, Kaltenborn, Mulligan

b. Biomechanical basis for mobilization, Effects of joint mobilsation, Indications and contraindications, Grades of mobilization, Principles of mobilization, Techniques of mobilization for upper limb, lower limb, Precautions.

8. Balance - Definition

a. Physiology of balance: contributions of sensory systems, processing sensory information, generating motor output

b. Components of balance (sensory, musculoskeletal, biomechanical)

c. Causes of impaired balance, Examination & evaluation of impaired balance, Activities for treating impaired balance: mode, posture, movement, Precautions & contraindications, TypesBalance retraining.

9. Co-ordination Exercise

a. Anatomy & Physiology of cerebellum with its pathways Definitions: Co-ordination, Inco-ordination

b. Causes for Inco-ordination, Test for co-ordination: equilibrium test, non-equilibrium test Principles of co-ordination exercise.

c. Frenkel's Exercise: uses of Frenkel's exercise, technique of Frenkel's exercise, progression, home exercise.

10. Posture

a. Definition, Active and Inactive Postures, Postural Mechanism, Patterns of Posture, Principles of re-education: corrective methods and techniques, Patient education.

11. Walking Aids

a. Types: Crutches, Canes, Frames; Principles and training with walking aids

12. Basics in Manual Therapy & Applications with Clinical reasoning

a. Examination of joint integrity

i. Contractile tissues

ii. Non contractile tissues

b. Mobility - assessment of accessory movement & End feel

c. Assessment of articular & extra-articular soft tissue status

i. Myofascial assessment

ii. Acute & Chronic muscle hold

iii. Tightness

iv. Pain-original & referred

d. Basic principles, Indications & Contra-Indications of mobilization skills for joints & soft tissues.

i. Maitland
ii. Mulligan
iii. Mckenzie
iv. Muscle Energy Technique
v. Myofascial stretching
vi. Cyriax
vii. Neuro Dynamic Testing

13. Hydrotherapy

a. Definitions, Goals and Indications, Precautions and Contraindications, Properties of water, Use of special equipment, techniques, Effects and uses, merits and demerits

14. Individual and Group Exercises

a. Advantages and Disadvantages, Organization of Group exercises, Recreational Activities and Sports

15. Introduction to Yoga

a. Asanas – Principles and elements;
b. Pranayamas – Principles, Methods and Techniques

BPT 209 EXERCISE AND MANUAL THERAPY LAB HOURS

Course description: This course involves a detailed study of physiological effects, application techniques, effects, indications, and contra-indications, precautions for exercises used in Physiotherapy.

Course Objectives: Student should be able to explain the rationale for the prescription of safe and effective exercises.

1. Soft tissue manipulative techniques region wise-upper limb, lower limb, neck, back and face.
2. Measurement of ROM of joints-upper limb, lower limb and trunk.
3. To practice the grading of muscle strength region wise upper limb and lower limb and trunk.
4. Position of joints, muscle work, and stability of various fundamental and derived positions.
5. Different types of muscle contraction, muscle work, group action of muscles and coordinated movement
6. Various types of suspension therapy and its applications on various part of body-regionwise.
7. Local and general relaxation techniques.
8. Structure and functions along with application of various equipment in a gymnasium.

9. Assessment & evaluative procedures, including motor, sensory, neuromotor coordination, vital capacity, limb length & higher functions.
10. Various techniques of mobilization of joints regionwise.
11. Various techniques of progressive strengthening exercises of muscles regionwise.
12. Use of various ambulation aids in gait training.
13. Evaluate ADLs and practice various training techniques.
14. Mat exercises.
15. Normal and abnormal posture & practice various corrective techniques.
16. Equilibrium/balance & practice various to improve balance.
17. Structure and functions of hydrotherapy equipment and their applications.
18. Various traction techniques, including manual, mechanical & electrical procedures.
19. Various group exercise therapies.
20. Breathing Exercises
21. Postural Drainage
22. Basic Yogic postures: Padahastasana /Padangusthanasana, Trikonasana, Utkatasana, Padmasana, Siddhasana,/ Sukhasana, Bhujangasana, Ardha- Salabhasana, Paschimottanasana, Savasana,Dhanurasana, ArdhaHalasana, Yogamudrasana, Uttanasana, Virasana, Vajrasana, SetuBandhasana, Gomukhasana, Pavan-Muktasana, Halasana, Sarvangasana, Naukasana,
23. Warm up exercises, aerobics - cool down exercises
24. Introduction to manual therapy techniques such as Maitland's, Cyriax, Mulligan's, Tensigrity, etc
25. Stretching techniques.

Recommended Books

1. Principles Of Exercise Therapy-Dena Gardiner
2. Massage, Manipulation & Traction---Sydney Litch

BPT 210* INTRODUCTION TO QUALITY AND PATIENT SAFETY

(not for university exams)

1. Quality assurance and management -The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

- Concepts of Quality of Care
- Quality Improvement Approaches
- Standards and Norms
- Quality Improvement Tools
- Introduction to NABH guidelines

2. Basics of emergency care and life support skills-Basic life support(BLS)is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:

    - Vital signs and primary assessment
    - Basic emergency care – first aid and triage
    - Ventilations including use of bag-valve-masks(BVMs)
    - Choking, rescue breathing methods
    - One- and Two-rescuer CPR
    - Using an AED (Automated external defibrillator).
    - Managing an emergency including moving a patient

3. At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

4. Biomedical waste management and environment safety-The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:

    - Definition of Biomedical Waste
    - Waste minimization
    - BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
    - Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
    - BMW Management & methods of disinfection

- Modern technology for handling BMW
- Use of Personal protective equipment (PPE)
- Monitoring & controlling of cross infection (Protective devices)

5. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –

- Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
- Prevention & control of common healthcare associated infections,
- Components of an effective infection control program, and
- Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance-

- History of Antibiotics
- How Resistance Happens and Spreads
- Types of resistance- Intrinsic, Acquired, Passive
- Trends in Drug Resistance
- Actions to Fight Resistance
- Bacterial persistence
- Antibiotic sensitivity
- Consequences of antibiotic resistance
- Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-

- Fundamentals of emergency management,
- Psychological impact management,
- Resource management,
- Preparedness and risk reduction,
- Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

BPT 301 ORTHOPAEDICS & SPORTS MEDICINE

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about Orthopaedic conditions the therapist would encounter in their practice. The objective of this course is that after completion of the lectures and discussion the student will be able to demonstrate an understanding of orthopedic conditions causing disability, list the etiology, clinical features and methods of investigations and management.

Course description: This course introduces and enables the student to understand orthopaedic conditions which commonly cause disability and their medical and surgical management.

Course objectives: The student will demonstrate an understanding of orthopaedic conditions which commonly cause disability and their medical and surgical management

1. Introduction

- Introduction to orthopaedics.
- Clinical examination in an Orthopedic patient.
- Common investigative procedures.
- Radiological and Imaging techniques in Orthopeadics.
- Inflammation and repair, Soft tissue healing.

2. Traumatology

- Fracture: definition, types, signs and symptoms.
- Fracture healing.
- Complications of fractures.
- Conservative and surgical approaches.
- Principles of management – reduction (open/closed, immobilization etc).
- Subluxation/ dislocations – definition, signs and symptoms, management (conservative and operative). and Dislocations of Upper Limb

3. Fractures

a. Fractures of Upper Limb - causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:

i. Fractures of clavicle and scapula.
ii. Fractures of greater tuberosity and neck of humerus.
iii. Fracture shaft of humerus.
iv. Supracondylar fracture of humerus.
v. Fractures of capitulum, radial head, olecranon, coronoid, and epicondyles.
vi. Side swipe injury of elbow.
vii. Both bone fractures of ulna and radius.
viii. Fracture of forearm – monteggia, galaezzi fracture –dislocation.
ix. Chauffer's fracture.
x. Colle's fracture.
xi. Smith's fracture.
xii. Scaphoid fracture.
xiii. Fracture of the metacarpals.
xiv. Bennett's fracture.
xv. Fracture of the phalanges. (Proximal and middle.)

b. Dislocations of Upper Limb –

i. Anterior dislocation of shoulder – mechanism of injury, clinical feature, complications, conservative management (Kocher's and Hippocrates maneuver), surgical management (putti plat, bankart's) etc.

ii. Recurrent dislocation of shoulder.

iii. Posterior dislocation of shoulder–mechanism of injury, clinical features and management.

iv. Posterior dislocation of elbow – mechanism of injury, clinical feature, complications & management.

4. Fracture of Spine

a. Fracture of Cervical Spine - Mechanism of injury, clinical feature, complications (quadriplegia); Management- immobilization (collar, cast, brace, traction); Management for stabilization, management of complication (bladder and bowel, quadriplegia).

i. Clay shoveller's fracture.

ii. Hangman'sfracture.

iii. Fracture odontoid.

iv. Fracture of atlas.

5. b. Fracture of Thoracic and Lumbar Regions - Mechanism of injury, clinical features, and management— conservative and surgical of common fractures around thoracic and lumbar regions.
c. Fracture of coccyx.
d. Fracture of Rib Cage - Mechanism of injury, clinical features, management for Fracture Ribs, Fracture of sternum.

6. Fractures and Dislocations of Lower Limb

a. Fracture of Pelvis and Lower Limb-causes, clinical features, mechanism of injury, complications, conservative and surgical management of the following fractures:

i. Fracture of pelvis.

ii. Fracture neck of femur – classification, clinical features, complications, management - conservative and surgical.

Fractures of trochanters.

i. Fracture shaft femur—clinical features, mechanism of injury, complications, management-conservative and surgical.

ii. Supracondylar fracture of femur.

iii. Fractures of the condyles of femur.

iv. Fracture patella.

v. Fractures of tibial condyles.

vi. Both bones fracture of tibia and fibula.

vii. Dupuytren's fracture

viii. Maisonneuve's

fracture.

ix. Pott's fracture – mechanism of injury, management.

x. Bimalleolar fracture

xi. Trimalleolar fracture

xii. Fracture calcaneum – mechanism of injury, complications and

management. xiii. Fracture of talus.

xiv. Fracture of metatarsals—stress fractures jone's fracture.

xv. Fracture of phalanges.

b. Dislocations of Lower Limb - mechanism of injury, clinical features, complications, management of the following dislocations of lower limb.

i. Anterior dislocation of hip.

ii. Posterior dislocation of hip.

iii. Central dislocation of hip.

iv. Dislocation of patella.

v. Recurrent dislocation of patella.

6. Soft Tissue Injuries - Define terms such as sprains, strains, contusion, tendinitis, rupture, tenosynovitis, tendinosis, bursitis.
a. Mechanism of injury of each, clinical features, managements- conservative and surgical of the following soft tissue injuries:

i. Meniscal injuries of knee.

ii. Cruciate injuries of knee.

iii. Medial and lateral collateral injuries of knee.

iv. Lateral ligament of ankle.

v. Wrist sprains.

vi. Strains- quadriceps, hamstrings, calf, biceps, triceps etc.

vii. Contusions- quadriceps, gluteal, calf, deltoid etc.

viii. Tendon ruptures-Achilles, rotator cuff muscles, biceps, pectorals etc.

7. Hand Injuries - mechanism of injury, clinical features, and management of the following –

i. Crush injuries.

ii. Flexor and extensor injuries.

iii. Burn injuries of hand.

8. Amputations - Definition, levels of amputation of both lower and upper limbs, indications, complications.

9. Traumatic Spinal Cord Injuries - Clinical features, complications, medical and surgical management of Paraplegia and Quadriplegia.

10. Deformities - clinical features, complications, medical and surgical management of the following Congenital and Acquired deformities.

- Congenital Deformities –

i. CTEV.

ii. CDH.

iii. Torticollis.

iv. Scoliosis.

v. Flat foot.

vi. Vertical talus.

vii. Hand anomalies- syndactyly, polydactyly and ectrodactly. Arthrogryposis multiplex congenita (amyoplasia congenita).

viii. Limb deficiencies- Amelia and Phocomelia. Klippel feil syndrome. Osteogenesis imperfecta(fragile ossium).

ix. Cervical rib.

- Acquired Deformities –

- Disease of Bones

Acquired Torticollis. Scoliosis. Kyphosis. Lordosis. Genu varum. Genu valgum. Genu recurvatum Coxa vara. Pes cavus. Hallux rigidus. Hallux valgus. Hammer toe. Metatarsalgia.

and Joints: Causes, Clinical features, Complications, Management- medical and surgical of the following conditions:

- Infective conditions: Osteomyelitis (Acute chronic).Brodie's abscess. T B spine and major joints like shoulder, hip, knee, ankle, elbow etc.
- Arthritic conditions: Pyogenic arthritis. Septic arthritis. Syphilytic infection of joints.
- Bone Tumors: classification, clinical features, management-medical and surgical of the following tumors: Osteoma. Osteosarcoma, Osteochondroma. Enchondroma. Ewing's sarcoma. Gaint cell tumor. Multiple myeloma. Metastatic tumors.
- Perthes disease, Slipped Capital Femoral Epiphysis and Avascular Necrosis.
- Metabolic Bone Diseases: Rickets. Osteomalacia, Osteopenia. Osteoporosis.

12. Inflammatory and Degenerative Conditions: causes, clinical feature, complications, deformities, radiological features, management- conservative and surgical for the following conditions:

- Osteoarthritis. Rheumatoid arthritis. Ankylosing spondylitis Gouty arthritis. Psoriatic arthritis. Hemophilic arthritis. Still's disease (juvenile rheumatoid arthritis). Charcot's joints.
- Connective Tissue Disorders- Systemic Lupus Erythematosis, Scleroderma, Dermatomyositis, Poliomyelitis, Mixed connective tissue Disease (MCTD)

13. Syndromes: Causes, Clinical features, complications, management- conservative and surgical of the following:

a. Cervico brachial syndrome. Thoracic outlet syndrome. Vertebro- basilar syndrome. Scalenus syndrome. Costo clavicular syndrome. Levator scapulae syndrome. Piriformis syndrome.

14. Neuromuscular Disorders: Definition, causes, clinical feature, complications, management. (Multidisciplinary approach) medical and surgical of the following conditions:
    - Cerebral palsy.
    - Poliomyelitis.
    - Spinal Dysraphism.
    - Leprosy.
15. Cervical and Lumbar Pathology: Causes, clinical feature, patho-physiology, investigations, management-Medical and surgical for the following:
    - Prolapsed interverbral disc (PID),

- Spinal Canal Stenosis.
- Spondylosis (cervical and lumbar)
- Spondylolysis.
- Spondylolisthesis.
- Lumbago/ Lumbosacral strain.
- Sacralisation.
- Lumbarisation.
- Coccydynia.
- Hemivertebra.

16. Orthopedic Surgeries: Indications, Classification, Types, Principles of management of the following Surgeries:

- Arthrodesis.
- Arthroplasty (partial and total replacement).
- Osteotomy,
- External fixators.
- Spinal stabilization surgeries (Harrington's, Luque's, Steffi plating) etc ,
- Limb re attachments.

17. Regional Conditions: Definition, Clinical features and management of the following regional conditions

- Shoulder: Periarthritic shoulder (adhesive capsulitis). Rotator cuff tendinitis. Supraspinatus Tendinitis. Infraspinatus Tendinitis. Bicipital Tendinitis. Subacromial Bursitis.
- Elbow: Tennis Elbow. Golfer's Elbow. Olecranon Bursitis (student's elbow).Triceps Tendinitis.
- Wrist and Hand: De Quervain's Tenosynovitis. Ganglion. Trigger Finger/ Thumb. Mallet Finger, Carpal Tunnel Syndrome, Dupuytren's Contracture.
- Pelvis and Hip: IT Band Syndrome. Piriformis Syndrome. Trochanteric Bursitis.
- Knee: Osteochondritis Dissecans. Prepatellar and Suprapatellar Bursitis. Popliteal Tendinitis. Patellar Tendinitis. Chondromalacia Patella. Plica Syndrome. Fat Pad Syndrome (Hoffa's syndrome).

f. Ankle and Foot: Ankle Sprains. Plantar Fasciitis / Calcaneal Spur. Tarsal Tunnel Syndrome. Achilles Tendinitis. Metatarsalgia. Morton's Neuroma.

BPT 302 ORTHOPAEDICS & SPORTS MEDICINE LAB HOURS

Course Description: This course involves a description of the assessment and treatment of general orthopedics and sports injury conditions.

Course Objectives: The student will be able to conduct a safe and effective treatment of patient with General orthopedics and sports injury conditions.

The students will be observing patients of relevant diseases and disorders for:
1. History taking of the conditions of patients.
2. Evaluation and treatment planning: its presentation and documentation of all the conditions listed in BPT 301

BPT 303 NEUROLOGY, NEUROSURGERY AND PEDIATRICS

SUBJECT DESCRIPTION-This subject follows the basic science subjects to provide the knowledge about relevant aspects of neurology & neurosurgery. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various neurological conditions.

Course Description: This course introduces and enables the student to understand neurological conditions which commonly cause disability and their medical and surgical management.

Course objectives: The student will demonstrate an understanding of neurological conditions which commonly cause disability and their medical and surgical management.

1. Disorders of function in the context of Pathophysiology, Anatomy in Neurology and Cortical Mapping.

2. Classification of neurological involvement depending on level of lesion.

3. Neurological assessment: Principles of clinical diagnosis, higher mental function, assessment of brain & spinal cord function, evaluation of cranial nerves and evaluation of autonomic nervous system.

4. Investigations: principles, methods, views, normal/abnormal values/features, types of following investigative procedures- skull x-ray, CT, MRI, evoked potentials, lumbar puncture, CSF examination, EMG, NCV.

5. Neuro-ophthalmology: Assessment of visual function – acuity, field, colour vision, Pupillary reflex, accommodation reflex, abnormalities of optic disc, disorders of optic nerve, tract, radiation, occipital pole, disorders of higher visual processing, disorders of pupil, disorders of eye movements, central disorders of eye movement.

6. Deafness, vertigo, and imbalance: Physiology of hearing, disorders of hearing, examination & investigations of hearing, tests of vestibular function, vertigo, peripheral vestibular disorders, central vestibular vertigo.

7. Lower cranial nerve paralysis Etiology, clinical features, investigations, and management of following disorders - lesions in trigeminal nerve, trigeminal neuralgia, trigeminal sensory neuropathy, lesions in facial nerve, facial palsy, bell's palsy, hemi facial spasm, Glossopharangial neuralgia, lesions of Vagus nerve, lesions of spinal accessory nerve, lesions of hypoglossal nerve. Dysphagia – swallowing mechanisms, causes of dysphagia, symptoms, examination, and management of dysphagia.

8. Cerebrovascular diseases: Define stroke, TIA, RIA, stroke in evolution, multi infarct dementia and Lacunar infarct. Classification of stroke – Ischemic, hemorrhagic, venous infarcts. Risk factors, cause of ischemic stroke, causes of hemorrhagic stroke. Classification of hemorrhagic stroke, classification of stroke based on symptoms, stroke syndrome, investigations, differential diagnosis, medical and surgical management.

9. Head injury: Etiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications.

10. Higher cortical, neuro psychological and neurobehavioral disorders: Causes of blackouts, physiological nature of Epilepsy, classification, clinical features, investigations, medical& surgical management of following disorders – Non-epileptic attacks of childhood, Epilepsy in childhood, Seizers, and Epilepsy syndromes in adult. Classification and clinical features of Dyssomnias, Parasomnias, Dementia, Obsessive-compulsive disorders. Neural basis of consciousness, causes &investigations of Coma, criteria for diagnosis of Brain death. Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Perceptual disorders and Speech disorders.

11. Movement disorders: Definition, etiology, risk factors, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Parkinson's disease, Dystonia, Chorea, Ballism, Athedosis, Tics, Myoclonus and Wilson's disease.

12. Cerebellar and coordination disorders: Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, management of Congenital ataxia, Friedreich's ataxia, Ataxia talengiectasia, Metabolic ataxia, Hereditary cerebellar ataxia, Tabes dorsalis and Syphilis.

13. Spinal cord disorders: Functions of tracts, definition, etiology, risk factors, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Spinal cord injury, Compression by IVD prolapse, Spinal epidural abscess, Transverse myelitis, Viral myelitis, Syringomyelia, Spina bifida, Sub acute combined degeneration of the cord, Hereditary spastic paraplegia, Radiation myelopathy, Progressive encephalomyelitis, Conus medullaris syndrome, Bladder & bowel dysfunction, and Sarcodosis.

14. Brain tumors and spinal tumors: Classification, clinical features, investigations, medical and surgical management.

15. Infections of brain and spinal cord: Etiology, pathophysilogy, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders – Meningitis, Encephalitis, Poliomyelitis and Post-polio syndrome. Complications of systemic infections on nervous system – Septic encephalopathy, AIDS, Rheumatic fever, Brucellosis, Tetanus, and Pertussis.

16. Motor neuron diseases: - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications of following disorders - Amyotrophic lateral sclerosis, Spinal muscular atrophy, Hereditary bulbar palsy, Neuromyotonia and Post-irradiation lumbosacral polyradiculopathy.

17. Multiple sclerosis - Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, and complications.

18. Disorders of neuromuscular junction – Etiology, classification, signs & symptoms, investigations, management, of following disorders Myasthenia gravis, Eaton-Lambert syndrome, and Botulism.

19. Muscle diseases: Classification, investigations, imaging methods, Muscle biopsy, management of muscle diseases, genetic counselling. Classification, etiology, signs & symptoms of following disorders – Muscular dystrophy, Myotonic dystrophy, myopathy, Non-dystrophic myotonia.

20. Polyneuropathy – Classification of Polyneuropathies, Hereditary motor sensory neuropathy, hereditary sensory and Autonomic neuropathies, Amyloid neuropathy, acute idiopathic Polyneuropathies. Guillain-Barre syndrome – Causes, clinical features, management of GBS, Chronic Idiopathic Polyneuropathies, diagnosis of polyneuropathy, nerve biopsy.

21. Focal peripheral neuropathy: Clinical diagnosis of focal neuropathy, neurotmesis, Axonotmesis, Neuropraxia. Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – RSD, Nerve tumors, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & Intercostal nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, Sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, Pudental nerve palsy.

22. Paediatric neurology: Neural development, Etiology, pathophysiology, classification, clinical signs & symptoms, investigations, differential diagnosis, medical management, surgical management and complications of following disorders - Cerebral palsy, Hydrocephalus, Arnold-chiari malformation, Basilar impression, Klippel-Feil syndrome, Achondroplacia, Cerebral malformations, Autism, Dandy walker syndrome and Down's syndrome.

23. Toxic, metabolic and environmental disorders: Etiology, risk factors, classification, neurological signs & symptoms, investigations, management, of following disorders – Encephalopathy, Alcohol toxicity, Recreational drug abuse, Toxic gases & Asphyxia, Therapeutic & diagnostic agent toxicity, Metal toxicity, Pesticide poisoning, Environmental & physical insults, Pant & Fungal poisoning, Animal poisons, & Complications of organ transplantation.

24. Introduction, Indications and Complications of following Neuro surgeries: Craniotomy, Cranioplasty, Stereotactic surgery, Deep brain stimulation, Burr-hole, Shunting, Laminectomy, Hemilaminectomy, Rhizotomy, Microvascular decompression surgery, Endarterectomy, Embolization, Pituitary surgery, Ablative surgery - Thalamotomy and Pallidotomy, Coiling of aneurysm, Clipping of aneurysm, and Neural implantation.

BPT 304 COMMUNITY & REHABILITATION MEDICINE

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about conditions the therapist would encounter in their practice in the community. The objective of this course is that after 60 hrs of lectures and discussion the student will be able to demonstrate an understanding of various aspects of health and disease list the methods of health administration, health education and disease preventive measures.

Course Description: This course involves an over view of community resources available for rehabilitation.

Course Objective: The concept of team approach in rehabilitation.Observation and identification of diagnostic features.Medical and surgical aspects of disabling conditions.Identification of residual potentials in patients with partial and total disability. Formulation of appropriate goals in treatment and rehabilitation.

1. Health and Disease: Definitions, Concepts, Dimensions and Indicators of Health, Concept of well-being, Spectrum and Determinants of Health, Concept and natural history of Disease, Concepts of disease control and prevention, Modes of Intervention, Population Medicine, The role of socio-economic and cultural environment in health and disease.

2. Epidemiology, definition and scope. Principles of Epidemiology and Epidemiological methods: Components and Aims, Basic measurements, Methods, Uses of Epidemiology, Infectious disease epidemiology, Dynamics and modes of disease transmission, Host defenses and Immunizing agents, Hazards of Immunization, Disease prevention and control, Disinfection. Screening for Disease: Concept of screening, Aims and Objectives, Uses and types of screening.

3. Epidemiology of communicable disease: Respiratory infections, Intestinal infections, Arthropod-borne infections, Zoonoses, Surface infections, Hospital acquired infections Epidemiology of chronic non-communicable diseases and conditions: Cardio vascular diseases:
Coronary heart disease, Hypertension, Stroke, Rheumatic heart disease, Cancer, Diabetes, obesity, Blindness, Accidents and Injuries.

4. Public health administration- an overview of the health administration set up at Central and state levels. The national health programme-highlighting the role of social, economic and cultural factors in the implementation of the national programmes. Health problems of vulnerable groups- pregnant and lactating women, infants and pre-school children, occupational groups.

5. Health programmes in India: Vector borne disease control programme, National leprosy eradication programme, National tuberculosis programme, National AIDS control programme, National programme for control of blindness, Iodine deficiency disorders (IDD) programme, Universal Immunisation programme, Reproductive and child health programme, National cancer control programme, National mental health programme. National diabetes control programme, National family welfare programme, National sanitation and water supply programme, Minimum needs programme.

6. Demography and Family Planning: Demographic cycle, Fertility, Family planning- objectives of national family planning programme and family planning methods, A general idea of advantage and disadvantages of the methods.

7. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics: MCH problems, Antenatal, Intranatal and post-natal care, Care of children, Child health problems, Rights of child and National policy for children, MCH services and indicators of MCH care, Social welfare programmes for women and children, Preventive medicine and geriatrics.

8. Nutrition and Health: Classification of foods, Nutritional profiles of principal foods, Nutritional problems in public health, Community nutrition programmes.

9. Environment and Health: Components of environment, Water and air pollution and public health: Pollution control, Disposal of waste, Medical entomology.

10. Hospital waste management: Sources of hospital waste, Health hazards, Waste management.

11. Disaster Management: Natural and man-made disasters, Disaster impact and response, Relief phase, Epidemiologic surveillance and disease control, Nutrition, Rehabilitation, Disaster preparedness.

12. Occupational Health: Occupational environment, Occupational hazards, Occupational diseases, Prevention of occupational diseases. Social security and other measures for the protection from
occupational hazard accidents and diseases. Details of compensation acts.

13. Mental Health: Characteristics of a mentally healthy person, Types of mental illness, Causes of mental ill health, Prevention, Mental health services, Alcohol and drug dependence. Emphasis on community aspects of mental health. Role of Physiotherapist in mental health problems such as mental retardation.

14. Health Education: Concepts, aims and objectives, Approaches to health education, Models of health education, Contents of health education, Principles of health education, Practice of health education.

BPT 305 COMPUTER APPLICATIONS

SUBJECT DESCRIPTION: The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

Course Description: This course involves an introduction to the use of computers in daily life.

Course Objectives: The students should be able to have a working knowledge of computer software and hardware and be able to use computers for enhancing their class work.

2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).

3. Processor and memory: The Central Processing Unit (CPU), main memory.

4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.)

6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

7. Introduction to Excel: introduction, about worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs.

8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

9. Introduction of Operating System: introduction, operating system concepts, types of operating system.

10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW), www browsers, use of the internet.

a. Application of Computers in clinical settings.

PRACTICAL: Practical on fundamentals of computers -

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency

BPT 306 GENERAL MEDICINE, FIRST AID AND EMERGENCY

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about relevant aspects of general medicine. The student will have a general understanding of the diseases the therapist would encounter in their practice. The objective of this course is that discussion the student will be able to list the etiology, pathology, clinical features and treatment methods for various medical conditions.

Course Description: This course involves the management of general medical, cardiopulmonary, skin, psychiatric conditions and common emergencies requiring medical care. Identification and description of the relevant instruments used for investigation and practice for management of general medical, cardiopulmonary, skin and psychiatric conditions will also be discussed.

Course Objectives: The student should be able to describe the management of general medical, cardiopulmonary, skin and psychiatric conditions with a special emphasis on conditions involving physiotherapy management. The student should be able to describe the assessment of general medical, cardiopulmonary, skin and psychiatric conditions with a special emphasis on conditions involving physiotherapy management.

1. Infection : Effects of Infection on the body – Pathology – source and spread of infection – vaccinations – generalized infections – rashes and infection – food poisoning and gastroenteritis – sexually transmitted diseases – HIV infections and Aids.

2. Poisoning: Clinical features – general management – common agents in poisoning – pharmaceutical agents – drugs of misuse – chemical pesticides – Envenomation.

3. Food and Nutrition: Assessment Nutritional and Energy requirements; Deficiency diseases– clinical features and treatment; Protein – Energy Malnutrition: Clinical features and treatment; Obesity and its related disorders: Causes – Complications – benefits of weight loss – management of Obesity – diet, exercise and medications.

4. Endocrine diseases: Common presenting symptoms of Endocrine disease – common classical disease presentations, clinical features and its management; Diabetes Mellitus: Etiology and pathogenesis of diabetes – clinical manifestations of the disease – management of the disease – Complications of diabetes.

5. Diseases of the blood: Examinations of blood disorders – Clinical manifestations of blood disease; Anemia – signs and symptoms – types and management ; Hemophilia - Cause – clinical features severity of disease – management – complications due to repeated hemorrhages – complications due to therapy.

6. Diseases of the digestive system: Clinical manifestations of gastrointestinal disease– Etiology, clinical features, diagnosis, complications and treatment of the following conditions : Reflux Oesophagitis, Achlasia Cardia, Carcinoma of Oesophagus, GI bleeding, Peptic Ulcer disease, Carcinoma of Stomach, Pancreatitis, Malabsorption Syndrome, Ulcerative Colitis, Peritonitis, Infections of Alimentary Tract ; Clinical manifestations of liver diseases - Aetiology, clinical features, diagnosis, complications and treatment of the following conditions : Viral Hepatitis, Wilson's Disease, Alpha1-antitrypsin deficiency, Tumors of the Liver, Gall stones, Cholycystitis.

7. Diseases of the Skin: Examination and clinical manifestations of skin diseases; Causes, clinical features and management of the following skin conditions: Leprosy, Psoriasis, Pigmentary Anomalies, Vasomotor disorders, Dermatitis, Coccal and Fungal Parasitic and Viral infections.

8. Pediatrics : Problems and management of LBW infants, Perinatal problems and management, Congenital abnormalities and management, Respiratory conditions of childhood, Cerebral Palsy – causes, complications, clinical manifestations, treatment ; Spina Bifida – management and treatment, Epilepsies – types, diagnosis and treatment; Recognizing developmental delay, common causes of delay ; Orthopedic and Neuromuscular disorders in childhood, clinical features and management ; Sensory disorders – problems resulting from loss of vision and hearing ; Learning and behavioural problems – Hyperactivity, Autism, Challenging behaviours, Educational delay, The Clumsy Child

9. Psychiatric Disorders: Classifications, Causes, Clinical manifestations and treatment methods used in Psychiatry. Modalities of psychiatric treatment, Psychiatric illness and physiotherapy, Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illnesses -. Anxiety neurosis, Depression, Obsessive compulsive neurosis, Psychosis, Maniac-depressive psychosis, Post-traumatic stress disorder, Psychosomatic reactions: Stress and Health, theories of Stress – Illness.
   Etio-pathogenesis, manifestations, and management of psychiatric illness

   - Drug dependence and alcoholism,
   - Somatoform and Dissociate Disorders – conversion reactions, Somatization, Dissociate Amnesia, and Dissociate Fugue,
   - Personality disorders
   - Child psychiatry- manifestations, and management of childhood disorders-attention deficit syndrome and behavioral disorders.
   - Geriatric psychiatry.

BPT 307 GENERAL SURGERY

SUBJECT DESCRIPTION - This subject follows the basic science subjects to provide the knowledge about relevant aspects of general surgery. The student will have a general understanding of the surgical conditions the therapist would encounter in their practice. The objective of this

course is that after 60 hrs of lectures and discussion the student will be able to list the indications for surgery, etiology, clinical features and surgical methods for various conditions.

Course Description: This course involves the management of general surgical, eye, ENT, cardiopulmonary, gynaecological and obstetrical conditions. Identification and description of the instruments used for investigation and practice for management of general surgical, eye, ENT, cardiopulmonary, gynaecological and obstetrical conditions will be discussed.

Course Objectives: The student should be able to describe the management of general surgical, eye, ENT, cardiopulmonary, gynaecological and obstetrical conditions with a special emphasis on conditions involving.

1. Fluid, Electrolyte and Acid-Base disturbances – diagnosis and management ; Nutrition in the surgical patient ; Wound healing – basic process involved in wound repair, basic phases in the healing process, clinical management of wounds, factors affecting wound healing, Scars – types and treatment. Hemostasis – components, hemostatic disorders, factors affecting bleeding during surgery. Transfusion therapy in surgery – blood components, complications of transfusion ; Surgical Infections ; General Post – Operative Complications and its management.

2. Reasons for Surgery; Types of anaesthesia and its affects on the patient; Types of Incisons; Clips Ligatures and Sutures; General Thoracic Procedures – Radiologic Diagnostic procedures, Endoscopy – types, Biopsy – uses and types. Overview and Drainage systems and tubes used in Surgery.

3. Causes, Clinical Presentation, Diagnosis and treatment of the following Thoracic Trauma situations – Airway obstruction, Pnuemothorax, Hemothorax, Cardiac Tamponade, Tracheobronchial disruption, Aortic disruption, Diaphragmatic disruption, Esophageal disruption, Cardiac and Pulmonary Contusions.

4. Surgical Oncology – Cancer – definition, types, clinical manifestations of cancer, Staging of Cancer, surgical procedures involved in the management of cancer.

5. Disorders of the Chest Wall, Lung and Mediastinum

6. Thoracicsurgeries– Thoracotomy Definition, Types of Incisions with emphasis to the site of insision, muscles cut and complications. Lung surgeries: Pnumonectomy, Lobectomy, segmentectomy – Indications, Physiological changes and Complications; Thoracoplasty, Pleurectomy, Pleurodesis and Decortication of the Lung. Cardiac surgeries – An overview of the Cardio-Pulmonary Bypass Machine – Extracardiac Operations, Closed Heart surgery, Open Heart surgery. Transplant Surgery – Heart, Lung and Kidney – Indications, Physiological changes and Complications.

7. Diseases of the Arteries and Veins: Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases : Arteriosclerosis, Atherosclerosis, Aneurysm, Buerger's disease, Raynaud's Disease, Thrombophlebitis, Deep Vein Thrombosis, Pulmonary Embolism, Varicose Veins.

8. Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Neprectomy, Prostectomy.

9. Burn: Definition, Classification, Causes, Prevention, Pathological changes, Complications, Clinical Features and Management. Skin Grafts – Types, Grafting Procedures, Survival of Skin Graft ; Flaps – Types and uses of Flaps.

10. ENT: Common problems of ear, otitis media, Otosclerosis, functional achonia and deafness, management facial palsy classification, medical and surgical management of lower motor neuron type of facial palsy.

11. Ophthalmology: Ophthalmologic surgical conditions, refraction's, conjunctivitis, glaucoma, corneal ulcer, iritis, cataract, retinitis, detachment of retina, defects of extra-ocular muscles-surgical management.

OBSTETRICS AND GYNECOLOGY

At the end of the course the candidate will be able to:

1. Describe the normal and abnormal physiological events during the puberty, labor, puerperium, post – natal stage and menopause.

2. Discuss the various complications during pregnancy, labour, puerperium and post – natal stage, pre and post-menopausal stage and various aspects of urogenital dysfunction and their management in brief.

3. Acquire the skill of clinical examination of pelvic floor

4. Acquire the skill of clinical examination of pregnant woman.

THEORY

1. Anatomy and physiology of the female reproductive organs. Puberty dynamics

2. Physiology of menstrual cycle –

    - ovulation cycle,
    - uterine cycle,
    - Cx cycle,
    - duration,
    - amount
    - Hormonal regulation of menstruation,

3. Hormonal disorders of females-obesity and female hormones

4. Pregnancy

Diagnosis of pregnancy

A. Abortion

B. Physiological changes during pregnancy

C. Importance of antenatal care exercise

D. High risk pregnancy, prenatal common complications – investigation and management

E. Musculoskeletal disorders during pregnancy

F. Multiple child birth

G. Normal labor complications, investigation and management

5. Child birth

6. Normal puerperium, lactation and importance of post-natal exercises

7. Family planning.

8. Medical termination of pregnancy

9. Infection of female genital tract including sexually transmitted diseases, low backache

10. Prolapse of uterus and vagina

11. Principle of common gynaecological operations – hysterectomy, D&C, D&E, Pop smear

12. Menopause: Its effect on emotions and musculoskeletal system

13. Urogenital dysfunction – pre and post-natal condition

14. Sterility: Pathophysiology, investigations, management, Malnutrition and deficiencies in females.

15. Surgical procedures involving child birth.
    a. Definition, Indications and Management of the following surgical procedures – pelvic repair, caesarian section, nephrectomy, Hysterosalphyngography, Dilatation and Curettage, Laproscopy, Colposopy, Hysterectomy.

16. Carcinoma of female reproductive organs – surgical management in brief Mastectomy – Simple, radical. Hysterectomy.

17. Incontinence – Types, Causes, Assessment and Management.

BPT 308 PHYSIOTHERAPY IN GENERAL MEDICINE AND GENERAL SURGERY

SUBJECT DESCRIPTION -At the end of the course the candidate will be able to:

1. Identify discuss and analyze cardiovascular and pulmonary dysfunctions based on pathophysiological principles and arrive at appropriate functional diagnosis.

2. Acquire knowledge of rationals of basic investigative approaches in the medical system and surgical intervention, regimes in general surgeries (special emphasis on abdominal surgeries)

3. Execute effective physiotherapeutic measures (with appropriate clinical reasoning) and exercise, conditioning in general medical and surgical conditions.

4. Acquire knowledge of the over view of patient's care in the I.C.U. for bronchial hygiene and continuous monitoring of the patient in I.C.U.

5. Select strategies for cure, care and prevention, adopt restorative and rehabilitative measures for maximum possible functional independence of a patient at home, work and in community.

6. Acquire the knowledge of evaluation and physiotherapeutic treatment for obstetric and gynecological conditions

7. Acquire the knowledge of various conditions where physiotherapy plays a vital role in the rehabilitation (psychiatry, dermatology, geriatric and ENT conditions)

8. Evaluate, grade and treat non healing wounds.

Course Description: This course involves a description of the assessment and treatment of patients with general medical and general surgical conditions.

Course Objectives: The student will be able to conduct a safe and effective treatment of patients with General medical and general surgical conditions.

THEORY

1. Physiotherapy in mother and child care – ante and post-natal management, early intervention and stimulation therapy in child care (movement therapy)

2. Geriatrics – handling of old patients and their problems.

3. Complication common to all operations

4. Abdominal incisions.

5. Physiotherapy in pre and post-operative stages.

6. Operations on upper G.I.T.- oesophagus, stomach, duodenum

7. Operations on large and small intestine – Appendisectomy, cholecystectomy, partial colectomy, ileostomy, hernia and herniotomy, hernioraphy, hernioplasty.

8. Physiotherapy in dentistry

9. Burns and its treatment – physiotherapy in burns, skin grafts, and reconstructive surgeries.

10. Management of wound ulcers- Care of ulcers and wounds - Care of surgical scars-U.V.R and other electro therapeutics for healing of wounds, prevention of Hyper-granulated Scars Keloids, Electrotherapeutics measures for relief of pain during mobilization of scars tissues.

11. Physiotherapy intervention in the management of Medical, Surgical and Radiation Oncology Cases.

12. Physiotherapy in dermatology -Documentation of assessment, treatment and follow up skin conditions. U.V.R therapy in various skin conditions; Vitiligo; Hair loss; Pigmentation; Infected wounds ulcers. Faradic foot bath for Hyperhydrosis. Massage maneuvers for cosmetic purpose of skin; use of specific oil as medium; Care of anesthetic hand and foot; Evaluation, planning and management of leprosy-prescription, fitting and training with prosthetic and orthotic devices.

13. ENT – sinusitis, non-suppurative and chronic suppurative otitis media, osteosclerosis, labrynthitis, mastoidectomy, chronic rhinitis, laryngectomy, pharyngeo – laryngectomy, facial palsy.

BPT 309 PHYSIOTHERAPY IN GENERAL MEDICINE AND GENERAL SURGERY LAB HOURS

Course Description: This course involves a description of the assessment and treatment of general medical and general surgical conditions.

Course Objectives: The student will be able to conduct a safe and effective treatment of patient with General medical and general surgical conditions.

The students will be shown patients of relevant diseases and disorders for:

1. History taking of the conditions of patients.

2. Assessment of medical and cardiopulmonary functions

3. Clinical diagnosis of the presentations.

4. Investigations and tests of different clinical presentations

5. Physiotherapy management of the various diseases & surgeries

BPT 310 BIOENGINEERING

Course Description: This course involves a description of biomechanical principles of application of variety of aids & appliances used for ambulation, protection & prevention, various material used for orthoses& prostheses, fabrication of simple splints made out of low cost material

Course Objectives: The student will be able to apply biomechanical principles for the prescription and use of variety of aids & appliances used for ambulation, protection & prevention and understand the fabrication of simple splints made out of low cost material

ORTHOTIC DEVICES
Principles involved in prescribing orthotic devices for different parts of the body. Outline the purpose of each type and list major indication and contraindications and demonstrate methods of training in their use. Prescription checklist.

PROSTHETIC DEVICES
Artificial limbs and their functions. Methods of training in their use.

BPT 311 DIAGNOSTIC IMAGING FOR PHYSIOTHERAPIST

(NOT FOR UNIVERSITY EXAMINATION)

SUBJECT DESCRIPTION- This course covers the study of common diagnostic and therapeutic imaging tests. At the end of the course students will be aware of the indications and implications of commonly used diagnostic imaging tests as they pertain to patient's management. The course will cover that how X-Ray, CT, MRI, Ultrasound and Other Medical Images are created and how they help the health professionals to save lives.

1. IMAGE INTERPRETATION
   a. History
   b. New Kind of Ray
   c. How a Medical Image Helps
   d. What Imaging Studies Reveal
   e. Radiography(x-rays)
   f. Fluoroscopy
   g. Computed Tomography (CT)
   h. Magnetic Resonance Imaging (MRI)
   i. Ultrasound
   j. Endoscopy

2. RADIOGRAPHY AND MAMMOGRAPHY
   a. Equipment components
   b. Procedures for Radiography & Mammography
   c. Benefits versus Risks and Costs
   d. Indications and contraindications.

3. FLUOROSCOPY
   a. What is Fluoroscopy?

b. Equipment used for fluoroscopy
c. Indications and Contra indications
d. How it helps in diagnosis
e. The Findings in Fluoroscopy
f. Benefits versus Risks and Costs.

4. COMPUTED TOMOGRAPHY (CT)

a. What is Computed Tomography?
b. Equipment used for Computed Tomography
c. Indications and Contra indications
d. How it helps in diagnosis
e. The Findings in Computed Tomography
f. Benefits versus Risks and Costs.

5. MAGNETIC RESONANCE IMAGING (MRI)

a. What is MRI?
b. Equipment used for MRI
c. Indications and Contra indications
d. How it helps in diagnosis
e. The Findings in MRI
f. Benefits versus Risks and Costs
g. Functional MRI.

6. ULTRASOUND

a. What is Ultrasound?
b. Equipment used for Ultrasound
c. Indications and Contra indications
d. How it helps in diagnosis
e. The Findings in Ultrasound
f. Benefits versus Risks and Costs.

7. ENDOSCOPY

a. What is Endoscopy?
b. Equipment used for Endoscopy
c. Indications and Contra indications
d. How it helps in diagnosis
e. The Findings in Endoscopy
f. Benefits versus Risks and Costs.

8. NUCLEAR MEDICINE

a. What is Nuclear Medicine?
b. Equipment used for Nuclear Medicine
c. Indications and Contra indications
d. How it helps in diagnosis.
e. Benefits versus Risks and Costs.

BPT 401 RESEARCH METHODOLOGY AND BIOSTATISTICS

Course Description: This course involves a description of principles for conducting research.

Course Objectives: The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

RESEARCH METHODOLOGY

1. Introduction to Research methodology:

Meaning of research, objectives of research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India.

2. Research problem:

Statement of research problem, Statement of purpose and objectives of research problem, Necessity of defining the problem

3. Research design:

Meaning of research design, Need for research design, Features for good design, Different research designs, Basic principles of research design

4. Sampling Design:

Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design

5. Measurement & scaling techniques:

Measurement in research - Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques.

6. Methods of data collection:

Collection of primary data,collection data through questionnaires & schedules, Difference between questionnaires & schedules.

7. Sampling fundamentals:

Need for sampling & some fundamental definitions, important sampling distributions.

8. Processing & analysis of data:

Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.

9. Testing of hypothesis:

What is hypothesis? Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis

10. Computer technology:

Introduction to Computers, computer application in research, computers & researcher.

BIOSTATISTICS

1. Introduction: Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.

2. Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

3. Measure of Central Tendency: Need for measures of central Tendency, Definition and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped., Meaning and calculation of mode, Comparison of the mean, median and mode, Guidelines for the use of various measures of central tendency.

4. Probability and Standard Distributions: Meaning of probability of standard distribution, the binominal distribution, the normal distribution, Divergence from normality – skew ness, kurtosis.

5. Sampling techniques: Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors, Sampling variation and tests of significance.

6. Analysis of variance & covariance: Analysis of variance (ANOVA), what is ANOVA? Basic principle of ANOVA, ANOVA technique, Analysis of Co variance (ANACOVA).

7. Format of scientific documents: Structure of protocols, formats reporting in scientific journals, systematic reviews and meta-analysis).

Recommended Books

1. Handbook Of Research In Physical Therapy. CE Bork
2. Physical Therapy Research: Principles And Application. E Domholdt
3. Research Methodology For Physical Therapists. C Hicks

BPT 402 ORGANIZATION AND ADMINISTRATION & PHYSIOTHERAPY ETHICS

Course Description: Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

Medical/ Physiotherapy ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics versus medical law - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medical diagnosis versus physiotherapy diagnosis.
9. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
10. Professional Indemnity insurance policy
11. Development of standardized protocol to avoid near miss or sentinel events
12. Obtaining an informed consent.
13. Biomedical ethical principles
14. Code of ethics for physiotherapists
15. Ethics documents for physiotherapists
16. Laws affecting physiotherapy practice

ADMINISTRATION

1. Introduction:

a. Branches of administration, Nature and scope of administration, How to be an effective administrator, Planning hospital administration as part of a balanced health care program.

b. Principles of hospital administration and its applications to physiotherapy.

c. Planning and organization: Planning cycle, Principles of organizational charts, Resource and quality management, planning change -innovation

d. Financial issues including budget and income generation

e. Hospital administration: Organization, Staffing, Information, Communication, Coordination, Cost of services, Monitoring and evaluation.

f. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources.

g. Organizing meetings, committees, and negotiations

h. Personnel management: Personnel performance appraisal system, Quality care delivery from the staff.

2. Aims of physiotherapy education

a. Concepts of teaching and learning

b. Curriculum development

c. Principles and methods of academic and clinical teaching

d. Measurement and evaluation

e. Guidance and counseling

f. Faculty development program

g. Administration in clinical setting

h. Use of A-V aids in teaching

i. Taxonomy of education

MANAGEMENT

1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams

8. Leadership
9. Time Management
10. Cost and efficiency

BPT 4O3 ORTHOPAEDICS AND SPORTS PHYSIOTHERAPY

SUBJECT DESCRIPTION -The subject serves to integrate the knowledge gained by the students in orthopedics and traumatology with skills to apply these in clinical situations of dysfunction and musculoskeletal pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to musculoskeletal dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore musculoskeletal function.

1. PT assessment for Orthopedic conditions - SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness- grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length- apparent, true and segmental , girth measurement, muscle length testing- tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up.

2. Fractures - types, classification, signs and symptoms, complications. Fracture healing - factors affecting fracture healing. Principles of fracture management - reduction - open and closed, immobilization - sling, cast, brace, slab, traction - manual, mechanical, skin, skeletal, lumbar and Cervical traction, external fixation, functional cast bracing. PT management in complications - early and late - shock, compartment syndrome, VIC, fat embolism, delayed and mal union, RSD, myositis ossificans, AVN, pressure sores etc. Physiotherapy assessment in fracture cases. Aims of PT management in fracture cases - short and long term goals. Principles of PT management in fractures - Guidelines for fracture treatment during period of immobilization and guidelines for treatment after immobilization period.

3. Specific fractures and dislocations: PT assessment and management of upper limb fractures and dislocations. PT assessment and management of lower limb fractures and dislocations including pelvis. PT assessment and management spinal fractures.

4. Selection and application of physiotherapeutic techniques, maneuver's, modalities for preventive, curative and rehabilitative means in all conditions.

5. Principles of various schools of thought in manual therapy. (Briefly Maitland and Mc kenzie).

6. Degenerative and inflammatory conditions: Definition, signs and symptoms, clinical features, path physiology, radiological features, deformities, medical, surgical management. Describe the PT assessment and management and home program for the following conditions – Osteoarthritis - emphasis mainly on knee, hip and hand, Rheumatoid Arthritis, Ankylosing spondylitis, Gout, Perthes disease, Periarthritic shoulder.

7. Infective conditions: Definition, signs and symptoms, clinical features, pathophysiology, radiological features, medical, surgical management. Describe PT assessment and management for following conditions – Osteomyelitis – acute and chronic, Septic arthritis, pyogenic arthritis, TB spine and major joints - knee and hip.

8. Define, review the postural abnormalities of spinal column, clinical features, deformities, medical and surgical management. Describe PT assessment and management and home program.

9. Deformities: Review in detail the causes, signs and symptoms, radiological features, medical and surgical management. Describe the PT. assessment and management of the following conditions: Congenital: CTEV, CDH, Torticollis, pes planus, pes cavus and other common deformities. Acquired: scoliosis, kyphosis, coxa vara, genu varum, valgum and recurvatum.

10. Cerebral palsy: Definition, etiology, classification, clinical features, complications, deformities, medical and surgical management and home program with special emphasis on carrying techniques. PT management after surgical corrections.

11. Poliomyelitis: Definition, etiology, types, pathophysiology, clinical features, deformities, medical and surgical management. PT. assessment and management after surgical corrections and reconstructive surgeries - emphasis on tendon transfer and home program.

12. Leprosy: Definition, cause, clinical features, medical and surgical management. PT assessment, aims, and management after surgical procedures such as tendon transfer both pre and post operatively.

13. Amputations: Definition, levels, indications, types, PT assessment, aims, management pre and post operatively. PT management with emphasis on stump care and bandaging. Pre and post prosthetic training, checking out prosthesis, complications of amputations and its management.

14. Spinal conditions: Review the causes, signs and symptoms, investigations, radiological features, neurological signs. PT assessment, aims, and management and home program of the following conditions: Cervical spondylosis, Lumbar spondylosis, Spondylolisthesis, Spinal canal stenosis, Spondylolysis, Sacro-iliac joint dysfunction, Sacralisation, Lumbarisation, Intervertebral disc prolapse, Coccydynia, Spina bifida occulta.

15. Effects of spinal traction, types of traction, modes of application, indications for spinal traction, contraindications, precautions, limitations of traction.

16. Osteoporosis- causes, predisposing factors, investigations and treatment.

17. Orthopedic surgeries: Pre and post-operative PT assessment, goals, precautions and PT management of following surgeries such as : Arthrodesis, Osteotomy, Arthroplasty-partial and total - Excision arthroplasty, excision arthroplasty with implant, interpositional arthroplasty and total replacement; Tendon transplant, Soft tissue release- tenotomy, myotomy, lengthening; Arthroscopy, Spinal stabilization, Re-attachment of limbs, External fixators, Synovectomy.

18. Shoulder joint: Shoulder instabilities, TOS, RSD, Impingement syndrome - conservative and post-operative PT management. Total shoulder replacement and Hemi replacement. - Post operative PT management. AC joint injuries - rehabilitation. Rotator cuff tears-conservative and surgical repair. Subacromial decompression - Post operative PT management.

19. Elbow and forearm: Excision of radial head - Post operative PT management. Total elbow arthroplasty- Post operative PT management

20. Wrist and Hand: Total wrist arthroplasty. Repair of ruptured extensor tendons. Carpal tunnel syndrome. Flexor and extensor tendon lacerations - Post operative PT management.

21. Hip: Joint surgeries - hemi and total hip replacement - Post operative PT management Tendonitis and bursitis. - Management.

22. Knee: Lateral retinacular release, chondroplasty- Post operative management. Realignment of extensor mechanism. ACL and PCL reconstruction surgeries - Post operative rehabilitation. Meniscectomy and meniscal repair - Post operative management. Plica syndrome, patellar dysfunction and Hoffa's syndrome-conservative management. TKR- rehabilitation protocol. Patellar tendon ruptures and Patellectomy-rehabilitation.

23. Ankle and foot: Ankle instability. Ligamentous tears- Post operative management.

24. Introduction to Bio-Engineering; Classification of Orthoses and prostheses; Biomechanical principles of orthotic and prosthetic application; Designing of upper extremity, lower extremity and spinal orthosis, indications and check out; Designing of upper extremity and lower extremity prostheses, indications and check out; Psychological aspects of orthotic and prosthetic application; prescription and designing of footwear and modifications; Designing and construction of adaptive devises.

25. Sports Physiotherapy: Physical fitness. Stages of soft tissue healing. Treatment guidelines for soft tissue injuries- Acute, Sub acute and chronic stages. Repair of soft tissues- rupture of muscle, tendon and

Ligamentous tears. Soft tissue injuries- prevention and rehabilitation of, Lateral ligament sprain of ankle. Rotator cuff injuries. Collateral and Cruciate injuries of knee. Meniscal injuries of knee. Supraspinatus and Bicipital tendonitis. Pre patellar and Sub-acromial bursitis. Tennis and Golfer's elbow. Hamstring strains, Quadriceps contusion, TA rupture. Dequervain's tenosynovitis. Trigger and Mallet finger. Plantar fasciitis. Wrist sprains.

26. Applied Yoga in orthopedic conditions

BPT 404 ORTHOPEDICS & SPORTS PHYSIOTHERAPY LAB HOURS

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions
2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended Books

1. Cash`S Text Book Of Orthopaedics& Rheumatology ForPhysio Therapists-Jaypee Bros.
2. Manual Mobilisation Of Extremity Joints-By FredyKaltenborn,Maitland
3. Therapeutic Exercise By-Kolby&Kisner
4. Therapeutic Exercises By O`Sullivan
5. Taping Techniques - Rose Mac Donald
6. Orthopaedic Physical Therapy-By Donatelli
7. Manual Therapy -By Maitland,
8. Neural Tissue Mobilisation-Butler

BPT 405 NEUROPHYSIOTHERAPY

Course Description - The subject serves to integrate the knowledge gained by the students in neurology and neurosurgery with skills to apply these in clinical situations of dysfunction and neurological pathology. The objective of the course is that after the specified hours of lectures and demonstrations the student will be able to identify disabilities due to neurological dysfunction, plan and set treatment goals and apply the skills gained in exercise therapy and electrotherapy in these clinical situations to restore neurological function.

1. **Neurological Assessment:**

   Required materials for examination, Chief complaints, History taking – Present, Past, medical, familial, personal histories, Observation, Palpation, Higher mental function – Consciousness, Orientation, Wakefulness, memory, Speech, Reading Language, Writing, Calculations, Perception, Left right confusion, Reasoning, and Judgment, Motor Examination – Muscle power, Muscle tone, Spasticity, Flaccidity, Reflexes – Developmental reflexes, deep tendon reflexes, Superficial reflexes, Sensory examination – Superficial, Deep and Cortical sensations, Special tests – Romberg's, Kernig's sign, Brudenzki sign, Tinels's sign, Slum test, Lehermitte's sign, Bells Phenomenon,

Gower's sign, Sun set sign, Battle's sign, Glabellar tap sign, etc, Balance examination, coordination examination, Gait analysis – Kinetics & Kinematics (Quantitative & Qualitative analysis), Functional Analysis, Assessment tools & Scales – Modified Ashworth scale, Berg balance scale, FIM, Barthel index, Glasgow coma scale, Mini mental state examination, Rancho Los Amigos Scale for Head injury, APGAR score, ASIA scale, Reflex Grading. Differential diagnosis.

2. **Neuro physiological Techniques** –

Concepts, Principles, Techniques, Effects of following Neurophysiological techniques: NDT, PNF, Vojta therapy, Rood's Sensory motor Approach, Sensory Integration Approach, Brunnstorm movement therapy, Motor relearning program, Contemporary task oriented approach, Muscle re-education approach and Constraint induced movement therapy.

3. Paediatric Neurology:

Paediatric Examination, Developmental milestones, developmental reflexes, Neuro developmental screening tests. Evaluation & Management - History, Observation, Palpation, Milestone Examination, developmental reflex Examination, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches & Modalities in Risk babies, Minimum brain damage, Developmental disorders, Cerebral palsy, Autism, Down's Syndrome, Hydrocephalus, Chorea, Spina bifida, and syringomyelia.

4. Evaluation and Management of Brain and Spinal Cord Disorders :

History, Observation, Palpation, Higher mental function, Cranial nerve examination, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Cerebro vascular Accident, Meningitis, Encephalitis, Head Injury, Brain Tumors, Perceptual disorders, Amyotrophic lateral sclerosis, and Multiple sclerosis.

5. **Evaluation and Management of Cerebellar, Spinal Cord and Muscle Disorders** :

History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications,

Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Ataxia, Sensory Ataxia, Parkinson's disease, Muscular dystrophy (DMD), Myasthenia Gravis, Eaton-Lambert Syndrome, Spinal tumors, Spinal cord injury, Transverse myelitis, Bladder & Bowel Dysfunction, Spinal muscular atrophies, Poliomyelitis, Post-Polio Syndrome.

6. Evaluation and Management of Peripheral Nerve Injuries and Disorders :

History, Observation, Palpation, Motor & Sensory examination, Reflex testing, differential Diagnosis, Balance & Coordination examination, Gait analysis, Functional analysis, List of Problems & Complications, short & Long Term goals, Management of systemic complications, Management of Mechanical Complications, Use of various Neurophysiological approaches& Modalities in Hereditary motor sensory neuropathy, Guillain-Barre syndrome, Brachial plexus palsy, Thoracic outlet syndrome, Lumbosacral plexus lesions, Phrenic & intercostals nerve lesions, Median nerve palsy, Ulnar nerve palsy, Radial nerve palsy, Musculocutaneous nerve palsy, Anterior & Posterior interosseous nerve palsy, Axillary nerve palsy, Long thoracic nerve palsy, Suprascapular nerve palsy, sciatic nerve palsy, Tibial nerve palsy, Common peroneal nerve palsy, Femoral nerve palsy, Obturator nerve palsy, and Pudental nerve palsy.

7. Assessment and management of Neurological gaits:

Quantitative and Qualitative (Kinetic & Kinematics) analysis, List of Problems, short & Long Term goals, Management of following Neurological Gaits - Hemiplegic gait, Parkinson gait, High step gait, Hyperkinetic gait, Hypokinetic gait, Waddling gait, Scissoring gait, Spastic gait, Choreaform Gait, Diplegic Gait, and Myopathic Gait.

8. **Pre and post-surgical assessment and treatment following conditions** –

Spinal disc herniation, Spinal stenosis, Spinal cord trauma, Head trauma, Brain tumors, Tumors of the spine, Spinal cord and peripheral nerves, Cerebral aneurysms, Subarachnoid hemorrhages, epilepsy, Parkinson's disease, Chorea, Hemiballism, Psychiatric disorders, Malformations of the nervous system, Carotid artery stenosis , Arteriovenous malformations, and Spina bifida.

9. Applied Yoga in Neurological conditions.

BPT 406 NEUROPHYSIOTHERAPY LAB HOURS

Course Description:
Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions

2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended Books

1. Cash`s Text Book For Physiotherapists In Neurological Disorders --Jaypee Bros. Publication
2. Proprioceptive Neuro Muscular Facilitation- By Herman Kabat
3. Practical Physical Therapy-Margaret Hollis
4. Therapeutic Exercise -O` Sullivan
5. ―Right In The Middle‖-PatraciaDevis
6. Stroke Rehabilitation--Margaret Johnson
7. Therapeutic Exercise -Basmajiian.
8. Physical Rehabilitation -Krusen

BPT 407 CARDIOPULMONARY PHYSIOTHERAPY

Course Description: Following the basic science and clinical science course, this course introduces the Student in cardio-thoracic conditions which commonly cause disability. The subject is designed to provide knowledge in assessing and planning physiotherapy interventions for various General, Medical and Surgical conditions. The student must be able to reassess the patient as necessary, to monitor the patient in regard to treatment, to monitor the patient's vital signs, student must know emergency drugs indication and contra-indication, care in intensive care unit (ICU) and to provide appropriate interventions to the patient.

Course Objective: The objective of this course is that after lectures and demonstration in addition to clinics the student will be able to demonstrate an understanding of Cardio-thoracic conditions causing disability and their management. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitations imposed by cardiovascular pathology on the functioning of the individual.

1. Anatomy and Physiology

a. Respiratory system

i. Upper respiratory tract

ii. Lower respiratory tract – Trachea, Bronchial tree, Bronchopulmonary segments

iii. Respiratory unit, hilum of lung.

iv. Muscles of respiration

v. Pleura, intra pleural space, intra pleural pressure, surfactant

vi. Mechanics of respiration – Chest wall movements, lung & chest wall compliance

vii. V/Q relationship, airway resistance

viii. Respiratory centre, Neural & chemical regulation of respiration

ix. Lung volumes and lung capacities, Spiro meter, lung function test

x. Pulmonary circulation, Lung sounds, cough reflex

b. Cardiovascular systems

i. Chambers of heart, semi lunar and atria ventricular valves

ii. Coronary circulation, conductive system of heart

iii. Cardiac cycle, ECG, Heart sounds

iv. Blood pressure, pulse, cardiac output

2. Cardio Vascular system

a. Define, etiology, pathogenesis, clinical features, complications,

b. Conservative and surgical management of the following conditions

i. Ischemia heart disease

ii. Myocardial infarction

iii. Heart failure

iv. Cardiac arrest

v. Rheumatic fever

vi. Hypertension

vii. Infective endocarditis

viii. Myocarditis & cardiomyopathy

c. Cardiovascular Disease : Examination of the Cardiovascular System Investigations : ECG, Exercise Stress Testing, Radiology ; Clinical manifestations of Cardiovascular disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following diseases and disorders of the heart : Pericarditis, Myocarditis, Endocarditis, Rheumatic Fever – resulting in valve disorders, Ischemic Heart Disease, Coronary Valve Disease, Congenital disorders of the Heart, Cardiac Arrest ; Examination and Investigations of diseases of arteries and veins ; Hypertension : Definition, causes, classification, types, assessment, investigations and management.

d. Disorders of the Heart – Definition, Clinical features, diagnosis and choice of management for the following disorders : Congenital Heart diseases – Acyanotic congenital heart disease & Cyanotic congenital heart disease : Patent Ductus Arteriosus, Coarctation of Aorta, Atrial Septal Defect, Ventricular Septal Defect, Tetraology of Fallot, Transposition of Great Vessels ; Acquired Heart Disease – Mitral Stenosis & Insufficiency, Aortic Stenosis and Insufficiency, Ischemic Heart Disease – Coronary Artery Disease, Cardiac tumors.

3. Respiratory System

a. Respiratory Disease : Examination of the Respiratory System – Investigations : Chest Radiographs, Pulmonary Function Testing, Arterial Blood Gas Analysis ; Clinical manifestations of Lung disease ; Patterns of lung disease – Chronic Obstructive Lung Disease and Restrictive Lung Disease ; Definition, Etiology, Clinical features, signs and symptoms, complications, management and treatment of following lung diseases : Chronic Bronchitis, Emphysema, Asthma, Bronchiectasis, Cystic Fibrosis, Upper Respiratory Tract Infections, Pneumonia, Tuberculosis, Fungal Diseases, Interstitial Lung Diseases, Diseases of the pleura, diaphragm and chest wall ; Respiratory failure – Definition, types, causes, clinical features, diagnosis and management.

b. Chest wall disorders- Definition, Clinical features, diagnosis and choice of management for the following disorders – chest wall deformities, chest wall tumors, Spontaneous Pneumothorax, Pleural Effusion, Empyema Thoracis, Lung abscess, Bronchiectasis, Tuberculosis, Bronchogenic Carcinoma, Bronchial Adenomas, Metastatic tumors of the Lung, tracheal Stenosis, Congenital tracheomalacia, Neoplasms of the trachea, Lesions of the Mediastinum. Carcinoma of the female breast.

4. Anatomical and Physiological differences between the Adult and Pediatric lung.

5. Bedside assessment of the patient- Adult & Pediatric.

6. Investigations and tests – Exercise tolerance Testing – Cardiac & Pulmonary, Radiographs, PFT, ABG, ECG, Hematological and Biochemical Tests.

7. Physiotherapy techniques to increase lung volume – controlled mobilization, positioning, breathing exercises, Neurophysiological Facilitation of Respiration, Mechanical aids - Incentive Spirometry, CPAP,IPPB.

8. Physiotherapy techniques to decrease the work of breathing – Measures to optimize the balance between energy supply and demand, positioning, Breathing re-education – Breathing control techniques, mechanical aids – IPPB, CPAP, BiPAP.

9. Physiotherapy techniques to clear secretions – Hydration, Humidification & Nebulisation, Mobilisation and Breathing exercises, Postural Drainage, Manual techniques – Percussion, Vibration and Shaking, Rib Springing, ACBT, Autogenic Drainage, Mechanical Aids – PEP, Flutter, IPPB, Facilitation of Cough and Huff, Nasopharyngeal Suctioning.

10. Drug therapy – Drugs to prevent and treat inflammation, Drugs to treat Bronchospasm, Drugs to treat Breathlessness, Drugs to help sputum clearance, Drugs to inhibit coughing, Drugs to improve ventilation, Drugs to reduce pulmonary hypertension, Drug delivery doses, Inhalers and Nebulisers.

11. Neonatal and Pediatric Physiotherapy – Chest physiotherapy for children, The neonatal unit, Modifications of chest physiotherapy for specific neonatal disorders, Emergencies in the neonatal unit.

12. Physiotherapy in Obstructive lung conditions.

13. Physiotherapy in Restrictive lung conditions.

14. Management of breathlessness.

15. Pulmonary Rehabilitation.

16. Physiotherapy following Lung surgeries

17. Respiratory failure – Oxygen Therapy and Mechanical Ventilation.

18. Introduction to ICU : ICU monitoring –Apparatus, Airways and Tubes used in the ICU - Physiotherapy in the ICU – Common conditions in the ICU – Tetanus, Head Injury, Lung Disease, Pulmonary Oedema, Multiple Organ Failure, Neuromuscular Disease, Smoke Inhalation, Poisoning, Aspiration, Near Drowning, ARDS, Shock; Dealing with an Emergency Situation in the ICU.

19. Physiotherapy management following cardiac surgeries.

20. Cardiac Rehabilitation.

21. Physiotherapy management following PVD.

22. Abdominal Surgeries - Management of Pulmonary Restorative Dysfunction following surgical procedures on Abdomen and Thorax.

23. Management of Amputations following Diabetes, PVD - Prosthesis in amputations of lower limbs following ulcers and gangrenes.

24. Home program and education of family members in patient care.

25. Treatment, Response to exercise and Implications of Physiotherapy in the following disease conditions: Hypertension, Diabetes, Renal Failure and Obesity.

BPT 408 CARDIOPULMONARY PHYSIOTHERAPY LAB HOURS

PRACTICAL:

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions

2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

Recommended Books

1. Cash`S Text Book For Physiotherapists In Chest, Heart & Vascular Diseases
2. Chest Physical Therapy & Pulmonary Rehabilitation-Donna Frownfilter
3. Brompton`S Hospital Guide
4. Physio Therapy In Cardio- Vascular Rehabilitation-Webber

5. Exercise &The Heart, Wenger

BPT 409 RESEARCH PROJECT

1. Research Project will be done under the supervision of the Faculty Members.
2. Presentation of the same will be held.

BPT 410 HEALTH PROMOTION, FITNESS AND WELLNESS

(NOT FOR UNIVERSITY EXAM)

Course description: This course includes discussion on the theories of health and wellness, including motivational theory, locus of control, public health initiative, and psycho-Social, spiritual and cultural consideration. Health risks, screening, and assessment considering epidemiological principles are emphasized. Risk reduction strategies for primary and secondary prevention, including programs for special populations are covered.

1. Prevention practice: a holistic perspective for physiotherapy

a. Defining Health

b. Predictions of Health Care

c. Comparing Holistic Medicine and Conventional Medicine

d. Distinguishing Three Types of Prevention Practice.

2. Healthy People

a. Definition of healthy people

b. Health education Resources

c. Physiotherapist role for a healthy community.

3. Key concepts of fitness

a. Defining & Measuring Fitness

b. Assessment of Stress with a Survey

c. Visualizing Fitness

d. Screening for Mental and Physical Fitness

e. Body Mass Index calculations.

4. Fitness training

a. Physical Activities Readiness Questionnaire

b. Physical Activities Pyramid

c. Exercise Programs

d. Evidence-Based Practice.

5. Health, fitness, and wellness issues during childhood and adolescence

6. Health, fitness, and wellness during adulthood

7. Women's health issues: focus on pregnancy:

8. Prevention practice for older adults

9. Resources to optimize health and wellness

10. Health protection.

11. Prevention practice for musculoskeletal conditions

12. Prevention practice for cardiopulmonary conditions

13. Prevention practice for neuromuscular conditions

14. Prevention practice for integumentary disorders

15. Prevention practice for individuals with developmental disabilities

16. Marketing health and wellness.

NOIDA INTERNATIONAL UNIVERSITY

SCHOOL OF HEALTH SCIENCES

Curriculum for Bachelor of Science

OPERATION THEATRE TECHNOLOGY

w.e.f session -2021 onwards

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

> *'Alliedandhealthcareprofessionals(AHPs)includesindividualsinvolvedwiththedeliveryofhealthorhealthcarer elated services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurs es andpublichealthofficialstopromote protect treatand/ormanageaperson('s)physical mental social emotional*

Scope and need for allied and healthcare professionals in the Indian healthcare system

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses suchas in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;

- In a broad range of settings from a patient's home to community, primarycare centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio- economies and cultural norms within the society.
- Learning goals and objectives for allied and healthcare professionals

Credit hours vs traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance.17 All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transfer ability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit- based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programme, 'joint degrees' and 'study abroad' programme.

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

Table 1 Clinical learning opportunities imparted through the use of advanced techniques

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios
	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills

	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	As specific to Operation Theatre Technology

Background of the profession

Statement of Philosophy– Why this profession holds so much importance

A latest study by the Harvard School of Public Health has found that while the South-East Asia region has just 2.6 OTs per 1 lakh population, the number is as low as 1.3 OT per 1 lakh population in India and Pakistan. Whereas, developed regions like Eastern Europe have the highest number of OTs per 1 lakh population - 25.1, followed by Asia Pacific (high income countries) 24.3, Central Europe 15.7, Western Europe 14.7, North America and Australasia 14.3, Central Asia 11.7 and the Caribbean 10.4 OTs). So we may interpret that there is an enormous scope and need for the profession not only in India as well as in other developing countries but at the same time along with skilled manpower we need adequate manpower.

Moreover, a variety of electrical and electronic equipment are in use in modern operation theatres for monitoring anesthesia & surgical procedures, the success of the procedures and safety of patients depend largely on the reliability, smooth and trouble free performance of these equipment's and ability of skilled manpower to operate the same. Thus, there is increased need for qualified and trained professionals in the system. This course is aimed at satisfying this need.

About Operation Theatre Technology

An operation theatre (OT) technologist forms an intrinsic part of any hospital. To become a trained professional one must undertake operation theatre technology course. An OT professional is the one, who facilitates the surgical procedures, planned and emergency both, by preparing in advance the equipment that are necessary for any surgical procedures. He/she also looks after all the work and management of the operation theatre which includes managing the patients in & out of operation theatre, looking after all the surgical equipment, arrangement of operation theatre table, dressing table, anesthesia table as well as

management of the staff. As the surgical branch has various specialty including General Surgery, OBG, Cardiac, Ortho and genito-urinary, the OT technologist needs to know about these various specialties.

Scope of practice

- Setup, check, and maintain anesthesia machine, monitors life support equipment like airway equipment, ventilator, emergency equipment, defibrillator, and anesthetic and resuscitation drugs.
- Orders, Maintains and keep records of all anesthesia equipment and drug.
- Assist Anesthetist in patient procedures like setting up of invasive lines, airwaymanagement, setting up of monitors and administer anesthesia to patient
- Assists during emergency situations by assisting in basic and advanced life support, critical events
- Prepares and maintains operation table, light, electric cautery, tourniquets etc.
- Management of central sterile services department. Packing of equipment and linen.Sterilization procedures like autoclaving, plasma sterilization and disinfection procedures as per guidelines, checking, storage and dispatch.
- Management in Intensive Care unit and emergency department of equipment like ventilators, monitors, infusion pumps, defibrillators etc.
- Assist disaster team in disaster situations and national emergencies on field and safe transport in ambulance.
- Assist anesthesia and surgical team in all kinds of surgical disciplines.
- Assist anesthetist during anesthesia procedures outside operation theatres like CT and MRI suits, Cardiac catheterization laboratory, pain relief procedures etc.
- Recognition of Title and qualification
- Within the multidisciplinary team, the professional responsible for the facilitation and preparation of the surgical procedures is the Operation theatre technologist.
- The recommended title thus stands as the Operation Theatre Technologist with the acronym - OTT for this group of professionals

It is a known fact that with the career advancement, the nomenclature will also vary and will also depend on the sector and profile of the professional. Considering the 10 NSQF levels designed by the NSDA, the following level progression table has been proposed by the taskforce to map the nomenclature, career pathways and progression in different sectors of professional practice for Operation theatre technologist.

The proposed progression is for further discussion and deliberation, the implementation time of the same may vary depending on the current system and regulations in place.

The table 2 below indicates the various channels of career progression in three distinct sectors such as clinical setting, academic and industry (management/sales or technical) route. It is envisaged that the OTT will have two entry pathways – students with diploma or baccalaureate. The level of responsibility will increase as the career progresses and will starts with level four (4) for diploma holders and level five (5) for baccalaureate holders. The table also indicates the corresponding level of qualification with experience required by the professional to fulfill the requirements of each level. Considering the degree of patient dealing in operation theatre technology and such other professions, government aims to phase out the Diploma and PG Diploma level courses and promote Bachelors' and Masters' degree courses. In the academic front, as per UGC guidelines, to work at the position of a Lecturer/Assistant Professor the candidate must attain master degree. At present there are limited master degree seats in Operation Theatre Technology in India, and thus it has been decided that eventually provisions will be made to provide bridge courses for PG Diploma holder for certain number of years to bring them at par with the master level courses and universities will be promoted to start master degree courses. The table also indicates that career progression is upto the level 10, however it needs to be stated that the ultimate signatory authority on patient documentation stands with the surgeon on role, the chief technical officer of the OT unit (clinical route) will be the ultimate authority for the management responsibilities, the final authority for the clinical decisions will be with the doctor.

Table 2 Nomenclature based on career progression for Operation Theatre Technologist (Proposed)

	Nomenclature in various sectors			Qualification and experience
Levels	Clinical	Academic	Industry	
Level 4	Operation Theatre Assistant		Technical associate	Diploma OTT with 0 - 5 years post Diploma OTT experience
Level 5	Junior Operation Theatre Technologist	Demonstrator	Junior Operation Theatre Technologist	BSc OTT with 0-5 years post BSc OTT Diploma OTT with 6-10 years post OTT (only for Industry pathway)

Level 6	Senior Operation Theatre Technologist	Tutor	Senior Operation Theatre Technologist	PGDOTT with 0-5 years post PGDOTT BSc OTT with 6-10 post BSc OTT Diploma OTT 11-15 years' experience with General B.Sc. (only for Industry pathway)
Level 7	Junior Technical Officer	Clinical Instructor	Chief OT Technologist	PGDOTT with 6-10 years post PGDOTT BSc OTT with 11-15 years (Only clinical/industry role) post BSc OTT
Level 8	Senior Technical Officer	-	Deputy Manager for OT Technology	PGDOTT with 11-15 years post PGDOTT BSc OTT with 16-20 years (only clinical/industry role) post BSc OTT
Level 9	Chief Operation Theatre Officer	-	Additional Director for OT Technology	PGDOTT with 16-20 years post PGDOTT BSc OTT with 21-25 years (only clinical/industry role) post BSc OTT
Level 10	Chief Operation Theatre Manager	-	Director for OT Technology	PGDOTT with 21-25 years post PGDOTT BSc OTT with 26-30 years (only clinical/industry role) post BSc OTT

PGDOTT- Post Graduate Diploma for Operation Theatre Technology, this has been included in this table considering the fact that some MSc course or PG Diploma course may exist or/and can be developed for the Operation Theatre technology professionals. So the probable progression will be as indicated in the table 2 above.

Definition of Operation Theatre Technologist

OperationtheatreTechnologistisamemberofamultidisciplinaryteaminoperationtheatreswho Prepare and maintain an operating theatre. Assists anesthetist and surgical team during peri-operative period and provides support to patients in the recovery room.

Education of the operation theatre technologist When developing any education programme it is necessary that programme planning should be outcome-based, meeting local and national manpower requirements, personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge and skills to competency based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.

Thus, the following curriculum aims to focus on skills and competencies based approach for learning and is designed accordingly. The curriculum is prescriptive and is designed with an aim to standardize the content across the nation.

Entry requirements

It is recommended that the students entering the OTT programme should have completed the recognized secondary school studies as the qualification, stipulated for OTT course (diploma/degree) is 10+2 or equivalent examination with science subject from a recognized university or board which would provide the foundation for and prepare them for higher education studies with minimum 50% aggregate marks at HSC for open category and minimum 45% aggregate marks for reserve category.

Course Duration

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as an entry level professional in OTT -

3.5 year programme (including 6 month of clinical training /internship)- Bachelor's degree level
The emphasis initially should be on the academic content establishing a strong scientific basis and in the latter year on the application of theory to clinical/reflective practice. In Bachelor degree programme minimum one year should be devoted to clinical practice and this should be on a continuum of rotation

from theory to practice over the programme. The aim of the 4 year degree programme is to enable the development of the OTT as a key member of the multidisciplinary team and to enable him/her to execute his/her role with ensuring quality.

With the change in the disease dynamics and multifold increase in the, it is imperative that a well- structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. Thus, a master's degree programme is recommended with minimum of two years of education in specialized field. The post graduate students can contribute significantly in research and academics. Presently, there are limited master degree courses in the country and institutes and universities should be encouraged to start such courses.

Teaching Faculty and Infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.Teaching areas should facilitate different teaching methods. Where students share didactic lectures with other disciplines (e.g. nurses) large lecture theatres may be appropriate, but smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues where students are placed the health and safety standards must be adhered to. The recommended teachers to student ratio in the UG level should be -1:25.

Job availability

As per ILO documentation, employers worldwide are looking for job applicants who not only have technical skills that can be applied in the workplace, but who also can communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.22 After completion of the courses mentioned in following chapters, the individual will find a challenging career in a hospital, nursing homes, trauma / emergency centers, Intensive Care units, CSSD etc. Graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded. With further experience, graduates may be employed by medical equipment manufacturers and development specialists.

Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years and will keep on increasing due to changing environment and conditions.

B. Sc. in Operation Theater Technology

Introduction:

Learning Objectives: At the completion of this course, the student should be -

- Able to help the anesthesiologist in administering anesthesia, assist in various procedures and also help in continuous monitoring of patients during surgery.
- Able to train and develop an individual to independently handle the latest technology and high end biomedical equipment in Operation Theatre
- Able to assist anesthesiologists in developing and plummeting patient anesthesia careplans, including pre-operative, surgical theater, recovery room, and post-operative intensive care procedures.
- Able to do- patient data collection, catheter insertion, airway management , assisting the administration and monitoring of regional and peripheral nerve blockades, support therapy, adjusting anesthetic levels during surgery, inter-operative monitoring, postoperative procedures, pain clinics and patient education, and administrative tasks.
- Able to manage medical gases and pipeline system
- Able to assist in Intensive care unit
- Able to manage Central sterile supply department
- Able to assist during Disaster and emergency situations.
- Expectation from the future graduate in the providing patient care.

The Course prepares the operating theatre technologist to work as a competent, reliable member of the health care team under the guidance and supervision of doctors in their delivery of patient care, training also focuses on the knowledge and skills of monitoring infection control policy and procedures in the operating theatre.

Employment opportunities can be found in hospitals in both private and public sectors as well as in independent trauma centres.

OTT graduate is encouraged to pursue further qualification to attain senior position in the professional

field, also to keep abreast with the advance and new technology, the professional should opt for continuous professional education credits offered by national and international institutes.

Eligibility for admission Selection Procedure

He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%)in physics, chemistry, biology/mathematics.
OR
Diploma in Operation Theatre Technology after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics, chemistry and biology/mathematics provided the candidate has passed in each subject separately.

He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.

Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12th Standard level.

The qualifying examination passed by FN/PIO/CIWGC students should be considered equivalent to eligibility examination by the Association of Indian Universities/Academic Council

He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

Admission to B.Sc. Operation Theatre Technology course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme of CBSE, subject-wise distribution of questions will be as 40% in Physics, 25% in Biology/25% in Mathematics, 15% in Chemistry, 10% in English (Language & Comprehension) and 10% in General Awareness about health related methods.

Successful candidates on the basis of written Test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of Surgery and/or

Anesthesia (Chairman of the Board) along with other nominees, whose recommendations shall be final for the selection of the students.

During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year for allied and healthcare science courses for candidates who have passed diploma program from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the same subject have been studied at diploma level.

Duration of the course

Duration of the course: 3.5 years

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance:

A candidate has to secure minimum-

75% attendance in theoretical

80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Assessment:

Assessments should be completed by the academic staff, based on the compilation of the student's theoretical &clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be included and evaluated.

Course Structure:

First Year

SL NO	COURSE CODE	SUBJECT	HOURS	CREDITS
1	OTT 101	Human Anatomy	125	4
2	OTT 102	Physiology	125	4
3	OTT 103	Introduction to Quality and Patient safety	90	3
4	OTT 104	Biochemistry I	90	3
7	OTT 105	Introduction to OTT	90	3
8	OTT106	Practical (Introduction to OTT)	90	3
9	OTT 107	English(Communication and soft skills)	30	1
10	OTT 108	Introduction to Healthcare Delivery System in India	90	3
11	OTT 109	Basic computers and information science	30	1
12		Clinical Lab posting	200	

Theory	760
Practical	90
Clinical	200
Total	1050

Second Year

SL NO	COURSE CODE	SUBJECT	HOURS	CREDITS
1	OTT 201	Medicine	90	3
2	OTT 202	Applied Pathology & blood banking	60	2
3	OTT 203	Applied Microbiology	60	2
4	OTT 204	Clinical Pharmacology	90	3
5	OTT 205	Psychology & Sociology	90	3
6	OTT 206	Basic of surgery	90	3
7	OTT 207	Principles & basics of Anesthesia	90	3

8	OTT 208	OTT Practical	60	3
10		Clinical Lab posting	300	

Theory	630
Practical	60
Clinical	300
Total	990

Third Year

SL NO	COURSE CODE	SUBJECT	HOURS	CREDITS
1	OTT 301	Operation theatre technology - clinical	60	2
2	OTT 302	Operation theatre technology - practical	60	1
3	OTT 303	Operation theatre technology - Applied	120	4
4	OTT 304	Operation theatre technology - practical	120	2
5	OTT 305	Operation theatre technology - Advanced	100	4
	OTT 306	Operation theatre technology – Advanced - Practical	60	2
6	OTT 307	Ethics & Database management	30	1
7	OTT 308	Research and Biostatistics	30	1
8		Clinical Lab posting	600	

Theory	340
Practical	240
Clinical	600
Total	1108

INTERNSHIP

SR. NO.	COURSE TITTLE	HOURS		
1	INTERNSHIP	THEORY	PRACTICAL	HOURS
			1000	1000

SYLLABUS FOR B.SC OPERATION THEATRE TECHNOLOGY

COURSE CODE: OTT101

COUSE NAME: HUMAN ANATOMY

COURSE CREDIT HOURS: 4

TOTAL HOURS: 125(THEORY: 100 HOURS PRACTICAL: 25 HOURS)

COURSE OBJECTIVES:

By the end of this course the students will demonstrate the anatomy of the human body regarding upper limb, lower limb thorax, abdomen, and head and neck. Also, student will demonstrate the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body.

COURSE DESCRIPTION:

It is designed to provide students with the working knowledge of the structure of the human body which is essential foundation for their clinical studies.

COURSE CONTENT:

UNIT 1

Introduction: human body as whole

Theory:

- Definition of anatomy and its divisions Terms of location, positions and planes Cell mid its organelles
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous & mucous glands with examples
- Basic tissues - classification with

examples Practical:

- Histology of types of epithelium
- Histology of serous, mucous & mixed salivary gland

UNIT 2

Locomotion and support

Theory:

Cartilage - types with example & histology

Bone - Classification, names of bone cells, parts of long bone, names of all bones, vertebral column ,fontanels of fetal skull Joints - Classification of joints with examples, synovial joint (in detail for radiology)

Muscular system: Classification of muscular tissue & histology

Names of muscles of the body

Practical:

Histology of the 3 types of cartilage

Demo of all bones showing parts, radiographs of normal bones & joints

UNIT 3

Cardiovascular system

Theory:

- Heart-size, location, chambers, exterior & interior
- Blood supply of heart
- Systemic & pulmonary circulation
- Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachialartery, superficial palmar arch, femoral artery, internal iliac artery
- Peripheral pulse
- Inferior venacava, portal vein, portosystemic anastomosis, Great saphenous vein, Dural venoussinuses
- Lymphatic system- Histology of lymphatic tissues, Names of regional lymphatic, axillary and inguinal lymph nodes in brief

Practical

- Demonstration of heart and vessels in the body
- Histology of large artery, medium sized artery & vein, large vein
- Microscopic appearance of large artery, medium sized artery & vein, large vein pericardium
- Histology of lymph node, spleen, tonsil & thymus Normal chest radiograph showing heart shadows
- Normal angiograms

UNIT 4

Gastro-intestinal system

Theory:

- Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands ,Waldeyer's ring) Oesophagus, stomach, small and large intestine, liver, gallbladder, pancreas
- Radiographs of abdomen

UNIT 5

Respiratory system

- Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments
- Histology of trachea, lung and pleura
- Names of paranasal air sinuses

Practical:

- Demonstration of parts of respiratory system.
- Normal radiographs of chest
- Histology of lung and trachea

UNIT 6

Peritoneum

Theory: Description in brief

Practical: Demonstration of reflections

UNIT 7

Urinary system -

- Kidney, ureter, urinary bladder, male and female urethra
- Histology of kidney, ureter and urinary bladderPractical:

Demonstration of parts of urinary system Histology of kidney, ureter, urinary bladder Radiographs of abdomen-lVP, retrograde cryptogram

UNIT 8

Reproductive system

Theory:

- Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)
- Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology)Mammary gland - gross,

Practical:

Demonstration of section of male and female pelvis with organs in situ Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary Radiograph.

UNIT 9

Endocrine glands

Theory:Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal glad - (gross & histology)

Practical:

- Demonstration of the glands
- Histology of pituitary, thyroid, parathyroid, suprarenal glands

UNIT 10

Nervous system

- Neuron
- Classification of NS
- Cerebrum, cerebellum, midbrain, pons, medulla oblonguta, spinal cord with spinal nerve (gross& histology) Meninges, Ventricles & cerebrospinal fluid

Practical:

- Histology of peripheral nerve & optic nerve Demonstration of all plexuses and nerves in the bodyDemonstration of all part of brain
- Histology of cerebrum, cerebellum, spinal

UNIT 11

Sensory organs

Theory:

- Skin: Skin-histology Appendages of skin
- Eye: Parts of eye & lacrimal apparatus
- Ear: parts of ear- external. middle and inner ear and contents

Practical:

Histology of thin and thick skin Demonstration and histology of eyeball Histology of cornea & retina

UNIT 12

Embryology Spermatogenesis & oogenesis, Ovulation, fertilization Fetal circulation Placenta

COURSE LEARNING OUTCOMES:

CLO 1. Students can demonstrate the location, position and planes. Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system. . They will be able to demonstrate epithelial and glands. (UNIT 1)

CLO 2. Classify different types of tissue and explain anatomy and physiology of skeletal system, joints and muscular system. Demonstrate the bones of all parts.(UNIT 2)

CLO 3. Describe how the heart is positioned in the thoracic cavity. List and describe the layers of the heart wall. Name the chambers of the heart and their valves. Name the major vessels that enter and exit the heart and their branches. Describe blood flow through the heart. Explain how the conduction system of the heart controls proper blood flow.(UNIT 3)

CLO 4. Identify the organs of the alimentary canal from proximal to distal, and briefly state their function. Identify the accessory digestive organs and briefly state their function. Describe the four fundamental tissue layers of the alimentary canal.(UNIT 4)

CLO 5. Outline the forces that allow for air movement into and out of the lungs. Outline the process of gas exchange. Summarize the process of oxygen and carbon dioxide transport within the respiratory system. Create a flow chart illustrating how respiration is controlled.(UNIT 5)

CLO 6. What are the nine regions of abdomen. Explain peritoneum, its layers, peritoneal cavity, blood supply, nerve supply, lymphatic drainage, venous drainage and functions of peritoneum.(UNIT 6)

CLO 7. Describe different parts of urinary system, their further sub divisions, dimensions, weight, size,shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.(UNIT 7)

CLO 8. Describe different parts of male and female reproductive system, their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.(UNIT 8)

CLO 9. Describe different endocrine glands (pituitary, thyroid, parathyroid and suprarenal gland), their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.(UNIT 9)

CLO 10. Identify the anatomical and functional divisions of the nervous system. Relate the functional and structural differences between gray matter and white matter structures of the nervous system to the structure of neurons. List the basic functions of the nervous system.(UNIT 10)

CLO 11. Describe different sensory organs (skin, eye and ear), their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous

drainage and applied anatomy. (UNIT 11)

CLO 12. Describe spermatogenesis, oogenesis, ovulation and fertilization. Explain Fetal circulation. Describe placenta and its functions(UNIT 12)

TEXT BOOKS:

Human Anatomy by BD Chaurasia (4 Volume)

REFERENCE BOOKS:

Gray's Anatomy by Richard Drake & A. Wayne Vogl & Adam W. M. Mitchell

WEB LINKS:

- YouTube channel by Dr. Peter de Souza and Dr. Jack Hurley, U.K. Medical doctors.
- https://guides.lib.uw.edu
- www.linkedin.com ›slideshare

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 102
COURSE NAME: GENERAL PHYSIOLOGY
COURSE CREDIT: 4
TOTAL HOURS: 125(THEORY: 100 HOURS PRACTICAL: 25 HOURS)

COURSE OBJECTIVES:

To provide in-depth instruction in the organization, structures, and functions of the human body. Students will learn the terminology of physiology of each body system and how they interrelate to maintain homeostasis.

COURSE DESCRIPTION:

The student will demonstrate a thorough understanding of the normal physiology of each organ system of the body.

COURSE CONTENT:

UNIT1.

General Physiology: Cell: morphology, Structure and function of cell organelles Structure of cell membrane Transport across cell membrane Intercellular communication Homeostasis

UNIT 2.

Blood: Introduction-composition & function of blood W.B.C., R.B.C., Platelets formation & functions, Immunity Plasma: composition, formation & functions, Plasma Proteins:-types & functions Blood Groups-types , significance, determination Hemoglobin Haemostasis Lymph-composition, formation, circulation &functions

UNIT 3.

Cardiovascular system: Conducting system-components, impulse conduction Heart valves Cardiac cycle-definition, phases of cardiac cycle Cardiac output- definition, normal value, determinants. Stroke volume and its regulation Heart rate and its regulation: Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure Shock-definition, classification, causes and features Basic idea of ECG Cardiovascular changes during exercise

UNIT 4.

Respiratory System: Mechanics of respiration Lung volumes and capacities Pulmonary circulation, transport of respiratory gases Factors affecting respiration Regulation of respiration-neural regulation, voluntary control and chemical regulation Hypoxia,Hypercapnoea, Hypocapnoea Artificial respiration Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation, apnoea, tachypnoea Respiratory changes during exercise.

UNIT 5.

Nerve Muscle Physiology: Muscles- classification, structure, properties, Excitation contraction coupling Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise Nerve –structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction Concept of nerve injury & Wallerian degeneration Synapses Electrical events in postsynaptic neurons Inhibition & facilitation at synapses Chemical transmission of synaptic activity Principal neurotransmitters. 6. Nervous system: Introduction, central and peripheral nervous system, functions of nervous system.

UNIT 6.

Reflexes- monosynaptic, polysynaptic, superficial, deep &withdrawal reflex Sense organ, receptors, electrical & chemical events in receptors Sensory pathways for touch, temperature, pain, proprioception & others Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions Motor mechanism: motor cortex, motor pathway: the descending tracts- pyramidal & extra pyramidal tracts-origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis. Spinal cord lesions- complete transection & hemi section of the spinal cord Autonomic nervous system :features and actions of parasympathetic & sympathetic nervous system Hypothalamus Higher functions of nervous system Special senses- eye, ear, nose, mouth + - + Water excretion, concentration of urine-regulation of Na , Cl , K excretion

UNIT 7.

Renal System: Physiology of kidney and urine formation Glomerular filtration rate, clearance, Tubular function

UNIT 8.

Digestive System: Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation

Functions of Liver & Stomach.

UNIT 9.

Endocrinology Physiology of the endocrine glands – Pituitary, PinealBody, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications and functions.

UNIT 10.

Male & female reproductive system Male - Functions of testes, pubertal changes in males, testosterone - action & regulations of secretion. Female - Functions of ovaries and uterus, pubertal changes, menstrual cycle, estrogens and progestron - action and regulation.

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to…

CLO1. Describe the structure and function of cellular organelles.

CLO2. Describe the functions of blood.Classify the different types of blood cells

CLO3. Name the chambers of the heart and their valves.Name the major vessels that enter and exit the heart. Describe blood flow through the heart. Describe the stages of a cardiac cycle

CLO4. Explain the function of the respiratory system. Name the organs of the system. Define the parts of the internal nose and their functions

CLO5. Name the functions of the skeletal system..Describe and compare the basic differences between the anatomy of skeletal, smooth and cardiac muscles. List the structural and functional classification of neurons.Explain how a neuron transmits a nerve impulse. (UNIT 5)

CLO6. Describe the structure of the spinal cord. Name and number the spinal nerves.(UNIT 6)

CLO7. Define the following internal parts of the kidneys: cortex, medulla, medullary pyramids, renal papillae, renal columns and major and minor calyces.Name the parts of a nephron and describe the flow of urine through this renal tubule..List the functions of the nephrons.(UNIT 7)

CLO8. Explain the major digestive enzymes and how they function. .Explain the functions of the liver(UNIT 8)

CLO9. List the functions of hormones. Describe how the hypothalamus of the brain controls the endocrine system. Name the endocrine glands and state where they are located.List the major hormones and their effects on the body(UNIT 9)

CLO10. Name the internal parts of a testis. Explain the effects of testosterone on the male body. Describe the phases of the menstrual cycle. (UNIT 10)

22

PRATICALS

- Examination of pulse, B.P., Respiratory rate.
- Reflexes
- Spirometery to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on Spirometery.
- Estimate of Haemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count. E Blood indices, Blood grouping, Bleeding & Clotting time

TEXT BOOKS:

- Anatomy and Physiology for Nurses
- Surface and Radiological Anatomy – Hamilton et al (Heffer)
- Essentials Of Medical Physiology: by K Sembulingam
- Textbook of Physiology- AK Jain

REFERENCE BOOKS :

- Essentials of Human Anatomy – Russel
- An Atlas of normal radiographic Anatomy – Ross and Wilson

WEB LINKS:

- https://www.physoc.org/
- http://aups.org.au/
- https://www.hapsweb.org/default.aspx

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 103
COURSE NAME: BASIC CLINICAL BIOCHEMISTRY
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE OBJECTIVE:

This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

COURSE DESCRIPTION:

This course involves a study of the metabolism of carbohydrates, proteins,fats, minerals, vitamins and essential enzymes. The role of these in the functioning of the humanbody will be discussed.

COURSE CONTENT:

UNIT 1.

Carbohydrate Metabolism

- Introduction, Importance and Classification
- Digestion and Absorption
- Metabolism: - Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis
- Disorders of carbohydrate metabolism.

UNIT 2.

Protein Metabolism

- Introduction, Importance and classification
- Important properties of proteins
- Digestion & absorption of Proteins
- Protein synthesis
- Metabolism of proteins
- Disorders of protein metabolism and Urea Cycle

UNIT 3.

Lipid

- Introduction & Classification
- Digestion & absorption of fats

- Lipoproteins
- Fatty acid biosynthesis & fatty acid oxidation

UNIT 4

Nucleic Acid

- Introduction
- Functions of Nucleic acid
- Functions of energy carriers

UNIT 5

Enzymes

- Introductions, Importance & Classifications
- Properties of enzymes
- Mechanism of enzyme action
- Factors affecting enzyme action
- Enzyme kinetics & enzyme inhibiters

COURSE LEARNING OUTCOMES

CLO 1. Discuss the Glycolysis, Citric acid cycle, Gluconeogenesis, Glycogenolysis, Glycogenesis (UNIT 1)

CLO 2. To explain about importance and metabolism of protein. (UNIT 2)

CLO 3. To discuss about fatty acids and fatty acid oxidation(UNIT 3)

CLO 4. At the end of the course, the students have knowledge of nucleic acid and its functions (UNIT 4)

CLO5 To explain about enzymes, its importance and mechanism of enzyme action.(UNIT 5)

TEXT BOOKS

- Practical Clinical Biochemistry by Harold Varley
- Text book of biochemistry by P. B. Godker
- Principal of Biochemistry by u. Satyanarayana
- Principal of Biochemistry by M. A. Siddiqi

REFERENCE BOOKS

- Instrumental Analysis by Chatwal Anand

- Text book of Medical Biochemistry by Chaterjee, Shinde
- Principal of Biochemistry by Lehninger

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS.

- http://www.freebookcentre.net/Chemistry/BioChemistry-Books
- https://www.slideshare.net/

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 104
COURSE NAME: INTRODUCTION TO QUALITY AND PATIENT SAFETY
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE DESCRIPTION:-

The goal of this course is to introduce the fundamentals of patient safety, evaluation of quality and quality measures and principals of quality improvement to students working
in any aspect of health care or in health services research.

COURSE OBJECTIVE:-

- Understand the fundamental principles and lessons of the patient safety movement
- Understand the terminology and basic methodology of quality measurement
- Understand the principles of designing and evaluating quality measures
- Assume a leadership role in the design and implementation of a quality monitoring system for use in quality improvement

COURSE CONTENT:

UNIT 1

Introduction to Quality and patient safety

Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.

- Concepts of Quality of Care
- Quality Improvement Approaches
- Standards and Norms
- Quality Improvement Tools
- Introduction to NABH guidelines

UNIT 2.

Basics of emergency care and life support skills –

Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental

aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:

- Vital signs and primary assessment
- Basic emergency care – first aid and triage
- Ventilations including use of bag-valve-masks (BVMs)
- Choking, rescue breathing methods
- One- and Two-rescuer CPR
- Using an AED (Automated external defibrillator).
- Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

UNIT 3.

Bio medical waste management and environment safety-

The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:

- Definition of Biomedical Waste
- Waste minimization
- BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
- Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
- BMW Management & methods of disinfection
- Modern technology for handling BMW
- Use of Personal protective equipment (PPE)
- Monitoring & controlling of cross infection (Protective devices)

UNIT 4.

Infection prevention and control –

The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes.

Concepts taught should include –

- Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
- Prevention & control of common healthcare associated infections,
- Components of an effective infection control program, and
- Guidelines (NABH and JCI) for Hospital Infection Control

UNIT 5.

Antibiotic Resistance-

- History of Antibiotics
- How Resistance Happens and Spreads
- Types of resistance- Intrinsic, Acquired, Passive
- Trends in Drug Resistance
- Actions to Fight Resistance
- Bacterial persistence
- Antibiotic sensitivity
- Consequences of antibiotic resistance
- Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

UNIT 6.

Disaster preparedness and management-

The objective of this section will be to provide knowledge on the principles of on-site disaster management.

Concepts to be taught should include-

- Fundamentals of emergency management,
- Psychological impact management,
- Resource management,
- Preparedness and risk reduction,
- Key response functions (including public health, logistics and governance, recovery,rehabilitation

and reconstruction), information management, incident command and institutional mechanisms.

COUSRSE LEARING OUTCOMES

CLO 1. Recognise the magnitude and the importance of patient safety (UNIT 1)

CLO 2. Become aware of the principles and methodologies in patient safety and how this relates to delivering safe and quality services to patient (UNIT 2)

CLO 3. Reflect on how patient safety practices can help to minimize the incidence and impact of medical errors, adverse events, and maximize recovery from them (UNIT 3)

CLO 4. Become aware of the range of tools, solutions and strategies to improve patient safety(UNIT 4) **CLO5** . Aware the students regarding antibiotic resistance and disaster preparedness management (UNIT 5 & 6)

TEXT BOOKS :

- Fundamentals of quality and patient safety in medicine and surgery 1st edition by wolter kluwer publication.
- Quality and safety in critical care medicine.

REFERENCE BOOK:

- Quality and Safety in Nursing: A Competency Approach to Improving Outcomes edited by Gwen Sherwood, Jane Barnsteiner.
- Quality and Safety in Anesthesia and Perioperative Care
- edited by Keith J. Ruskin, Stanley H. Rosenbaum, Marjorie P. Stiegler

WEB LINKS:

- Www.ahrq.giv.in
- Www.nibc.nml.nih.gov

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 105
COURSE NAME: INTRODUCTION TO OTT
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE OBJECTIVES:

- To prepare the students in understanding every issue and aspect related to Operation Theatre
- To make the students aware of infection control policies and procedures
- To provide knowledge about assisting anesthetist in handling emergencies, taking care ofmedical and diagnostic supplies

COURSE DESCRIPTION:

- Discuss the methods of sterilization and disinfection utilized in health care system (mostly in OT).
- Discuss the of chemical treatment for disinfection and physical methods for sterilization including dry and moist heat methods.
- Describe and discuss anesthesia services provided in operation theatre, and in preoperative period.
- The course gives a concept of emergencies which can be faced in OT and other dept. Of hospital and their initial management and assisting surgeon and anesthetist in managing emergencies in OT.

COURSE CONTENT:

UNIT 1.

C.S.S.D, and logistics:-

Cleaning and dusting - methods of cleaning, composition of dust. Advantages of CSSD .Sterilization process in CSSD .Disinfectants of instruments and Sterilization- Definition, Methods, cleaning agents, detergents, Mechanical washing, ultrasonic cleaner, lubrication inspection and pitfalls

.Various methods of chemical treatment- formalin, glutaraldechyde etc, thermal. Hot Air oven-dry heat, Autoclaving, steam Sterilization water etc,. UV treatment.

- Sterilization of equipments - Arthroscope, Gastroscope, imago Lamp, Apparatus, suction Apparatus Anaesthetic equipments including endotracheal tubes -

UNIT 2.

Anaesthesia Service --

History, pre-operative, Intra operative; post operative care, General Anaesthesia Techniques

- Local Anaesthesia Techniques

UNIT 3.

Basic requirement before Anesthesia.

- PAC (Pre Anesthesia Check-up) and Investigations/Monitoring, Equipments used in Anesthesia,
- Intra-Venous Fluids used During Anesthesia, Methods of Drug Administration, Suturing

UNIT 4.

Blood Transfusion- blood, composition of blood, function of blood,

- Blood grouping, cross matching and blood transfusion, transfusion hazard

UNIT 5.

Bandaging Positioning of Patient- Supine position, prone position, side lying positions, Fowler's Position, Cardiac Position, Erect position, Lithotomy position, Knee chest position, Trendelenburg position

UNIT 6.

- Emergencies outside the Operation Theatre:
- First Aid, Emergencies Trauma Techniques/ Accident & Emergency Department.
- Duties of Nurses,
- CPR (Cardiopulmonary Resuscitation), PACU (Post-Anesthesia Care Unit) ICU (Intensive
- Care Unit)

UNIT 7.

- Hazards in OTT
- Environmental hazards
- Chemical hazards
- Electrical hazards
- Musculoskeltal and biological hazards
- Radiation hazards
- Technical Risks and safety

COURSE LEARNING OUTCOMES:

CLO 1. Gaining knowledge and understanding of complexities of CSSD (UNIT 1)

CLO 2. Sharpening cognitive skills to handle emergencies and patient breakdowns during

complex procedures (UNIT 2, 3,4,5)

CLO3. Efficiency and skills in handling different types of equipment(UNIT 6)

CLO4. Discuss about various hazards in OT (UNIT 7)

TEXT BOOKS

- Manual of instruments and procedures 3rd edition Jay pee publishers
- Basics of operation theatre technology 2nd edition by Jay peebrothers

REFERENCE BOOKS

Surgical technology for surgical tech a positive care approachby AST 12th edition

WEB LINKS

www.medscape.com

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 106
COURSE NAME: ENGLISH (COMMUNICATION AND SOFT SKILLS)
COURSE CREDIT: 1
TOTAL HOURS: 30

COURSE OBJECTIVES:

This course emphasizes the fundamental language skills of reading, writing, speaking, listening, thinking, viewing and presenting. An emphasis on vocabulary and composition skills will be an on- going part of the program. The development of critical reading and writing skills is a major emphasis of the course.

COURSE DESCRIPTION

To educate the student in both the artistry and the utility of the English Language through the study of literature.

To make students aware of the different communicative skills and make them effectively communicate in written and spoken modes.

To provide students with the critical faculties necessary in an academic environment, while at job and in an increasingly complex and interdependent world.

COURSE CONTENT:

UNIT - I:

INTRODUCTION:

Study Techniques

Organization of effective note taking and logical processes of analysis and synthesis Use of the dictionary

Enlargement of vocabulary Effective diction

UNIT - II :

APPLIED GRAMMAR :

Correct usage

The structure of sentences The structure of paragraphs Enlargements of Vocabulary

UNIT - III :

WRITTEN COMPOSITION :

Precise writing and summarising Writing of bibliography Enlargement of Vocabulary

UNIT - IV :

READING AND COMPREHENSION :

Review of selected materials and express oneself in one's words. Enlargement of Vocabulary.33

UNIT - V :

THE STUDY OF THE VARIOUS FORMS OF COMPOSITION :

Paragraph, Essay, Letter, Summary, Practice in writing

UNIT - VI :

VERBAL COMMUNICATION :

Discussions and summarization, Debates, Oral reports, use in teaching

COURSE LEARNING OUTCOMES:

1. **CLO 1** - To develop the students' abilities in grammar, oral skills, reading, writing and study skills.(UNIT 1)
2. **CLO 2** - To improve their accuracy and fluency in producing and understanding spoken and written English.(UNIT 2)
3. **CLO 3** - To become a more competent, efficient, and perceptive academic reader who is able to communicate to others through writing and speaking the contents and main ideas of what is read.(UNIT 3)
4. **CLO 4** – To develop skills that enable them to communicate effectively in writing. They will learn to present ideas clearly and logically to achieve a specific purpose and to be appropriate for an intended audience.(UNIT 4)
5. **CLO 5 -** Develop abilities as a critical reader and writer.(UNIT 5)
6. **CLO 6** - Develop public speaking abilities by giving opportunities to speak in class, both informally and formally.(UNIT 6)

TEXT BOOKS:

1. Fundamentals of Effective Communication by Dr M.P. Sinha

REFERENCE

1. English Grammar Collins, Birmingham University, International Language Data Base, Rupa & Co.1993
2. Wren and Martin - Grammar and Composition, 1989, Chanda & Co, Delhi
3. Letters for all Occasions. A S Myers. Pub - Harper Perennial
4. Spoken English V. Shasikumar and P V Dhanija. Pub. By: Tata Mcgraw Hill, New Delhi
5. Journalism Made Simple D Wainwright
6. Writers Basic Bookself Series, Writers Digest series
7. Interviewing by Joan Clayton Platkon
8. Penguin Book of Interview

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS

a. https://guides.lib.uw.edu

b. https://guides.lib.uw.edu

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 107
COURSE NAME: INTRODUCTION TO NATIONAL HEALTHCARE SYSTEM IN INDIA
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE OBJECTIVES :-

- Examine global health system , service delivery , health dipsrities and evidence based care atlocal state , and national level.
- Demonstrate a basic understanding of a healthcare system's organizational structure, mission, vision, and values.
- Examine role of local, state and national regulatory and accreditation agencies in providing quality health care
- Course description : The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

COURSE CONTENT

UNIT 1.

- Introduction to healthcare delivery system
- Healthcare delivery system in India at primary, secondary and tertiary care
- Community participation in healthcare delivery system
- Health system in developed countries.
- Private Sector
- National Health Mission
- National Health Policy
- Issues in Health Care Delivery System in India

UNIT 2.

National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.

UNIT 3.

- Introduction to AYUSH system of medicine

- Introduction to Ayurveda.
- Yoga and Naturopathy
- Unani
- Siddha
- Homeopathy
- Need for integration of various system of medicine

UNIT 4.

Health scenario of India- past, present and future

UNIT 5.

- Demography & Vital Statistics-
- Demography – its concept
- Vital events of life & its impact on demography
- Significance and recording of vital statistics
- Census & its impact on health policy

UNIT 6.

- Epidemiology
- Principles of Epidemiology
- Natural History of disease
- Methods of Epidemiological studies
- Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

COURSE LEARNING OUTCOMES [CLO's]

CLO 1. Describe concepts and dimensions of health(UNIT 1)

CLO 2. Describe concepts of national health policies in India and other developing countries.(UNIT 2)

CLO 3.describe other systems of health care like unani and ayurvedic.(UNIT 3)

CLO 5. Describe concepts and scope of demography(UNIT 4 &5)

CLO 4. Describe the concept, scope and methods of epidemiology.(UNIT 6)

TEXT BOOK

- Health systems science [kindle] by susan E. skochelak
- Health care delivery system published by scholar select.

REFERENCE BOOKS

Understanding health care delivery system by Micheal Howell, Jennifer Stevens

WEB LINKS

- http//Medscape/health/healthcare delivery system/html
- http//www.slideshare.net

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 108
COURSE NAME: BASIC COMPUTERS AND INFORMATION SCIENCE
COURSE CREDIT: 1
TOTAL HOURS: 30

COURSE OBJECTIVES:

The students should be able to have a working knowledge of computer software and hardware and be able to use computers for enhancing their class work.

COURSE DESCRIPTION:

This course involves an introduction to the use of computers in daily life. The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE CONTENT:

UNIT 1

INTRODUCTION TO COMPUTER:

Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.

UNIT 2

INPUT OUTPUT DEVICES:

Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).

UNIT 3

PROCESSOR AND MEMORY:

The Central Processing Unit (CPU), main memory.

UNIT 4

STORAGE DEVICES:

Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

UNIT 5

INTRODUCTION OF WINDOWS:

History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.)

UNIT 6

INTRODUCTION TO MS-WORD:

Introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spellchecking, printing the document file, creating and editing of table, mail merge.

UNIT 7

INTRODUCTION TO EXCEL:

Introduction, about worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs.

UNIT 8

INTRODUCTION TO POWER-POINT:

Introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

UNIT 9

INTRODUCTION OF OPERATING SYSTEM:

Introduction, operating system concepts, types of operating system.

UNIT 10

COMPUTER NETWORKS:

Introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

UNIT 11

INTERNET AND ITS APPLICATIONS:

Definition, brief history, basic services (E-Mail, File Transfer

Protocol, telnet, the World Wide Web (WWW), www browsers, use of the internet.

A). Application of Computers in clinical settings.

PRACTICAL: Practical on fundamentals of computers -

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency

COURSE LEARNING OUTCOMES:

CLO 1-Students will be able to demonstrate the characteristics of computer, block diagram of computer, generations of computer, computer languages.(UNIT 1) **CLO 2-** Ability to identify and demonstrate the Input devices and output devices.(UNIT 2)

CLO 3- Students will have the knowledge of The Central Processing Unit (CPU), main memory.(UNIT 3)

CLO 4- Students will be able to develop the sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.(UNIT 4)

CLO 5- Students will be able to operate the windows(UNIT 5)

CLO 6- Students will be able to use MS-word(UNIT 6)

CLO 7- Students will be introduced about excel and they will know how to work on worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs.(UNIT 7)

CLO 8 power points will be introduce to the students and they will know how to create and manipulate presentation, views, formatting and enhancing text, slide with graphs.(UNIT 8)

CLO 9 Students will know the operating system including Introduction, operating system

concepts and types.(UNIT 9)

CLO 10 Students will be able to know the Introduction, types of network, network topologies and components of network.(UNIT 10)

CLO 11 Students will be able to demonstrate the brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW), www browsers, and use of the internet.(UNIT 11)

CLO 12 Students will be able to use practically the following programmes

MS office: MS word, MS PowerPoint, MS Excel, install different software and data entry efficiency(UNIT 12)

TEXT BOOKS:

- My computer book
- Basic Computer knowledge John MonyJokMaluth\
- Computer Fundamentals. Pradeep K. Sinha, Preti Sinha

REFERENCE BOOKS:

- Computer programming
- Fundamentals of computer

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS

- www.slideshare.net
- https://www.ncbi.nlm.nih.gov/pmc/
- Google scholar
- www.researchlink.org

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

SECOND YEAR

COURSE CODE: OTT 201 COURSE
NAME: OTT MEDICINE COURSE
CREDIT: 03
TOTAL CREDIT HOURS: 90 HOURS

COURSE OBJECTIVES:

- To impart knowledge about equipment support in an acute care environment
- To make the students aware of infection control policies and procedures
- To sharpen the students' communication skills
- Describe the cause, symptoms, treatment and prevention of Medical Surgical Diseases.
- Demonstrate skill in carrying out nursing technique and procedures with the applicant of scientific principles.
- Discuss process and provide care to patients with medical surgical/ diseases
- To make the students better communicators with patient while preparing them for operative procedures
- They should have cared for patients of all ages; manage the care of patients with multiple medical, surgical, and/or psychiatric diagnoses.

COURSE DESCRIPTION:

- The course is suitable to describe the epidemiology, etiology, Pathophysiology and diagnostic assessment of Medical Surgical conditions and helps to participate in national health programs for health promotion prevention and rehabilitation of patients with Medical – Surgical conditions.
- The course offers students the opportunity to function as a clinical specialist in health promotion and restoration in acute or rehabilitative services.
- Students can choose relevant concepts to explore in depth with specified groups of clients and use current research findings, theory and advanced practice skills to provide comprehensive care.
- The employment opportunities in this profession are available in private and government hospitals, industries, orphanages, nursing homes, old age homes, sanatoriums and the armed forces. Indian Red Cross Society, State Nursing Councils, Indian Nursing Council and various other nursing institutions are few other employment areas where one can find jobs.

COURSE CONTENT:

UNIT 1.

Cardiac and Respiratory diseases

- Cardio vascular diseases

  - Hypertension, Ischemic heart diseases, Myocardial Infarction, arrhythmias
  - Heart failure, shock - types, causes

- Respiratory diseases

  - Pneumonia, tuberculosis,
  - Chronic obstructive pulmonary disease, asthma c. Pleural effusion, pneumothorax d.interstitial lung disease

UNIT 2.

- Neurological, Renal, GI and infectious diseases
- Neurological diseases: Polio myelitis,, epilepsy / seizure disorder,cerebro vascular accident / stroke
- Renal Disease:

  - Acute kidney injury
  - Chronic Kidney Disease

- Gastro intestinal and Liver Diseases

  - Gastritis, peptic ulcer
  - Acute gastroenteritis
  - Hepatitis.

- Infectious diseases: Dengue, malaria, leptospirosis

UNIT 3.

- Blood, fluid, electrolyte and acid base abnormalities
- Blood loss and Anemia, thrombocytopenia

- Fluid Electrolyte imbalance and corrective methods
- Acid Base abnormalities and corrective methods

UNIT 4.

- Health problems in specific conditions

  - Pregnancy - antenatal care, disorders in pregnancy
  - Children and new born
  - Obesity
  - Diabetes mellitus
  - HIV infections and AIDS
  - Elderly subjects and disability
  - Brief mention about endocrine disorders

- Poisoning and drug over dosing

- Classification of poisons
- Principles of treatment of poisoning and Primary care
- Poisons and drug over dosing requiring ventilation

- Miscellaneous
- Drowning
- Hanging

UNIT 5.

- Common symptoms of diseases –
- Pain: pathophysiology, clinical types, assessment and management
- Fever: clinical assessment and management
- Cough, chest pain, dyspnoea, hemoptysis
- Edema, anasarca, ascites
- Pallor, jaundice
- Bleeding
- Anorexia, nausea and vomiting
- Constipation and diarrhea
- Hematemesis, malena and hematochezia
- Common urinary symptoms- dysuria, pyuria, anuria, oliguria, polyuria, nocturia, enuresis

- Body pains and joint pains
- Headache, seizures, fainting, syncope, dizziness, vertigo
- Disturbances of consciousness and coma
- Weight loss and weight gain

UNIT 6.

- Immune Response and Infections
- Approach to infectious diseases – diagnostic and therapeutic principles
- Immune defense mechanisms
- Laboratory diagnosis of infections
- Principles of immunization and vaccine use
- Immunodeficiency disorders - acquired
- Immunodeficiency disorders – congenital

Practical:

- History Taking and clinical examination, monitoring of patient.
- Case Discussion.
- Demonstration of Procedures.
- Therapeutic care for various disease conditions.
- Uses of different drugs, Instruments and devices.

COURSE LEARNING OUTCOME:

CLO1. This course is designed to help students to gain understanding of the concept of disease conditions.(UNIT 1)

CLO2. Introduce them to the wider horizon of rendering services to prevent diseases. (UNIT 2,3,45)

CLO3. Course is designed to help students acquire the disease condition according to different system. (UNIT 2,3,45)

CLO4. Acquire knowledge about immune response and its mechanism.(UNIT 6)

TEXTBOOKS:

- Brunner &Suddarth's Textbook of Medical-Surgical Nursing (Brunner and Suddarth's Textbook of Medical-Surgical)
- P.K. Panwar Textbook of Medical- Surgical

REFERENCE BOOKS:

- Davidson's Principles and Practice of Medicine - Elsevier Publications
- Harrison's Principle of Internal Medicine

WEB LINKS:

- https://en.wikipedia.org/wiki/Medical-surgical_nursing
- https://www.nhp.gov.in/hospital/shrimati-champa-devi-medical-surgical..
- https://jobs.mitula.in/medical and surgical nursing book/now
- https://www.mayoclinic.org/diseases-conditions/index

- https://www.medicinenet.com/diseases_and_conditions/article.htm

- Essentials of Human Diseases and Conditions - E-Book

- Margaret Schell Frazier
- Essentials of Human Diseases and Conditions
- Margaret Schell Frazier,
- Jeanette Drzymkowski

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

Course Code: OTT 202
Course Name: APPLIED PATHOLOGY
Course Credit: 02
Total Credit Hours: 60 hours

COURSE OBJECTIVES:

- To familiarize students with the basic disease patterns including definition, etiology,morphological changes in different organ system diseases in addition to their fate and complication.
- To provide students with essential knowledge for gross and microscopic changes in different diseases for understanding and interpreting pathological reports.

COURSE DESCRIPTION:

- Discuss the principals of general pathology (cell injury, inflammation, tissue repair, homodynamic, cellular dyspalsia , neoplasia… etc.) and explain different disease processes occurring in cardiovascular system, renal and endocrinal organs; their causes (etiology), and how the disease develops in response to the etiologic agents (pathogenesis) together with infectious diseases in all body organs.
- Describe and discuss characteristic gross and microscopic pictures of different pathologic lesions within those organ systems and the associated functional disturbances.
- Determine the fate and complications of different disease processes

COURSE CONTENT:

UNIT 1.

CARDIOVASCULAR SYSTEM

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms - Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy - causes, Pathophysiology & Progression to Heart Failure.
- Ischemic heart diseases- Definition, Types. Pathophysiology, in brief Pathology & Complications of various types of IHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy - Definition, Types, causes and significance.

- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases - Basic defect and effects of important types of congenital heart diseases.

UNIT 2.

HAEMATOLOGY

- Anemia - Definition, morphological types and diagnosis of anemia. Brief concept aboutHemolytic anemia and polycythemia.
- Leukocyte disorders- Briefly leukemia, leukocytosis, agranulocytosis etc.
- Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

UNIT 3.

RESPIRATORY SYSTEM

- Chronic obstructive airway diseases - Definition and types causes, Pathology & complications of each type of COPD in brief.
- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion - causes, effects and diagnosis

UNIT 4.

RENAL SYSTEM

- Clinical manifestations of renal diseases. Briefly the causes, mechanism, effects and laboratory diagnosis of ARF & CRF. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease - Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

PRACTICALS

- Description & diagnosis of the following gross specimens.
- Atherosclerosis.
- Aortic aneurysm.
- Myocardial infarction.
- Emphysema
- Chronic glomerulonephritis.

- Chronic pyelonephritis.
- Interpretation & diagnosis of the following charts.
- Hematology Chart - AML, CML, Hemophilia, neutrophilia, eosinophilia.
- Urine Chart - ARF, CRF, Acute glomerulonephritis.
- Estimation of Hemoglobin.
- Estimation of Bleeding & Clotting time. Interpretation of Hematology Chart Interpretation of Urine Chart Estimation of Hemoglobin
- Estimation of Bleeding time & clotting time

COURSE LEARNING OUTCOME:

CLO1. Interpret gross and microscopic pictures aiming at reaching the correct diagnosis.(UNIT 1)

CLO2. Predict the diagnosis of different diseases based on the underlying gross and microscopic pictures (UNIT 2)

CLO3. Employ the different diagnostic pathological tools (UNIT 3)

CLO4. Interpret a pathology report in an accurate manner.(UNIT 4)

TEXTBOOKS:

- harsh_mohan text book of pathology 6th edition.
- Robbins and cot ran pathologic basis of disease , 9th edition

REFRENCE BOOKS :

Guyton and hall text book of medical physiology 13th edition

WEB LINKS:

Http/www.pathologystudent .com

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	Grades

Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE : OTT 203

COURSE NAME :APPLIED MICROBIOLOGY

COURSE CREDIT : 02

TOTAL CREDIT HOURS :60 HOURS

COURSE OBJECTIVES:

- Ability to present and articulate their knowledge of Microbiology.
- To make the students Understanding of diverse Microbiological processes.
- To sharpen the students' communication skills
- Basic skills such as culturing microbes, maintaining microbes, safety issues related to handling of microbes, Good Microbiological practices etc.
- Demonstrate skill in carrying out moderately advanced skills in working with microbes such as pilot scale culturing, downstream processes, diagnostics etc.
- Analysis of data collected through study and small projects.
- Awareness how some microbiology leads may be developed into enterprise
- They should have Ability to participate in team work through small microbiology projects.

COURSE DISCRIPTION:

- Acquired knowledge and understanding of the microbiology concepts as applicable to diverseareas such as medical, industrial, environment, genetics, agriculture, food and others.
- Demonstrate key practical skills/competencies in working with microbes for study and use in the laboratory as well as outside, including the use of good microbiological practices.
- Competent enough to use microbiology knowledge and skills to analyse problems involving microbes, articulate these with peers/ team members/ other stake holders, and undertakeremedial measures/ studies etc.
- Developed a broader perspective of the discipline of Microbiology to enable him to identify challenging societal problems and plan his professional career to develop innovative solutions for such problems.

COURSE CONTENT:

UNIT 1.

Health care associated infections and Antimicrobial resistance: Infections that patients acquire during the

course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aurous infections, Infections caused by Clostridium difficle, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associated infection.

UNIT 2

Disease communicable to Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory syncytial virus etc.), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc.), oro -fecal route (Salmonella, Hepatitis A etc.), direct contact (Herpes Simplex Virus etc.). Preventive measures to combat the spread of these infections by monitoring and control.

UNIT 3.

Microbiological surveillance and sampling: Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumonia, Haemophilus influenza, and Moraxella catarrhalis and also to assess the antimicrobial resistance. Sampling: rinse technique, direct surface agar plating technique.

UNIT 4.

Importance of sterilization:

- Disinfection of instruments used in patient care: Classification, different methods, advantagesand disadvantages of the various methods.
- Disinfection of the patient care unit
- Infection control measures for ICU's 10 Hours

UNIT 5.

Sterilization:

- Rooms: Gaseous sterilization, One Atmosphere Uniform Glow Discharge Plasma (OAUGDP).
- Equipment's: classification of the instruments and appropriate methods of sterilization.
- Central supply department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas.

UNIT 6.

Preparation of materials for autoclaving:

Packing of different types of materials, loading, holding time and unloading.

PRACTICALS- 30 HOURS

- Principles of autoclaving & quality control of Sterilization.
- Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.
- The various methods employed for sterility testing.
- Interpretation of results of sterilitytesting.
- Disinfection of wards, OT and Laboratory

COURSE LEARNING OUTCOME:

CLO-1. This course is designed to help students to gain understanding of the microbes.(UNIT 1)

CLO-2. This course is designed to use microbiology knowledge and skills to analyze problems involving microbes.(UNIT 2 & 3)

CLO-3. This course is designed to help students to understand about sterilization and its importance. (UNIT 4&5)

CLO-4. Acquire basic knowledge of autoclaving and packing of articles(UNIT 6)

TEXTBOOKS:

- Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi - 199 7. Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers, New Delhi 8. Medical Parasitology - Ajit Damle
- Chatterjee - Parasitology - Interpretation to Clinical medicine.

REFERENCE BOOKS:

- Anathanarayana&Panikar Medical Microbiology
- RobertyCruckshank - Medical Microbiology - The Practice of Medical Microbiology
- Rippon - Medical Mycology
- Emmons - Medical mycology

WEBLINKS

- https://en.wikipedia.org/wiki/Microbiology
- https://www.britannica.com/science/microbiology
- https://microbiologysociety.org/why-microbiology-matters/
- https://byjus.com/biology/microbiology
- https://jobs.mitula.in/online microbiology course/now

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: OTT 204
COURSE NAME: CLINICAL PHARMACOLOGY
COURSE CREDIT: 03
TOTAL CREDIT HOURS: 90 HOURS

COURSE OBJECTIVES:

- Apply the nursing process to the safe administration of medications to clients.
- Utilize critical thinking to evaluate potential complications of administration of various categories of drugs to clients.
- Explain the physiological effects of various medications on selected body systems.
- Apply nursing knowledge and concepts from the arts, sciences, and humanities in assisting clients to safely take medications.
- Verbalize an understanding of professional guidelines, standards of practice , and laws regulatingthe use and distribution of drugs.
- Discuss professional nursing responsibilities and roles in administration of medications to clients.
- Apply assessment skills to determine the effectiveness of drug therapy clients.
- Utilize professional research literature to expand a knowledge base to assist clients with self-administration of medications.
- Discuss the use of knowledgeable caring when administering medications toclients.
- Describe effective communication techniques to be used in teaching clients and their families about medications.
- Discuss the importance of understanding individual socio-cultural practiceswhenadministering medications to clients.
- Discuss professional nursing responsibilities regarding ethicallyappropriate behaviors during medication administration.

COURSE DESCRIPTION:

This course is designed to enable students to acquire understanding ofPharmacodynamics of different types of drugs

- Pharmacokinetics of drugs
- Mechanism of action of drugs
- Indication and contraindications of drugs
- Nursing implications of theraputics

COURSE CONTENT:

UNIT 01

Introduction:

General concepts about pharmacodynamics and Pharmacokinetics Principles involved in drug activity.

UNIT 02.

Antisialagogues:

Atropine, Glycopyrrolate.

UNIT 03:-

Sedative

Anxiolytics: Diazepam, Midazolam, Phenergan, Lorazepam, Chlorpromazine, and Triclofos.

Narcotics: Morphine, Pethidine, Fentanyl, Pentazozine, tramadol.

UNIT 04.

Antiemetic's:

Metoclopramide, Ondansetron, Dexamethasone

UNIT 05.

Induction Agent:

Thiopentone, Diazepam, Midazolam, Ketamine, Propofol, Etomidate.

UNIT 06.

Muscle Relaxants:

Depolarizing - Suxamethonium, Non depolarizing - Vecuronium, Atracurium, rocuronium

UNIT 07.

Inhalational

Gases: Gases-02, N20, Air,

Inhalational Agents Ether ,Halothane, Isoflurane, Sevoflurane, Desflurane

UNIT 08.

Reversal Agents:

Neostigmine, Glycopyrrolate, Atropine, Naloxone, Flumazenil (Diazepam).

UNIT 09.

Local Anesthetics:

Xylocaine, Bupivacaine –

Topical, Prilocaine-jelly, Emla - Ointment, Etidocaine. Ropivacaine.

UNIT 10.

Emergency Drugs :

- Mode or administration, dilution, dosage and effects
- Adrenaline, Atropine
- Ephedrine, Methoctramine
- Bicarbonate, calcium, potassium.
- Inotropes: dopamine, dobutamine, amiodarone
- Aminophylline, hydrocortisone, antihistaminic,
- Antihypertensive –Beta-blockers, Ca-channel blockers.
- Antiarrhythmic- xylocard
- Vasodilators- nitroglycerin & sodium nitroprusside
- Respiratory system- Bronchodilators
- Renal system- Diuretics, frusemide, mannitol

UNIT 11.

Miscellaneous.

- IV fluids- various preparations and their usage.
- Electrolyte supplements
- Immunosuppressive agents
- New drugs included in perfusion technology.
- Drugs used in metabolic and electrolyte imbalance.

COURSE LEARNING OUTCOME:

CLO_1 Understand the basic concepts of pharmacology

CLO_2 Understand common cardiovascular, autonomic nervous system drugs, general and local anesthetic drugs, analgesics, diuretics and corticosteroids drugs (UNIT 2,3,4,5,6,7) **CLO**_3 Understand common drugs of Reverse agent and local anaesthetics (UNIT 8 & 9).

CLO_4Understand various emergency drugs(UNIT 10&11)

REFERENCE BOOKS:

- R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition, single Volume, M/S Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.
- K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.
- Laurence and Bennet, Clinical Pharmacology, ELBS Edition, 9th Edition

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE : OTT 205
COURSE NAME : PSYCHOLOGY & SOCIOLOGY
COURSE CREDIT : 03
TOTAL CREDIT HOURS : 90 HOURS

COURSE OBJECTIVES:

- This course introduces the allied health student to psychological theories and constructs thatare crucial to working within the allied health professions.
- Students will be provided with an introduction to psychology including a review of contemporary perspectives in psychology along with an understanding of the alignment of psychological principles with the allied health professions.
- Students will cover learning theory, memory and intelligence, motivation and emotion, personality, social cognition, and health psychology. An understanding of these psychological factors is crucial as application of this knowledge is required by allied health students when undertaking professional practice placements and across their entire professional career.
- Describe the history, scope and methods of psychology: Introduction • History and origin of science of psychology
- Definitions & Scope of Psychology
- Relevance to nursing
- Methods of Psychology
- To teach students the concepts, theories, and methods of the behavioral and social services
- To introduce students to the basic social processes of society, social institutions and patterns of social behavior.
- Introduce students to the concepts, theories, and research which define this discipline of Sociology.
- Provide an understanding of the methods social scientists use to explore social phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical and interpretive analysis.
- To introduce students to the basic social processes of society ,social institutions and patterns of social behavior.
- To enable students to cope effectively with the socio cultural and Interpersonal processes of constantly changing complex society.

COURSE DESCRIPTION:

This course is designed to help student gaining knowledge and understanding of sociology and help the students to the field by focusing on several important sociological topics, including socialization, culture, the social construction of knowledge, inequality, race and ethnic relations, poverty, and political

sociology.

COURSE CONTENTS:

UNIT 1.

Explain the biology of Human behavior:
Biology of behavior • Body mind relationship- modulation process in health and illness • Genetics and behavior: Heredity and environment • Brain and behavior: Nervous System,, Neurons and synapse, • Association Cortex, Rt and Lt Hemispheres • Psychology of Sensations • Muscular and glandular controls of behavior • Nature of behavior of an organism/Integrated responses

UNIT 2.

Describe various cognitive processes and their applications: Cognitive processes • Attention: Types, determinants, Duration & degree, alterations • Perception: Meaning, Principles, factors affecting, Errors, • Learning: Nature, Types, learner and learning, Factors influencing, laws and theories, process, transfer, study habits • Memory: Meaning, Types, Nature Factors influencing, Development Theories and methods of memorizing and Forgetting Thinking: Types and levels, stages of development, Relationship with language and communication Intelligence: Meaning, classification, uses, theories Aptitude:Concept, types, Individual differences and variability Psychometric assessments of cognitive processes Alterations in cognitive processes Applications. Describe motivation, emotions, stress, attitudes and their influence on behavior: Motivation and Emotional Processes: • Motivation: Meaning, Concepts, Types, Theories, Motives and behavior, Conflicts and frustration, conflict resolution • Emotions & stress Emotion: Definition, components, Changes in emotions, theories emotional adjustments, emotions in health and illness Stress: stressors, cycle, effect, adaptation & coping • Attitude: Meaning, nature, development, factors affecting, Behavior and attitudes Attitudinal change • Psychometric assessments of emotions and attitudes • Alterations in emotions Applications

UNIT 3.

Explain the concepts of personality and its influence on behavior:
Personality Definitions, topography, types, Theories Psychometric assessments of personality Alterations in personality Applications.

UNIT 4.

Describe psychology of people during the life cycle:

Developmental Psychology • Psychology of people at different ages from infancy to old age • Psychology of vulnerable individuals challenged, women, sick, etc Psychology of groups

UNIT 5.

Describe the characteristics of Mentally healthy Person.

Explain ego defense mechanisms: Mental hygiene and mental Health • Concepts of mental hygiene and mental health • Characteristics of mentally healthy person • Warning signs of poor mental health • Promotive and Preventive mental health- strategies and services • Ego Defense mechanisms and implications • Personal and social adjustments • Guidance and counseling • Role of nurse.

UNIT 6.

Explain the Psychological assessments and role of nurse:

Psychological assessment & tests • Types, development, Characteristics, Principles, Uses, Interpretations and Role of nurse in psychological assessment.

UNIT7.

Introduction

- Meaning- Definition and scope of sociology
- Its relation to Anthropology, Psychology, Social Psychology.
- Methods of Sociological investigations- Case study, social survey, questionnaire,
- Interview and opinion poll methods.
- Importance of its study with special reference to Health Care Professionals.

UNIT 8.

Social Factors in Health and disease situations:

- Meaning of social factors
- Role of social factors in health and illness

UNIT 9.

Socialization:

- Meaning and nature of socialization.

- Primary, Secondary and Anticipatory socialization.
- Agencies of socialization.

UNIT 10.

Social Groups:

Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

UNIT 11.

Family:

- The family, meaning and definitions.
- Functions of types of family
- Changing family patterns
- Influence of family on the individuals health, family and nutrition, the effects of sickness inthe family and psychosomatic disease and their importance to physiotherapy.

UNIT 12.

Community:

- Rural community: Meaning and features –Health hazards of ruralities, health hazards totribal community.
- Urban community: Meaning and features- Health hazards

UNIT 13.

Culture and Health:

- Concept of Health
- Concept of Culture
- Culture and Health
- Culture and Health Disorders

UNIT 14.

Social change:

- Meaning of social changes.

- Factors of social changes.
- Human adaptation and social change
- Social change and stress.
- Social change and deviance.
- Social change and health programme
- The role of social planning in the improvement of health and rehabilitation.

UNIT 15.

Social Problems of disabled: Consequences of the following social problems in relation to sickness and disability, remedies to prevent these problems.

Population explosion

- Poverty and unemployment
- Beggary
- Juvenile delinquency
- Prostitution
- Alcoholism
- Problems of women in employment
- Geriatric problems
- Problems of underprivileged.

Unit 16.

Social Security: Social security and social legislation in relation to the disabled.

Unit 17.

Social worker:

- Meaning of Social Work
- The role of a Medical Social Worker.

COURSE LEARNING OUTCOME:

CLO-1 : Describe the scientific approach of modern psychology and principles for generating knowledge.(UNIT 1)

CLO-2 : Explain the principles of major learning theories in psychology and identify implications for understanding behavior in health settings.(UNIT 2)

CLO-3 : Describe the main theories of human memory and some of their implications for understanding behavior in health settings .(UNIT 3)

CLO-4 : Explain the major theories of motivation, emotion, and personality and their use in allied health practices.(UNIT 4)

CLO-5 : Locate and extract appropriate information from electronic health databases in preparing an assessment using relevant academic conventions.(UNIT 5)

CLO 6: Recognize how and when the modern family began to emerge.(UNIT 6)

CLO 7: Identify and describe what contemporary families and households look like today.(UNIT 7)

CLO 8: Contrast variations in family structure.(UNIT 8)

CLO 9: Classify major life course transitions related to family life.(UNIT 9)

CLO 10: Analyze relationships of stratification within cities, especially race and class, and how that impacts personal interactions and political dynamics in urban settings.(UNIT 10)

CLO 11: Describe population and policy, and apply this to critically evaluate the complexity of policy and human population issues.(UNIT 11)

CLO 12: Apply theories of social change. Awareness of the debate regarding forms of culture: high, low, folk.(UNIT 12)

CLO 13: Ability to discuss the social history of amusements and the conditions necessary to create a truly 'popular' culture (UNIT 13, 14,15,16)

TEXTBOOKS:

- Burton, L., Weston, D., & Kowalski, R. (2015) Psychology. (4th ed.). Milton, Queensland: Wiley.
- Gazzaniga, M. S., Heatherton, T., & Halpern. D. (2012). Psychological Science (4th ed.).London: Norton.
- IntroductiontoSociology-VidyaBhushan
- TheStructureofSociologicalTheory-Turner
- PerspectivesinSociology-Cuff,

REFERENCES:

Gerrig, R., Zimbardo, P., Campbell, A., Cumming , S., & W ilkes, F. (2009). Psychology and life: Whiten, W . (2010). Psychology: Themes and Variations (9th ed.). Wadsworth: Cengage Learning.

WEBLINK:

www.slideshare.com

www.wikipedia.com

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE : OTT 206
COURSE NAME : BASICS OF SURGERY
COURSE CREDIT : 03
TOTAL CREDIT HOURS : 90 HOURS

COURSE DESCRIPTION:-

The course introduces students to peri- and pre-operative patient care. The students can learn about the impact of surgical intervention on the patients, reasons for surgical intervention classification of surgical interventions and their risks, safety measures to be taken while performing surgical procedures, post-operative care of patient in recovery room. The course is designed to provide knowledge about aseptic techniques, principles, and technologies used in operation theatre during surgery and in emergency situations

COURSE OBJECTIVES-

Demonstrate an understanding of process used to obtain informed consent for surgery and anesthesia.
Understand methods of preparation of operative site for surgery.
Explain principles of urinary catheterization and demonstrate the procedure.
Identify developing emergency situation, initiate appropriate action, and assist in treatment of the patient.
Discuss methods and types of documentation used in the OR.

COURSE CONTENTS:

UNIT 1:-

Preoperative and post-operative patient care

Introduction

- Experience of surgery and types of surgical procedures
- Preoperative phase, preoperative implications and patient preparation.
- Preoperative morning care and patient care activities
- Surgical check list and documentation
- Information consent.
- High risk consent.

UNIT 2:-

Intra-operative phase.

Introduction

- Reasons for surgical intervention.

- The surgical team.
- Surgical risks
- Counting procedure.
- Safe use of pneumatic tourniquet.
- Safe use pulsed lavage.
- Emergency and disaster considerations.
- Malignant hyperthermia.
- Cardiopulmonary arrest.

UNIT3:

- The Recovery room phase

- PACU or recovery room
- Patient care in recovery room.
- Postoperative monitoring.
- Recovery room complications
- Respiratory distress

UNIT 4:-

Post- operative patient care according to body system.

- Respiratory system
- Cardiovascular system.
- Urinary system .
- Gastrointestinal system.
- Integumentary system.

UNIT 5:-

Principles and practice of aseptic technique .

Introduction

- Principles of aseptic technique
- Surgical attire.
- Surgical hand washing.
- Gowning and gloving.
- Contamination during surgery .

UNIT 6-

Surgical skin preparation and draping

Introduction.

- Patient hygiene before surgery.
- Urinary catheterization.
- Surgical skin preparation
- Draping the surgical site.
- Draping of equipment.
- Removing drape.

UNIT 7:-

Technical adjuncts to surgery.

- Laser technology
- Endoscopy: minimal access approach
- Robotics
- Microsurgery
- armonic scalpel and plasma scalpel
- Argon beam coagulator
- Radiofrequency ablation.
- Electrosurgery .

COURSE LEARNING OUTCOME:

CLO-1 Identify the nursing implications related to preparing a patient for surgery (UNIT 1)

CLO-3-To demonstrate doctor's orders for implementation of pre-operative care.(UNIT 2)

CLO-4-Examine recovery room care and complications.(UNIT 3)

CLO-5-Examine the post operative care according to body system(UNIT 4)

CLO-6-Demonstrate surgical site skin preparation and draping.(UNIT 5 &6)

CLO-7-Gaining knowledge about latest technologies used in surgery.(UNIT 7)

TEXT BOOKS:

Pocket guide for operating room third edition by Maxine A Goldman.

Text book of instruments and procedures by jay pee publishers

REFERENCE

Surgical technology for surgical technologist by AST 6th edition.

Surgical technology a positive care approach by AST { association of surgical technologists }

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

COURSE CODE : OTT 207
COURSE NAME : PRINCIPLES OF ANESTHESIA
COURSE CREDIT : 03
TOTAL CREDIT HOURS : 90 HOURS

COURSE OBJECTIVE:-

Becoming familiar with the principles of general and local anesthesia, and the organizational structure, equipment, tools and instruments, facilities, and rules related to the field of anesthesiology. Obtain knowledge about the proper functioning of various anesthetic equipments such as the work station, anesthesia monitors, syringe pumps etc . Assist the anesthesiologists efficiently during procedures in and outside the operation theatre.

Perform Basic skills of cardiopulmonary resuscitation, post-operative and intensive care unit management

COURSE DESCRIPTION:

The course is designed to provide the student with a basic understanding of immediate preoperative patient management. You may or may not be permitted to attempt endotracheal intubation; however, your grade is not dependent on performance of this skill. You may also be permitted to perform intravenous access and you may wish to take advantage of this rotation to gain valuable advice regarding your access skills. The single most important technical skill you can learn is the ability to deliver effective bag-mask ventilation.

COURSE CONTENT:

PRINCIPLES OF ANESTHESIA

UNIT 1:

Medical gas supply

- Compressed gas cylinders
- Color coding
- Cylinder valves; pin index.
- Gas piping system
- Recommendations for piping system
- Alarms & safety devices.

- Scavenging of waste anesthetic gases

UNIT 2:

Anesthesia machine

- Hanger and yoke system
- Cylinder pressure gauge
- Pressure regulator
- Flow meter assembly
- Vaporizers - types, hazards, maintenance, filling and draining, etc.

UNIT 3:

Breathing system

- General considerations: humidity & heat
- Common components - connectors, adaptors, reservoir bags.
- Capnography
- Pulse oximetry
- Methods of humidification.
- Classification of breathing system
- Mapleson system - a b c d e f
- Jackson Rees system, Bain circuit
- Non rebreathing valves - Ambu valves
- The circle system

UNIT 4:

Face masks & Airway laryngoscopes

- Types, sizes
- Endotracheal tubes - Types, sizes.
- Cuff syst
- Fixing, removing and inflating cuff, checking tube position, complications.

UNIT 5:

Anesthesia ventilator and working principles.

UNIT 6:

Monitoring

- Electrocardiography(ECG)
- Pulse oximetry(Sp02)
- Temperature- central and peripheral
- End tidal carbon dioxide(EtCO2)
- Anesthesia gas monitoring
- Non-invasive blood pressure (NIPB) and Invasive blood pressure(IBP)
- Central venous pressure(CVP)
- PA Pressure, LA Pressure & cardiac output
- Anesthesia depth monitor
- Neuromuscular transmission monitor

BASIC TECHNIQUES OF ANESTHESIA

UNIT 1:

Resuscitation techniques:

- Basic life support (Airway, breathing, circulation) and the equipment used for it.
- Drugs used in CPR.
- AED and Defibrillators.

UNIT 2:

Anesthesia drugs and techniques:

- Principles of anesthesia.
- Basics of general anesthesia depth, mechanism and intubation.
- Techniques of general anesthesia.
- Various intravenous and inhalational agents.
- Regional anesthesia, spinal and epidural, posture and drugs.
- Local Anaesthetic agents.
- Neuro muscular blocking agents.
- Principles of oxygen administration along with the apparatus.
- Care of patient in the recovery room.
- Post-operative pain: evaluation and management.
- Types of fluid and therapy.

- Blood and blood components transfusion.
- Preparation of anesthesia machine, intubation kit, suction machine, anesthesia drugs.
- Patient identification, marking, shifting to OT before surgery and out of OT to recovery roomafter surgery, complete takeover and handover of the patient with vital signs recording before and after surgical procedure to the nursing staff.

PRACTICAL

- Supply of compressed gases:
  a. Types of gases and their chemical and physical properties.
  b. Types of containers.
  c. Their checking and maintenance.
  d. Types of compressors.
  e. Structure and mechanism of various type of gauges, liquid oxygen storage and supply system.

- Structure of reducing valves-
  a. Mechanism of pressure reducing valves.
  b. Their maintenance and safety checks

- Structure and mechanism of flow meters, maintenance and safety checks
- Volatile anaesthetic agents.
  a. Selection of material to be used for containers of the volatile anaesthetic agents.
  b. Structure of different types of vaporizers.
  c. Principles of various vaporizers, their maintenance and safety precautions.

- Types of circuits:
  a. Open, Semi closed and closed circuits.
  b. Non-rebreathing valves.
  c. T-piece circuit and its modifications.
  d. To and fro system and circle absorber.

- Types of valves used in the different circuits. Structure and working of Heidbrink's valve, Rubin valve nu-man valve etc.

Practical

- Anesthesia work station

- Boyle's anesthesia apparatus and other Advanced Anesthesia machines.
- Apparatus and technique of the intravenous injections:
    a. Selection of the material used for intravenous injection.
    b. Different types of intravenous needles and cannulas.
    c. Theoretical study for testing of the toxicity of the materials.

- Resuscitation equipment and Resuscitation techniques:
    a. Endotracheal tubes :
    b. Selection of the material used for the endotracheal tube
    c. Study of the structure of various types of the endotracheal tubes. Cleaning and sterilizationof ETT.
    d. Connectors: Various connectors, size and material used.
    e. Mask: Material, structure and importance of dead space of face mask.
    f. Supraglottic airways.
    g. Spinal and epidural blocks: equipment, types of spinal and epidural needles, theirstructure. Instruments used for spinal and epidural blocks.
    h. Laryngeal sprays: Types, structure and material used, mechanism, uses and their maintenance

COURSE LEARNING OBJECTIVES:-

CLO_1 : .Work as efficient technician, excelling in theoretical knowledge and implementation of practical skills in the operation theatre.(UNIT 1)

CLO_2 : Pre-operative risk assessment of patients undergoing anesthesia.(UNIT 2) **CLO**_3 : Basic understanding of immediate perioperative patient management.(UNIT 3) **CLO**_4 : Learn the ability to deliver effective bag-mask ventilation.(UNIT 4)

CLO_5 : Basic knowledge and skill exposure to oral endotracheal intubation and LMA insertion.(UNIT 5)

CLO_5 : Basic knowledge and skill exposure to peripheral intravenous catheter insertion.(UNIT 6) **CLO**_6 : Management of patients Anaesthesia trugs and techniques(UNIT 1& 2)

TEXT BOOKS

1:- Lawrence, Peter F. Essentials of Surgical Specialties, 3rd Ed., 2007. Lippincott, Williams and Wilkins (or newer edition).Chapter 1: Anesthesiology, pp 1-50

2 : text book of anesthesiology by ajay yadaw 5th edition

REFERENCE BOOKS

Butterworth, J., Morgan and Mikhail's Clinical Anesthesiology, 5e, McGraw-Hill Inc, 2013

Morgan GE, Mikhail MS, Murray MJ. (Eds) Clinical Anesthesiology. 4th edition, McGraw-Hill Medical. Aug 26, 2005

WEB LINKS

http://www.virtual-anaesthesia-textbook.com/index.shtml

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

THIRD YEAR

COURSE CODE: OTT 301 COURSE NAME: OTT CLINICALS COURSE CREDIT: 02 TOTAL CREDIT HOURS: 60 HOURS

COURSE OBJECTIVES:

1-Describe the physical, mental and social adjustment required of a sick individual and his family. 2 Carry out basic techniques and care with the application of sound scientific principle.

3 Develop skills in assessment, planning, implementation and evaluation of the care rendered to the patients.

4 Communicate effectively and establish good interpersonal relationship with the patients, their relatives and other health team members.

5 Demonstrate skills in observation, recording and reporting.

6 Recognize and utilize opportunities for planning and implementing need based health teaching programme (s) for individuals, groups, families and communities.

7- Develop an ability to meet the basic health need of the patients.

COURSE DISCRIPTION:

This course provides opportunities to develop competencies necessary to meet the needs of individuals throughout the lifespan in a safe, legal, and ethical manner using the process. Students learn concepts and theories basic to the art and science of nursing. Students are introduced to the concepts of client needs, safety, communication, teaching/learning, critical thinking, ethical-legal, cultural diversity, nursing history, and the program's. Additionally, this course introduces psychomotor skills needed to assist individuals in meeting basic human needs. Skills necessary for maintaining microbial, physical, and psychological safety are introduced along with skills needed in therapeutic interventions. At the conclusion of this course students demonstrate competency in performing basic nursing skills for individuals with common health alterations.

COURSE CONTENT :

UNIT 1:

INTRODUCTION, COMMUNICATION AND DOCUMENTATION

- Physical facility:

a. Layout of operation theatre
b. Peripheral support area
c. Operating room
d. Special procedure room

- Communication & Documentation:
  a. Communication with doctors, colleagues and other staffs.
  b. Non-verbal communication, Inter-personnel relationships.
  c. Patient contact techniques, communication with patients and their relatives

- Documentation:
  a. Importance of documentation,
  b. Initial and follow up notes;
  c. Documentation of therapy, procedures and communication.

UNIT 2:

UNIVERSAL PRECAUTIONS AND INFECTION CONTROL

- Hand washing and hygiene.
- Injuries and Personal protection, Insulation and safety procedures.
- Aseptic techniques, sterilization and disinfection.
- Disinfection and Sterilization of devices and equipment
- Central sterilization and supply department
- Biomedical Medical waste management

UNIT 3:

MEDICATION ADMINISTRATION AND TRANSPORT OF PATIENT

- Medication Administration:

Oral and Parenteral medication administration: Intra venous, intra muscular, subcutaneous, intra dermal routes, Intra venous Infusion.

- Position and Transport of patient:

  a. Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
  b. Lifting and transporting patients: lifting patients up in the bed, transferring from bed towheel

chair, transferring from bed to stretcher.

c. Transport of ill patients (intubated / ventilated patients)

UNIT 4:

MONITORING AND BED SIDE CARE OF PATIENT:

- Pulse, ECG (Cardiac Monitor), Oxygen Saturation, Blood Pressure, Respiration and Temperature.
- Hydration, intake and output monitoring
- Monitoring ventilator parameters: Respiratory Rate, Volumes, Pressures.
- Invasive monitoring techniques .

UNIT 5:

ICU CARE

- Care and maintenance of ventilator , suction and monitoring devices
- Air conditioning and control of pollution/ environmental control in ICU
- Care of unconscious adult and pediatric patient.
- Physiotherapy techniques
  a. Royel's tube insertion
  b. Hyper alimentation

- Suctioning and positioning of semi and unconscious patients
- O2 therapy , maintenance of clear airway
- Ventilation of patient in crisis
  a. Mouth to mouth
  b. Mouth to ventilator
  c. Short term ventilator / transport ventilator

- Detection of blood gas
- Principles of ABG
- Invasive and noninvasive monitoring

UNIT 6:

DRESSING AND WOUND CARE:

- Bandaging: basic turns, bandaging extremities, triangular bandages and their application.
- Surgical dressing: observation of dressing procedures.
- Suture materials and suturing techniques

- Splinting
- Basic care of patient with burns

Practical:

Demonstration of Patient care Procedures:

- Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding
- Obtaining blood samples, Arterial Blood sampling for ABG
- Injections: intra muscular, intra venous, sub cutaneous, intra dermal
- Insertion of intra venous catheter and infusion of medications, blood transfusion
- Recording of ECG and monitoring of patient
- Oxygen therapy: oxygen cannula masks. nebulization, inhalers
- Suctioning and care of artificial airway
- Insertion of urinary bladder catheter

COURSE LEARNING OUTCOME:

CLO-1 : This course is designed to help students to develop an ability to meet basic health needs.(UNIT 1& 2)

CLO-2 : Acquire knowledge about basic needs of patient regard to care.(UNIT 3)

CLO-3: To develop skill in the competencies required for rendering effective patient care.(UNIT 4,5 &6)

TEXTBOOKS:

- Kozier and Erb's Fundamentals of Nursing: Concepts, Process and Practice | Tenth Edition | By Pearsonby Audrey Berman, Shirlee J. Snyder, et al

- Clinical Nursing Procedures: The Art of Nursing Practice Paperback – 1 January 2019by Annamma Jacob (Author)

Reference Books:

1. Principles and practice of Nursing - Sr Nancy

2. Introduction to Critical Care Nursing - Mary Lou Sole

3. First Aid - Redcross society guidelines

Online links for study and reference materials

1- dlsii.com/blog/tag/what-are-the-fundamentals-of-nursing/

2-https://www.goodwin.edu/enews/what-are-the-fundamentals-of-nursing

3-https://www.jica.go.jp/nepal/english/office/topics/pdf/topics02_01.pdf · PDF file

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

COURSE CODE- 303
COURSE NAME- OTT APPLIED
COURSE CREDIT-04
TOTAL CONTACT HOUR: 120 (THEORY HOURS: 100 & PRACTICAL HOURS: 20)

COURSE OBJECTIVE

- To prepare the students in understanding issues and aspects related to operation Theater.
- To impart knowledge about equipment support in an acute care environment.
- To make the students aware of effective policies and procedures.
- To sharpen the students communication skill.
- To create responsible professional competent to understand how to follow biomedical waste management / disposals support in an acute care environment.
- To provide complete knowledge about assisting anesthetist in handling emergencies ,taking care of medical and diagnostic supplies .

COURSE DESCRIPTION

This course is designed to help student gaining knowledge and understanding of complexities of operation theatre technologies, and sharpening cognitive to handle emergencies and patient break downs during complex procedures.

COURSE CONTENT

- **UNIT 1**

  Medical gas supply

  a. Compressed gas cylinders
  b. Color coding
  c. Cylinder valves; pin index.
  d. Gas piping system
  e. Recommendations for piping system
  f. Alarms & safety devices.

- Anesthesia machine

  a. Hanger and yoke system
  b. Cylinder pressure gauge
  c. Pressure regulator

d. Flow meter assembly

e. Vaporizers - types, hazards, maintenance, filling and draining, etc.

- **UNIT 2**

Breathing system

a. General considerations: humidity & heat

b. Common components - connectors, adaptors, reservoir bags.

c. Capnography

d. Methods of humidification.

e. Classification of breathing system

f. Mapleson system

g. Jackson Rees system, Bain circuit

h. Non rebreathing valves - ambu valves

i. The circle system

j. Components

k. Sodalime,indicators

- **UNIT 3**

Face masks & airway laryngoscopes

a. Types, sizes

b. Endotracheal tubes - Types, sizes.

c. Cuff system

d. Fixing, removing and inflating cuff, checking tube position complications.

- **UNIT 4**

Basic anesthetic techniques

a. Inhalational anesthetic era

b. local & Regional anesthetic era

c. Intravenous anaesthetic era

d. Modem anaesthetic era

e. Minimum standard of anaesthesia

f. Spinal and epidural anaesthesia

- **UNIT 5**

Artificial and mechanical ventillation

a. Introduction of artificial ventilation

b. Principles of mechanical ventilation

c. Intermittent positive pressure ventilation

d. Modes of IPPV

e. Automated pressure and time cycled ventilator

f. Operating room ventilators

g. Other types (HFJV , NIV)

h. General care of patients on ventilator

i. Complications of patients on ventilator

j. Sterilization and disinfectioning of ventilators

k. Humidification

l. Principles of oxygen administration and methods used

m. Acid base balance

- **UNIT 6**

Diagnostic procedures

a. Pathological examinations (CBC,LFT,KFT)

b. Radiological examinations (CT SCAN,MRI,X-RAY)

c. Nuclear medicine studies (USG,ENDOSCOPY,LYRENGOSCOPY)

PRACTICAL EXAMINATION

One common practical for all the three papers with equal weight age of marks i.e. 50 practical marks for each paper.

COURSE LEARNING OUTCOMES (CLOS)

CLO 1. Apply the knowledge and skills of handling operation theatre room to provide safe and effective care. (UNIT 1)

CLO 2. Demonstrate relative knowledge and understanding of Anaesthesia procedure and equipment to be maintained(UNIT 2)

CLO 3. Skill to assess , analyse and evaluate the information regarding medical gas supply and the treatment.(UNIT 3)

CLO 4. Demonstrate the procedure of laryngoscope ability to plan , organize and repeat different diagnosis related to its treatment.(UNIT 4)

CLO 5. Understand professional and ethical responsibilities in patient care.(UNIT 5)

CLO 6. Apply the knowledge regarding the various procedures and examinations done for the treatments given.(UNIT 6)

TEXT BOOKS-

Dr.GN Sharma & A.L.Agarwal (2013) Text Book of Operation Theatre Technique and Management, 3rd Edition Medico Refresher Publications.

REFERENCES BOOK:

Neelam Rai & Arpit Ravindra lal (2017) Text Book of Operation Theatre Technician, 1`st Edition,Jaypee Publications.

ONLINE LINKS FOR STUDY & REFERENCES MATERIALS:

www.slideshare.com

www.wikipedia.com

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

COURSE CODE- OTT 305

COURSE NAME- OTT

ADVANCE COURSE

CREDIT- 4

TOTAL CONTACT HOUR - 100

COURSE OBJECTIVE:

- To prepare the students understanding in anaesthesia for speciality surgeries.
- To provide complete knowledge and understanding in the safe anaesthesia techniques for various elective and emergencies surgeries in and outside the operation theatre.
- To Perform Basic skills of cardiopulmonary resuscitation, post-operative and intensive care unit management.
- To make students better communicators with patient while preparing them for operative procedure.
- To impart knowledge of various surgical procedures including the surgical instruments used in operation theatre.
- To provide complete knowledge about assisting anesthetist in handling emergencies ,taking care of medical and diagnostic supplies .

COURSE DESCRIPTION:

This course is designed to help student gaining knowledge and understanding of types of anaesthesia for speciality surgeries, instruments, emergencies related to anaesthesia and treatment, skills in handling different types of instruments, policies and procedures for biomedical waste disposal and infection control , maintain s practice standards, code of ethics, code of conduct.

The course is intended to describe the process use to obtain an informed consent for surgical treatment and discuss the legal restrictions involved.

COURSE CONTENT

UNIT 1:

- Basics of surgery
  a. History of Surgery, role of the surgeon, importance of team work and anticipating the needsof surgeons; stresses that may arise during operative procedure
  b. Surgical terminology, types of incision and indications for the use of particular incision;

c. Identification of types of tourniquets reasons for use and duration of application, dangers ofuse;

d. Wounds, types, process of healing, treatment and complications; inflammation; wound infections causes and treatment; incision and drainage of abscesses; importance of personal cleanliness and aseptic techniques;

e. .Knowledge of surgical asepsis, skin preparation for invasive procedures

- SURGICAL PROCEDURES
  a. GI procedures
  b. Extra intestinal abdominal procedures
  c. Genitourinary procedures

- Emergencies in OT

Intraoperative

a. Regional drug toxicity
b. Cardiopulmonary arrest
c. Laryngospasm
d. Anaphylaxis
e. Shock
f. Malignant hyperthermia
g. Hemorrhage
h. Hemolytic reaction
i. Deep vein thrombosis

Postoperative

a. Pain
b. Airway obstruction
c. Pulmonary embolism
d. Nausea vomiting
e. Hypo / hyperthermia

UNIT 2:

Regional Anesthetic techniques.

- Local anesthetic technique
- Nerve blocks
- Spinal Anesthesia epidural anesthesia
- Regionalnerve blocks

UNIT 3

Anesthesia for specialty Surgeries

NEURO ANAESTHESIA

- Neurological surgeries .
- Glasgow coma scale
- Premedication
- Special investigation - CT, Angiography and MRI
- Checklist
- Reinforced Endotracheal tubes
- Positioning in neuron surgery
- I.C.P.
- Air embolism
- Reversal of the patient
- Transferring to I.C.U. / Ward

UNIT 4

OBSTETRIC ANAESTHESIA

- Obstetric procedures
- Differences between a pregnant and a normal lady
- Risks for anesthesia.
- Precautions to be taken
- Check list
- Regional vs. general anesthesia
- Induction / maintenance and recovery .
- Resuscitation of the new born, Apgar score
- Reversal and estuation
- Emergencies - manual removal of placenta
    a. P .H.
    b. P.P.H.
    c. Ruptures uterus
    d. Ectopic Pregnancy

UNIT 5

PAEDIATRIC ANAESTHESIA

- Pediatric patients general introduction
- Pediatric advanced life support skills
- .Theatre settings.
- Check list
- Pediatric procedures
- Premedication - modes
- Induction
- Intubation - Securing the EIT
- Reversal & estuation – Problems
- Transferring / ICU management
- Pain management

UNIT 6

ENT ANAESTHESIA

- ENT procedures
- Emergency tracheostomy
- Anesthesia for adenotonsillectomy
- Anesthesia for mastoidectomy

UNIT 7

CARDIAC ANAESTHESIA

- cardiovascular procedures
- Arrhythmias
- Angina
- Dyspnea
- Special investigations

a. echo cardiograph
b. angiography

- Premedication
- Setting up of monitoring system
- Monitoring - invasive and non - invasive
- Getting ready for the case
- Induction of cardiac patient, precautions to be taken
- Cardiopulmonary bypass

- I.C.U management.

UNIT 8

ANAESTHESIA OUTSIDE THE O.R.

- Situations
- Cath Lab
- Radiology
- E.C.T.
- Short comings

UNIT 9

DAY CARE ANAESTHESIA

- Special features
- Set up
- Advantages
- Disadvantages
- Complications
- Future

UNIT 10

GERIATRIC ANAESTHESIA

- Physiological changes
- Diseases of aging
- Nervous system
- Geriatric pharmacodynamics / pharmacokinetics
- Postoperative nervous system dysfunction.

UNIT 11

.ANAESTHESIA FOR TRAUMA & SHOCK

- Resuscitation
- Pre-Operative investigation & assessment
- Circulatory management
- Management of anesthesia

- Rapid sequence induction
- Other problems

UNIT 12

THORACIC ANAESTHESIA

- Thoracic procedures
- Preoperative preparations
- Premedication
- Check list
- Induction. Intubation
- Double lumen tubes
- Monitoring
- Pain management
- Exudation
- ICU management

UNIT 13

EQUIPMENT'S USED IN OT

- Thermal high frequency coagulator
- Argon beam coagulator
- Harmonic scalpel / plasma scalpel
- Radiofrequency ablation
- Diathermy
- Auto transfusion
- Pneumatic tourniquet
- Microsurgery
- Laser technology
- Laparoscopic surgical system
- Cell saver
- CUSA

COURSE LEARNING OUTCOMES (CLOS):

CLO-1:Demonstrate ability to prepare and maintain asepsis operation theatre.(UNIT-1)

CLO-2:Demonstrate ability to maintain equipment support in acute care environment. (UNIT - 1)

CLO-3:Demonstrate to assist the Anesthesiologist for safe anaesthesia techniques & procedure in operation theatre.(UNIT -2)

CLO-4:Work as a efficient technician, excelling in theoretical knowledge about surgeries and implementation of practical knowledge in operation theatre. (UNIT - 3)

CLO-5:Demonstrate skills and knowledge to assist anesthetist in handling emergencies outside the OT room. (UNIT -4)

CLO-6:Demonstrate the basics and emergencies care and life support skills.(UNIT- 6)

CLO-7:Efficiency and skills in handling different types of equipment's in operation theatre.(UNIT -5)

TEXT BOOKS:

Dr.GN Sharma & A.L.Agarwal (2013) Text Book of Operation Theatre Technique and Management, 3rdEdition Medico Refresher Publications.

Pocket guide for ORA by Maxine A gold man ,6th edition. Morgan
& Mikhaila clinical anaesthesiology , 6th Edition

REFERENCES BOOK:

Neelam Rai & Arpit Ravindra lal (2017) Text Book of Operation Theatre Technician, 1`st Edition,Jaypee Publications.
Surgical technology principles & practice by AST , 6th edition.

ONLINE LINKS FOR STUDY & REFERENCES MATERIALS

www.slideshare.com

www.wikipedia.com

YouTube/prepmedic

YouTube/ surgical tech tips

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

COURSE CODE- OTT 307 COURSE NAME- ETHICS AND DATA BASE MANAGEMENT COURSE CREDIT- 1 TOTAL CONTACT HOUR - 30 HOUR

COURSE OBJECTIVE:

- To provide the students understanding in history , theories & guidelines of ethics.
- To provide complete knowledge and understanding in ethical principles for perioperative settings.
- To Perform Basic skills for managing budget and finance of health care department.
- To make students better understanding for rules and responsibilities of professional conduct & scope of practice.
- To impart knowledge of hospital management , organization , staffing & time management.
- To provide complete knowledge about handling administration in health care department.

COURSE DESCRIPTION:

This course is designed to help students gaining information about roles and responsibilities of health care workers, standard of practice and code of conduct. This course help for apply evidence based practice in all areas of clinical duties, professional and government licencing , certification and registration. It helps to identify the common area of negligence in perioperative practice, importance of documentation in perioperative settings.

COURSE CONTENT:

UNIT 1:

Introduction:

- History, Theories and Guidelines of Ethics
- Belmont report
- Ethics Principles For Ethical Decision Making
- Ethics and Regulatory issues on Human Research in Public Health (ICMR guidelines, OHRP & FWA).
- Major ethical principles applied to moral issues in health care
- Rules of professional conduct & scope of practice.
- Confidentiality and responsibility
- Professional and government licensing accreditation and education standards.

UNIT 2:

General Management.

- Planning & Organisation: Planning Cycle, Quality management, Planning change
- Financial issues including budget and income generation
- Hospital Management: Hospital Organisation, Staffing, information.
- Self-Management

a. Preparing for first job
b. Time Management
c. Career development

UNIT 3:

Management and administration

Unit 4:

Recent advances in Health organization.

COURSE LEARNING OUTCOMES (CLOS):

CLO-1: Gaining knowledge and understanding for theoris & guidelines of ethics.(UNIT-1)

CLO-2: Efficiency and skills for understanding the ethical principles, rules & regulations of health care department(UNIT - 1)

CLO-3: Ability to understand the planning, hospital management , organization and staffing pattern.(UNIT -2)

CLO-4:Work as a efficient technician with the understanding of professional ethical conduct.(UNIT - 2)

CLO-5: Ability to understanding the management and administration. (UNIT -3)

CLO-6: Efficiency and skills in handling legal and ethical issues in perioperative settings.(UNIT-4)

TEXT BOOKS:

Handbook for Rural health care ethics : a practical guide for professional.

Ethics,Legal Issues and Professionalism in Surgical Technologby Julia & Jackson 2007

REFERENCES BOOK:

Ethics , prevention and public health by Angus Dawson , Marcel Verweij

ONLINE LINKS FOR STUDY & REFERENCES MATERIALS

www.slideshare.com

www.wikipedia.com

Www.classcentral.com/ ethics/ healthcare

http://Www.ncbi.nml.nih.gov

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

COURSE CODE:-OTT308

COURSE NAME: RESEARCH METHODOLOGY AND BIOSTATISTICS

COURSE CREDIT: 01

TOTAL HOURS: 30 HRS

COURSE DESCRIPTIONS:

This course involves a description of principles for conducting research. The goal of the research is to describe or define a particular phenomenon. In this case, descriptive research would be an appropriate strategy. A descriptive may, for example, aim to describe a pattern. Descriptive research has many useful applications, and you probably rely on findings from descriptive research without even being aware that that is what you are doing.

COURSE OBJECTIVES

- Identify and discuss the role and importance of research in the social sciences.
- Identify and discuss the issues and concepts salient to the research process.
- Identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.
- Identify and discuss the concepts and procedures of sampling, data collection, analysis, and reporting.
- To familiarize participants with the basics of research and the research process.

- To enable the participants in conducting research work and formulating research synopsisand report.
- To familiarize participants with Statistical packages such as SPSS/EXCEL.
- To impart knowledge for enabling students to develop data analytics skills and m

COURSE CONTENT :

RESEARCH METHODOLOGY

UNIT 1

:Introduction to Research methodology:

Meaning of research, objectives of the research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by

researchers in India.

UNIT 2:

Research problem:

Statement of the research problem, Statement of purpose and objectives of the research problem, Necessity of defining the problem

UNIT 3:

Research design:

Meaning of research design, Need for research design, Features for good design, Different research 8designs, Basic principles of research design

UNIT 4:

Sampling Design:

Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design

UNIT 5:

Measurement & scaling techniques:

Measurement in research - Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques.

UNIT 6:

Methods of data collection:

Collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.

UNIT 7:

Sampling fundamentals:

Need for sampling & some fundamental definitions, important sampling distributions.

UNIT 8:

Processing & analysis of data:

Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.

UNIT 9:

Testing of hypothesis:

What is a hypothesis? Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis

UNIT 10:

Computer technology:

Introduction to Computers, computer application in research, computers & researcher.

BIOSTATISTI

CS UNIT 1:

Introduction:

Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.

UNIT 2:

Tabulation of Data:

Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

UNIT 3:

The measure of Central Tendency:

Need for measures of central Tendency, Definition, and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped., Meaning and calculation of mode, Comparison of the mean, median, and mode, Guidelines for the use of various measures of central tendency.

UNIT 4:

Probability and Standard Distributions:

Meaning of probability of standard distribution, the binomial distribution, the normal distribution,

Divergence from normality – skewness, kurtosis.

Sampling techniques: Need for sampling –

Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling design errors, Sampling variation, and tests of significance.

UNIT 5:

Analysis of variance & covariance:

Analysis of variance (ANOVA), what is ANOVA? The basic principle of ANOVA, ANOVA technique,

Analysis of Covariance (ANCOVA).

UNIT 6:

Format of scientific documents:

Structure of protocols, formats reporting in scientific journals, systematic reviews, and meta-analysis).

COURSE LEARNING OUTCOMES

Students who successfully complete this course will be able to:

CLO. 1.Explain key research concepts and issues (UNIT1),(UNIT2,3)

CLO 2. Read, comprehend, and explain research articles in their academic discipline.

CLO3. Develop an understanding of various kinds of research, objectives of doing research, research process, research designs, and sampling. (UNIT5)

CLO4. They have basic knowledge of qualitative research techniques(UNIT8)

CLO5. They have adequate knowledge of measurement & scaling techniques as well as quantitative data analysis (UNIT9)

CLO6. Have a basic awareness of data analysis and hypothesis testing procedures. (UNIT9)

CLO7. Basics knowledge of Analysis of variance & covariance.(UNIT6)

TEXTBOOKS :

Handbook Of Research In Physical Therapy. CE Bork

REFERENCE BOOKS:

Physical Therapy Research: Principles And Application. E Domholdt

Research Methodology For Physical Therapists. C Hicks.

Kothari, C.R. Research Methodology (Methods and Techniques), New Age Publisher. Fundamentals of modern statistical methods by Rand R.wilcox

WEB LINKS:

https://scholar.google.com/

https://pubmed.ncbi.nlm.nih.gov/

https://www.researchgate.net/

ASSESSMENT METHOD

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

0

Assessment	**Grades**
Assignment	**10**
Class test	**5**
Quiz	**5**
Question & Answer Session	**5**

OTT Directed Clinical Education – (Internship)

The course provides students the opportunity to continue to develop confidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning, intermediate, and advanced procedures in both areas. Students will participate in advanced and specialized treatment procedures.

Specialized anesthesia and surgery

- Cardiovascular and Respiratory System- Techniques, equipment, procedures and instruments

  a. Diseases of cardiovascular and respiratory systems.
  b. Types of perfusion machines.
  c. Techniques of Perfusion and operational capabilities.
  d. Intra-aortic Balloon pump.
  e. Cell saver techniques.
  f. Care, maintenance and working of Heart lung Machine.
  g. Patient's record keeping preoperatively, during anesthesia and post-operatively.
  h. Principles and techniques of temperature monitoring.
  i. Positioning during cardiothoracic surgical procedures.
  j. Positioning and techniques for:
     i. Radial artery cannulation.
     ii. Central venous cannulation/pulmonary artery catheter.
     iii. Femoral artery/venous cannulation.

- Monitoring Techniques and Equipment:

  a. Cardiac monitors, blood pressure and ECG monitoring.
  b. Respiratory monitors, respiratory rate, Spirometers, SpO2, and EtCO2.
  c. Temperature monitors.
  d. TEE and echocardiography machine
  e. Non- invasive cardiac output machine

- Positioning-

  a. During various neurosurgical procedures including sitting, prone, lateral and position for trans-sphenoidal hypo-physectomy.
  b. Fixation of head during various neurosurgical procedures.

c. Prone and Knee chest position for spine surgery.

- Requirements during intubation in a case of cervical spine fracture including fiber- optic laryngoscopy, awake intubation, LMA family especially ILMA.
- Anaesthetic and surgical requirements during aneurysm surgery.
- Surgical and Anaesthetic requirements during micro neurosurgery including types ofmicroscopes, principle, structural features, microscopic photography and cameras used.
- Anaesthetic and surgical requirements during thyroid surgery, adrenal surgery.
- Anaesthetic and surgical requirements during abdominal surgery including Laproscopic surgery, genitourinary surgery including percutaneous nephrolithotomy, Endoscopic surgery, TURP, TURBT, Lithotripsy, ESWL (Extracorporeal shock wave therapy)
- Anaesthetic and surgical requirement during renal transplant donor and recipient surgery including care and precautions during operative procedures of hepatitis B & hepatitis C positive patients.
- Anaesthetic and surgical requirement during pediatric and Neonatal surgical procedures including emergency procedures like tracheo-esophageal fistula. Sub diaphragmatic hernia, major abdominal and thoracic procedures. Foreign body bronchus and esophagus.
- Apparatus and techniques for measuring blood pressure and temperature.
- Principle and working of direct/Indirect blood pressure monitoring apparatus.
- Intraoperative and postoperative problems and complications of general surgery.
- Management of emergency caesarean section.
- Management of massive obstetrical hemorrhage.
- Surgical management in major burns and craniofacial surgery.
- Surgical management of joint replacement and arthroscopy.
- Surgical management of endoscopies, laryngectomy with RND and cochlear implant.
- Management of PPV and perforating eye injury.
- Care and maintenance of Para-surgical equipment (Cautery, OT Lights, OT Table etc.)

Skills based outcomes and monitorable indicators for Operation Theatre Technologist

Competency statements

- Demonstrate ability to prepare and maintain Operation Theater
- Demonstrate ability to maintain equipment support in an acute care environment
- Identify and move to maintain a sterile field
- Follow infection control policies and procedures
- Manage and maintain theater equipment
- Demonstrate ability to prepare the patient for operative procedures
- Provide intra-operative equipment and technical support
- Demonstrate skills and knowledge to assist anesthetist in handling emergencies outside of OT Room
- Manage hazardous waste and follow biomedical waste disposal protocols
- Ensure availability of medical and diagnostic supplies
- Monitor and assure quality

- Act within the limits of one's competence and authority
- Work effectively with others
- Manage work to meet requirements
- Maintain a safe, healthy, and secure working

92

S. no.	Learning outcomes	Knowledge/compreh ension	Applications / synthesis /evaluation	Hours
1	Prepare and maintain Operation Theatre	Be familiar with the Operation Theatre and all the equipment.	Prepare the OT for the operation along with all the necessary equipment.	300
		Know the protocols used in Operation Theatre	Interpret and understand all planning techniques to keep an OT functional.	
	Maintain equipment support in an acute care environment	Use basic knowledge of surgical procedures to assist and identify the needs of equipment of Operating teams.	Clean and store equipment safely	300
			Position equipment in accordance with set up procedures	
3	Assist anaesthetist in handling emergencies outside of OT Room.	Knowledge of assisting anaesthetist outside OT Room.	Prepare emergency kit to handle areas outside OT Room.	300
			Ensure any signs or symptoms of a clinical emergency is identified correctly and reported to the appropriate clinician.	

4	Follow infection control policies and procedures	Knowledge of effective infection control strategy that ensures the safety of the patient.	Preform the standard precautions to prevent the spread of infection in accordance with organization	220
5	Ensure availability of medical and diagnostic supplies	Anticipating demand and ensuring availability of adequate medical and diagnostic supplies.	Maintain adequate supplies of medical and diagnostic supplies. Arrive at actual demand as accurately as possible	100
6	Prepare patient for operative procedures	Knowledge of preparing patients as required before the operation.	Safely position patient to meet the requirements of the anaesthetist and Surgeon.	200
7	Provide intra-operative equipment and technical support	Knowledge to assist the anaesthetist and provide technical support during surgical procedure.	Monitoring the performance of equipment used and adjusting surgical equipment.	200
8	Work effectively with others	Working with other people to meet requirements	Identify any problems with team members and other people and take the initiative to solve these problems.	100
		Communicating with other team members and people internal or external to the	Communicate with other people clearly and effectively	

		organisation		
9	Be able to demonstrate professional behavior	Explain the legal and ethical guidelines related to the profession	Promote collaborative practice	100
		Be aware of your own competency levels		
10	Be able to complete accurate treatment documentation	Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
11	Manage hazardous waste	Knowledge of Handle, collect and dispose of the hazardous waste.	Coordinate the hazardous waste management program.	100
			Properly identify, segregate, handle, label, and store waste.	
12	Maintain a safe, healthy and secure working environment.	Complying the health, safety and security requirements and procedures for Workplace.	Identify individual responsibilities in relation to maintaining workplace health safety and security requirements.	100
			Follow the organization's emergency procedures promptly, calmly, and Efficiently.	
13	Monitor and assure quality	Monitor treatment	Evaluate potential faults	200

		process/outcomes process/outcomes	in treatment procedures.	
		Identify problems in treatment	Identify breaches in health, safety and security procedures.	
		Solve treatment process/outcome problems	Follow the organization's emergency procedures promptly, calmly and efficiently.	
	Total			2270

Job Description for all levels

Level 4- OT Assistant

- JOB TITLE - Operation Theatre Assistant
- JOB PURPOSE

a. Assisting team in pre-operative arrangements.
b. Assisting during intra-operative with surgeons & anesthesiologist.
c. Assisting team post-operative.
d. Maintenance of machines.

- ACCOUNTABLE TO - HOD- Anesthesia Department / Senior OT Technologist/ OT Technologist
- QUALIFICATION - Diploma in Operation Theatre Technology (2 years)

RESPONSIBILITIES:

a. Responsible for the transportation of patients to and from the theatre and wards
b. Assist staff with the mobilization of the patient within the Operation Theatre
c. Assist with patient procedures as required
d. Maintain procedure room/operating theatre equipment so as to ensure a clean, safe andefficient environment for patients and staff
e. Assist in the preparation of patient prior to surgery, e.g. pre-operative shave, patient positioning.
f. Ensure that the patient is positioned securely and safely on the operating table prior to surgery and on the patient trolley at the completion of surgery
g. Provide assistance to medical and nursing staff
h. Promote patient safety at all the times
i. Assist in other areas within the theatre complex as workload permits
j. Maintain good communications with other staff in the theatre complex
k. Maintain patient confidentiality at all the times
l. Be familiar with the correct operation of all equipment
m. Collect and return all necessary equipment for the procedure and patient safety
n. Report malfunctioning equipment to person as per protocol
o. Follow the hospital's Health and Safety policies and procedures
p. Be aware of the OH&S guidelines for the safe transport of beds and patients throughoutthe hospital

Level 5 onwards – Operation Theatre Technologist

- JOB TITLE - Operation Theatre Technologist
- JOB PURPOSE

    a. Assisting team in pre-operative arrangements.
    b. Assisting during intra-operative with surgeons & anesthesiologist.
    c. Assisting team post-operative.
    d. Maintenance of machines

- ACCOUNTABLE TO - HOD/ Senior Operation Theatre Technologist
- QUALIFICATION - B.Sc. Operation Theatre Technology (3 ½ years including 6 months internship)

RESPONSIBILITIES:

- Supporting the multidisciplinary team in providing a safe, high quality environment for the carrying out of surgical procedures by:
- Assisting in skin preparation and draping of the surgical field.
- Supporting and observing the patient throughout the operation.
- Assisting in the measurement and recording of fluid input / output.
- Working as part of the multidisciplinary team for the benefit of the patient, appreciatingeach member of the team's needs and role.
- Anticipating the needs of the surgical team and responding effectively.
- Safely handling, recording and used instruments in line with Policy.
- Disposing of clinical waste safely and appropriately in line with Policy.
- Capturing and maintaining patient data / documentation and any informationrequired for auditing / quality issues. Documentation will be countersigned by the Registered Practitioner.
- Utilizing communication skills, preparing the environment and equipment and acting as alink between the surgical team and other parts of the theatre and hospital.
- Assisting the Registered Practitioner in the handover of the patient to the recovery staff, providing appropriate information and documentation.
- Notifies appropriate health physicians when immediate clinical response is necessary based on emergency in Operation Theater.
- Involvement in research and development.

NOIDA INTERNATIONAL UNIVERSITY
SCHOOL OF HEALTH SCIENCES

The Public Health Landscape in India:

Despite significant achievements over the years, Public Health challenges continue to stretch the existing resources, both in India and in the world. The countries, across the globe, strive towards achieving the Millennium Development Goals, yet the agenda remains unfinished. With the commencement of Sustainable Development Goals (SDG) era, a renewed thrust is required to maintain and improve upon the progress achieved so far.

While old threats continue to challenge health systems, new issues and challenges have appeared, thereby overburdening the health systems. Countries have developed an increased ownership towards the need to create a healthier population. Across the world, governments and voluntary organizations have worked towards strengthening the health systems through multiple approaches. Creation of a dedicated Public Health Cadre has been identified as one of the important pre-requisites in this direction. Public Health professionals help in bridging the gap between the clinical and managerial aspects of the program implementation and provide techno-managerial inputs. Public Health Programs demand a special emphasis on the study of disease epidemiology, various determinants of health & emerging challenges in health, public policy making and program management.

The determinants of health reside both within and beyond the formal health sector. Public health, as defined by Winslow is both an 'art' and a 'science'. Every discipline has its unique perspective of the world. We believe these perspectives from individual disciplines enrich public health. This course will be an attempt to prepare competent cadre of professionals who have a basic understanding of the various aspects of public health and are able to successfully apply this knowledge towards meeting public health challenges in Indian context.

Establishment of the Taskforce on Public Health in India:

The Joint Working Group UK- India embarked on the Master of Public Health (MPH) curriculum under the direction of Joint Secretary (Medical Education and Training) and held its first meeting on Sep 03, 2014 at New Delhi and the second meeting in January 2015 in London, UK. Subsequent to further joint meetings, led by the two co-chairs, it was decided to form a Taskforce on Public Health Education (PHE) in India under the Sub-group on Health Education and Training with expert members from the two countries.

The curriculum guideline that follows herewith, is a result of detailed deliberations, both remote and in person, between public health (PH) experts of both countries. As prescribed in the Terms of Reference for the Taskforce, the following essential elements, among others, have been addressed and included:

a) Level of course/ semester(s) for MPH
b) Minimum duration of course work
c) Evaluation criteria
d) Expected skills and competencies to be developed in the PH Postgraduate **Overall**

Program/Course Objectives in terms of Skills, Competencies and Learning Outcomes:

The course will help candidate to **develop skills in the following areas:**

- Analytical and assessment skills for collecting and interpreting information

- Policy planning and development skills to address public health challenges
- Communication skills for advocacy, dissemination and evaluation of public health data and information
- Financial planning and management skills for running public health programs in the country
- Leadership skills

At the end of the 2-years program, the PH Post-graduates are expected to demonstrate the **following Broad Values in the context of Public Health**:

1. Apply contemporary ideas to influence program organization and management, problem solving and critical thinking in public health domain
2. Undertake operational research in institutional and field settings
3. Work in socially, culturally and economically diverse populations by being attentive to needs of vulnerable and disadvantaged groups and be well versed with existing health systems
4. Demonstrate qualities of leadership and mentorship
5. Be an effective member of a multidisciplinary health team
6. Demonstrate ethics and accountability at all levels (professional, personal and social)
7. Practice professional excellence, scientific attitude and scholarship
8. Demonstrate social accountability and responsibility
9. Be open to lifelong learning

Specific to the course content, successful candidates are expected to demonstrate thefollowing competencies in a Public Health setting:

1. **Apply the course learning to the public health system and its challenges:**
    a. Demonstrate adequate knowledge and skills to a wide range of public health topics
    b. Critically conduct the situational analysis and develop action plan for identified public health issues
    c. Develop workforce for taking public health related responsibilities in defined geographical areas
    d. Develop an understanding of the epidemiological transitions of programs specific to each State within the country in order to prioritize public health challenges for policy making

2. **Develop, implement and evaluate key public health policies:**
    a. Develop a capacity to apply conceptual framework to understand policy processes in health care
    b. Understand roles of supply and demand in policy making in health care
    c. Develop an understanding to facilitate inter-sectoral coordination and public- private partnership
    d. Critically analyse resource allocation for competing public health interests across programs
    e. Formulate context appropriate policies and design programs to address public health challenges, effectively

3. **Develop and demonstrate competency in managing health systems at different levels:**
    a. Identify immediate and long term health program goals at national, State and district levels
    b. Prioritize health issues in population
    c. Describe various managerial information systems and their application
    d. Describe program management plans in health
    e. Understand and apply core management principles for human resources in health
    f. Understand and apply program budgeting and economic evaluation
    g. Understand and apply quality assurance and improvement techniques in health care

4. **Develop competency in research:**
    a. Understand and apply ethical principles in research, evaluation and dissemination
    b. Develop competence to critically evaluate existing information and identify gaps
    c. Formulate and test research hypotheses in real world scenario
    d. Translate research knowledge for evidence based policy making

Eligibility Criteria for the Masters in Public Health Program:

Since public health is interconnected and influenced by our surrounding, global institutions have wide eligibility criteria for undertaking the Masters in Public Health (MPH) programs. In the Indian context, we see a very important role for candidates from multiple professional backgrounds within MPH programs. Thereby, the eligibility Criteria for MPH program in India may include both science as well as non-science graduates.

The following are suggested eligibility criteria for the MPH Program in India:

Graduates in

- Medicine / AYUSH / Dentistry / Veterinary Sciences / Allied and Health Sciences / Life Sciences
- Statistics / Biostatistics / Demography / Population Studies / Nutrition / Sociology / Psychology / Anthropology / Social Work

Although highly recommended, candidates need not be restricted to the above disciplines and graduates from selected backgrounds other than these, may be taken by the Universities, when considering the overall aptitude and eligibility of a certain candidate.

Demonstrated work experience in a healthcare-related field is highly desirable.

Duration of the course: This course is designed to be a two years' full time program including internship and dissertation.

Course outline

COURSE FORMAT

During the MPH classes, there will be instructor/speaker presentation, class discussion, andgroup work and/or class activities addressing the designated topic. Students are encouraged to share any additional journal or newspaper articles related to course topics with the class.

Please email or bring them to class so they can be shared. Course points will be earned based on the following:

1. Group/Class Participation & Attendance: Students are expected to attend every class, read all class assignments, participate in class and working group discussions/activities, complete written assignments, and complete in-class exams. Please inform, submit and sign documents from the instructor in case of any unexpected absences prior to class. Attendance are taken seriously and will be taken regularly. Use the BIOMETRIC REGULARLY FOR YOUR ATTENDANCE IN THE MORNING from 9.30 a.m. to 4.30p.m daily. On NO OCCATION SHOULD ANY STUDENT LEAVE THE PREMISSES. Most weeks, students will be divided into groups to discuss the topic of the week or engage in a class activity. Individuals will be placed in different groups each time. Discussions/activities will address readings, case studies, article highlights and specified issues. In most instances, the group will provide a verbal and written report back to the rest of the class. All discussion should be respectful and reflect understanding of individuals' beliefs and experiences.

2. Assignments: This includes individual or groups assignments to given by yourteachers and submitted throughout the semester. There also projects involve with the assignments, attendance, posters, labs will be graded.

3. Research Paper: Research papers will focus on a specific health issue and an at risk population. All papers will include a discussion of the identified health issue, justification of the targeted population (for example epidemiological data), and identification of both positive and negative social, cultural, and/or behavioral factors e.t.c that contribute to the specific health pattern or outcome. Topics must be pre-approved by the instructor. Topic proposal in the form of a paragraph (300 words).

Your paper should include the following sections:-

□ Title Page (Title, Your name, Date, Course Name & Number, Instructor Name)

□ Introduction

- This section should include a brief description of the overall purpose of the paper and provide an overview of the health issue.

□ Health Issue (Review and synthesize of pertinent literature)

- Discuss the specific health problem/issue.
- Discuss the relationship between the biological pathway and the major factors influencing the disease process and/or health outcome.
- Do not select a health issue that has a strong genetic determinant as you will have little opportunity to discuss behavioural factors.

□ Objectives & Method

- Targeted Population, Discuss the specific population on which you are focusing.
- Provide a demographic description of the population.
- Discuss any relevant factors of the population.

□ Result

- Integration of the Health Issue and Target Population related to your topic

- Explain how the risk and/or protective factors for the specific population contributingto the control and/or occurrence of the health condition.
- Identify positive and negative factors related to the topic that you have chose

□ Discussion of conclusions and recommendations

- Summarize the literature and your conclusions about the relationship between thepopulation and the specific health pattern
- Make recommendations regarding what could be done to prevent and reduce thehealth problem in this population and how lessons learned in this population could beapplied to other populations or the nation.

□ References Cited - use the Vancouver style. Citing references should be cited in the body

of the text. (http://www.apastyle.org/learn/tutorials/basics-tutorial.aspx/).

Do not use Wikipedia as a cited reference. Focus on peer-reviewed research articles. Other

information: The papers should not be longer than 10 double spaced pages, not Including

references or title page. Margins should be one inch and font should be

New Times Roman 12-point font. If you have limited experience writing a scientific research paper, review articles in professional public health journals to understand the concise style typical of research manuscripts. Avoid using first person and unreferenced pronouns, e.g. "it", "that" or "this" not followed by a noun. Other "pitfalls" will be reviewed. Department of Public Health- SON, will offer students a 1-2 hour workshop for PubMed/Ovid Searching, google scholar and RefMan. Attendance at this workshop is optional. This workshop will help students meet the reference criteria of the research paper.

The MPH course will comprise of 15 Core modules and several elective modules which may be offered by Universities depending on their capacity and capability. **Four** elective streams comprising five modules each have been suggested in this document in addition to **15 Core** modules. A candidate will need to pass 15 Core (compulsory) modules, and five (5) elective modules of the chosen stream to successfully complete the program.

A. Core modules (compulsory for all four streams)

i. Social &Behavioural Aspects of Public Health
ii. Epidemiology
iii. Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases
iv. Biostatistics
v. Population sciences
vi. Women, Child health & Gender issues
vii. Health System & Policies in Public Health
viii. Ethics in Public Health
ix. Health Economics & Health care Financing
x. Occupation & Industrial health
xi. Environmental Health & Sustainable Development
xii. Nutrition & Food Safety in Public Health
xiii. Health Communication & Behavioural change Communication

xiv. Research methodology
xv. Health Programme Management
xvi. Global health

B. Elective streams •Epidemiology

i. Advanced Biostatistics
ii. Advanced Epidemiology
iii. Survey design and methods
iv. Infectious disease epidemiology
v. NCD epidemiology

Note: *Modules (i) to (v) compulsory for Epidemiology Stream*

•**Health Management**

i. Strategic management in public health
ii. Organization Behavior and Design
iii. Human Resource Development
iv. Quality Assurance and Total Quality
v. Management Information and Evaluation System
vi. *Social entrepreneurship, NGO Management & Marketing

Note: *Modules (i) to (v) compulsory for Health Management Stream*

•**Industrial and Occupational Health**

i. Principles and Relevance of Industrial and
ii. Occupational Health
iii. Occupational health disorders and diseases
iv. Industrial Hygiene
v. Ergonomics
vi. Industrial Psychology
vii. Occupational Services at workplace
viii. Legislations related to occupational health and safety
ix. Semester-IV

Note: *Modules (i) to (v) compulsory for Industrial and Occupational Health*

•**Clinical Trials Specialization (III & IV Semester)**

i. Epidemiology and principles of clinical research
ii. Drug discovery and Development
iii. Ethics in clinical trials
iv. Drug safety research and pharmacovigilance
v. Statistics and Data Management for clinical research
vi. Designing of clinical trials
vii. Regulatory affairs in clinical
viii. Management of clinical trials
ix. Semester – IV

Note: *Modules (i) to (v) compulsory for Clinical Trials Specialization +A Stream*

Note: Institutes may also choose to offer elective modules in other thematic areas such as *Advanced Health Economics and Financing, Advanced HealthInformatics, RMNCH+A, Advanced Environmentaland Health Programme, Policy and Planning, Global health security and International Policies,Advanced Health Promotions, Human Resources for Health* etc. Each elective stream MUST contain coursework for at least **10 credits or 350 hours**.

C. Dissertation

Semester Distribution of Master's Program

Suggested calendar of activities
(*1 month ~ 120 teaching hours @ 6 hours per day* 5 days a week*)
(1 credit = 35 teaching hours) Breaks to be calculated as applicable

Semesters	Months	In/out Campus	Approximate division of Teaching/practical Hours
Semester 1	6 months	In campus classes	~500
Semester 2	6 months	In campus classes	~500
Semester 3	4 months	In campus classes	~350
	2 month	**Internship**	~80
Semester 4	2 months	In campus classes	~150
	4 months	**Research, submission and defence of dissertation**	350

Holidays and breaks may be planned as applicable to each individual institution/regional calendar. The suggested organization of modules is as follows:

SEMESTER 1 MODULES
Social and Behavioural Aspects of Public Health
Epidemiology
Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases
Biostatistics
Population Sciences
Women & Child Health and Gender Issues
Health System & Policies in Public Health
SEMESTER 2 MODULES
Ethics and Regulatory issues on Human Research in Public Health
Health Economics & Health Care Financing and application to global health
Occupational and Industrial Health
Health Communication & Behaviour Change Communication
Research Methodology

Health Program Management [Disaster Management]
Global Health
Environmental Health and Sustainable Development
Nutrition and Food Safety in Public Health
SEMESTER 3 MODULES
Strategic management in public health
Organization Behavior and Design
Human Resource Development
Quality Assurance and Total Quality
Management Information and Evaluation System
*Social entrepreneurship, NGO Management & Marketing
Internship with health care organization – Thesis writing and presentation
SEMESTER 4 MODULES
Elective Stream modules (5)

COURSE CREDITS and TEACHING HOURS

S No.	COURSE		Credits		TeachingHours
A	**COREMODULES**				
MPH101	Social &Behavioural Aspects of Public Health		3		**50**
MPH102	Epidemiology		6		**90**
MPH103	Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases		6		**90**
MPH104	Biostatistics		5		**75**
MPH105	Population sciences		4		**60**
MPH106	Women, Child health & Gender issues		2		
MPH107	Health System & Policies in Public Health		6		**90**
MPH108	Ethics in Public Health		2		**40**
MPH109	Health Economics & Health care Financing		4		**60**
MPH110	Occupation & Industrial health		1		**20**
MPH111	Environmental Health & Sustainable Development		4		**60**
MPH112	Nutrition & Food Safety in Public Health		4		**60**
MPH113	Health Communication & Behavioural change Communication		4		**60**
MPH114	Research methodology		6		**90**
MPH115	Health Programme Management		4		**60**
MPH116	Global health		1		**20**

	TOTAL FOR CORE MODULES		62		925

S No.	COURSE		Credits		TeachingHours
A	**SEMESTER 1 CORE MODULES**				
(MPH101)	Social and Behavioural Aspects of Public Health		3		50
(MPH102)	Epidemiology		6		90
(MPH103)	Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases		6		90
(MPH104)	Biostatistics		5		75
(MPH105)	Population Sciences		4		60
(MPH106)	Women & Child Health and Gender Issues		2		40
(MPH107)	Health System & Policies in Public Health		6		90
	TOTAL FOR CORE MODULE		32		495
B	**SEMESTER 2 CORE MODULES**				
(MPH201)	Ethics and Regulatory issues on Human Research in Public Health		2		40
(MPH202)	Health Economics & Health Care Financing and application to global health		4		60
(MPH203)	Occupational and Industrial Health		1		20
(MPH204)	Environmental Health and Sustainable Development		4		60
(MPH205)	Nutrition and Food Safety in Public Health		4		60
(MPH206)	Health Communication & Behaviour Change Communication		4		60
(MPH207)	Research Methodology		6		90
(MPH208)	Health Program Management [Disaster Management]		4		60
(MPH209)	Global Health		1		20
	TOTAL FOR CORE MODULE		30		470
C	**SEMESTER 3** **Based on Specializations in any one area**				
C1	**Health Management**				
MPH301	Strategic management in public health		4		60
MPH302	Organization Behavior and Design		4		60

MPH303	Human Resource Development		4		60
MPH304	Quality Assurance and Total Quality		4		60
MPH305	Management Information and Evaluation System		4		60
MPH306	Social entrepreneurship, NGO Management &Marketing		4		60
SEMESTER 4 CORE MODULES					
MPH 400	Hospital Management		3		50
MPH 401	Internship with health care organization – Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		24		360
C2	**Industrial and Occupational Health**				
MPH307	Principles and Relevance of Industrial and Occupational Health		4		60
MPH308	Social entrepreneurship, NGO Management &Marketing		4		60
MPH 309	Industrial Hygiene		4		60
MPH 310	Ergonomics		4		60
MPH 311	Industrial Psychology		4		60
MPH 312	Occupational Services at workplace		4		60
MPH 313	Legislations related to occupational health and safety		4		60
MPH 400	Hospital Management		3		50
MPH 402	Internship- Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		28		420
C3	**Clinical Trials Specialization (III & IV Semester)**				
MPH 314	Epidemiology and principles of clinical research		4		60
MPH 315	Drug discovery and Development		4		60
MPH 316	Ethics in clinical trials		2		20
MPH 317	Drug safety research and pharmacovigilance		4		60
MPH 318	Statistics and Data Management for clinical research		4		60
MPH 319	Designing of clinical trials		4		60
MPH 320	Regulatory affairs in clinical		4		60
MPH 321	Management of clinical trials		4		60
MPH 400	Hospital Management		3		50
MPH 403	Internship with industry, Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		30		440

	IT applications in Public Health				
	Epidemiology & Biostatistics				

NB: 1Credit= 15hrs of class room teaching and doubled in case of field visit/practical/ project

Importance of Professionalism, values and communication: During orientation week, the course is expected to provide the candidate an overview of professionalism, importance of professional values and communication including;

- Professional values- Integrity, objectivity, professional competence and confidentiality.
- Core values- Accountability, Altruism, Compassion/ caring, excellence, integrity, professional duties, social responsibility
- Personal values- ethical or moral values
- Attitude and behaviour- professional behaviour, treating people equally
- Code of conduct, professional accountability and responsibility, misconduct
- Cultural issues in the healthcare environment
- Differences between the various healthcare professions and importance of team efforts
- Entry level health care practitioner, direct access, autonomy in profession, practitioner of medical practice and evidence based practice

General evaluation:

Each semester will have theory exam and practical examination at the end of the semester and in addition the fourth semester will also be evaluated on the basis of the Dissertation.

MPH 1ST SEMESTER

COURSE CODE: MPH 101
COURSE TITLE: SOCIAL AND BEHAVIOURAL ASPECTS OF PUBLIC HEALTH
COURSE CREDIT: 3
TOTAL HOURS: 50

COURSE OBJECTIVE

Aim: To familiarize students with views on key concepts that forms a basis for the social and behavioral aspects of public health: culture, race/ethnicity, gender, poverty/disparities, factors related to behavior change, community, organizational climate, family. To familiarize students with the policies that are involve, and investigative tool. To help develop empathy for Health promotion & disease prevention toward populations with whom one will work in the field of public health. To promote interest in further study of the social and behavioral determinants of health

COURSE CONTENT

UNIT 1: Introduction and Determinants of Health
UNIT 2: Introduction to social and behavior aspects of health UNIT
3: Contribution of social aspect of health to the community UNIT
4: Individual health behavior
UNIT 5: Impact of social interactions on health
UNIT 6: Evidence-based approaches in the development and evaluation of social and behavioural science interventions
UNIT 7: Behavioral and social science models
UNIT 8: Stakeholders in Public Health including NGO's and Social Support Networks
UNIT 9: Theories, research, and practice models at varying social ecological levels, including the intraindividual, inter-individual
UNIT 10: Communications theory, community or organizational mobilization, political economy and culture theory
UNIT 11: Chronic disease interventions

COURSE LEARNING OUTCOME [CLOs]

CLO1: Explain the determinants of health: Value of the social and behavioral sciences for understanding and solving public health problems. UNIT 1
CLO2: Concept of socio aspects of health, the behaviors that affect health, Disease pathogenesis, diagnosis, diagnostic techniques and management of communicable and non – communicable diseases which are of high burden to the society. UNIT 2
CLO3: Explain the social aspect of health in the community, explore selected behavioral and social science models including the Precede-Proceed Model (PPM) and the Behavior-Determinant-Intervention Logic model (BDI) to develop a systematic process for developing evidence-based public health interventions. UNIT 3 CLO4: Understand individual health behaviors and evaluate the importance and association of social and economic inequalities and other factors (e.g. psychological stress, coping, social class, gender, race/ethnicity, culture, social capital, social relationships) on health-related behavior and disease patterns. UNIT 4
CLO5: Impact of social interactions on health Discuss how communications theory, community or organizational mobilization, political economy and culture theory might be applied to selected contemporary public health issues. UNIT 5& 6
CLO6: Evaluate a public health intervention using a systematic, evidence-based approach. Evidence-based approaches in the development and evaluation of social and behavioral science interventions UNIT 7
CLO7: Analyze the causes of social and behavioral factors that affect health of individuals and populations. Behavioral and social science models UNIT 8
CLO8: Stakeholders in Public Health including NGO's and Social Support Networks UNIT 9
CLO9: Theories, research, and practice models at varying social ecological levels, including the intraindividual, inter-individual. UNIT 10

CLO10: Communications theory, community or organizational mobilization, political economy and culture theory Chronic disease interventions. UNIT 11

BOOKS

1. Park K. Park's textbook of preventive and social medicine. Preventive Medicine in Obstet, Paediatrics and Geriatrics. 2005.

2. Edberg M. Essential readings in health behavior: Theory and practice. Jones & Bartlett Publishers; 2010 Oct 22.

3. Bhalwar R, Singh M, Jayaram J, Vaz LS, Bhatti VK, Agrawal S, Datta A. Text book of public health and community medicine. History. 2009;1:2.

4. Coreil J, editor. Social and behavioral foundations of public health. Sage; 2010.

5. Edberg MC. Essentials of health behavior: Social and behavioral theory in public health. Jones & Bartlett Publishers; 2007.

REFERENCES

1. Pan-Ngum W, Poomchaichote T, Cuman G, Cheah PK, Waithira N, Mukaka M, Naemiratch B, Kulpijit N,
Chanviriyavuth R, Asarath SA, Ruangkajorn S. Social, ethical and behavioural aspects of COVID-19. Wellcome open research. 2020;5.

2. Shen B, Guan T, Ma J, Yang L, Liu Y. Social Network Research Hotspots and Trends in Public Health: A Bibliometric and Visual Analysis. Public Health in Practice. 2021 Jun 24:100155.

3. Vanderslott S, Van Ryneveld M, Marchant M, Lees S, Nolna SK, Marsh V. How can community engagement in health research be strengthened for infectious disease outbreaks in Sub-Saharan Africa? A scoping review of the literature. BMC public health. 2021 Dec;21(1):1-6.

4. Wang Y, Zhao L, Gao L, Pan A, Xue H. Health policy and public health implications of obesity in China. The Lancet Diabetes & Endocrinology. 2021 Jun 4.

5. Towne SD, Liu X, Li R, Smith ML, Maddock JE, Tan A, Hayek S, Zelber-Sagi S, Jiang X, Ruan H, Yuan Z. Social and Structural Determinants of Health Inequities: Socioeconomic, Transportation-Related, and ProvincialLevel Indicators of Cost-Related Forgone Hospital

Care in China. International Journal of Environmental Research and Public Health. 2021 Jan;18(11):6113.

WEBLINK

http://library.umac.mo/ebooks/b28354990.pd

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 102
COURSE TITLE:
EPIDEMIOLOGY
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

Aim: To provide an introduction to the basic concepts and methods of Epidemiology and to highlight Interrelationship between epidemiology and medicine to understand evidence based medicine

COURSE CONTENT

UNIT 1

- Fundamentals Of Epidemiology

UNIT 2

- Epidemiologic Study Design And Analysis

UNIT 3

- Methodological Challenges In Epidemiologic Research

UNIT 4

- Epidemiological Inferences In epidemics and Outbreak Investigations UNIT 5
- Critical Analysis of Published Epidemiological Studies

UNIT 6

- Disease Surveillance Clinical/ Field trial methodology

COURSE LEARNING OUTCOME [CLOs]

CLO1
Explain the Basic Concepts / Basics of Epidemiology.
Measuring the occurrence of diseases: -Evaluate the measures of Morbidity (Incidence, Prevalence), Measures of Mortality (Mortality Rates).
Measures of Prognosis, Case Fatality rate, Five Year Survival. Observed Survival (Life Table). Discuss critically with examples the Median Survival Time, Relative Survival Time .
Explain with relevant examples the following Measurement of Risk, Relative Risk, Odds Ratio, Attributable Risk UNIT 1
CLO 2: Epidemiological study design and Analysis. Explain with illustration the various study Design: Cross sectional, cohort, case control and intervention studies UNIT 2
CLO3: Assessing the methodological challenges in epidemiology research, strengths and limitations of different study designs association and Causation.
Describe critically Causality, random errors, Bias, Interaction and Confounding factors in epidemiological research. Methods for assessment of Effect Modification. Strategies to allow / adjust for confounding in design and analysis
Design, application, strength and weakness of studies
Concepts of Validity and Reliability (Causation and Casual interference) UNIT 3
CLO4: Epidemiological Inferences in epidemics and Outbreak Investigations
Preventive Strategies: Concepts of Screening
Disease Surveillance. Outbreak
investigation.
Benefits and limitations of different forms of epidemiological evidence in formulating policy decisions. UNIT 4
CLO5: Critical Analysis of Published Epidemiological Studies

Interpretations of published epidemiological UNIT 5

CLO6: Discuss critically Disease Surveillance Clinical/ Field trial methodology UNIT 6

BOOKS:

1. Leon Gordis (2019), Epidemiology, 6th Edition, Elsevier Publication.
2. R Beaglehole (2007), Basic Epidemiology, WHO.
3. Principles of Epidemiology in Public Health Practice (2012), 3rd Edition, CDC.
4. Rothman, Greenland and Lash (2008). Modern Epidemiology. (3rd Ed.) Lippincott Williams & Wilkins

REFERENCES

1. Park's - Textbook of Preventive and Social Medicine.
2. Jugal Kishore. Textbook of National Health Programmes: National Policies & Legislation related to Health.
3. CDC - Global Health protection – NCD Training Modules.
4. WHO – NCD steps questionnaire
(http://www.who.int/ncds/surveillance/steps/instrument/en/)
5. NPCDCS - National Health Programmes in India- (https://www.nhp.gov.in/nationalprogramme-for-prevention-and-control-of-c_pg)
6. GBD 2015 Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet, 2016; 388(10053):1659-1724
7. WHO – Global Action Plan for the Prevention and control of NCD 2013- 2020
8. WHO – Package of Essential NCD interventions for primary health care in low resource settings.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 103

COURSE TITLE: EPIDEMIOLOGY & MANAGEMENT OF COMMUNICABLE AND NON COMMUNICABLE DISEASES

COURSE CREDIT: 6

TOTAL HOURS: 90

COURSE OBJECTIVE

AIM: To provide students with an understanding of the scope of the public health issues with regard to communicable disease and non- communicable diseases in India and also provide them with the overview with the national health programs that have been designed to address these issues

COURSE CONTENT

UNIT 1

Classification of various communicable and non-communicable diseases and also appreciate the modes of evolution of disease stages.

UNIT 2

Burden of Communicable and non-communicable diseases

UNIT 3

Policies and programs used in the control of important communicable and non-communicable diseases, Issues involved in their implementation and evaluation;

UNIT 4

Appreciate the issues involved in managing and evaluating various National health programs.

COURSE LEARNING OUTCOME [CLOs]

CLO 1: Understand and explain the classification of diseases UNIT 1

CLO 2: Discuss the global Burden of diseases and Disease cycle / transmission UNIT 2

CLO 3: Describe, geographical trends, causes, approach to surveillance, prevention and control of Communicable diseases and Non-communicable diseases UNIT 3

CLO 4: Explain critically the National Health programs UNIT 4

Books:

1. Leon Gordis (2019), Epidemiology, 6_{th} Edition, Elsevier Publication.
2. R Beaglehole (2007), Basic Epidemiology, WHO.
3. Principles of Epidemiology in Public Health Practice (2012), 3_{rd} Edition, CDC.
4. Rothman, Greenland and Lash (2008). Modern Epidemiology. (3rd Ed.) Lippincott Williams & Wilkins

Reference

1. Park's - Textbook of Preventive and Social Medicine.
2. Jugal Kishore. Textbook of National Health Programmes: National Policies & Legislation related to Health.
3. CDC - Global Health protection – NCD Training Modules.
4. WHO – NCD steps questionnaire (http://www.who.int/ncds/surveillance/steps/instrument/en/)
5. NPCDCS - National Health Programmes in India- (https://www.nhp.gov.in/national-programme-forprevention-and-control-of-c_pg)
6. GBD 2015 Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet, 2016; 388(10053):1659-1724
7. WHO – Global Action Plan for the Prevention and control of NCD 2013- 2020
8. WHO – Package of Essential NCD interventions for primary health care in low resource settings.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE- MPH 104
COURSE NAME- BIOSTATISTICS
COURSE CREDIT- 5
TOTAL CONTACT HOUR - 75 HOUR

COURSE OBJECTIVE:

Demonstrate an understanding of

1. fundamental principles and practices in health promotion, education, and behavior
2. organization, principles, and practices in health administration
3. principles and practices in epidemiology, and tools for translating epidemiological findings into public health action
4. public health statistical applications

a) environmental health from the perspective of the earth as a complex, dynamic system.

COURSE DESCRIPTION : To introduce the basic statistical methods used in public health research. As part of this introduction, students will learn to make practical use of statistical computer packages.

COURSE CONTENT :

Unit 1• Organization of data - Primary and Secondary

Unit 2• Sources of data – Nature and functions of primary and secondary data.

Unit 3• Difference between scores and other non-score data.

Unit 4 • Properties of measurement - Measuring and interpretation of score/ other data methods of scaling Nominal, Ordinal, Ratio and Interval scale.

Unit 5• Developing indices - Nature and function of an • Index. Building composite scale simple and weighted scale – Developing weighted scores by statistical methods – Data Reduction techniques.

Unit 6• Measuring Reliability and validity of scales and such scales.

Unit 7 • Statistical Methods and Application through SPSS processing.

Unit 8• Data Organization – Raw data files and files.

Unit 9• Transformation and Manipulation of SPSS file.

Unit 10• Statistical Procedures.

★ Descriptive Statistics ☐Univariate Statistics ☐Bi variate Statistics.

★ Multivariate Statistics.

COURSE LEARNING OBJECTIVE: At the end of the course students will able to :

- CLO 1: Demonstrate an understanding of fundamental principles and practices in health promotion, education, and behavior; UNIT 1

- CLO 2: Demonstrate the ability to interpret the results of a statistical analysis, and to communicate such interpretations in an easily comprehensible manner. UNIT 2,3&4
- CLO 3: Demonstrate the ability to evaluate a given health related problem, and to identify the most appropriate statistical technique (e.g., t-test, contingency table, correlation) for analysis. UNIT 5
- CLO 4: Display a mastery of a variety of traditional and newly developed statistical techniques, including multi-variable methods for continuous and categorical data analysis. UNIT 6
- CLO 5: Demonstrate the ability to apply analytic epidemiologic methods used to investigate health conditions. UNIT 7
- CLO 6: Demonstrate the ability to structure available data in an easily useable form, using a variety of data management software tools. UNIT 8 & 9
- CLO 7: Gain exposure to a wide variety of public health topics, and demonstrate a basic understanding of the philosophy of public health practice.

  Demonstrate the ability to interpret the results of a statistical analysis, and to explain those results in understandable terms to public health practitioners. UNIT 10

Text book:

- ★ Nikpeyma, N., Abed_Saeedi, Z., Azargashb, E., &Alavi_Majd, H. (2014). Problems of clinical nurse performance appraisal system: A qualitative study. Asian Nursing Research, 8(1), 15-22.
- ★ Kumar, R. (2005). Research Methodologies: a step-by-step guide for beginners. 2nd.
- ★ Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. Journal of clinical nursing, 16(2), 234-243.
- ★ Fathalla, M. F. A Practical Guide for Health Researchers World Health Organization Regional Office for the Eastern Mediterranean: Cairo, 2004. Available at: wwwwhoint/emro/2004/92902136
- ★ Clough, P., &Nutbrown, C. (2012). A student's guide to methodology. Sage.
- ★ Cronbach, L. J. (1971). Test validation. In R. L. Thorndike (Ed.). Educational
- ★ Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77–101.

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 105
COURSE TITLE: POPULATION SCIENCES
COURSE CREDIT: 3
TOTAL HOURS: 50

COURSE OBJECTIVE

Aimed at providing students with an understanding of community demographics, socio-economic status, types and distribution of diseases and disorders in a community, and a community perspective of the factors determining utilization of health

COURSE CONTENT

- UNIT 1:Concepts Of Population And Development
- UNIT 2 :Sources Of Data
- UNIT 3: Mortality, Morbidity And Fertility
- UNIT 4:Model Life Tables and Indirect Methods of Estimating Vital statistics.
- UNIT 5Migration, Population Growth, Ageing, Problems, Projections

COURSE LEARNING OUTCOME [CLOs]

- CLO1 Explain the concepts of Population and Development o
  Meaning, Nature and scope of demography,
  Population growth, structure, characteristics and distribution; Components of population change,
  Demographic Transition UNIT 1
- CLO 2 Describe the sources of data :Census, surveys and
  - registries - objectives and components UNIT 2
- CLO3 Critically expanciate on fertility – Concept and definitions of basic terms like Fecundity, Sub-fecundity, fertility, conception, pregnancy, abortion, still-birth, live-birth, menarche, menstrual cycle, menopause, family size, sources of fertility data and their limitations. Measures of Fertility factors effecting fertility UNIT 3
- CLO 4 Discuss mortality - Basic concepts, importance, sources of mortality data and errors in death statistic and measurement of errors; Mortality measures: Crude death rates, specific death rates by age, sex, causes of death, marital status and other characteristics; standardized rates; Life tables: Meaning, assumptions, type, functions and uses of life tables, construction of life tables from census data, mortality comparisons; multiple decrement life tables and cause specific life tables. UNIT 4
- CLO 5 Explain critically Migration, and the impact on the population. Understand the Ageing Population, causes of the trend, and contribution to the population. Describe Population growth and projections including the causes, prevention and impact on the globe. UNIT 5

REFERENCES BOOKS

1. Andrew Scharlach and Amanda Lehning (2016). Creating aging-friendly communities. Oxford University Press
2. Brocklehurst's Textbook of Geriatric Medicine and Gerontology, 7th Edition (2010).
3. RonniChernoff'sGeriatric Nutrition (2010). The Health Professional's Handbook4th Edition
4. O.P. Sharma (2012). A Textbook of Geriatrics & Gerontology, 3rd edition.
5. Ministry of health and family welfare. New Delhi: Director General of Health Services, MOHFW, Government of India; 2011. National Program for Health Care of the Elderly (NPHCE): Operational Guidelines 2011.

6. Central Statistics Office. New Delhi: Central Statistics Office Ministry of Statistics and Programme Implementation, Government of India; 2011. Situation Analysis of the Elderly in India.
7. Central Statistics Office. New Delhi (2006) . National Sample Survey Organization, Ministry of Statistics and Programme Implementation, Government of India.
8. Morbidity, Health Care and the Condition of the Aged. NSSO (64th round) Jan-June 2004.
9. Colleen Keller&Julie Fleury. Health Promotion for the Elderly (2012). SAGE Publications, Inc
10. National Programme for the Health Care of the Elderly (NPHCE): An approach towards active and healthy ageing. Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. 2011.
11. National Programme for Health Care of the Elderly. India current affairs (2011). A leading resource of online information of India.
12. Olshansky, S.J.& B.A. Carnes. 2009. "The future of human longevity." Pp. 731-745 in International Handbook of Population Aging: Springer.
13. Jagger, C. 2006. "Can we live longer, healthier lives?" Pp. 7-22 in Longer Life and Healthy Aging, edited by Y. Zeng. New York: Springer.
14. Moen. 2013. New Directions in the Sociology of Aging. National Academy of Sciences.
15. Hermalin, A.I. et al. 2007. "Future characteristics of the elderly in developing countries and their implications for policy." Asian Population Studies 3(1):5-36.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 106
COURSE TITLE: WOMEN & CHILD HEALTH AND GENDER ISSUES
COURSE CREDIT: 2
TOTAL HOURS: 40

COURSE OBJECTIVE

Aim: To impart an understanding of the scope of women and child health and toenable students to find and interpret relevant information on women and child health

COURSE CONTENT

UNIT 1 Women's Health – Concepts, Definition And Measures
UNIT 2 Customs, Norms, Attitudes And Practices In India UNIT 3 Adolescent Sexual Health And Family Planning
UNIT 4 RTI's , STI And HIV/AIDS
UNIT 5 Millennium Development Goals And Government
UNIT 6 Programs In Reproductive Health

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Women's Health – concepts, definition and measures. Customs, norms, attitudes and practices pertaining to various aspects of women's health including menstruation, puberty, childbirth and menopause; sexual and reproductive rights; infertilityUNIT 1
- CLO 2 Adolescent Sexual Health & Contraception
- Role and involvement of men in RH.
- Methods of Family Planning
- Health Benefits of Family Planning
- Contraceptive Behavior, Measurement & Service Delivery
- Quality of Family Planning Care
- Gender, autonomy, empowerment and status of women, domestic violence in India
- Maternal morbidity and mortality.
- Abortion, Family Planning UNIT 2
- CLO 3 RTIs & STIs and HIV/AIDS UNIT 3
- CLO 4 Millennium Development Goals And Government UNIT 4
- CLO 5Response of Govt. to Issues of Millennium UNIT 5
- CLO 6Development Goals in the context of women and child health. UNIT 6

BOOKS &REFERENCES

1. Krieger, Nancy, "Genders, sexes, and health: what are the connections – and why does it matter?" *International Journal of Epidemiology* 32 (2003): 652-657.

2. Krieger, Nancy and Elizabeth Fee, "Man-Made Medicine and Women's Health: The Biopolitics of Sex/Gender and Race/Ethnicity," *International Journal of Health Services* 24(2) (1994): 265-283.

3. Connell, Raewyn, "Gender, health and theory: Conceptualizing the issue, in local and world perspective," *Social Science & Medicine* 74 (2012): 1675-1683.

4. Denton, Margaret, Steven Prus, and Vivienne Walters, "Gender differences in health: a Canadian study of the psychosocial, structural, and behavioural determinants of health," *Social Science & Medicine* 58 (2004): 2585-2600.

5. Courtenay, Will, "Constructions of masculinity and their influence on men's well-being: a theory of gender and health," *Social Science & Medicine* 50 (2000): 1385-1401.

6. Bowleg, Lisa, "The Problem With the Phrase *Women and Minorities*: Intersectionality – an Important Theoretical Framework for Public Health," *American Journal of Public Health* 102(7) (2012): 1267-1273.

7. Samuels-Dennis, Joan et. al., "Intersectionality Model of Trauma and Post-Traumatic Stress Disorder," in *Health Inequities in Canada: Intersectional Frameworks and Practices*, ed. OlenaHankivsky, UBC Press: 2011, 274-288.
8. M. Pilar Sánchez-LópezRosaLimiñana-Gras,The Psychology of Gender and Health, 1st edition 3rd January 2017,Academic Press
9. Jasmine Gideon, "Handbook on Gender and Health" Publication Date: 2016 ISBN: 978 1 78471 085 9
10. Annandale Kuhlmann Annandale Kuhlmann,The Palgrave Handbook of Gender and Healthcare,2 New edition 2012, Palgrave MacMillan
11. Purohit, Brijesh C, "Inequity in Indian Health Care", 1st edition 2017 Hardcover ISBN 978-981-10-5043- 5, Springer Singapore
12. K.S. James Arvind Pandey, Dhananjay W. BansodLekhaSubaiya, "Population, Gender and Health in India: Methods, Processes and Policies",Academic Foundation (2010)
13. Manoranjan Pal, PremanandaBharati, Bholanath Ghosh, and T.S. Vasulu, "Gender and Discrimination Health, Nutritional Status, and Role of Women in India", Published: 10 November 2011,Oxford University Press 2017
14. KeertyNakray ,"Gender-based Violence and Public Health: International perspectives on budgets and policies" 1 edition (16 June 2017), Routledge
15. Chloe E. Bird, " Gender and Health: The Effects of Constrained Choices and Social Policies" edition (January 28, 2008) , Cambridge University Press;
16. Judith Lorber and Lisa Jean Moore, Gender and the Social Construction of Illness (Gender Lens) 2 edition (August 15, 2002), AltaMira Press
17. Steele, Linda and Leanne Dowse, "Gender, Disability Rights and Violence Against Medical Bodies," *Australian Feminist Studies* 31(88) (2016): 187-202.
18. Fish, Rebecca and Chris Hatton, "Gendered experiences of physical restraint on locked wards for women," *Disability & Society* 32(6) (2017): 790-809.
19. Day et al. Integrating and evaluating sex and gender in health research. Health Research Policy and Systems. 2016, 4(1):75.
20. Tanenbaum et al. Why sex and gender matter in implementation research. BMC Medical Research Methodologies. 2016,16(1):145

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 107
COURSE TITLE: HEALTH SYSTEM & POLICIES IN PUBLIC HEALTH
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

Aim: To introduce students the different types of services and different levels in health care delivery.

COURSE CONTENT

- UNIT 1 Policy Making Process, With Historical, Ethical, Legal and Political Realities
- UNIT 2 Standard Frameworks For Policy Analysis
- UNIT 3 Basic Model And Function Of Health Service
- UNIT 4 Indigenous Systems Of Medicine
- UNIT 5 International Health
- UNIT 6 Persistent and Widespread Issues In Providing Health Services

COURSE LEARNING OUTCOME [CLOs]

At the end of the subject students should be able to understand and explain the below

CLO 1 Policy:

- Understanding, need and goals for various policies related to public health - Health policy, population policy, nutritional policy, research policy, women policy, child policy etc.
- Policy environment
- Methods to assess the needs of for the policy development / assessment process.
- Standard Frameworks for policy analysis, applying these to the assessment of current policies.
- Factors influencing the policy: external factors (interest groups as one example), politics and the like. UNIT 1

CLO 2 Health care system:

- Primary Health Care institutions (sub-centers, primary health centers, community health centers, district hospitals),
- Teaching hospitals, specialist hospitals, and health insurance schemes like Employees State Insurance and Central Government Health Scheme, defense health services, Railway health services.
- Private Health care system: Private hospitals, Polyclinics, Nursing homes and dispensaries, one-doctor practices; Major voluntary health agencies;
- Planning at Central, State, District, Block and Village levels like Union Ministry of Health and Family Welfare, Directorate General of Health Services, Central Council of Health, State Ministry of Health, State Health Directorate, District Health Organization etc
- Private health sector entities like private hospitals, polyclinics, nursing homes and dispensaries, one-doctor practices; Major voluntary health agencies; UNIT 2&3

CLO 3 Indigenous systems like Ayurveda, Homeopathy and Unani.

- Guided visits to one institution in each of the following category viz. PHC, CHC, Taluk Hospital, General Hospital, sub-centre and Anganwadi are undertaken to help the learning process
- Health Care Delivery Structure:
  - Central : State, District, Block and Village levels like Union Ministry of Health and Family Welfare, Directorate General of Health Services, Central
  - State level : Ministry of Health, State Health Directorate, District Health Organization etc
  - In-sectoral co-ordination UNIT 3 &4

CLO 4 International Health: Health care systems in developing countries and developing countries UNIT 5
CLO 5 Explain the Persistent and Widespread Issues In Providing Health Services UNIT 6

BOOKS &REFERENCES

1. IAPSM's Textbook of Community Medicine Paperback – Mar 2019, A. M Kadri (Author) 2.
Lee, Kenneth and Mills, Anne "Policy making and planning in health Sector" 1987, OUP.
3. Priorities in Health, World Bank Publications, 2006
4. An Introduction to Social Policy, Peter Dwyer & Sandra Shaw 9eds), SAGE, 15-Mar-2013

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

MPH 2ND SEMESTER

COURSE CODE: MPH 201
COURSE TITLE: ETHICS ANDREGULATORY ISSUES ON HUMAN RESEARCH IN PUBLIC HEALTH
COURSE CREDIT: 2
TOTAL HOURS: 40

COURSE OBJECTIVE

Aim: To understand ethical issues involved in epidemiology and public health practice and research

COURSE CONTENT

- UNIT 1 History of Ethics in Health Research
- UNIT 2 Theories and Principles and Guidelines of Research
- UNIT 3 Ethics Principles for Ethical Decision Making
- UNIT 4 OHRP and FWA Approvals and Institutionalizing Ethics

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 History of Ethics in Health Research UNIT 1
- CLO 2 Theories and Principles and Guidelines of Research UNIT 2
- CLO 3 Ethics Principles for Ethical Decision Making UNIT 3
- CLO 4 OHRP and FWA Approvals and Institutionalizing Ethics UNIT 4

REFERENCES&BOOKS

- Introduction to public health laws and Ethics.
- Healthy City Planning: From Neighborhood to National Health Equity (Planning, History and Environment Series) by Jason Corburn
- The Health Practitioner's Guide to Climate Change: Diagnosis and Cure (Earthscan: Climate) by Jenny Griffiths, Mala Rao, et al.
- Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks by Regina E. Lundgren and Andrea H. McMakin

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**

Internal Assessment Exam	**25**

COURSE STRUCTURE

COURSE CODE: MPH-202

COURSE NAME: HEALTH ECONOMICS AND HEALTH CARE FINANCING

COURSE CREDIT: 04 COURSE HOURS: 60

1. **COURSE OBJECTIVES:**

   The student should be able to describe the basics of Health Economic and Health Care financing, sector reforms, Fundamentals of Budgeting and Financial Management, Cost- Benefit Analysis: Theory & its Techniques, Health Care Financing- Case Studies related to health care financing, Medical Insurance and Public Private Partnerships.

2. **Course description:**

   This course involves the introduction of Health Economic and Health Care financing, budgeting and financial management, medical insurance, and its benefits.

3. **Course Content:**

UNIT-1. Introduction to Health Economic and Health Care financing

- Introduction
- Definition
- Scope of health economics
- Demand, supply, and market
- Economic objectives of health care
- Concepts of economics efficiency and hospital economics
- Resource generation for hospital

UNIT-2. Basics Of Health Economics and Financing

- Introduction
- Health economics
- Microeconomics
- Macroeconomics
- Health economics evaluation- Scope
- Health economics evaluation- Indian Perspective

UNIT-3. Sector Reforms

- Introduction
- Definition
- Goals of Health sector reforms
- Historical Perspective: Health sector reforms
- Health sector reforms in India:

- Public Sector
- Private sector

- Health sector reforms: International examples
- Impact evaluation of health sector reforms

UNIT-4 Fundamentals of Budgeting and Financial Management

- Introduction
- Definition
- Purpose of Budgeting
- Prerequisites of budgeting
- Characteristics of budgeting
- Importance and principles of budgeting
- Types and classification of budgeting
- Budgeting process
- Advantages and disadvantages of budgeting

UNIT-5 Cost-Benefit Analysis (CBA) : Theory & Techniques

- Introduction
- Definition
- History of cost benefit analysis
- Principles of cost benefit analysis
- Key indicators and Challenges of cost benefits analysis
- Tools to improve CBA

UNIT-6 Health Care Financing – Case Studies

- Definition
- Purposes of Health Care Financing
- Challenges of Health Care Financing
- Sources of Health Care Financing in India
- Role of the Private sector in health care delivery system
- Public Private Partnership: Public Policy Response
- Human Resources for Health
- Initiative by Government of India
- Other Models of financing
- Challenges of Health Care Financing

UNIT-7. Medical Insurance and Public Private Partnerships

- Definition Medical Insurance and Public Private Partnership
- Goals of Public Private Partnerships
- Objectives, concept, and core principles of Public Private Partnerships

- Basic dimensions of Public Private Partnerships
- Approaches and Common models of Public Private Partnerships
- Importance, challenges, and opportunities of Public Private Partnerships

Course learning outcomes:

CLO-1.

Students should be able to know about Scope, Demand, supply, and market risk of health Economic. Able differentiate the objectives of health care, Concepts of economics efficiency and Resource generation for hospital. UNIT 1

CLO-2

Should be able to differentiate in Microeconomics and Macroeconomics,

Scope of Health economics evaluation and health economics evaluation- Indian Perspective. UNIT 2

CLO-3.

After the completion of this unit students should know the Goals of Health sector reforms, Historical Perspective, Health sector reforms in India in regards with Public & Private sector, Impact evaluation of health sector reforms. UNIT 3

CLO-4.

Should be able to acquire knowledge regarding Fundamentals of Budgeting and Financial Management, Purpose, Prerequisites & Characteristics of budgeting. Formulation of budget and Budgeting process. Advantages and disadvantages of budgeting **CLO-5.**

Should be able to know in depth about Cost-Benefit Analysis (CBA): Theory & Techniques. Key indicators and Challenges of cost benefits analysis. Tools to improve CBA. UNIT 4

CLO-6.

Students will be able to knowPurposes, Challenges, Sources and of Health Care Financing. Public Private Partnership: Public Policy Response. Initiative by Government of India and important Models of financing.UNIT 6

CLO-7.

Students should be able to acquire knowledge regarding Medical Insurance and Public Private Partnerships in details. Approaches and Common models of Public Private Partnerships UNIT 7

Textbooks:

1. Creese A., Parker D., cost analysis in primary health care. WHO UNICEF, Agakan foundation 1994.
2. Pindyck, Robert S and Rubinfield, Daniel I., Micro economics 5th edition
3. Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. (2015). Methods for the economic evaluation of health care programmes. Oxford university press.

4. Donaldson, C., & Gerard, K. (1993). Economics of health care financing. Basingstoke: Macmillan.

Reference books:

1. Green, A. (1992). An introduction to health planning in developing countries. Oxford University Press (OUP).
2. Thomas E. Getzen. (1997). Health economics: fundamentals and flow of funds. John Wiley & Sons.
3. Dror, D. M., Preker, A. S., &Jakab, M. (2002). The role of communities in combating social exclusion. Social reinsurance: A new approach to sustainable community health financing,

Online link for study and reference materials

a) www.slideshare.net
b) https://www.ncbi.nlm.nih.gov/pmc/
c) Google scholar
d) www.researchlink.org

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 203
COURSE NAME: INDUSTRIAL AND OCCUPATIONAL HEALTH
COURSE CREDIT:1
TOTAL HOURS: 20

COURSE OBJECTIVES:

The purpose of this course is to make the students aware about the responsibility of occupational health services to keep all employees informed about hazards in the workplace. The measures taken to protect employee health should be thoroughly explained so that workers understand the necessity of complying with unpleasant restrictions as the wearing of protective clothing and face masks. First aid facilities should be organized and employees instructed about first aid procedures in case of accidental injuries or other emergencies.

COURSE DESCRIPTION:

OH specialists aim to enhance a worker's health status, increase the productivity of a workforce, and improve business performance and the economy. They have specific training and experience to understand the link between health and work. This enables them to support both workers and employers. OH focuses on three main objectives:

- Maintenance and promotion of workers' health and working capacity
- Improvement of working environments to ensure that they are conducive to health and safety.
- The development of work organisations/cultures in ways which support health and safety at work, promote positive social interactions and improve productivity.

COURSE CONTENT:

UNIT 1- Introduction to Occupational Health
UNIT 2- Introduction to work environment
UNIT 3- Occupation epidemiology
UNIT 4- Occupational Health Policy & Administration
UNIT 5- Occupational Safety & injury prevention UNIT
6- Ergonomic /Human factor
UNIT 7- Occupation Health care delivery
UNIT 8- Practice of Occupation Health

COURSE LEARNING OUTCOME:

CLO 1- To understand the importance of occupational health and safety of workers at workplace. To provide them safe environment so that they can contribute effectively in the economic growth. UNIT 1

CLO 2- To have the students' proper orientation to healthy work environment. To understand the proper uses of PPE kits and its importance. UNIT 2

CLO 3- To know about the incidences of work related accidents and how it effects the performance of workers and along with the growth of an organization. UNIT 3

CLO 4- Have a brief understanding of the policies and guidelines laid down by the policy makers and the organization for the betterment of the individual.UNIT 4

CLO 5- To know about the injuries occurred at workplace and the steps taken to safeguard the health of the workers. UNIT 5

CLO6- To have a brief knowledge about the good ergonomics and the considerations to be taken in order to avoid injuries due to bad posture. UNIT 6

CLO 7- To know the role of the occupational health care services and their functions. UNIT 7

CLO 8- Healthy occupational practices and the need to know the importance of induction program to its workers. UNIT 8

BOOKS

1. Martins R, Duarte J, Branco JC, Teixeira T, Vasconcelos S, Fernandes M, Bustos D, Niquice F. Book of Abstracts of the 4th Symposium on Occupational Safety and Health.
2. Slote L. Handbook of occupational safety and health.
3. Islam MN. Occupational Health Hazard of Female Beedi Workers in Rural West Bengal: A Case Study.
4. Saikh LM, Chaudhury SK. OCCUPATIONAL HEALTH STATUS OF SMALL SCALE INDUSTRY WORKERS: A CASE STUDY OF BERHAMPORE MUNICIPALITY, WEST BENGAL, INDIA.
5. VANAJAKSHI DE, NM A. Occupational health status among women workers: a study in food industry. Journal of Contemporary Issues in Business and Government. 2021 Apr 8;27(3):1251-6.
6. Mukhopadhyay K. Occupational Hazards in the context of SARS-CoV-2. Occupational Hazards. 2021 May;5(1).
7. Hirsh R. The Developing World Outreach Initiative: Expansion of Occupational Hygiene through Volunteerism and Networking. InImproving Global Worker Health and Safety Through Collaborative Capacity Building Initiatives (pp. 61-85). CRC Press.

REFERENCES

1. Fundamental principles of occupational health and safety Second edition by Benjamin O. ALLI, INTERNATIONAL LABOUR OFFICE • GENEVA
2. Detels R, Beaglehole R, Lansang MA, Gulliford M. Oxford textbook of public health. Oxford University Press; 2011.
3. Burke RJ, Clarke S, Cooper CL, editors. Occupational health and safety. Gower Publishing, Ltd.; 2011.
4. Baker MG. Occupational Health Surveillance as a Tool for COVID-19 Prevention.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**

Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 204
COURSE TITLE: ENVIRONMENTAL HEALTH AND SUSTAINABLE DEVELOPMENT
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: The course provides the comprehensive knowledge in issues related to environment affecting health and means of sustainable development.

COURSE CONTENT

- UNIT 1 Public Health Ecology
- UNIT 2 Air And Noise Pollution Control
- UNIT 3 Water Pollution, Solid Waste Management And Hazardous Waste
- UNIT 4 Sustainable Development And The Environment
- UNIT 5 Waste Minimization & Cleaner Production

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Air and Noise Pollution Control: Definition of air pollution pollutants and their sources – effects on human health, vegetation and climate of air pollution – air pollution control legislation – noise pollution – sources and effects – control measures. UNIT 1 & 2
- CLO 2 Water Pollution: Definition, sources, classification of water pollutants – organic waste, oxygen demanding waste, disease causing wastes, synthetic organic UNIT 3
- CLO 3 Compounds. Sewage and agricultural run – off, inorganic pollutants suspended solids and sediments, radioactive materials, BOD, COD, Waste water treatment- primary secondary, tertiary.UNIT 3
- CLO 4 Solid waste management – classification, origin, methods of solid waste treatment and disposal compositing, sanitary land filling, thermal process (incineration, Pyrolysis) Recycling and reuse. UNIT 3
- CLO 5 Hazardous waste – sources, identification and management of hazardous waste – treatment and disposal UNIT 3
- CLO 6 Development and The Environment: Climate change - ozone depletion global warming, greenhouse effect. UNIT 4
- CLO 7 From unsustainable to sustainable development – urban problems related to energy – water conservation, rainwater harvesting, watershed management – resettlement and rehabilitation of people – its problems and concerns. UNIT 5

BOOKS

1. Thind PS, Sareen A, Singh DD, Singh S, John S. Compromising situation of India's bio-medical waste incineration units during pandemic outbreak of COVID-19: Associated environmentalhealth impacts and mitigation measures. Environmental Pollution. 2021 May 1;276:116621.

2. **https://www.researchgate.net/publication/347439215_SMART_PUBLIC_HEALTH_PLANNING_FOR_SMART_CITY_A_SYSTEMATIC_REVIEW**

3. Chandrappa R, Das DB. Environmental Health Planning. InEnvironmental Health-Theory and Practice 2021 (pp. 69-98). Springer, Cham.

4. Thakur JS, Paika R. Smart Health and Wellness Promoting Villages: A Case Study from India. Smart Villages.:321.

REFERENCES

1. Occupational Safety and Health: Fundamental Principles and Philosophies by Charles D. Reese
2. Industrial and Occupational health (pb 2017) by Haldar 3. Industrial Relations and Labour Legislation by Sharma R.C.
4. Industrial Safety, Health and Environment Management Systems by R. K. Jain and Sunil S. Rao

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 205
COURSE TITLE: NUTRITION AND FOOD SAFETY IN PUBLIC HEALTH
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: This module covers the basics of human and community nutrition. Issuesrelated to food safety are also covered.

COURSE CONTENT

- UNIT 1. Principles Of Nutrition
- UNIT 2. Disease Specific Nutrition
- UNIT 3.Community Nutrition And Nutritional Assessment
- UNIT 4.Policy And Programmes For Nutrition Related Issues
- UNIT 5.Food Safety

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Basics of Nutrition: Importance of pattern and balanced diet for preschooler school going children, adolescents, pregnant & lactating mothers, old age, athletes, space nutrition UNIT 1
- CLO 2 Disease specific Nutrition: Diet modifications during various diseased condition diabetes, obesity, heart diseases, civil and kidney, TB, HIV UNIT 2
- CLO 3 Community Nutrition: Deficiency disorders and dietary management – PCM, anemia, goiter and vitamin & mineral deficiency. Prevalence of under nutrition and malnutrition in India – Assessment of nutritional status anthropometric measurements – clinical examination delay survey – malnutrition infection and infestation effect of malnutrition in infancies, pregnant & nursing mothers – Nutrition organization programmes – UNIT 3
- CLO 4 National , international & voluntary organizations – undertaken to combat malnutrition UNIT 4
- CLO 5 Policy and programmes for nutrition related Issues Food Safety: General principles importance of food borne illness – prevention of contamination, food toxicants, food additives, aduthathur and food standers – Importance of safe drinking water – purification methods. UNIT 5

REFERENCES

1. World Health Organization. To improve nutrition, food safety and food security, throughout the life-course, and in support of public health and sustainable development.
2. Losasso C, Cibin V, Cappa V, Roccato A, Vanzo A, Andrighetto I, Ricci A. Food safety and nutrition: Improving consumer behaviour. Food Control. 2012 Aug 1;26(2):252-8.
3. Walls H, Baker P, Chirwa E, Hawkins B. Food security, food safety & healthy nutrition: are they compatible?. Global Food Security. 2019 Jun 1;21:69-71.
4. Dietary Guidelines for Indians-A Manual, National Institute of Nutrition, Indian Council of Medical Research (ICMR Centenary Year Celebrations)
5. Shills, E.M., Olson, A.J and Shike, Lea and Febiger, Modem Nutrition in health and disease.
6. Frances, J. Zeman (1983), Nutrition and Dietetics.
7. Srilakshmi, B (2003), Dietetics, New age International Pvt. Ltd.

8. Srilakshmi, B (2003), Nutrition science, New age International Pvt. Ltd.

9. Summerfied (Liane, M), Nutrition, Exercise and Behaviour: An integrated approach to weight management.

10. Vidya. C. Bhaskar Rao. D. A Text Book of Nutrition Discovery Publishing House, New Delhi.

11. Beaton, GH. & M. C. Henry, E. W (1996) Nutrition: A Comprehensive Treatise. Vol III Academic Press, New York.

12. Bandilla R. K. (1992) food problems in India. Ashish publishing House.

13. Water Low J. C (1992) Protein in Energy Malnutrition Edward Arnold, London. 23

14. Vinodini Reddy., Pralhad Raj., Gowrinathsastry, J find Kashinath, K.C. (1993), Nutrition Trends in India, NIN, Hyderabad.

15. Park and park (2018), Text book of preventive and social medicine, Banarsidas published by Jabalpur.

16. Jellifee, D.D and Pathes (1989), Assessment of Nutritional status of community, WHO, Geneva.

BOOKS

- Manoranjan Pal, PremanandaBharati, Bholanath Ghosh, and T.S. Vasulu, "Gender and Discrimination Health, Nutritional Status, and Role of Women in India", Published: 10 November 2011,Oxford.

- Industrial Safety, Health and Environment Management Systems by R. K. Jain and Sunil S. Rao University Press 2017

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**

Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 206
COURSE TITLE: HEALTH COMMUNICATION AND BEHAVIOR CHANGE
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVES:

The purpose of this model is to introduce different models of communication for use in health promotion activities and also in community based health activities.

COURSE DESCRIPTION:

- Behavior Change Communication (BCC) is a communication strategy which encourages individual/community to change their behavior.
- It is a strategy that triggers people/society/communities to adopt healthy, beneficial and positive behavioral practices.
- BCC is an effective communication approach which helps to promote changes in knowledge, attitudes, norms, beliefs and behaviors

COURSE CONTENT:

UNIT1.
Communication Process, Function and Types

- Barriers to communication
- Mass Communication
- Communication Skills
- Community Participation
- Concepts and Types

UNIT2.
Information, Education and Communication

- IEC in Health and Family Welfare
- IEC structure in districts
- Innovative strategies and evaluation

UNIT3.
Behavioral Change Communication

- Best practices and strategic approaches
- BCC framework, implementation strategy

UNIT4.
Target Audience Segmentation

- Different approaches to target audience

UNIT5.
Physician – Patient Communication

- Why and how of physician – patient relationship
- Data for IEC Planning

- Relationship Management

COURSE LEARNING OUTCOMES:

CLO1: Describe concept of communication and its type, function and implementation.
CLO2: Knowledge of IEC in health, family welfare and district structure.
CLO3: knowledge of basic concept of behavioral change communication and its implementation**.**
CLO4: To describe target audience and segmentation**.**
CLO5: Basic concept of physician patient communication and its application and management.

TEXT BOOKS:

- Schiavo, R. (2013). *Health communication: From theory to practice*. John Wiley & Sons.
- Brashers, D. E. (2001). Communication and uncertainty management. *Journal of communication*, *51*(3), 477-497.

REFERENCE BOOKS

- Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of communication*, *56*(suppl_1), S1-S17.
- Noar, S. M., Grant Harrington, N., Van Stee, S. K., & Shemanski Aldrich, R. (2011). Tailored health communication to change lifestyle behaviors. *American Journal of Lifestyle Medicine*, *5*(2), 112-122.

ASSESSMENT GRADING

Internal exam 40%; Final exam 60%

Assessment	**Grades[40%]**
Assignment	**10**
Class test	**10**
Quiz	**10**
Question & Answer Session	**10**

COURSE TITLE: RESEARCH METHODOLOGY
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

The students will be able understand various steps research Able to Design and develop research proposals

COURSE CONTENT

Unit 1: Quantitative and Qualitative
Unit 2: Data Management: Packages for Analysis –
Unit 3: Quantitative and Qualitative
Unit 4: Health Care Organizations: Public Health System and Its Boundaries Unit 5: Comparative Health Systems

COURSE LEARNING OUTCOME [CLO]

CLO 1: Basics of Research - Definitions and designs

- Uses of Research in public health
- Formulation of research problems
- Developing hypothesis
- Writing research questions
- Sampling: How much sample and how to choose, principles of sampling and terminology UNIT 1

CLO 2: Design and development of Interview schedule, questionnaire construction, pre-testing (reliability and validity)

Research ethics (protection of human subjects).

Data collection – Filed work, mapping and listing operations, selecting of respondents and MIS for major research projects

Data management - editing, entry and preparing data sets for analysis

Data analysis using spss/epi. Info/stata UNIT 2

CLO 3: Qualitative research

Development of conceptual framework.

Qualitative methods: FGDs, indepth interviews, biographies, participatory methods, participant observation etc.. UNIT 3

CLO 4: Data collection, recording, Public Health System and Its Boundaries UNIT 4

CLO 5: Comparative Health Systems, Data analysis (manual and computer based using QSR) UNIT 5

REFERENCES& BOOKS

1. Research Methods In Health:- Investigating health and health services Second edition Ann Bowling
2. Nikpeyma, N., Abed_Saeedi, Z., Azargashb, E., &Alavi_Majd, H. (2014). Problems of clinical nurse performance appraisal system: A qualitative study. *Asian Nursing Research*, *8*(1), 15-22.
3. Kumar, R. (2005). Research Methodologies: a step-by-step guide for beginners. 2nd. 4. Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. *Journal of clinical nursing*, *16*(2), 234-243.
5. Fathalla, M. F. A Practical Guide for Health Researchers World Health Organization Regional Office for the Eastern Mediterranean: Cairo, 2004. *Available at:*

wwwwhoint/emro/2004/9290213639.
6. Clough, P., &Nutbrown, C. (2012). *A student's guide to methodology*. Sage.
7. Cronbach, L. J. (1971). Test validation. In R. L. Thorndike (Ed.). *Educational* 8. Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 208

COURSE TITLE: HEALTH PROGRAM MANAGEMENT [DISASTER MANAGEMENT]

COURSE CREDIT: 4

TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: The overall aim of the Module is to train the students in project management with special focus on formulation, implementation, supervision and evaluation.

COURSE CONTENT

- UNIT 1: Principles Of Planning, Management,
- UNIT 2: PIME, HMIS
- UNIT 3: Management Of Health Services
- UNIT 4: Disaster Management With Focus On Nutrition, And Livelihood Assistance

COURSE LEARNING OUTCOME [CLOs]

- CLO 1: Principles of Management and results based management
  - Project management cycle
  - Situational analysis - SWOT
  - Strategy formulation (formulation of alternatives and selection of a strategy) UNIT 1
- CLO 2: Planning tools: Log frame, PERT, CPM
  - Quality assurance in project management
  - Activity based implementation plan
  - Human aspects of project management like motivating people, team building, improving personal influence and effectiveness.
  - Gender issues in Project Management.
  - Monitoring UNIT 2
- CLO 3: Disaster management
  - Disaster definition and managementUNIT 3
- CLO 4: Management Information System (MIS)
  - Evaluating the projects
  - Developing action plans for project implementation UNIT 4

REFERENCES

1. EUROPEAN COMMISSION - JOINT RELEX SERVICE FOR THE MANAGEMENT OF COMMUNITY AID TO NON-MEMBER COUNTRIES (SCR), Resources, relations with the other institutions, evaluation, and information, Evaluation, Version 1.0, May 1999 – Project Cycle Management – Training handbook.
2. Centers for Disease Control and Prevention, 1999. *Framework for Program Evaluation in Public Health*. Atlanta, Georgia: Centers for Disease Control and Prevention.
3. Project Management for Healthcare. David Shirley. April 25, 2011 by CRC Press ISBN 9781439819531
4. Cook, T.D. and Campbell, D.T, 1979. *Quasi-Experimentation: Design and analysis issues for field settings.* Boston, MA: Houghton Mifflin Company.
5. Healthy City Planning: From Neighbourhood to National Health Equity (Planning, History and Environment Series) by Jason Corburn

LINKS

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE TITLE: GLOBAL HEALTH
COURSE CODE: MPH209
COURSE CREDIT: 1
GLOBAL PUBLIC HEALTH
COURSE HOURS: 20

COURSE OBJECTIVE

This unit aims to introduce terms and concepts that underpin global public health discourses, policies and practices, and to provide an overview of key public health issues, challenges and responses at local, national and global levels

COURSE CONTENT

UNIT I: Basic concepts in global health
01. Defining and measuring global health
02. Global health definitions, case studies
03. Historical origin and evolution
57
04. Health systems and global health

UNIT II: Understanding the key global health challenges
01. Current global health status
02. Global burden of disease
03. Global health priorities for twenty-first century
04. Global health at the human–animal–ecosystem interface

UNIT III: Cross-cutting themes in global health and emerging trends
01. Environment, climate, and migration
02. Nutrition, Food, water, and sanitation
03. Health disparities
04. Women's health
05. Emerging, remerging infectious diseases
06. NCD and injuries
07. Maternal and child health
08. Childhood immunization
09. Adolescent health
10. Neglected tropical diseases
11. Antimicrobial resistance

IV: Global health diplomacy
01. Overview of global health diplomacy

02. Global health actors and activities {International and national health agencies, activities & other actors}
03. Global health financing
04. Global health policy and governance
05. Drivers of policy for global health diplomacy
06. Globalization, trade, work, and health

07. Foreign policy and health

UNIT V: Global health security
01. Global health security: Gender and Health
02. Pandemics and health security responses
03. Health in complex humanitarian emergencies
04. Humanitarian response and humanitarian dilemmas05. Global health equity
06. Values in global health
07. Towards a social justice approach to global health

UNIT VI: Research, development, innovation, and technology for global health
01. The environment, sustainable development, and health
02. Universal health coverage in the context of aging
03. Sustaining good health with equity at low cost
04. Science and technology for global health
05. Scaling up effective models in global health delivery

COURSE LEARNING OUTCOME [CLO]

CLOI: Student should understand the basic concepts in global health, defining and measuring global health. Global health definitions, case studies. Historical origin and evolution, Health systems and global health UNIT 1

CLO2: Understanding the key global health challenges, Current global health status, Global burden of disease. Global health priorities for twenty-first century. Global health at the human–animal– ecosystem interface UNIT 2

CLO3: Cross-cutting themes in global health and emerging trends. Environment, climate, and migration. Nutrition, Food, water, and sanitation. Health disparities. Women's health. Emerging, remerging infectious diseases. Describe NCD and injuries. Explain Maternal and child health. Describe Childhood immunization. Explain Adolescent healt. Neglected tropical diseases
11. Antimicrobial resistance. Global health diplomacy and management UNIT 3

CLO4: Critically explain Global health actors and activities {International and national health agencies, activities & other actors}. Global health financing. Global health policy and governance. Drivers of policy for global health diplomacy. Globalization, trade, work, and health . Foreign policy and health UNIT 4

CLO5: Define Global health security. Global health security: Gender and Health. Pandemics and health security responses. Health in complex humanitarian emergencies. Humanitarian response and humanitarian dilemmas05. Global health equity. Values in global health. Towards a social justice approach to global health UNIT 5

CLO6: Research, development, innovation, and technology for global health. The environment, sustainable development, and health. Universal health coverage in the context of aging. Sustaining good health with equity at low cost. Science and technology for global health. Scaling up effective models in global health delivery UNIT 6

REFERENCE

1. Amatya A, Basel P. Why study global health? Kathmandu Univ Med J (2014) 12:87–

8.10.3126/kumj.v12i2.13650 [PubMed] [Cross Ref]
2. Koplan JP, Bond TC, Merson MH, Reddy KS, Rodriguez MH, Sewankambo NK, et al. Towards a common definition of global health. Lancet (2009) 373:1993– 5.10.1016/S0140-6736(09)60332-9[PubMed] [Cross Ref]
3. Pati S, Sharma K, Zodpey S, Chauhan K, Dobe M. Health promotion education in India: present landscape and future vistas. Glob J Health Sci (2012) 4:159– 67.10.5539/gjhs.v4n4p159 [PMC free article][PubMed] [Cross Ref]
4. Rowson M, Smith A, Hughes R, Johnson O, Maini A, Martin S, et al. The evolution of global health teaching in undergraduate medical curricula. Global Health (2012) 8:35.10.1186/1744-8603-8-35 [PMC free article] [PubMed] [Cross Ref]
60
5. Bateman C, Baker T, Hoornenborg E, Ericsson U. Bringing global issues to medical teaching. Lancet(2001) 358:1539–42.10.1016/S0140-6736(01)06586-2 [PubMed] [Cross Ref]
6. Macfarlane SB, Jacobs M, Kaaya EE. In the name of global health: trends in academic institutions. J Public Health Policy (2008) 29:383– 401.10.1057/jphp.2008.25 [PubMed] [Cross Ref]
7. Bozorgmehr K, Saint VA, Tinnemann P. The 'global health' education framework: a conceptual guide for monitoring, evaluation and practice. Global Health (2011) 7:8.10.1186/1744-8603-7-8 [PMC free article] [PubMed] [Cross Ref]
8. Crump JA, Sugarman J. Working Group on Ethics Guidelines for Global Health Training (WEIGHT). Ethics and best practice guidelines for training experiences in global health. Am J Trop Med Hyg (2010) 83:1178–82.10.4269/ajtmh.2010.10-0527 [PMC free article] [PubMed] [Cross Ref]
9. Pati, S., Sinha, R., Panda, M., Pati, S., Sharma, A., &Zodpey, S. (2017). Global Health teaching in india: a Curricular landscape. *Frontiers in public health*, *5*, 259.

ASSESSMENT METHOD:

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

MPH 3RD SEMESTER

COURSE CODE: MPH 301
COURSE TITLE: STRATEGIC MANAGEMENT
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

The aim of this course is to help students to understand and gain knowledge in the use of effective tool and strategies to ensure that the healthcare organization delivers the best results. In improving business planning, guiding employees to think in a new and better way about the success of the organization and ensures that the future goals are accomplished.

COURSE CONTENT

UNIT 1: Introduction, history, concept and characteristics about strategic management

UNIT 2: Vision, Mission, Strategy framework for institutional approach to public health

UNIT 3: Public-Private Partnership as a Strategic Public Health Management -. Case studies in Strategic Management

UNIT 4: TQM as a public health management strategy - Healthy Plan it –

UNIT 5: Public Health Planning - Utilization of Health Services - (Public/Private facilities, Urban/Rural) UNIT 6:

Human Resource challenges and issues in Public Health Management

UNIT 7: Models in Healthcare Delivery – Delegation

UNIT 8: Change Management Problem solving tools

UNIT 9: Country/Region Strategy planning from public health perspective – Field Visits.

COURSE LEARNING OUTCOMES (CLOs)

After completion of this course successfully, the students will be able to

CLO1: Explain the vision, mission and strategic framework of institutional approach towards public health UNIT 1
CLO2: Explain and apply the PPP as a strategic public health management UNIT 2
CLO3: Understand and explain TQM as a public health management strategy UNIT 3
CLO4: Illustrate and explain Healthy Plan it -Public Health Planning UNIT 4
CLO5: Evaluate Utilisation of Health Services - (Public/Private facilities, Urban/Rural) UNIT 5
CLO6: Describe Human Resource challenges and issues in Public Health Management UNIT 6
CLO7: Explain the Models in Healthcare Delivery- Delegation UNIT 7
CLO8: Understand and explain Change Management Problem solving tool UNIT 8
CLO9: Discuss the Country/Region Strategy planning from public health perspective UNIT 9

BOOKS

1. Ansoff, H. I. Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion. New York: McGraw-Hill, 1965.
2. Ansoff, H. Igor. "Critique of Henry Mintzberg's 'The Design School: Reconsidering the Basic Premises of Strategic Management'." Strategic Management Journal 12, no. 6 (1991): 449-61.
3. Chandler, A. D. Strategy and Structure: Chapters in the History of the American Industrial Enterprise. Cambridge, MA: MIT Press, 1962.

REFERENCES

4. Review." Journal of Management Studies 28, no. 4 (1991): 353-74. Bracker, Jeffrey. "The Historical Development of the Strategic Management
5. Graetz, F. "Strategic Thinking versus Strategic Planning: Towards Understanding the Complementarities." Management Decision 40, no. 5 (2002): 456-62.
6. Hill, C.W.L. and G. R. Jones. Strategic Management: An Integrated Approach. Independence, KY: South-Western, 2007.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 302

COURSE TITLE: ORGANISATION BEHAVIOUR AND DESIGN

COURSE CREDIT: 4

TOTAL HOURS: 60

COURSE OBJECTIVES

- To help the students to develop cognizance of the importance of human behaviour.
- To enable students to describe how people behave under different conditions and understand why people behave as they do.
- To provide the students to analyse specific strategic human resources demands for future action.
- To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

COURSE DESCRIPTION

The main objective of Organizational Behavior course is to help the students to acquire and develop skill to take rational decisions in the process of O.B. People have always been regarded as important in managing organizations. Human aspects are critical in each functional aspects of management and equally so for the effective utilization of resources. In view of this, organizational behavior has assumed great importance. This course is designed primarily for students who are being exposed to Organizational Behavior for the first time. MPH 302- Organisational Behaviour Student must have basic understanding of General Management. This course covers the explanations about the human behavior in the organizational context. It details the impact of individual, group and organizational factors on human behavior. The course also focuses on understanding the behavior of the employees working in the organization. It highlights the significance of Challenges and Opportunities of OB, perception, attribution, learning, organizational change, organizational culture, motivation, leadership and conflict management. Students are encouraged to share any additional journal or newspaper articles related to course topics with the class. Please email or bring them to class so they can be shared.

COURSE CONTENT

UNIT 1

Health services Org-Systems - The changing health care system - Ecology of Healthcare -Organizations –

UNIT 2

Manager and Managerial Activity. Learning: Classical Conditioning - Social Learning - Operational Conditioning - Schedules of reinforcement.

UNIT 3

Motivation: Define Motivation - Myths about Motivation - Theories of motivation.

UNIT 4

Leadership: Understand what leadership is and what is not - Key features of leadership perspective - Challenges in healthcare organizations. Distinction between leadership and management.

UNIT 5

Groups and teams: Stages of team development- Team effectiveness - Understanding and improving team performance - A model of team effectiveness.

UNIT 6

Work Design: Psychological Approach - Technical Approach - Approaches to work design - Changes in design of health care work - Dividing work into jobs

UNIT 7

Power and Politics: Power, influence and politics – Definition - Sources of Power - Abuse of Power in Organizations -Power strategies and tactics- Transactional Analysis (TA).

UNIT 8

Organizational design: Various types of organizational design - Organizational Structure -Organizational Culture.

UNIT 9

Organizational performance: Efficiency and effectiveness

COURSE LEARNING OUTCOMES (CLOs)

On completion of this course, the students will be able to

CLO1: Demonstrate the applicability of the concept of organizational behaviour to understand the behaviour of people in the organization in the health care. UNIT 1

CLO2: Demonstrate the applicability of analysing the complexities associated with management of individual behaviour in the organization. UNIT 2

CLO3: Analyse the complexities associated with management of the group behaviour and motivation in the organization. UNIT 3

CLO4: Demonstrate leadership skills in the organizational behaviour and integrate understanding the motivation (why) behind behaviour of people in the organization UNIT 4

CLO5: Explain the stages of team development- Team effectiveness - Understanding and improving team performance. UNIT 5

CLO6: Psychological Approach - Technical Approach - Approaches to work design - Changes in design of health care work - Dividing work into jobs. UNIT 6

CLO7**:** ExplainPower, influence and politics – Definition - Sources of Power - Abuse of Power in Organizations - Power strategies and tactics- TransactionalAnalysis(TA). UNIT 7

CLO8: Describe the various types of organizational design - Organizational Structure and Culture. UNIT 8

CLO9: Evaluate the Organizational performance: Efficiency and effectiveness UNIT 9

Books

1. Organizational Behavior – by Stephen Robins – Prentice Hall Publications
2. Organizational Behavior – by K. Ashwathappa – Himalaya Publishing
3. Organizational Behavior – by L. M. Prasad – Sultan Chand Publications
4. Organizational Behavior – by Suja Nair – Sultan Chand Publications

References

- Cunningham TR, Geller ES. Organizational behavior management in health care:applications for large-scale improvements in patient safety.
- Davis R, Campbell R, Hildon Z, Hobbs L, Michie S. Theories of behaviour andbehaviour change across the social and behavioural sciences: a scoping review. Healthpsychology review. 2015 Aug 7;9(3):323-44.
- Johnson J, editor. Health organizations: Theory, behavior, and development. Jones &Bartlett Learning; 2009 Oct 6.
- Kawonga M, Blaauw D, Fonn S. The influence of health system organizational structureand culture on integration of health services: the example of HIV service monitoring inSouth Africa. Health policy and planning. 2016 May 19;31(9):1270-80.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 303
COURSE TITLE: HUMAN RESOURCE DEVELOPMENT IN PUBLIC HEALTH
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

To introduce the students to the systems theory to make them understand the development of human resources in an organization. Students will be able to correlate an organization to a system and will be able to understand how to achieve organisational goals, work culture,employee motivation, team integration and all that's required to make the human resource department achieve their goals.

COURSE DESCRIPTION

Organizations are made up of people: their knowledge, skills, attitudes and interconnections. In order to survive and thrive, organizations need to facilitate the growth of all of these as part of a HRD strategy. Human Resource Development (HRD) is a key activity that systematically leads to the growth and development of people in organisations, and makes organisations more effective. The process of identifying needs and designing and delivering HRD interventions that are part of the course are crucial skills for all managers. The course will focus on the role of HRD in designing and implementing appropriate strategies in line with the business goals of their organization. The course will include topics related to design, development, implementation and evaluation of HRD programmes. In addition to HRD Process, it would cover a number of HRD interventions like coaching, mentoring, and counselling. The course will also address the competency mapping framework of HRD, role of HRD in career planning and development,

COURSE CONTENT

UNIT 1
Preparatory: Introduction and Organization Designand Human Resource Development: Emergent of HRD, Critical HRD roles, challenges for HRD. Essential principles of systems Theory.

UNIT 2
Foundational: Evolutionary Psychology Model of Individual Human Behaviour - Systems model and evolving understanding of collectives and organisations. HRD Process Model: identification of HRD needs and Design and development of HRD programmes

UNIT 3:
Core Learning: The HRM processes cycle from job (role) analysis, recruitment, training, career development, performance evaluation and enhancement, compensation, communication, decisions, workplace issues, organisational culture, leadership.

UNIT 4:
Applicatory: Strategic HRM, Contemporary issues, Tools relevant to systems practice in organisational HRM context.Employee counselling for HRD: Overview of counselling programmess, employee assistance programme, stress management, employee wellness and health promotion

UNIT 5Competency framework of HRD: why competency mapping? Understanding the competency mapping framework, steps in competency mapping

COURSE LEARNING OUTCOME

CLO1:To have an understanding of the basic concepts, functions and processes of human resource management. To be aware of the role, functions and functioning of human resource department of the organizations UNIT 1

CLO2: Explain the evolutionary psychology model of individual human behaviour and HRD Process Model - systems model, evolving understanding of collectives and organisations. HRD Process Model: UNIT 2

CLO3: To understand issues, design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals, employee safety and reward Systems, Compensation Plans, policy analysis and Ethical Behaviour. UNIT 3

CLO4: Develop ways in which human resources management might diagnose a business situation, strategy and then facilitate the internal change through various tools relevant to system practice necessary to accomplish the strategy in terms of counselling, stress management, wellness programs and so on relevant to accelerate the goals of the organisation. UNIT 4

CLO5: Evaluate the developing role of human resources in areas not limited to competency and steps in competency mapping. UNIT 5

Text Book

1. Dessler, G.&VarkkeyB.(2011) Human Resource Management, 12th Ed, Pearson Educatio
2. Aswathappa K. (2005) Human Resource and Personnel Management,4th Ed,Tata Mc Graw Hill Publishing Co. Ltd
3. A Textbook of Human Resource ManagementR S Dwivedi

Suggested Readings

- Durai, P. (2010), Human Resource Management, Pearson Education
- Snell/ Bohlander, Human resource Management, Cengage Learning
- David Lepak\ Mary Gowan, Human Resource Management: managing Employees for the Competitive advantage

Web Resources

- http://aise.swlearning.com
- www.pearsonhighered.com/lepak
- www.hgsi.com

4. www.slideshare.net
5. https://www.ncbi.nlm.nih.gov/pmc/

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades

Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 304

COURSE NAME: QUALITY ASSURANCE AND TOTAL QUALITY COURSE

CREDIT: 4

TOTAL HOURS: 6O

COURSE OBJECTIVES-

- TO develop products and focuses on the prevention of defects.
- TO improve development and testing processes to prevent defects from arising during the product development lifecycle.

COURSE DESCRIPTION-

The course provides basic concepts of quality in health care and approaches and skills to implement sustainable quality assurance program in the health system. The course, various quality improvement approaches (QC, QA, CQI, TQM), role of standards and norms, use of quality improve tools, methods of quality assessment and approaches to operationalise and implement quality Assurance program. Concepts of organization for quality improvement, including Quality Teams (QT) and Quality Control Circles (QCC) are explained.

COURSE CONTENT:

UNIT 1: Introduction to quality**:** Definition, concept, History – UNIT

2: TQM framework - Benefits,Awareness and Obstacles

UNIT 3: Quality Vision, Mission and Policy Statements

UNIT 4: Customer Focus, Customer Perception of Quality,

UNIT 5: Translating needs into requirements,

UNIT 6: Principles and Philosophies of Quality Management: Overview of the contributions of Walter Shewhart, Deming &Juran and others

UNIT 7: Concepts of quality circle: Japanese 5S Principles and 8D Methodologies

UNIT 8: Dimensions of Quality and Quality assurance: A Model Defining Quality

UNIT 9: Measuring Quality: Six-Sigma

UNIT 10: Quality assessment: Concept and tools

UNIT 11: Improving Quality: Institutionalizing QA

Course learning Outcomes:

CLO1: To ensure that a product is manufactured, or a service is provided, to meet the specifications which ensure public needs are met. UNIT 1

CLO2: To ensure all associated employees work toward the common goals of improving product or service quality, as well as improving the procedures that are in place for production.UNIT 2

CLO3: To foster student success in academic and professional leadership UNIT 3

CLO4: To answer customer questions, resolve support issues, improve credibility and nurture relationships UNIT 4

CLO5: To agree on the phrasing of one sentence in the original text, this effect is multiplied in the translation process. UNIT 5

CLO6: To improve quality of products or services your institution provides UNIT 6

CLO7: To improve quality, productivity and the total performance of the organization and also to enrich the quality of work life UNIT 7

CLO8: To verifying or determining whether services meet or exceed public expectations UNIT 8

CLO9: To identify and reduce errors and increase the efficiency of processes UNIT 9

CLO10: To clear, specific statements of what learners will be able to perform at the conclusion of instructional activities. UNIT 10

CLO11: To measure each component and achieve improvements. UNIT 11

TEXT BOOKS

1. **A Textbook of Quality AssurancebyPAPatilDr.AtulChoapade**
2. **Mukhopadhyay M. Total quality management in education. SAGE Publications Pvt. Limited; 2020 May 4.**
3. **Ross JE. Total quality management: Text, cases, and readings. Routledge; 2017 Oct 6.**
4. **Arcelay A, Sánchez E, Hernández L, Inclán G, Bacigalupe M, Letona J, González RM, Martínez□Conde AE. Self□assessment of all the health centres of a public health service through the European Model of Total Quality Management. International Journal of Health Care Quality Assurance. 1999 Apr 1.**
5. **Sidin AI. Is Total Quality Management/Continous Quality Improvement or Quality Assurance Applicable in Health Services?. International Journal of Health and Medical Sciences. 2016;2(1):712.**

REFERENCES

1. Agarwal A, Aeran H, Uniyal S, Nautiyal A. Quality assurance in dentistry: a need in Indian scenario. Int J Oral Health Dentistry. 2015 Dec;1(4):172-6.
2. Kumar MR. *Total quality management as the basis for organizational transformation of Indian Railways: a study in action research* (Doctoral dissertation, Southern Cross University).
3. McLaughlin CP, Kaluzny AD. Total quality management in health: making it work. Health Care Management Review. 1990 Jan 1;15(3):7-14.
4. Barendsz AW. Food safety and total quality management. Food control. 1998 Apr 1;9(2-3):163-70.
5. Dall'Agnol M, di Loreto C, Pirani WM, Utagawa ML, Pereira SM, Sakai YI, Feres CL, Shih LW, Yamamoto LS, Rodrigues RO, Shirata NK. 100% rapid rescreening for quality assurance in a quality control program in a public health cytologic laboratory. Actacytologica. 2005 Nov 1;49(6):639-43.

Total Quality Management: An Integrated Approach by Dr. Kiran, Bsp

Online link for study and reference materials

e) www.slideshare.net

f) https://www.ncbi.nlm.nih.gov/pmc/

g) Google scholar

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 305
COURSE TITLE: MANAGEMENT INFORMATION AND EVALUATION SYSTEM
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

- To describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems.
- To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.
- To enable students, understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
- enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems.
- To provide the theoretical models used in database management systems to answer business questions.

COURSE CONTENT

UNIT 1
Information System in Health care: Perspectives on information systems UNIT 2
The basic concepts - Steps and approaches in developing HMIS: Reviewing the existing system. UNIT 3
Defining data needs - data flow: Designing the data collection and reporting tools UNIT 4
Procedures for data processing: Monitoring and evaluating the system
UNIT 5
Dimensions of information systems: Contemporary Approaches to Information Systems
UNIT 6
Learning to Use Information Systems – New Opportunities with Technology – HMIS in Various National Health Programs

COURSE LEARNING OUTCOME

Upon completing the course, students will be able to:
CLO1: Define an information system from both a technical and business perspective and distinguishbetween computer literacy and information systems literacy.Apply a framework and process for aligning and organization's information system objectives with organisations strategy.UNIT 1

CLO2: Defend the strategic value of information resources for an organization. What are the steps and approach in developing and HMIS? Explain the existing HMIS of any state. UNIT 2

CLO3: Participate in an organization's information systems and technology decision-making processes. Understand. Defining data needs - data flow: Designing the data collection and reporting tools UNIT 3

CLO4: Identify ways information systems & technology may improve an organization's performance, including improving organizational processes, decision-making, collaboration, and personal productivity.

Procedures for data processing: Monitoring and evaluating the system UNIT 4

CLO5: Dimensions of information systems: Contemporary Approaches to Information Systems Define what a manager should be able to expect from an IT department in an organization.

Build a business case for IT, addressing key IT acquisition decisions such as make/buy; outsource/insource; project management. UNIT 5

CLO6: Learning to Use Information Systems – New Opportunities with Technology – HMIS in Various National Health Programs. Apply a framework for evaluating information-related ethical dilemmas commonly faced by managers. UNIT 6

REFERENCES

Chaulagai CN, Moyo CM, Pendame RB. Health management information system in Malawi: Issues and innovations. InProceedings of the RHINO Workshop 2001 Mar 14 (pp. 14-16).

Ngoma C. *Cultivation Strategies in the Implementation of Health Management Information System in Zanzibar: An Action Research Study* (Master's thesis).

Ngoma C. *Cultivation Strategies in the Implementation of Health Management Information System in Zanzibar: An Action Research Study* (Master's thesis).

BOOKS

Muraleedharan VR, Dash U, Gilson L. Tamil Nadu 1980s–2005: a success story in India. 'Good health at low cost'25 years on. 2009:159.

Trikha S, Arora B, Sharma M, Thakur P. Implementing e-Upchaar: Hospital Management Information System for public health facilities in Haryana. Electronic Physician. 2020 Apr 1;12(2).

Links https://www.slideshare.net/Sujatamohapatra/health-management-information-evaluation-systemhttps://www.measureevaluation.org/resources/publications/ms-13-74/at_download/documenthttps://hmis.nhp.gov.in/#!/aboutus

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH-306

COUSE NAME: SOCIAL ENTREPRENEURSHIP, NGO MANAGEMENT AND MARKETING IN PUBLIC HEALTH

COURSE CREDIT HOURS: 04

TOTAL CONTACT HOUR: 60

COURSE OBJECTIVES

The student should be able to describe the introduction of Entrepreneurship, difference between Commercial and SocialEntrepreneurship. Explain the Frameworks for Social Entrepreneurship, Management of Social Enterprises, Culture, Leadership and Strategy. Case studies in Social Entrepreneurship. Demonstrate the NGO management and Concepts of marketing and Social marketing in Public Health.

COURSE DESCRIPTION

This course involves the introduction of Entrepreneurship, Social Entrepreneurship, NGO management and marketing in Public Health

COURSE CONTENT:

UNIT-1. Introduction to Entrepreneurship

- Introduction
- Development of the Concept of Entrepreneurship
- Current Scenario of Entrepreneurship in India
- Characteristic Features Of Entrepreneur
- Traits of Successful Entrepreneurs
- Functions of an Entrepreneur
- Types of Entrepreneur

UNIT-2. Commercial and Social

- Introduction
- Differentiation between “commercial entrepreneurs” and “social entrepreneurs”
- “PCDO” analytical framework
- Modern Approach to Creating Social Value
- How Does Social Entrepreneurship Work?

UNIT-3. Frameworks for Social Entrepreneurship

- Characteristics of Social Enterprises
- Promotion of Social Innovation
- Behaviour of Successful Social Entrepreneurship
- Social Entrepreneurship Framework
- Applying the Framework

UNIT-4. Managing for Social Enterprises

- Introduction
- Business Model for Social Enterprise
- Learning for Social Enterprise Framework
- Strength of the management structures in social enterprises?
- Define good Leadership & Management
- Core Leadership and Management Skills
- Qualities of a Great Leader for Social Entrepreneurs •How can we improve leadership and management capability?
- Manage a team in a social enterprise

UNIT 5. Culture, Leadership and Strategy

- Introduction and definition
- Conceptual Bases for Organizational Cultural Analysis
- The Culture of Social Enterprise in Businesses
- The Culture of Social Enterprise in CSOs
- Final Reflections
- Leadership in Social Enterprise
- Venture Start-Up
- Social Venture Institutionalization
- Conglomerate Leadership
- Strategy
- Mission, Values, and Value Proposition

UNIT-6. Case studies in Social Entrepreneurship

- Introduction
- Advantages of Social & Rural Enterprises
- Case Study on Social Entrepreneurship

UNIT-7. NGO management - guidelines & regulations and

- What is a Non-Governmental Organization (NGO)?
- Registration of NGOs
- Types of NGOs
- Setting up an NGO's By-Laws
- An NGO Approach to Solving Community Problems
- Financial Management for NGOs
- Solving Organization Problems in NGOs

UNIT-8. Concepts of marketing- role of Marketing in Health care

- Marketing Concepts
- Role of Marketing in Health care

UNIT-9. Social Marketing – process and case studies

- Defining Social Marketing
- The Marketing Mix
- Consumer Orientation And The Importance Of Research
- Steps in the Social Marketing Process

- Case Examples Of Social Marketing Applications

4. Course learning outcomes:

CLO-1. The student should be able to implement the role of entrepreneurship. They will be able to develop of the Concept of Entrepreneurship, Characteristic and Traits of Successful Entrepreneurs. Explain the Functions and types of an Entrepreneur. UNIT 1

CLO-2. Ability to differentiate between "commercial entrepreneurs" and "social entrepreneurs", "PCDO" analytical framework and Modern Approach to Creating Social Value UNIT 2

CLO-3. Ability to describe thecharacteristics of Social Enterprises, Promotion of Social Innovation and Behaviour of Successful Social Entrepreneurship. Implementation of Social Entrepreneurship Framework and applying the Framework. UNIT 3

CLO-4. Students will be able to develop the business Model for Social enterprise, Strength of the management structures in social enterprises.
Core Leadership and Management Skills and Qualities of a Great Leader for Social Entrepreneurs, Manage a team in a social enterprise. UNIT 4

CLO-5. Students can Conceptualize the bases for Organizational Cultural Analysis and the Culture of Social Enterprise in Businesses and CSOs UNIT 5

CLO-6. Students will be able to demonstrate Non-Governmental Organization (NGO), Types of NGOs, NGO Approach to Solving Community Problems and Financial Management for NGOs UNIT 6

CLO-7. Marketing Concepts and Role of Marketing in Health care. UNIT 7

CLO-8. Ability to define Social Marketing , The Marketing Mix, Steps in the Social Marketing Process with Case Examples Of Social Marketing Applications UNIT 8 & 9

Text books:

a) Enterprising Nonprofits: A Toolkit for Social Entrepreneurs- J Gregory Dees

b) Social enterprise An introduction **Reference books:**

a) Social marketing in Public Health
b) Igniting the power of community

Online link for study and reference materials

a) www.slideshare.net
b) https://www.ncbi.nlm.nih.gov/pmc/
c) Google scholar

d) www.researchlink.org

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

HOSPITAL MANAGEMENT

COURSE TITLE: HOSPITAL MANAGEMENT [MPH 400]

COURSE CREDIT: 3

COURSE HOURS: 50

INTRODUCTION:

In the developing countries, the situation becomes even more intimidating as the hospitals have lesser space, equipment, hospital staff and are frequently overwhelmed and overcrowded. A more sensitive delivery of care in a more therapeutic environment can benefit patients and have a positive bottom- line impact on healthcare institutions.

Poor Quality of Hospital Services has been a major problem for public and private sector hospitals in most developing countries especially in India. One of the main contributors of the poor quality of hospital services, apparent to patients and staff alike, is the inefficiency of hospitals' management and its operations (long delays over minor treatments and cost of care). According to reports there were documents that there are large variations in the utilization of hospital services and that at present there are no quality control mechanisms in place within hospital sector, as a result, the public hospitals are generally perceived to be of low quality compared to developed countries.

LEARNING GOAL

The goal of the course is to enhance the students' knowledge regarding management and other issues faced by hospital managers and to develop their skills to address the managerial and administrative issues of Public and Private sector hospitals at all levels.

LEARNING OBJECTIVES

By the end of the course the participants will be able to:

1. Describe the management of hospitals in public and private sectors.
2. Describe the functional departments of a hospital.
3. Apply the management functions such as planning, organizing, staffing and controlling in hospitals.
4. List out the problems that are being faced by hospitals in implementing effectively these management functions.
5. Describe the expected role of hospital in the community.

6. Apply the principles and practice of Hospital Management.
7. Construct budgets, financial costing and cost effectiveness of the hospital services.
8. List the requirements for efficient management of hospital services and utilities like xrays, laboratory and indoor facilities.
9. Establish the concept of total quality management in health services.
10. Describe the dynamics of a Hospital as an Organization and the Corporate nature of a Hospital.
11. Address efficiency issues in the management of a hospital through its resources.
12. Explore possible options for Cost Containment and profitability.

COURSE CONTENTS

The contents of the course are as follows:

1. UNIT 1Hospital System and its Role, Components of a Hospital System & Role of Hospitals in PHC
2. UNIT 2Vision, Mission, Goals and Values of a Hospital
3. UNIT 3Role and Functions of Hospital Managers
4. UNIT 4Hospital Services Management Nursing Management
   - Change Management
   - Infrastructure Management
5. UNIT 5Inventory Management
6. UNIT 6Drugs Management in Hospitals-I and II
7. UNIT 7Human Resource Management
8. UNIT 8Financial Management
   - Accounting rules and practices in a public & Private Hospital
   - Financial Management
   - Hospital Financing for Sustainability
   - Cost Containment, cost effectiveness and profitability
   - Costing and Cost implications of Hospital Services
9. UNIT 9RAP Tool
   - Introduction to Rapid Appraisal Tool for assessment of Emergency of a Hospital Data
   - Collection in Hospitals using RAP Tool
10. UNIT 10Preparing a Hospital Budget
11. UNIT 11Hospital Waste Management and infection control
    - Hospital Environment & Hospital Waste Management
    - Hospital Environment-related issues: lighting, ventilation, Cleanliness and tidiness, horticulture and greenery, Clean, regular and safe water supply, standards of personal hygiene,

Control measures for hospital associated infections

12. UNIT 12Accident & Emergency /Trauma Management Services

13. UNIT 13Human Resource Management

- Human Resource Development: current status and future challenges

14. UNIT 14Infrastructure Management

- Hospital Planning and Design
- TQM and Medical Audit of the Hospital.
- Total Quality Management: key concepts and Introduction to some basic tools of TQM Hospital
- Purchasing Process
- Hospital Purchase, Tendering and Processing

15. UNIT 15SHospital Ethical Concerns

COURSE LEARNING OUTCOMES [CLO]

CLO1. ExplainHospital System and its Role, Components of a Hospital System & Role of Hospitals in PHC UNIT 1

CLO2. Discuss the vision, Mission, Goals and Values of a Hospital UNIT 2

CLO3. Role and Functions of Hospital Managers UNIT 3

CLO4. Define Hospital Services Management Nursing

- Management
- Change Management
- Infrastructure Management UNIT 4

CLO5. Discuss Inventory Management UNIT 5

CLO6. Drugs Management in Hospitals-I and II UNIT 6

CLO7. Explain the concept, functions ofHuman Resource Management, Human Resource Development: current status and future challenges UNIT 7

CLO8. Discuss the use, importance ofFinancial Management Accounting

- rules and practices in a public & Private Hospital Financial
- Management
- Hospital Financing for Sustainability
- Cost Containment, cost effectiveness and profitability
- Costing and Cost implications of Hospital Services UNIT 8

CLO9. RAP Tool importance, and case studies

- Introduction to Rapid Appraisal Tool for assessment of Emergency of a Hospital
- Data Collection in Hospitals using RAP Tool UNIT 9

CLO10. Describe the Preparing a Hospital Budget UNIT 10

CLO11. Hospital Waste Management and infection control, definitions, importance, causes and control

- Hospital Environment & Hospital Waste Management
- Hospital Environment-related issues: lighting, ventilation, Cleanliness and tidiness, horticulture and greenery, Clean, regular and safe water supply, standards of personal hygiene, Control measures for hospital associated infections UNIT 11

CLO12. DiscussAccident & Emergency /Trauma Management Services UNIT 12

CLO13. Elaborate and discussInfrastructure Management

- Hospital Planning and Design
- TQM and Medical Audit of the Hospital.
- Total Quality Management: key concepts and Introduction to some basic tools of TQM Hospital
- Purchasing Process
- Hospital Purchase, Tendering and Processing UNIT 13 & 14

CLO14: Infrastructural management with respect to hospital planning TQM, CONCEPT TOOLS, purchasing process and tendering UNIT 15

CLO15. Expanciate on theHospital Ethical Concerns UNIT 16

TEACHING METHODOLOGY

A combination of various teaching methods such as lectures, individual and group exercises, group presentations, Field visits to Private and Public Hospitals will be used.

RECOMMENDED READINGS

1. Barnum H, Kutzin J. Public hospitals in developing countries: resource use, cost, financing.Baltimore, MD: JohnsHopkinsUniversity Press; 1993.
2. Blanchet KD, Switlik MM. The handbook of hospital admitting management. USA: Aspen Publications; 1985.
3. Goel SL, Kumar R. Management of hospitals. New Dehli, India: Deep and Deep Publications; 2002.
4. King M, Lapsley I, Mitchell F, Moyes J. Activity based costing in hospitals: a case study investigation. London, UK: Chartered Institute of Management Accountants; 1994.
5. McMahon R, Barton E, Piot M, Gelina N, Rose F. On being in charge. Geneva: World Health Organization; 1992.
6. PrekerAS, Harding A (eds.). Innovations in health service delivery: the corporatization of public hospitals, vol. 1. WashingtonDC: World Bank; 2002.

7. Shepard DS, Hodgkin D, Anthony Y. Analysis of hospital costs in developing countries: a manual for managers. Waltham, MA: Institute for Health Policy, BrandeisUniversity; 1997.
8. Willan JA. Hospital management in the tropics and subtropics. London, UK: Macmillan Education Ltd, 1990.
9. World Health Organization. The hospital in rural and urban districts: report of a WHO study group on the functions of hospitals at the first referral level. World Health Organ Tech Rep Ser. 1992;819:1-74.

ASSESSMENT MENTHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

A. NTERNSHIP:

Two months' internship will be undertaken by all the candidates with an aim to integrate learning and practice in an active public health organization. This can be undertaken at governmental or non-governmental public health organisations or program management units. The internship should include the candidate's role and support in assessing, monitoring, or conducting surveillance of health problems/services in a population; research on population-based health problems; developing and/or implementing policies and intervention strategies to meet public health needs**.** Overall it should contribute to the organization, and should help in understanding public health management and coordination and gaining personal confidence and leadership experience. Although finding a suitable internship opportunity lie with the candidate him/herself, mentors will facilitate the process. After the completion of 2 months of internship, candidates will be expected to submit a brief summary of public health program/challenge dealt with and solution proposed/implemented by the candidate at the end of second semester.

Candidates should submit their project plan and preliminary time scale with their chosen topic for dissertation at the end of the internship to their mentor/tutor to seek appropriate approvals before embarking on the full investigation and project. **The internship is worth two (2) credits**.

B. DISSERTATION

At the end of the fourth semester, candidates will submit their **dissertation**on previously chosen and approved topic for assessment. **This will be a 10 credit course**. The dissertation will be evaluated by an internal examiner (60% weightage) and an external examiner (40% weightage) including a viva-voce.

LIST OF ABBREVIATIONS

AEFI	Adverse Event Following Immunization
AIDS	Acquired Immuno-Deficiency Syndrome
BCC	Behaviour Change Communication CBA
	Cost Benefit Analysis
CEA	Cost Effective Analysis
CD	Communicable diseases
CPCB	Central Pollution Control Board
CRS	Civil Registration System DLHS
	District Level Health Survey
GSI	Gender and Social Inclusion
HMIS	Health Management Information System
IDSP	Infectious Disease Surveillance Program
IEC	Information Education and Communication
IPC	Inter Personal Communication
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MCTS	Mother and Child Tracking System
MDG	Millennium Development Goals
MNCH	Maternal, New-born and Child Health

MPH	Master's in Public Health
NCD	Non Communicable Diseases
NFHS	National Family Health Survey
NHP	National Health Policy
OR	Operational Research
PHE	Public Health Education
PPP	Public Private Partnership
RMNCH+A	Reproductive, Maternal, Newborn, Child, and Adolescent health
SBCC	Social Behaviour Change Communication
SDG	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
SRS	Sample Registration Survey
STI	Sexually Transmitted Infections
SWOT	Strength, Weakness, Opportunities and Threats
TB	Tuberculosis
SAFE	Safety, Acceptability, Feasibility and Effectiveness (SAFE)

Evaluation and Grading

Requirement	Description	% Final grade
Assignments/Articles	Blended Learning assignments, visits, projects, discussions, group and individual assignments, written assignment.	
PowerPoints/Charts	Ppts for individuals & group	
Attendance	Course wise & general	
Internal Exams	October/November	
Final Exams	December/January	

Students Expectations, Roles and Responsibilities

Communication Expectations: It is highly important for MPH students to be able to have enough access to use computers during course related tasks only as identified by the instructor or teacher. If the use of such devices becomes distracting to the instructor or others, students may be asked to discontinue using the device. The expectation is any use of technology either on a school or personal device will be conducted in a professional and appropriate manner. It is the duty of students to take care of their devices properly.

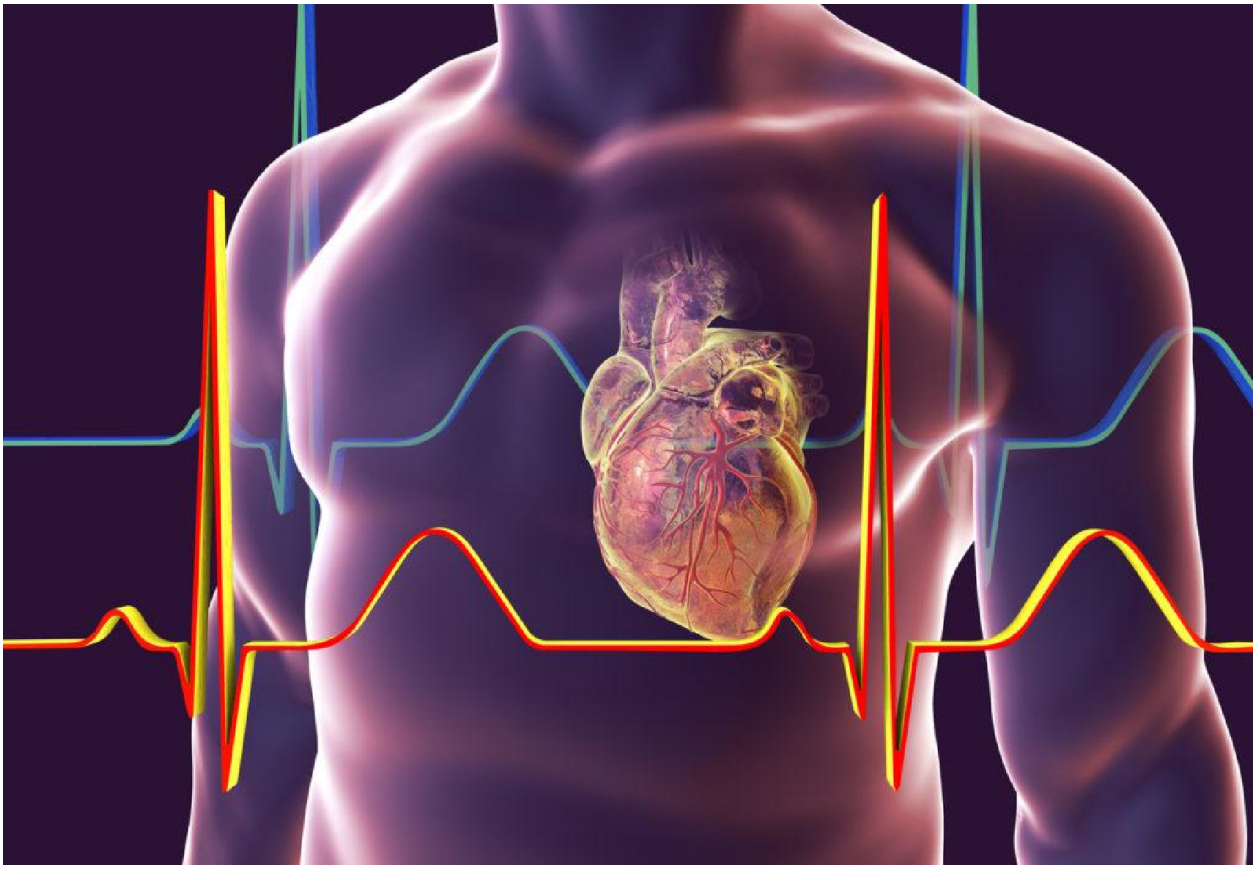
Students' Health and Counselling

There are sometimes when student experience stress during the academics periods from individual, academic, interpersonal issues e.t.c.. This may interfere with the health of the student and could be ill or have a health condition. If you find yourself in such situation that may interfere with your academics, you could seek the help of your teacher or counsellor. Come quickly as soon as you realise you have a health issue. Do not wait until there is a crisis before you call for help. We are here to help with everything that concerns your academic success.

NOIDA INTERNATIONAL UNIVERSITY
SCHOOL OF NURSING & HEALTH SCIENCES

Curriculum for Bachelor of Science

CARDIAC CARE TECHNOLOGY



w.e.f Session 2021 onwards

WHO IS ALLIED HEALTH PROFESSIONAL IN CARDIAC TECHNOLOGY

Cardiac Care Technology measures how well a heart is functioning and can monitor heart rate. Technicians here measure how well a patient's heart is functioning. Cardiac care technicians are the medical professionals who administer various tests that assist the doctor in diagnosis. Cardiac care technicians assist physicians during invasive cardiovascular testing, where a tube is inserted into one of the blood vessels that carry blood into the heart. Once doctors insert the catheter, technicians monitor patients' heart rates and blood pressure, looking for any signs of trouble or distress.

BSc Cardiac care Technology is a course which trains students to apply their skills in conducting Electrocardiograms, Echocardiographs and assisting the Physician in Cardiac catheterization procedures. The course is designed in such a way that the students will become experts in various diagnostic modalities related to cardiovascular diseases as well as analysing the results of the various tests.

Scope And Need For Allied And Healthcare Professionals In The Indian Healthcare System

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia’s health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system..

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the

benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing outof-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.2 Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and-
- With an understanding of the healthcare issues associated with diverse socio-economies· and cultural norms within the society.

Credit hours vs. traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System(CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance. All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) inthe UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, aneed now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices andprovide learners

mobility due to the popularity of initiatives such as ‘twinning programmes’, ‘joint degrees’ and ‘study abroad’ programmes.

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

ABOUT CARDIAC CARE TECHNICIAN

Cardiac Technicians are paramedics who are part of the instant responsible and first responder team. These allied healthcare forces go to places where patients need them the most. A Cardiac Technician works on ambulances, hospitals, nursing homes and other healthcare institutes. These paramedical professionals play an important role in serving patients and are considered as the backbone of any hospital, clinic or other healthcare institutes.

Cardiac care technicians assist physicians by diagnosing and treating diseases of the heart and blood vessels. They take images of the heart and peripheral blood vessels through both invasive and noninvasive procedures, such as catheterization, balloon angioplasty, or the use of ultrasound equipment. Some cardiac care technology professionals connect an EKG to a patient to monitor heart function. Cardiac technicians sometimes assist physicians prior to invasive procedures by shaving patients and preparing them for surgery. Cardiac technicians work in a variety of settings, including general hospitals, outpatient care centers and physician's offices.

What does a Cardiac Technician do?

One of the primary jobs of a Cardiac Technician is to maintain the healthcare equipment in a critical situation. Cardiac Technology deals with the heart and lungs of patients and it requires a lot of care and dedication. One must be an expert in the following tasks to be a skilled Cardiac Technician –

- The knowledge of IV drip is a must. A Cardiac Technician should be able to ensure that the drip is put on the patient to keep them hydrated and prevent them from losing body fluids.
- Performing Electrocardiogram (ECG) on patients to check the activity of the heart
- Updating the charts and stats of patients and reporting to the doctor in case of any changes in the health condition
- Comfortable around healthcare equipment, setting them up, connecting them to patients, monitoring them, etc.

- Decontaminating equipment before and after using it, and much more

SETTINGS PRACTICE AREA FOR A CARDIAC TECHNICIAN AFTER GRADUATES

After completing the Cardiac Technology course from our university, students can expect a respectable job at various healthcare institutes, such as –

- Cardiologist Cardiovascular Technician
- Cath Lab Technician
- Consultant Nephrologist
- Dialysis Technician
- Echocardiographer
- ICU-intensivist
- Medical Sonographer
- Registered Cardiac Electrophysiology Specialist
- Registered Cardiac Sonographer
- Registered Cardiovascular Invasive Specialist Registered Vascular Specialist

ABOUT ADVANCEMENT OF CARDIAC CARE TECHNOLOGY

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipments, hardwares, tools, machines, and pharmacological agents Handling of these equipments and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipments function, as well as to have hands- on skill in using these equipments correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipments and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of cardiovascular technology through didactic theoretic learning as well as supervised practical hands on training.

The B.Sc in Cardiovascular Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year

internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

Potential for the out going students:

1. Cardiac catheterization laboratory personnel
2. Research organizations
3. Biomedical industry
4. Technical specialists in healthcare institutions

ADMISSION

The admission policy and procedure shall be decided from time to time by the Board of Management (BOM) of the Institute, following guidelines issued by Ministry of Human Resource Development (MHRD), Government of India. The number of seats in each branch of the B.Sc. (Applied Science) programme will be decided by BOM as per the directives from MHRD, Government of India and taking into account the market demands. Some seats for Non Resident Indians and a few seats for foreign nationals shall be made available.

ELIGIBILITY FOR ADMISSION

Selection procedure:

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%)in physics, chemistry and biology(botany & zoology), mathematics.(I . e –Physics, chemistry and biology as mandates requirements).
2. Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology and English up to 12th Standard level.
3. Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.

a. English, Physics, Chemistry, Botany, Zoology

b. English, Physics, Chemistry, Biology and any other language

4. He/she has attained the age of 17 years as on - current year.
5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
6. Admission to Bachelor of Cardiac Care Technology course shall be made on the basis of eligibilityand

an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

a. Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme.
b. Successful candidates on the basis of written test will be called for counseling(s) nominated by the University or the board.
c. During subsequent counseling (s) the seat will be allotted as per the merit of thecandidate depending on the availability of seats on that particular day.
d. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.
e. The name of the students who remains absent from classes for more than 15 days at a stretch after joining the said course without giving any notice will be governed as per the respective University rules.

Lateral entry:

Candidates with 3 years Diploma from recognized Paramedical board are eligible to take admission to the second year B.Sc. CVT/CCT(if applicable).

Candidates who have completed diploma or vocational course through Correspondence shall not be eligible for any of the courses mentioned above.

Duration of the course

Duration shall be for a period of three years followed by six months of internship.

Medium of instruction

The medium of instruction and examination shall be in English.

Structure of the programme

The programme will have the following structure:

i) A general programme comprising Basic Anatomy, Physiology, Pathology, Biochemistry and basics of Computer.

ii) A core programme introducing the student to the foundations of Practical field.

1. The duration of the programme will be a minimum of 3 years. Every branch of the B.Sc. programme will have a curriculum and syllabus for the courses approved by the Academic Council.

2. The academic programmes of the Institute follow the credit system.

3. For the award of degree, a student has to earn certain minimum total number of credits specified in the curriculum of the relevant branch of study. The curriculum of the different programs shall be so designed that the minimum prescribed credits required for the award of the degree shall be within the limits of 120 .

4. The medium of instruction, examination and the language of the project reports will be English.

Main objectives of the course

The objective of this training program is to have a paramedical service of personnel with core knowledge in clinical cardiovascular medicine and technology to support-

1. Clinical cardiovascular procedures

2. Stress testing

3. Electrocardiography - performance and analysis

4. Holter recording and reporting.

5. HUTT performance and reporting

6. Echocardiography

7. Cardiac catheterization (diagnostic, therapeutics),EP/RFA, device therapy (patient preparation, sedation, procedure assistants, follow up care and rehabilitation)

8. Heart failure therapeutic support

9. Rhythm management support

10. Pacemaker analysis, programming and follow up

11. To carry out basic maintenance of equipments and hardwares.

Program Outcomes

- Fundamental knowledge on the subject.
- Effective communication skills.
- Knowledge in professional ethics
- Leadership qualities and team work.
- Problem Analysis and solving skills.
- Basic knowledge on research methodology.

- Higher Technical skills and competences.
- Higher study options in many fields.
- Employability in various sectors.
- Better employment opportunities.

Program Specific Outcomes

- Core knowledge in Clinical cardiovascular procedures
- Expertise in Stress testing, Electrocardiography - performance and analysis, Holter recording and reporting, HUTT performance and reporting and Echocardiography.
- Technical expertise in Cardiac catheterization
- Technical support in heart failure therapy and rhythm management.
- Pacemaker analysis, programming and follow up.
- To carry out basic maintenance of equipments and hard wares.

Faculty advisor

To help the students in planning their courses of study and for getting general advice on the academic programme, the concerned department will assign a certain number of students to a faculty member who will be called their faculty advisor.

Class committee

A Class Committee consisting of the following will be constituted by the Head of the Department for each class:

(i) A Chairman, who is not teaching the class.

(ii) All subject teachers of the class.

(iii) Two students nominated by the department in consultation with the class. The Class Committee will meet as often as necessary, but not less than six times during a year.

The functions of the Class Committee will include:

(i) Addressing problems experienced by students in the classroom and the laboratories.

(ii) Analyzing the performance of the students of the class after each test and finding ways and means of addressing problems, if any.

(iii) During the meetings, the student members shall express their opinions and suggestions of the class students to improve the teaching / learning process.

Grading

A grading system as below will be adhered to.

1. GPA & CGPA GPA is the ratio of the sum of the product of the number of credits Ci of course "i " and the grade points Pi earned for that course taken over all courses "i" registered by the student to the sum of Ci for all "i ".

That is,

$$CGPA = \frac{\sum_{i=1}^{n} C_i GP_i}{\sum_{i=1}^{n} C_i}$$

CGPA will be calculated in a similar manner, at any year, considering all the courses enrolled from first year onwards.

2. For the students with letter grade I in certain subjects, the same will not be included in the computation of GPA and CGPA until after those grades are converted to the regular grades.

3. Raw marks will be moderated by a moderation board appointed by the ViceChancellor of the University. The final marks will be graded using absolute grading system. The Constitution and composition of the moderation board will be dealt with separately.

Registration & Enrolment

1. Except for the first year, registration and enrollment will be done in the beginning of the year as per the schedule announced by the University.

2. A student will be eligible for enrollment only if he/she satisfies regulation 10 (maximum duration of the programme) and will be permitted to enroll if (i) he/she has cleared all dues in the Institute, Hostel & Library up to the end of the previous Year and (ii) he/she is not debarred from enrollment by a disciplinary action of the University.

3. Students are required to submit registration form duly filled in.

Registration requirement

1. If a student finds his/her load heavy in any year, or for any other valid reason, he/she may withdraw from the courses within three weeks of the commencement of the year with the written approval of his/her Faculty Advisor and HOD. However the student should ensure that the total number of credits

registered for in any year should enable him/her to earn the minimum number of credits per year for the completed years.

2. Continuation of programme

3. For those students who have not earned the minimum required credit prescribed for that particular year examination, a warning letter to the concerned student and also to his parents regarding the shortage of his credit will be sent by the HOD after the announcement of the results of the University examinations

Maximum duration of the programme

The normal duration of the programme is 3 years. However a student may complete the programme at a slower pace by taking more time, but in any case not more than 5 years excluding the years withdrawn on medical grounds or other valid reasons.

1. Temporary discontinuation

2. A student may be permitted by the Dean (Academic) to discontinue temporarily from the programme for six months or a longer period for reasons of ill health or other valid reasons. Normally a student will be permitted to discontinue from the programme only for a maximum duration of 6 months.

Discipline

1. Every student is required to observe discipline and decorous behavior both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the University.

2. Any act of indiscipline of a student reported to the (Academics) will be referred to a Discipline Committee so constituted. The committee will enquire into the charges and decide on suitable punishment if the charges are substantiated. The committee will also authorize the Dean (Academic) to recommend to the Vice-Chancellor the implementation of the decision. The student concerned may appeal to the Vice Chancellor whose decision will be final. The Dean (Academic) will report the action taken at the next meeting of the Council.

3. Ragging and harassment of women are strictly prohibited in the university campus and hostels.

Attendance

1. A student whose attendance is less than 75% in a year is not eligible to appear for the end – year examination. The details of all students who have less than 75% attendance in a course will be announced by the teacher in the class. These details will be sent to the concerned HODs and (Academic).

2. Those who have less than 75% attendance will be considered for condonation of shortage of attendance. However, a condonation of 10% in attendance will be given on medical reasons. Application for condonation recommended by the Faculty Advisor, concerned faculty member and the HOD is to be submitted to the Dean (Academic) who, depending on the merits of the case, may permit the student to appear for the year end examination. A student will be eligible for this concession at most in one year during the entire degree programme. Application for medical leave, supported by medical certificate with endorsement by a Registered Medical Officer, should reach the HOD within seven days after returning from leave or, on or before the last instructional day of the year, whichever is earlier.

3. As an incentive to those students who are involved in extra-curricular activities such as representing the University in Sports & Games, Cultural Festivals, and Technical Festivals, NCC/ NSS events, a relaxation of up to 10% attendance will be given subject to the condition that these students take prior approval from the officer – in-charge. All such applications should be recommended by the concerned HOD and forwarded to Dean (Academic) within seven instructional days after the programme / activity.

Assessment procedure

- The Academic Council will decide from time to time the system of tests and examinations in each subject in each year.
- Assessments should be completed by the academic faculty, based on the compilation of the student's theoretical &clinical performance throughout the training program. To achieve this, all assessment forms and feedback should be included and evaluated. The passing marks for every subjects in the year wise should be 50% marks in aggregate in theory/ practical.

Internal Assessment will be done based on the components below:

i)Written test/term test

ii) Record Books

iii) Assignments

iv)Oral presentations/seminars

v) Skills/practical training acquired in

Laboratory vi)Communication skills

3. For practical courses, the assessment will be done by the subject teachers as below:

(i) Weekly assignment/Observation note book / lab records – weightage 60%.

(ii) Year- end examination of 3 hours duration including viva – weightage 40%.

4. For courses on Physical Education, NSS, etc the assessment will be as satisfactory/not satisfactory only.

Make up examination/periodical test

1. Students who miss the year end examinations / periodical test for valid reasons are eligible for makeup examination /periodical test. Those who miss the year-end examination / periodical test should apply to the Head of the Department concerned within five days after he / she missed examination, giving reasons for absence.

2. Permission to appear for make-up examination/periodical test will be given under exceptional circumstances such as admission to a hospital due to illness. Students should produce a medical certificate issued by a Registered Medical Practitioner certifying that he/she was admitted to hospital during the period of examination / periodical test and the same should be duly endorsed by parent/guardian and also by a medical officer of the University within 5 days.

3. The student will be allowed to make up at the most two out of three periodical tests.

Declaration of results

1. A candidate who secures not less than 40% of total marks prescribed for a course with a minimum of 40% of the marks prescribed for the year end examination shall be declared to have passed the course and earned the specified credits for the course.

2. After the valuation of the answer scripts, the tabulated results are to be scrutinized by the Result Passing Boards of UG and PG programmes constituted by the Vice-Chancellor. The recommendations of the Result Passing Boards will be placed before the Standing Sub Committee of the Academic Council constituted by the Chancellor for scrutiny. The minutes of the Standing Sub Committee along with the results are to be

placed before the Vice-Chancellor for approval. After getting the approval of the Vice-Chancellor, the results will be published by the Controller of Examination / Registrar.

3. If a candidate fails to secure a pass in a course due to not satisfying the minimum requirement in the year end examination, he/she shall register and reappear for the end year examination during the following year. However, the internal marks secured by the candidate will be retained for all such attempts.

4. If a candidate fails to secure a pass in a course due to insufficient sessional marks though meeting the minimum requirements of the year end examination, wishes to improve on his/her sessional marks, he/she will have to register for the particular course and attend the course with permission of the HOD concerned and with a copy marked to the Registrar. The sessional and external marks obtained by the candidate in this case will replace the earlier result.

5. A candidate can apply for the revaluation of his/her year -end examination answer paper in a theory course within 2 weeks from the declaration of the results, on payment of a prescribed fee through proper application to the Registrar/Controller of Examinations through the Head of the Department. The Registrar/Controller of Examinations will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the Department. Revaluation is not permitted for practical courses and for project work.

GRADE CARD

1. After results are declared, grade sheet will be issued to each student which will contain the following details:

(i) Program and branch for which the student has enrolled.

(ii) Year of registration.

(iii) List of courses registered during the Year and the grade scored.

(iv) Year Grade Point Average (GPA)

(v) Cumulative Grade Point Average (CGPA).

CLASS / DIVISION

Classification is based on CGPA and is as

follows: 1.CGPA ≥8.0 : First Class with

distinction

2.7.0 ≤CGPA < 8.0 : First Class

3. 6.0 ≤CGPA < 7.0 : Second Class

4.5.0 ≤CGPA < 6.0 : Third Class

TRANSFER OF CREDITS

Within the broad framework of these regulations, the Academic Council, based on the recommendation of the transfer of credits committee so consulted by the Chancellor may permit students to earn part of the credit requirement in other approved institutions of repute and status in the country or abroad.

ELIGIBILITY FOR THE AWARD OF B.SC.

1. A student will be declared to be eligible for the award of the B.Sc. Degree if he/she has

i) Registered and successfully obtained credit for all the core courses;

ii) Successfully acquired the credits in the different categories as specified in the curriculum corresponding to the discipline (branch) of his/her study within the stipulated time;

iii) Has no dues to all sections of the Institute including Hostels, and

iv) Has no disciplinary action pending against him/her. The award of the degree must be recommended by the Academic Council and approved by the Board of Management of the University.

POWER TO MODIFY

Not with standing all that has been stated above, the Academic Council shall modify any of the above regulations from time to time subject to approval by the Board of Management.

THE COURSE STRUCTURE

Distribution of Teaching Hours in First Year Main Subjects

S. No	Course Code	Course Title	Total Theory	Total Practical	Total Credits	Total Hours (Theory + Practical)	IA	UE	Exam Hours
1.	**BCT 101**	General Anatomy	90	30	3	120	25	75	3 hrs
2.	**BCT102**	General Physiology	90	30	3	120	25	75	3 hrs
3.	**BCT103**	General Biochemistry	60	60	3	120	25	75	3 hrs
4.	**BCT 104**	General Microbiology	80	-	3	80	25	75	3 hrs
5.	**BCT 105**	General Nutrition	80	-	2	80	25	75	3 hrs
6.	**BCT 106**	General Pathology	60	-	2	60	25	75	3 hrs
7.	**BCT 107**	Basics of Computer	40	-	2	40	25	75	3 hrs
8.	**BCT 108**	English & Communication	40	-	2	40	25	75	3 hrs
9.	**BCT 109**	Clinical Hours	470 hrs						

Total Theory Hours – 660 hrs

Total Clinical Hours – 470 hrs

IA – Internal Assessment (Theory + Practical) ** UE- University Examinations (Theory)

Note - Teaching resources (tutors) should be made available at every institute for basic subjects such as –Remedial Biology, Remedial Mathematics and Remedial English for students who wish to undertake the extra classes for the same.

The classes in main are to be held from Monday to Thursday. On Fridays and Saturdays students shall work in hospitals in the respective specialty or department chosen by them
Hospital posting -470 Hours Friday 9am - 1pm and 2pm - 4-30, Saturday 9am - 1pm

Distribution of Teaching Hours in Second Year Subjects
Main Subjects

S. No	Course Code	Course Title	Total Theory	Total Practical	Total Credits	Total Hours (Theory + Practical)	IA	UE	Exam Hours
1.	**BCT 201**	Medical Electronics & Biophysics computer usage to cardiac care technology	60	20	2	80	25	75	3 hrs
2.	**BCT202**	Medicines relevant to cardiac care technology	80	-	2	80	25	75	3 hrs
3.	**BCT203**	Applied Pharmacology	80	-	2	80	25	75	3 hrs
4.	**BCT 204**	Introduction to Cardiac Care Technology	120	40	4	160	25	75	3 hrs
5.	**BCT 205**	Applied Microbiology & Pathology	60	-	2	60	25	75	3 hrs
9.	**BCT 206**	Clinical Hours	650 hrs						

Total Theory Hours - 460 hrs

Total Clinical Hours - 650 hrs

Note: Clinical postings can be encouraged on Saturdays too.

Cardiac care technology clinical posting – 650 hrs.

Distribution of Teaching Hours in Third Year Subjects
Main Subjects

S. No	Course Code	Course Title	Total Theory	Total Practical	Total Credits	Total Hours (Theory + Practical)	IA	UE	Exam Hours
1.	**BCT 301**	Cardiac Care Technology - Clinical	120	40	4	160	25	75	3 hrs
2.	**BCT302**	Cardiac Care Technology - Applied	120	40	4	160	25	75	3 hrs
3.	**BCT303**	Cardiac Care Technology - Advanced	120	40	4	160	25	75	3 hrs
4.	**BCT 304**	Introduction to Quality & Patient Safety	45	-	2	45	25	75	3 hrs
5.	**BCT 305**	Medical Psychology, Medical Law & Medical Ethics	50	-	2	50	25	75	3 hrs
6.	**BCT 306**	Research & Biostatistics	80	-	2	80	25	75	3 hrs
9.	**BCT 109**	Clinical Hours	750 hrs						

Total Theory Hours – 655 hrs

Total Clinical Hours - 750 hrs

Note – Cardiac Care Technology – Clinical (Clinical posting – 250 hours)

Cardiac Care Technology – Applied (Clinical posting – 250 hours)

Cardiac Care Technology – Advanced (Clinical posting – 250 hours)

Total Theory Course Hours – 1775 Hours

Total Clinical Course Hours – 1870 Hours

Note- Internship posting for 3 months

BACHELOR OF CARDIAC CARE TECHNOLOGY

SYLLABUS

COURSE CODE: BCT 101

COURSE NAME: GENERAL ANATOMY

COURSE CREDIT: 3

TOTAL THEORY HOURS: 90

COURSE OBJECTIVES

By the end of this course the students will be able to demonstrate the structure of the human body including upper limb, lower limb thorax, abdomen, and head and neck. Also, students will have the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body.

COURSE DESCRIPTION

This course is designed to provide students with the working knowledge of the structure of the human body which is an essential foundation for their clinical studies.

COURSE CONTENT

UNIT – 1

Introduction: human body as a whole

- Definition of anatomy and its divisions
- Terms of location, positions and planes
- Cell and its organelles
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous & mucous glands with examples
- Basic tissues - classification with examples
- Practical: Histology of types of epithelium
- Histology of serous, mucous & mixed salivary gland

UNIT -2

Locomotion and

support Musculoskeletal

Anatomy –

- Anatomical positions of body, axes, planes, common anatomical terminologies (Groove, tuberosity, trochanters etc).
- Connective tissue classification.
- Bones- Composition & functions, classification and types according to morphology and development.
- Joints-definition-classification, structure of fibrous, cartilaginous joints, blood supply andnerve supply of joints
- Muscles – origin, insertion, nerve supply and actions.

Upper Extremity

- Osteology: Clavicles, Scapula, Humerus, Radius, Ulna, Carpals, Metacarpals, Phalanges.
- Soft parts: Breast, pectoral region, axilla, front of arm, back of arm, cubital fossa, front of forearm, back of forearm, palm, dorsum of hand, muscles, nerves, blood vessels and lymphatic drainage of upper extremity.
- Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
- Arches of hand, skin of the palm and dorsum of hand.

Lower Extremity

- Osteology: Hip bone, femur, tibia, fibula, patella, tarsals, metatarsals and phalanges.
- Soft parts: Gluteal region, front and back of the thigh (Femoral triangle, femoral canal and inguinal canal), medial side of the thigh (Adductor canal), lateral side of the thigh, popliteal fossa, anterior and posterior compartment of leg, sole of the foot, lymphatic drainage of lower limb, venous drainage of the lower limb, arterial supply of the lower limb, arches of foot, skin of foot.
- Joints: Hip joint, knee joint, ankle joint, joints of the foot. Joints: Shoulder girdle, shoulder joint, elbow joints, radio ulnar joint, wrist joint and joints of the hand.
- Arches of hand, skin of the palm and dorsum of hand.

UNIT – 3

Cardiovascular system

- Heart-size, location, chambers, exterior & interior
- Blood supply of heart
- Systemic & pulmonary circulation

Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery.

- Peripheral pulse.
- Inferior venacava, portal vein, portosystemic anastomosis.
- Great saphenous vein.
- Dural venous sinuses.
- Lymphatic system- cisterna chyli & thoracic duct.
- Histology of lymphatic tissues.
- Names of regional lymphatics, axillary and inguinal lymph nodes in brief.
- Practical: Demonstration of heart and vessels in the body
- Histology of large artery, medium sized artery & vein, large vein
- Microscopic appearance of large artery, medium sized artery & vein, large vein
- pericardium
- Histology of lymph node, spleen, tonsil & thymus
- Normal chest radiograph showing heart shadows
- Normal angiograms

UNIT – 4.

Gastro-intestinal system

- Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands,
- Waldeyer's ring)
- Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas
- Radiographs of abdomen

UNIT - 5.

Respiratory system

- Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments
- Histology of trachea, lung and pleura
- Names of paranasal air sinuses
- Practical: Demonstration of parts of respiratory system.
- Normal radiographs of chest
- Histology of lung and trachea

UNIT - 6.

Peritoneum

- Theory: Description in brief
- Practical: Demonstration of reflections

UNIT - 7.

Urinary system

- Kidney, ureter, urinary bladder, male and female urethra
- Histology of kidney, ureter and urinary bladder
- Practical: demonstration of parts of urinary system
- Histology of kidney, ureter, urinary bladder
- Radiographs of abdomen-IVP, retrograde cystogram

UNIT - 8.

Reproductive system

- Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)
- Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology)
- Mammary glad - gross
- Practical: demonstration of section of male and female pelves with organs in situ
- Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary
- Radiographs of pelvis – hysterosalpingogram

UNIT - 9.

Endocrine glands

- Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland,
- suprarenal glad - (gross & histology)
- Practical: Demonstration of the glands
- Histology of pituitary, thyroid, parathyroid, suprarenal glands

UNIT - 10.

Nervous system

- Neuron
- Classification of NS
- Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross &
- histology)
- Meninges, Ventricles & cerebrospinal fluid
- Names of basal nuclei

- Blood supply of brain
- Cranial nerves
- Sympathetic trunk & names of parasympathetic ganglia
- Practical: Histology of peripheral nerve & optic nerve
- Demonstration of all plexuses and nerves in the body
- Demonstration of all part of brain
- Histology of cerebrum, cerebellum, spinal cord

UNIT – 11.

Sensory organs

- Skin: Skin-histology
- Appendages of skin
- Eye: parts of eye & lacrimal apparatus
- Extra-ocular muscles & nerve supply
- Ear:parts of ear- external, middle and inner ear and contents
- Practical: Histology of thin and thick skin
- Demonstration and histology of eyeball
- Histology of cornea & retina

UNIT – 12.

Embryology

- Spermatogenesis & oogenesis
- Ovulation, fertilization
- Fetal circulation
- Placenta

COURSE LEARNING OUTCOMES:

CLO1- Students will be able to demonstrate the histology of tissues of the body; Microscope,Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS. Ability to identify the Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue. Demonstrate the skin and its appendages. (Unit-1)

CLO2- To learn about the osteology of bones of upper limb, thorax, vertebral column and lower limb. (Unit-2)

CLO3- To learn about the anatomy of thorax and lungs including the intercostal space, pleura, bony thoracic cage, ribs, sternum & thoracic vertebrae. (Unit3)

CLO 4-5- To learn the surface anatomy of heart including the chambers of the heart, valves of the heart, major blood vessels of heart, pericardium, coronary arteries. (Unit4-5)

CLO 6-8- To learn about peritoneum, kidney structure, reproduction and their structure. (Unit 6-8)

CLO9-12- To learn about endocrine glands, brain and their structure, skin structure and process of spermatogenesis. (Unit 9-12)

TEXT BOOKS:

1. Human Anatomy by BD Chaurasia

REFERENCE BOOKS

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill
2. Chourasia –A Text book of Anatomy T.S. Ranganathan – A text book of Human Anatomy
3. Fattana, Human anatomy (Description and applied)Ander's& C P Prism Publishers, Bangalore – 1991
4. ESTER. M. Griscimer, physiology & Anatomy with Practical Considerations, J.P. LippinCott. Philadelphia
5. Bhatnagar Essentials of Human embryology – Revised Edition Orient Blackswan Pvt. Ltd.

WEB LINKS

YouTube channel by Dr. Peter de Souza and Dr. Jack Hurley, U.K. Medical doctors.

https://guides.lib.uw.edu

www.linkedin.com ›slideshare

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	Grades
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 151

COURSE NAME: GENERAL ANATOMY (PRACTICAL)

COURSE CREDIT: 3

TOTAL LAB HOURS: 30

COURSE OBJECTIVES

By the end of this course the students will be able to demonstrate the structure of the human body including upper limb, lower limb thorax, abdomen, and head and neck. Also, students will have the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body.

COURSE DESCRIPTION

This course is designed to provide students with the working knowledge of the structure of the human body which is an essential foundation for their clinical studies.

COURSE CONTENT

UNIT – 1 Demonstration of parts of microscope and its uses .

UNIT – 2 Demonstration of skeleton and joint.

UNIT - 3 Demonstration of deltoid and gluteus maximus, cubital fossa.

UNIT – 4 Demonstration of heart and its blood supply, demonstration of major arteries of upper limb

and lower limb, histology of cardiac muscle and histology of vessels.

UNIT - 5 Demonstration of location and parts of lungs, histology of trachea and lungs.

UNIT – 6 Demonstration of location of stomach, small and large intestines. Location and features of

pancreas, liver and gall bladder.

UNIT – 7 Demonstration of location and features of kidney, ureter, urinary bladder and urethra.

Histology of urinary system except urethra.

UNIT - 8 Demonstration of location of male and female reproductive organs.

UNIT - 9 Demonstration of brain and spinal cord

UNIT - 10 Histology of cornea and retina

COURSE LEARNING OUTCOMES:

CLO1- Students will be able to demonstrate the histology of tissues of the body; Microscope,Cell, Epithelium, Connective Tissue, Cartilage, Bone, Muscular tissue, Nerve Tissue – TS & LS. Ability to identify the Circulatory system – large sized artery, medium sized artery, large sized vein, lymphoid tissue. Demonstrate the skin and its appendages. (Unit-1)

CLO 2- To learn about the osteology of bones of upper limb, thorax, vertebral column and lower limb.(Unit-2)

CLO 3 and 4- To learn about the anatomy of thorax and lungs including the Intercostal space, pleura, bony thoracic cage, ribs, sternum & thoracic vertebrae.(Unit3-4)

CLO 5- To learn the surface anatomy of heart including the chambers of the heart, valves of the heart, major blood vessels of heart, pericardium, coronary arteries. (Unit5)

TEXT BOOKS:

1. Human Anatomy by BD Chaurasia

REFERENCE BOOKS

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill
2. Chourasia –A Text book of AnatomyT.S. Ranganathan – A text book of Human Anatomy
3. 3. Fattana, Human anatomy (Description and applied)Ander's& C P Prism Publishers, Bangalore –

   1991
4. ESTER. M. Griscimer, physiology & Anatomy with Practical Considerations, J.P. LippinCott. Philadelphia
5. Bhatnagar Essentials of Human embryology – Revised Edition Orient Blackswan Pvt. Ltd.

WEB LINKS

YouTube channel by Dr. Peter de Souza and Dr. Jack Hurley, U.K. Medical doctors.

https://guides.lib.uw.edu

www.linkedin.com ›slideshare

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 102

COURSE NAME: GENERAL PHYSIOLOGY

COURSE CREDIT: 3

TOTAL THEORY HOURS: 90

COURSE OBJECTIVES

Be aware of the functional relationships between various organ systems of the body. Explain the concept of the internal environment and its regulations by homeostatic mechanisms.

COURSE DESCRIPTION

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

COURSE CONTENT

UNIT – 1

Introduction – General Physiology

- Introduction to physiology
- Homeostasis: Definition, Positive feedback, negative feedback
- Body Fluid Compartments

UNIT – 2

Blood

- Introduction: Composition and function of blood, Blood Cells: types, Normal Count
- Red blood cells – Definition of Erythropoiesis, stages of differentiation, factors affecting, physiological variation, function.
- Hemoglobin –function, concentration, physiological variation Methods of Estimation, Structure
- White blood cells – different types, function, normal count, differential count, Immunity (in brief
- Platelets - Origin, normal count, functions, morphology.

- Haemostasis – Definition, steps, clotting factors, mechanism of clotting, disorders of clotting factors.
- Blood groups – ABO system, Rh system-Rh factor, Rh incompatibility., Blood grouping & typing, Cross matching
- Blood transfusion – Indication, universal donor and recipient concept.
- Selection criteria of a blood donor, transfusion reactions, Anticoagulants – Classification, examples and uses
- Anemias: Definition, Symptoms and signs (brief), Blood indices – Color index, MCH, MCV, MCHC (definition and normal values), Erythrocyte sedimentation Rate (ESR) and Paced cell volume (PCV) – Normal values, Definition, Determination (methods), Classification – morphological and etiological.
- Plasma Proteins –types & concentration, functions of albumin, globulin, Fibrinogen, Prothrombin
- Blood Volume -Normal value, determination of blood volume, regulation of blood volume(brief), functions of lymph

UNIT – 3

Cardiovascular system

- Heart – Embrological development ,Physiological Anatomy, Nerve supply, Properties of Cardiac muscle
- Cardiac cycle- definition, systole, diastole, phases, JVP(brief)
- Cardiac Output, stroke volume, EDV (only definitions)
- Heart sounds, Normal heart sounds, Mechanism and features, Areas of auscultation, Intraventricular pressure curves, Significance of heart sounds.
- Blood Pressure – Definition, normal value, clinical measurement of blood pressure, hypotension,hypertension.
- Heart rate - Physiological variations, regulation in brief, radial pulse.
- Electrocardiogram (ECG) –Definition, Normal ECG, Causes of ECG waves, Uses of ECG.
- Cardiac shock – Definition, types, Triple response

UNIT – 4

Digestive System

- Introduction- Physiological anatomy of Gastro intestinal tract (all structures in brief), Functions of digestive system, Functions of Saliva.
- Deglutination –definition and stages
- Stomach – functions
- Gastric secretion – Composition, function, phases of secretion

- Pancreas – functions (exocrine), composition
- Pancreatic juice - composition and regulation, Secretin and CCK-PZ
- Liver – functions, Bile secretion, Composition, function of bile, Bilirubin metabolism, types of bilirubin, Vandenberg reaction,
- Jaundice- types, significance.
- Gall bladder – functions
- Small intestine –Functions, Digestion, absorption, movements (in brief).
- Large intestine – Functions, Defecation reflex

UNIT – 5

Respiratory system

- Introduction - Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract.
- Respiratory organs - lungs, alveoli, respiratory membrane
- Mechanism of breathing – Inspiration, Expiration, muscles involved, mechanism
- Surfactant- Composition, functions, Intra pulmonary pleural pressure, surface tension
- Transportation of Oxygen: Forms of transport, Oxygen Hemoglobin curve.
- Lung volumes and capacities – Spirogram, Definitions and Normal Volumes
- Regulation of respiration - nervous and chemical regulation, Respiratory Centre. Herring Breuer reflexes
- Hypoxia – Definition, Classification, Description (in brief)
- Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnea (Definition only)

UNIT – 6

Endocrine System

- Introduction - Definition, Classification of Endocrine glands & their hormones
- Hypothalamus-pituitary Axis
- Pituitary hormones – Anterior and posterior pituitary hormone
- Functions of Growth hormone
- Thyroid gland – Thyroid hormones, Physiological function, regulation of secretion, Physiological Anatomy.
- Disorders – hypo and hyper secretion of hormone
- Adrenal cortex – functions of cortisol and Aldosterone, physiological anatomy
- Adrenal medulla – Functions of Adrenaline and nor adrenaline
- Pancreas (endocrine) – Hormones of pancreas, abnormalities(brief Insulin – functions, Regulation of blood glucose level, Diabetes mellitus.

- Regulation of calcium metabolism, hormones involved, actions of PTH, Calcitonin, Vit.D3,Tetany

UNIT – 7

Special senses

- Vision – Function of different parts (brief), Optic pathway, Dark adaptation, Color vision, structure of eye, structure of retina.
- Hearing -functions of middle ear, functions of inner ear, mechanism of hearing (brief)
- Chemical senses: Taste – types, receptors.
- Smell - physiology, receptors.

UNIT – 8

Nervous system

- Introduction – Parts of CNS and PNS, Functions of Nervous system
- Neuron - definition, structure, Neuroglia
- Nerve fiber - classification, conduction of impulses, continuous and salutatory
- Synapse – definition, structure, types, properties (brief)
- Receptors – Definition, classification, properties (brief)
- Reflex action – Definition, reflex arc, examples
- Pyramidal tract extrapyramidal tracts, functions of medulla, pons, hypothalamic disorders. Cerebral cortex lobes and functions, sensory cortex, motor cortex, cerebellum, functions of cerebellum.
- Babinski's sign, Tone, Posture (definition)
- Spinal Cord nerve tracts – Diagram and functions, Lateral spine-thalamic tract, Dorsal column pyramidal tract UMN and LMN lesion, Hemiplegia, Stroke (brief)
- Functions of - Cerebral cortex, Cerebellum, Hypothalamus, Basal ganglia EEG, Parkinsonism Cerebra-Spinal Fluid(CSF) – site of formation, circulation (brief), functions, lumbar puncture
- Autonomic Nervous System - Sympathetic and parasympathetic distribution and functions (brief)

UNIT – 9

Excretory System

- Introduction-Functions of kidneys, composition of urine, nephron, corticaland juxtamedullary nephrons – Comparison, vasa recta,
- Juxta Glomerular Apparatus – Structure and function.
- Mechanism of Urine formation

- GFR-Definition, Normal Values, factors affecting GFR, Measurement (Creatinine, Inulin Clearance)
- Tubular reabsorption, TMG, Tubular secretion (brief)
- Mechanism of urine concentration - Counter – Current Mechanisms, Role of ADH, Diuresis, Diuretics
- Micturition, Innervation of Bladder, Cystometrogram.

UNIT – 10

Reproductive system

- Introduction- Function of Reproductive system, changes during Puberty, sex differentiation
- **Male reproductive system-** Functions of testes
- Spermatogenesis –definition, site, stages, factors influencing, Endocrine functions of testes
- Androgens – Testosterone functions.
- **Female reproductive system-** menstrual cycle-definition, changes, ovulation
- Functions of progesterone and estrogen, Hormonal regulation
- Physiological changes during pregnancy, Lactation (brief), milk ejection reflex.

UNIT – 11

Muscle nerve physiology

- Introduction, Classification and structure of muscle, Sarcomere
- Neuromuscular junction, Transmission across Neuromuscular junction.
- Excitation contraction coupling. Mechanism of muscle contraction, Rigor mortis
- Contractile proteins, fatigue

UNIT – 12

Skin and Body temperature

- Structure and function of skin, Sweat glands
- Body temperature - Physiological variation, Regulatory mechanisms – Mechanisms activated by heat and cold
- Role of hypothalamus, Fever, Body temperature measurement, Hypothermia

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to.

CLO1: Describe function of different cell organelles. (Unit-1)

CLO2: Enumerate the functions of blood, RBC, platelet. (Unit-2)

CLO3: Describe functions of muscle and nerve (Unit-3)

CLO4: Understand the basic anatomy of heart, thorax and lungs, importance of structure and organisation of muscular system and histology, provide students insight into cardiac excitation and contraction of cardiovascular system, aware of assessment of cardiac output, understand the general circulation of human body. (Unit-4)

CLO5: Differentiate between respiration and breathing, describe mechanism of breathing. (Unit-5)

CLO6: Describe functions of stomach & liver. (Unit-6)

CL07: Describe how the hypothalamus of the brain controls the endocrine system. (Unit-7)

TEXT BOOKS:

1.Guyton (Arthur) Text Book of Physiology Latest Ed. Prism publishers

REFERENCE BOOKS

1. Chatterjee (CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency

2. Choudhary (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,

3.Gannon (William F) Review of Medical Physiology. Latest Ed Appleton

4.Essentials Of Medical Physiology: by K Sembulinga

5.Textbook of Physiology- AK Jain

WEB LINKS

https://www.physoc.org/

http://aups.org.au/

https://www.hapsweb.org/default.asx

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 152

COURSE NAME: GENERAL PHYSIOLOGY (PRACTICAL)

COURSE CREDIT: 1

TOTAL LAB HOURS: 30

COURSE OBJECTIVES

Be aware of the functional relationships between various organ systems of the body. Explain the concept of the internal environment and its regulations by homeostatic mechanisms.

COURSE DESCRIPTION

The course in Physiology over the first year is designed to give the student an in-depth knowledge of fundamental reactions of living organisms, particularly in the human body. The major topics covered include the following: the cell; primary tissue; connective tissue; skin; muscle; nervous tissue; blood; lymphoid tissues; respiration; blood vessels; circulation; cardiac cycle; systemic circulation; gastrointestinal tract; kidneys; uterus; urinary tract; pregnancy; endocrine system.

COURSE CONTENT

UNIT -

1Haemoglobinometry. UNIT

- 2 Haemocytometry UNIT -

3 Total leucocyte count.

UNIT - 4 Total Red blood cell count.

UNIT - 5 Determination of blood

groups. UNIT - 6 Differential WBC

count.

UNIT - 7 Determination of clotting time, bleeding time.

UNIT – 8 Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume,

Calculation of Blood indices: CI, MCH, MCV, MCHC.

UNIT - 9 Blood pressure recording.

UNIT – 10 Spirometery, Artificial Respiration

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to.

CLO1: Describe function of different cell organelles. (Unit-1)

CLO2: Enumerate the functions of blood, RBC, platelet. (Unit-2)

CLO3: Describe functions of muscle and nerve. (Unit-3)

CLO4: Understand the basic anatomy of heart, thorax and lungs, importance of structure and organisation of Muscular System and histology, provide students insight into Cardiac excitation and contraction of Cardiovascular System, aware of assessment of cardiac output, understand the general circulation of human body.(Unit-4)

CLO5: Differentiate between respiration and breathing, describe mechanism of breathing. (Unit-5)

CLO6: Describe functions of stomach & liver. (Unit-6)

CL07: Describe how the hypothalamus of the brain controls the endocrine system. (Unit-7)

TEXT BOOKS:

1.Guyton (Arthur) Text Book of Physiology Latest Ed. Prism publishers

REFERENCE BOOKS

1.Chatterjee (CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency 2.Choudhary (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,3.Gannon (William F) Review of Medical Physiology. Latest Ed Appleton 4.Essentials Of Medical Physiology: by K Sembulinga

5.Textbook of Physiology- AK Jain

WEB LINKS

https://www.physoc.org/
http://aups.org.au/
https://www.hapsweb.org/default.asx

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 103

COURSE NAME: GENERAL BIOCHEMISTRY

COURSE CREDIT: 2

TOTAL THEORY HOURS: 60

COURSE OBJECTIVE

This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

COURSE DESCRIPTION

This course involves a study of the metabolism of carbohydrates, proteins, fats, minerals, vitamins and essential enzymes. The role of these in the functioning of the human body will be discussed.

COURSE CONTENT

Unit – 1

Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids &Nucleotides

- Cell- Structure & Function of Cell Membrane
- Subcellular Organelles and their Functions.
- Carbohydrates- Definition, Classification & Biological importance of carbohydrates,
- Derivatives of Monosaccharides.
- Proteins- Definition & Classification of amino acids & Proteins,
- Biologically important peptides Plasma proteins,
- Immunoglobulins.
- Lipids- Definition, Classification & Biological importance and Functions of Lipids.
- Structure and functions of Cholesterol, types and functions of Lipoproteins.
- Nucleotides- Structure and Functions of DNA & RNA.
- Biologically important nucleotides.

Unit - 2

Enzymes & Acid base balance Enzymes

- Definition and Classification.
- Factors affecting enzyme activity.
- Coenzymes and Cofactors.
- Enzyme inhibition & Regulation of enzyme activity
- Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

Unit - 3

Vitamins & Minerals

- Vitamins-Classification, Sources, RDA,
- Functions(in brief), deficiency manifestations and hypervitaminosis.
- Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, magnesium, selenium, sodium, potassium and chloride.

Unit – 4

Nutrition, Blood chemistry & Urine Chemistry

- Nutrition- Nutrients, Calorific value of food, BMR, SDA, respiratory quotient and its applications,
- Balanced diet based on age, sex and activity, biological value of proteins, nitrogen balance,
- Protein energy malnutrition,
- Total parenteral nutrition, dietary fibers.
- Blood chemistry- Biochemical components & their reference ranges in normal & diseased states.
- Urine chemistry- Biochemical components & their reference ranges in normal & diseased states 23

Unit - 5

Clinical Biochemistry

- Specimen Collection- Blood,Urine and Body fluids.
- Preanalytical, analytical and postanalytical errors
- Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases.
- Diagnostic enzymology,
- Assessment of arterial Blood gas status and electrolyte balance,
- Point of Care Testing.
- Renal Function tests(in brief),
- Liver function tests(in brief),
- Biomedical Waste Management.

COURSE LEARNING OUTCOMES

CLO 1- To understand the cell structure, cell theory, cell membrane, cell organelles and their function. (Unit-1)

CLO 2- To have a brief knowledge on microscopy- simple & compound microscopy, phase contrast, dark field, florescence & electron microscopy.(Unit-2)

CLO 3- To read about the classification of Carbohydrates & properties, chemical structure & properties of monosaccharide, disaccharide & polysaccharide.(Unit-3)

CLO 4- To understand about Protein and It's properties, function & classification. Amino acids properties, essential & non-essential amino acid.(Unit-4)

CLO5- To learn about Nucleic Acids and Nucleotides and their chemical structure & base composition nucleoside & double helical structure- DNA & RNA. (Unit-5)

CLO 6- To learn about the classification of Lipids and its classification & chemical structure & properties of lipids (fatty acids) & biological significance. (Unit-6)

CLO 7- To understand about Vitamins & Minerals: - Properties water- & fat-soluble vitamins, deficiency & their clinical significance. Na, K, Ca, P, Fe, Cu and Se. (requirements, availability and properties). (Unit-7)

CLO 8- To learn about enzymes and its properties protein & non protein enzyme, ribozyme, lock & key mechanism & clinical significance. (Unit-8)

CLO 9- Have a brief understanding on hormones and their properties of endocrine glands brief outline of various endocrine glands & secretion of hormone. (Unit-9)

CLO 10- Water, Electrolyte & acid-base balance.(Unit-10)

TEXT BOOKS

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry -PankajaNaik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

REFERENCE BOOKS

1. The Text Book of Biochemistry- Dr. D.M.Vasudevan, Sreekumari.S
2. Text Book of Biochemistry- T.N.Pattabhiraman
3. Essentials of Biochemistry- U.Sathyanarayanan
4. Clinical Chemistry Varley William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York.
5. Clinical Chemistry TEITZ

WEB LINKS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books

https://www.slideshare.net/

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	Grades
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 153

COURSE NAME: GENERAL BIOCHEMISTRY (PRACTICAL)

COURSE CREDIT: 2

TOTAL LAB HOURS: 60

COURSE OBJECTIVE

This subject shall give information about all the major metabolic pathways occurring in our body. The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to them.

COURSE DESCRIPTION

This course involves a study of the metabolism of carbohydrates, proteins, fats, minerals, vitamins and essential enzymes. The role of these in the functioning of the human body will be discussed.

COURSE CONTENT

PRACTICAL

UNIT 1- Safety of measurements

UNIT 2- Specimen collection:

a. Pre-analytical variables.

b. Collection of blood.

c. Collection of CSF & other fluids.

d. Urine collection.

e. Use of preservatives.

f. Anticoagulants.

UNIT 3- Introduction to laboratory apparatus

a. Pipettes: different types (graduated, volumetric, Pasteur, automatic etc.).

b. Calibration of glass pipettes.

c. Burettes, beakers, petri dishes, depression plates.

d. Flasks: different types (volumetric, round bottomed, Erlenmeyer conical etc.).

e. Funnels: different types (conical, Buchner etc.).

f. Bottles: reagent bottles – graduated and common, wash bottles – different type specimen bottles

UNIT 4- Measuring cylinders, porcelain dish

a. Tubes: test tubes, centrifuge tubes, test tube draining rack.

b. Tripod stand, wire gauze, bunsen burner.

c. Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range.
Cuvette holder racks: bottle, test tube, pipette, desiccator, stop watch, timers, scissors.

d. Dispensers: reagent and sample.

e. Maintenance of lab glass ware and apparatus.

f. Glass and plastic ware in laboratory.

g. Use of glass: significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions of glass.

h. Care and cleaning of plastic ware, different cleaning solution.

UNIT 5- Instruments (Theory and demonstration) Diagrams to be drawn

a. Use, care and maintenance of: water bath, oven & incubators, water distillation plant, water deionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes.

b. Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversion of G to RPM and vice versa, different types of centrifuges.

c. Manual balances: single pan, double pan, triple balance, direct read out electrical balances.

d. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids, hygroscopic compounds etc.

e. Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types, guidelines to be followed and precautions to be taken while using.

UNIT 6- Acids and Bases

a. Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowry – Bronsted theory of acids and bases. Classification of acids and bases.

b. Differences between bases and alkali, acidity and basicity, monoprotonic and polyprotonic acids and bases. Concepts of acid base reaction, hydrogen ion concentration, ionization of water, buffer, and pH value of a solution.

c. Preparation of buffer solutions using pH meter. Salts: definition, classification, water of crystallization, definition and different types, deliquescent and hygroscopic salts.

UNIT 7- Acid- base indicators

a. Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use of standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators.

b. Titration of a simple acid and a base (preparation of standard solution of oxalic acid and using this solution finding out the normality of a sodium hydroxide solution. Acid to be titrated using this base Calculation of normality of an acid or a base after titration, measurement of hydrogen ion concentration.

UNIT 8- Quality control

a. Accuracy, precision. Specificity, sensitivity, limits of error allowable in laboratory, percentage error.

b. Normal values and Interpretations.

UNIT 9- Special Investigations

Serum electrophoresis, immunoglobulins, drugs: digitoxin, theophylline, regulation of acid base status, Henderson Hassel Bach equations, buffers of the fluid, pH regulation, disturbance in acid base balance, anion gap, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and pH, basic principles and estimation of electrolytes, water balance, sodium regulation, bicarbonate buffers, nutrition, nutritional support with special emphasis on parental nutrition, calorific value, nitrogen balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins.

UNIT 10- Analysis of normal urine

- Composition of urine.
- Procedure for routine screening

- Urinary screening for inborn errors of metabolism.
- Common renal disease.
- Urinary calculus.
- Urine examination for detection of abnormal constituents.

UNIT 11- Interpretation and diagnosis through charts.

- Liver function tests.
- Lipid profile.
- Cardiac profile
- Renal function test.
- Cardiac markers.
- Blood gas and electrolytes.
- Estimation of blood sugar, blood urea and electrolytes.
- Demonstration of strips, demonstration of glucometer.
- Preparation of solutions of different molar and normal concentration.
- Elucidation of basic principles (pH and Buffering system)
- Preparation of Buffer solutions and checking of pH
- Demonstration of pH meter
- Acidimetry and alkalimetry
- Preparation of standard succinic acid solution
- Determination of the strength of NaOH solution.
- Determination of the strength of HCl solution
- Determination of the strength of NH4OH solution
- Colorimetry
- Determination of Absorption Maximum
- Verification of Lambert-Beer's and Preparation of Standard Curve
- Qualitative tests for Carbohydrates, Proteins & Fats.
- Estimation of Blood sugar, Blood Urea and electrolytes.

COURSE LEARNING OUTCOME

CLO 1- To learn about safety of measurements. (Unit-1)

CLO 2- To know how to collect specimen for culture. (Unit-2)

CLO 3and 4- To understand about different laboratory apparatus.(Unit3-4)

CLO 5- To have an understanding of proper use, care and maintenance of laboratory apparatus. (Unit-5)

CLO 6and 7- To understand about difference between acids and bases and their determination using pH. (Unit6-7)

CLO 8- To have knowledge on quality control including accuracy, precision. Specificity, sensitivity, limits of error allowable in laboratory, percentage error. (Unit-8)

CLO 9- To know about the special investigations including serum electrophoresis, regulation of acid base status, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis etc. (Unit-9)

CLO 10-11- To have a brief idea of practical aspects of biochemical testing. (Unit10-11)

TEXT BOOKS

1. Textbook of Biochemistry -D.M.Vasudevan
2. Biochemistry -PankajaNaik
3. Clinical Biochemistry-Principles and Practice-Praful.B.Godkar
4. Textbook of Biochemistry-Chatterjea and Shinde
5. Textbook of Clinical Chemistry-Norbert W Teitz

REFERENCE BOOKS

1. The Text Book of Biochemistry- Dr. D.M.Vasudevan, Sreekumari.S
2. Text Book of Biochemistry- T.N.Pattabhiraman
3. Essentials of Biochemistry- U.Sathyanarayanan
4. Clinical Chemistry Varley William Heinemann Medical Books Ltd & Inter Science Book. Inc. New York.

5. Clinical Chemistry TEITZ

WEB LINKS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books

https://www.slideshare.net/

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 104

COURSE NAME: GENERAL MICROBIOLOGY

COURSE CREDIT: 2

TOTAL THEORY HOURS: 80

COURSE OBJECTIVES

It aims the students to learn about all aspects of the organisms in order to not only determine how they live in their environment, but also how they impact their respective surroundings and thus other organisms around them (human beings, animals, etc). Microbiology has proved to be one of the most important disciplines in biology, making it possible to identify how some of these organisms cause diseases, discover cures for such diseases and even use some microbes for industrial purposes etc.

COURSE DESCRIPTION

This subject follows the basic subjects of Anatomy, Physiology and Biochemistry and it forms a vital link between preclinical subjects and clinical subjects. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding of Microbiology & Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

COURSE CONTENT

Unit1

General & Clinical Morphology

- Introduction and definition, branches of microbiology, introduction and definition of microbes, virus, bacteria and microorganisms, size, shape and structure of bacteria and virus, use of microscope in the study of bacteria

Unit2

Growth and Nutrition

- Nutrition, growth and multiplication of bacteria, common bacterial diseases, use of culture media in diagnostic bacteriology.

Unit3

Sterilization and Disinfection

- Introduction and importance, principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator**,** pasteurization, antiseptic and disinfectants**,** antimicrobial sensitivity test.

Unit4

Immunology

- Immunity- vaccines, types of vaccine and immunization schedule**,** Principles and interpretation of commonly done serological tests like Widal, VDRL, ASLO, CRP, RF & ELISA**,** Rapid tests for HIV and HbSAg

Unit5

Systematic Bacteriology

- Morphology, cultivation, diseases caused by bacteria, laboratory diagnosis including specimen collection of Staphyloccci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, E. coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochaetes.

Unit6

Parasitology

- Morphology, life cycle, laboratory diagnosis of E. histolytica, Plasmodium Vivax, Bucheria bancrofti, tape worms and intestinal nematodes.

Unit7

Mycology

- Diseases caused and lab diagnosis of fungi like candida, cryptococcus, dermatophytes etc., opportunistic fungi

Unit8

Virology

- General properties of viruses, diseases caused, lab diagnosis and prevention of following viruses: Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

Unit9

Nosocomial Infection

- Causative agents, transmission methods, investigation, prevention and control of Nosocomial/Hospital infection, principles and practice, biomedical waste management.

COURSE LEARNING OUTCOME

CLO 1- To understand the microbes, bacteria & virus structures and histology. (Unit-1)

CLO 2- To knowledge about nutrition, growth and multiplication of bacteria, common bacterial diseases, use of culture media in diagnostic bacteriology.(Unit-2)

CLO 3- To read about the principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator**,** pasteurization, antiseptic and disinfectants**,** antimicrobial sensitivity test.(Unit-3)

CLO 4- To learn about immunity.(Unit-4)

CLO5- To learn about Morphology, life cycle, laboratory diagnosis of E. histolytica, Plasmodium Vivax, Bucheria bancrofti, tape worms and intestinal nematodes. (Unit-5)

CLO 6- To learn about the parasites, virus and fungus & nosocomial infection. (Unit6-7)

REFERRENCE BOOKS

1. Text Book of Medical Paracytology- C.K.Jayaram Panicker
2. Ananthanarayan and Paniker's Textbook of Microbiology. Tenth Edition. Reba Kanungo
3. Textbook of Microbiology for MLT. Second Edition.Dr. C. P. Baveja.

WEB LINKS

http://www.freebookcentre.net/Microbiology/Microbiology-Books

https://www.slideshare.net/

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 105

COURSE NAME:

NUTRITION COURSE

CREDIT: 2

TOTAL THEORY HOURS: 80

COURSE OBJECTIVES

One learns about diet through understanding what a body wants and what it needs based on certain health parameters. Breaking it down to the basics this course will help you perform critical evaluation of food through nutrition, dietetics and research, people management- learning to interact with patients and students, real time industry association with dieticians and clinicians, application of customized advanced diet therapy, fraternity interactions with professionals at research projects and conferences, finding a seamless integration between medicine, chemistry and food to nourish the body and treat ailments.

COURSE DESCRIPTION

This subject deals with managing a balanced diet, in order to prevent bodily diseases and malnourishment from a poor diet, which leads to imbalances in the human body. This brings the spotlight on Obesity and chronic illnesses linked to obesity, a lifestyle disease that is shaping up to something much bigger than what it was expected to do. The key areas of nutrition are; study of food elements and nutrients and its impact on the human body, analysis of substances ingested through food and drinks and their impact on human body, chalking out a balanced food diet to maintain the body.

COURSE CONTENT

UNIT 1

Introduction.

- History of Nutrition
- Nutrition as a science
- Food groups, RDA
- Balanced diet, diet planning.
- Assessment of nutritional status

UNIT 2

Energy

- Units of energy.
- Measurements of energy and value of food
- Energy expenditure.
- Total energy/calorie requirement for different age groups and diseases.
- Satiety value
- Energy imbalance- obesity, starvation.
- Limitations of the daily food guide.

UNIT 3

Proteins

- Sources and functions
- Essential and non- essential amino- acids.
- Incomplete and complete proteins
- Supplementary foods.
- PEM and the eye
- Nitrogen balance
- Changes in protein requirement.

UNIT 4

Fats

- Sources and functions
- Essential fatty acids
- Excess and deficiency
- Lipids and the eye. Hyperlipidemia, heart diseases, atherosclerosis.

UNIT 5

Minerals

- General functions and sources
- Macro and micro minerals associated with the eye.
- Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)

UNIT 6

Vitamins

- General functions, and food sources
- Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A
- Promoting sound habits in pregnancy, lactation and infancy.
- Nutrient with antioxidant.
- Properties
- Digestion of Proteins, carbohydrates & lipids

UNIT 7

Essential amino acids.

UNIT 8

Miscellaneous

- Measles and associated eye disorders, low birth weight

COURSE LEARNING OUTCOMES

CLO 1- To know the history and introduction of nutrition. Its importance and assessment of nutritional status. (Unit-1)

CLO 2- To understand the concept of energy, energy expenditure and consequences of energy imbalances. (Unit-2)

CLO3-7- To understand the importance and role of proteins, fats, vitamins, minerals and fatty acids in body. Their general functions and important dietary sources. (Unit3-7)

CLO 8- To know about the deficiency disorders like low birth weight, eye disorders etc.(Unit-8)

REFERENCE BOOKS

1. Boyer R (2000). 3rd Ed. Modern Experimental Biochemistry. Person Education, Asia.
2. Devlin TM (Ed) (2002). Textbook of Biochemistry with clinical correlations. 5th ed. Wiley-Liss.
3. Murray RK, Granner P, Mayes A, Rodwell VW (2003). Harper's Illustrated Biochemistry. McGraw-Hill.
4. Switzer RL, Garrity LF (1999). Experimental Biochemistry. WH. Freeman & Company.
5. Nelson DL & Cox MM (2004). Lehinger's Principles of Biochemistry. 2nd ed., Macmillan worth Publishers.
6. Voet D, Voet JG & Pratt CW (1999). Fundamentals of Biochemistry. Upgrade edition. John Wiley & Sons.

WEB LINKS

http://www.freebookcentre.net/Nutrition/Nutrition-Books

https://www.slideshare.net/

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 106

COURSE NAME:

PATHOLOGY COURSE

CREDIT: 2

TOTAL HOURS: 60

COURSE OBJECTIVES

This course will cover common cardiovascular diseases, their related pathology outline of clinical presentation and management of these conditions including medical and surgical interventions.

COURSE DESCRIPTION

Pathology involves the study of causes and mechanisms of diseases. The knowledge and understanding of Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

COURSE CONTENT

UNIT-1

Pericardial Diseases

- Pericardial effusion, Constrictive pericarditis, Cardiac tamponade

UNIT-2

Electrical disturbances of the heart

- Sinus node dysfunction, Arrhythmias and conduction disturbances, Treatment of arrhythmias, pharmacological, radiofrequency ablation and surgery

UNIT-3

Pulmonary hypertension

Primary pulmonary hypertension, Pulmonary thrombo-embolism

UNIT 4-

Peripheral Vascular Disease

- Atherosclerotic peripheral vascular disease, Aortic aneurysms, Aortic dissectiTakayasu arteritis

UNIT - 5

Congenital heart disease

(a) Acyanotic heart disease, Atrial septal defect, Ventricular

COURSE LEARNING OUTCOME

CLO 1- To have a brief understanding of pathology of pericardial diseases. (Unit-1)

CLO 2- To learn about the electrical activities of the heart and their disturbances. (Unit-2)

CLO 3- To have a brief knowedge on the different types of hypertension and its corrective treatment. (Unit-3)

CLO 4 and 5- To learn about the myocardial diseases including heart failures and cardiomyopathies and their corrective treatment protocol. (Unit4-5)

REFERRENCE BOOKS

1. Basic Pathology: An introduction to the mechanisms of disease- Sunil R Lakhani, Susan A Dilly,Caroline J Filayson.
2. Practical Pathology P. Chakraborty New Central Book Agency, Gargi Chakraborty
3. Text Book of Haematology Dr. Tejinder Singh
4. Text Book of Medical Praful Godkar Bhalani Publication House, Laboratory Technology
5. Practical Haematology Sir John Dacie.
6. Todd & Sanford, Clinical John Bernard Henry All India Travellar Booksellar, Diagnosis & Management Delhi by Laboratory Methods.
7. Practical Pathology Dr. Ganga S. Pilli Prabhu Publications, Dharwad.

WEB LINKS

http://www.freebookcentre.net/Nutrition/Nutrition-Books

https://www.slideshare.net/

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 107

COURSE NAME: COMPUTER

COURSE CREDIT: 1

TOTAL THEORY HOURS: 40

COURSE OBJECTIVE

The students should be able to have a working knowledge of computer software and hardware and be able to use computers for enhancing their class work.

COURSE DESCRIPTION

This course involves an introduction to the use of computers in daily life. The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE CONTENT

UNIT 1

Introduction to Computers: Definition of Computer; Components of Computer; Characteristics of Computers; History evolution of Computers; Generation of computers; Classification of Computers- According to Purpose, According to Technology, According to Size and Storage Capacity; Human being VS Computer; Difference between Computer and Calculator.

UNIT 2

Input Devices: Mouse, Keyboard, Light pen, Track Ball, Joystick, MICR, Optical Mark reader and Optical Character reader. Scanners, Voice system, Web, Camera. Output Devices: Hard Copy Output Devices; Line Printers, Character Printers, Chain Printers, Dot-matrix Printers, Daisy Wheel Printer, Laser Printers, Ink jet Printers, Plotters, Soft Copy device-Monitor, Sound card and speakers. Memory and Mass Storage Devices; Characteristics of Memory Systems; Memory Hierarchy; Types of Primary Memory; RAM and ROM; Secondary and Back-up; Magnetic Disks, Characteristics and classification of Magnetic Disk, Optical Disk, Magnetic Tape.

UNIT3

Documentation Using MS-Word -Introduction to Office Automation, Creating & Editing Document, Formatting Document, Auto -text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Advance Features of MS-Word-MailMerge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT 4

Electronic Spread Sheet using MS-Excel -Introduction to MS-Excel, Creating & Editing Worksheet, Formatting and Essential Operations, Formulas and Functions, Charts, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation.

UNIT 5 Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

COURSE LEARNING OUTCOME

CLO 1-Students will be able to demonstrate the characteristics of computer, block diagram of computer, generations of computer, computer languages. (Unit-1)

CLO 2- Ability to identify and demonstrate the Input devices and output devices. Students will have the knowledge of The Central Processing Unit (CPU), main memory. They will be able to develop the sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices. (Unit-2)

CLO 3- Students will be able to operate the windows. They will be able to use MS-word. MS office: MS word, MS PowerPoint, MS Excel, install different software and data entry efficiency. (Unit-3)

CLO 4 and 5- Students will be introduced about excel and they will know how to work on worksheet, entering information, saving work books and formatting, printing the worksheet, creating graphs. Power point will be introduce to the students and they will know how to create and manipulate presentation, views, formatting and enhancing text, slide with graphs.(Unit4-5)

TEXT BOOKS

1. Sinha, P.K. & Sinha, Priti, Computer Fundamentals, BPB

2. Dromey, R.G., How to Solve it By Computer, PHI

REFERENCE BOOKS

1. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.

2. Norton, Peter, Introduction to Computer, McGraw-Hill

3. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World

4. Rajaraman, V., Fundamentals of Computers, PHI

5. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 108

COURSE NAME: ENGLISH AND COMMUNICATION

COURSE CREDIT: 1

TOTAL THEORY HOURS: 40

COURSE OBJECTIVE

To educate the student in both the artistry and the utility of the English Language through the study of literature. To make students aware of the different communicative skills and make them effectively communicate in written and spoken modes. To provide students with the critical faculties necessary in an academic environment, while at job and in an increasingly complex and interdependent world.

COURSE DESCRIPTION

This course emphasizes the fundamental language skills of reading, writing, speaking, listening, thinking, viewing and presenting. An emphasis on vocabulary and composition skills will be an on-going part of the program. The development of critical reading and writing skills is a major emphasis of the course.

COURSE CONTENT

Unit 1

Pre- Requisites of written Communication

- One word substitution, Idioms and Phrases, Capital letters(use), Abbreviation, Antonyms, Synonyms, Word formation: prefix, suffix, Transformation of sentences: Interrogative to assertive & to negative & vice-versa.

Unit 2

Reading Skills

- Characteristics of reading, Types of reading, Purpose of reading, Process of reading, Rules for faster comprehension, Approach to reading, SQ3R, Comprehension (Unseen passage) .

Unit-3

Writing skills

- Report writings – Meaning and Introduction, Characteristics, Types, Business letters: Quotations and Tenders, Notice, Memorandum, Job Application Letter, Resume Writing, E-mail writing, Paragraph writing.

Unit 4

Technical Communication

- Nature, Origin and Development, Salient features, Scope & Significance, Forms of Technical Communication, Difference between Technical Communication & General Communication , Negotiation – Definition, Process, Types, Stages.

COURSE LEARNING OUTCOME

CLO 1 - To develop the students' abilities in grammar, oral skills, reading, writing and study skills and to improve their accuracy and fluency in producing and understanding spoken and written english. (Unit-1)

CLO 2 - To become a more competent, efficient, and perceptive academic reader who is able to communicate to others through writing and speaking the contents and main ideas of what is read and to develop skills that enable them to communicate effectively in writing. They will learn to present ideas clearly and logically to achieve a specific purpose and to be appropriate for an intended audience. (Unit-2)

CLO 3 - Develop abilities as a critical reader and writer. (Unit-3)

CLO 4 - Develop public speaking abilities by giving opportunities to speak in class, both informally and formally. (Unit-4)

PRACTICAL SYLLABUS-

a) Group Discussion

b) Just a minutes session: Speaking Extempore for one minutes on given topics

c) Reading aloud of newspaper headlines and important articles.

d) Improving pronunciation through tongue twisters.

e) Mannerism or Etiquette.

f) Mock Interview

CLO-1 To learn the skills of public speaking with confidence. To hold the command on voice. To be able to make a good rapport with the audience. (Unita-f)

REFERENCE BOOKS

1. Wren & Martin, High School English Grammar & Composition – S. Chand & Co. Delhi.

2. Raman Meenakshi & Sharma Sangeeta, Technical Communication-Principles & Practice –

O.U.P. New Delhi. 2007.

3. Mitra Barum K., Effective Technical Communication – O.U.P. New Delhi. 2006.

4. Better Your English- A Workbook for 1st year Students- Macmillan India, New Delhi. 5.Horn A.S., Guide to Patterns & Usage in English – O.U.P. New Delhi.

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	Grades
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE -BCT 201

COURSE NAME - MEDICAL ELECTRONICS, BIOPHYSICS AND COMPUTER USAGE RELEVANT TO CARDIAC TECHNOLOGY

COURSE CREDIT HOUR: 2

TOTAL CONTACT HR : 80

COURSE OBJECTIVES

To understand and get introduced to cardiac care, applied anatomy and physiology, noninvasive - ECG and TMT, noninvasive echocardiography, cardiac invasive in adult and pediatric, hardware and biomedical technology in Cath - Lab, clinical.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENT

UNIT1 – Introduction to Medical Physics

• Basics, Indications, Outcome, Machines related to Medical Physics.

UNIT2 – Electrophysiological Measurements

• Electrodes – Limb electrodes, floating electrodes, pregelled disposable electrodes, Microneedle and surface electrodes, ECG: Lead systems and recording methods, Typical waveforms, Electrical safety in medical environment: shock hazards, leakage current, Instruments for checking safety parameters of biomedical equipment, Transducers:selection criteria, Piezo electric ultrasonic transducers.

UNIT3 – Non – Electrical Prameter Measurements

• Measurement of blood pressure, Cardiac output, Stethoscope: Heart rate, Heart sound, ACT, Pulmonary function measurements – Spirometer, Photo Plethysmography, Body Plethysmography, Blood Gas analyzers: pH of blood, measurement of blood pCO2, pO2, finger-tip oximeter - ESR, GSR measurements.

UNIT4 – Assisting and Therapeutic Measurements

Types of Pacemakers, Types of Defibrillators, Ventilators- Types of Ventilators.

UNIT5 – Medical Imaging

• C-Arm, Coronary Computer tomography & MRI, TLD, Radiographic and fluoroscopic techniques: Echocardiography: TTE, TEE, Stress Echo, Coronary Angiography, PTCA

COURSE LEARNING OUTCOME

CLO1: Basic knowledge in Radiation Physics and Application, Medical Electronics. (Unit-1)

CLO2: Basic knowledge in ECG. (Unit-2)

CLO3: Basic knowledge in Exercise ECG. (Unit-3)

CLO4: Basic knowledge in echocardiography. (Unit-4)

CLO5: Basic knowledge in defibrillator, Doppler ultrasound and basic knowledge regaring cardiac equipments. (Unit-5)

TEXT BOOKS

1. R John Solaro, Biophysics of the failing Heart.
2. Dr. K R Valluvan, Medical Electronics.

REFERENCE BOOKS (LATEST EDITION)

1. M. Arumugam, 'Bio-Medical Instrumentation', Anuradha Agencies, 2003.
2. L.A. Geddes and L.E. Baker, 'Principles of Applied Bio-Medical Instrumentation', John Wiley & Sons, 1975.
3. J. Webster, 'Medical Instrumentation', John Wiley & Sons, 1995.
4. C. Rajarao and S.K. Guha, 'Principles of Medical Electronics and Bio-medical Instrumentation', Universities press (India) Ltd, Orient Longman ltd, 2000.

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

https://ecg.bidmc.harvard.edu

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE - BCT202

COURSE NAME – MEDICINE RELEVANT TO CARDIAC CARE TECHNOLOGY

COURSE CREDIT HOUR: 2

TOTAL CONTACT HR : 80

COURSE OBJECTIVE

This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

COURSE CONTENTS UNIT-1

Anti-anginal agents

1. Beta blockers

- Propranolol
- Atenolol
- Metoprolol
- Bisoprololcarvedilol,esmolol;

2. Nitrates

- Nitroglycerine
- Isosorbidedinitrate
- Isosorbidemononitrate
- Transdermal nitrate patches

2. Calcium channel blockers

- Nifedipine ,Verapamil, Dilteazem, Amlodipine.

UNIT-2

Anti-failure agents

1. **Diuretics**-furosemide, torsamide, thiazide diuretics, metolazone, spironolactone, combination diuretics;
2. **Angiotensin convertying enzyme (ACE) inhibitors –** captopril Enalapril, ramipril, lisinopril ACE inhibitors for diabetics and hypertensive renal disease;
3. **Digitalis and acute ionotropes**– digoxin, doubutamine, dopamine, adrenaline, noradrenaline, isoprenaline.

UNIT-3

Anti-hypertensive drug

- Diuretics, beta-blockers, ACE inhibitors, calcium antagonists, direct Vasodilators, centrally acting and peripherally acting vasodilators

UNIT-4

Anti- arrhythmic agents

- Amiodarone, adenosine, verapamil, diltiazem, lidocaine, mexiletine,Phenytoin, flecainide, bretylium, atro
- pine

UNIT-5

Antithrombotic agents

1. **Platelet inhibitors**: aspirin, clopidogrel;
2. **Anticoagulants**: heparin, low molecular weight heparin, warfarin;
3. **Fibrinolytics**: streptokinase, urokinase**;**
4. **Glycoprotein 2b3a antagonists**: abciximab, tirofiban, eptifibatide

UNIT-6

Lipid lowering and anti-atherosclerotic drugs

- Statins, exetimibe, niacin, fenofibrate

UNIT-7

Miscellaneous drugs

- **Narcotics**: Morphine, Pethidine, Fentanyl
- **Sedatives**: Diazepam, Midazolam
- **Steroids**: Hydrocortisone, Prednisolone
- **Antihistamines**: Diphenhydramine
- **Antibiotics**: Penicillins, Cephalosporins, Aminoglycosides
- **Anesthetic Agents**: Local, General Antacids and Proton Pump Inhibitors, Protamine

COURSE LEARNING OUTCOMES

CLO 1: Know the importance of cardiovascular drugs includes antihypertensives etc. (Unit-1)

CLO 2: Gain knowledge about antianginal and anti failure agents . (Unit-2)

CLO 3: Provide students insight into angiotensin convertying enzyme (ACE) inhibitors. (Unit-3)

CLO 4: Develop practical skills in the management of intake of miscellaneous drugs. (Unit-4)

CLO 5: Understand the pathology, microbiology related to valvular diseases. (Unit-5)

TEXT BOOKS

1. "Antianginal Drugs: Pathophysiological, Haemodynamic, Methodological, Pharmacological, Biochemical" by Robert Charlier.
2. "Pharmacological Basis of Therapeutics" by Goodman and Goodman
3. "Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations" by Sara E Rosenbaum

REFERENCE BOOKS

1. "Pharmacological Experiments on Intact Preparations" by L J McLeod
2. "Principles of Pharmacology: The Pathophysiologic Basis of Drug Therapy" by Golan
3. Basic and Clinical Pharmacology (Katzung)

WEB LINKS

1. www.cvphysiology.com
2. www.cvpharmacology.com
3. https://medicine.umich.edu/dept/pharmacology 4. https://pharm.virginia.edu
5. https://en.wikipedia.org
6. https://www.pharmacology.ucla.edu
7. https://www.drugs.com
8. https://en.wikipedia.org › wiki › Antianginal

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 40 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT203

COURSE NAME: APPLIED PHARMACOLOGY

COURSE CREDIT HOUR: 2

TOTAL CONTACT HOUR: 80

COURSE OBJECTIVE

This course will cover general pharmacology with special emphasis on common drugs used, route of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management of toxic effect, drug interaction, knowledge of chemical and trade names, importance of manufacture and expiry dates and instructions about handling each drug.

COURSE DESCRIPTION

The course designed for understand the general concepts about pharmacodynamic and Pharmacokinetic Principles involved in drug activity

COURSE CONTENTS

Unit – 1

General Concepts

- Principles involved in drug activity
- Drug dose, route of administration, indications, contra-indications and adverse drug reactions
- Drugs acting on Autonomic Nervous System- anti sialagogues, atropine, glycopyrolate and other drugs.

Unit – 2

Cardiovascular Drugs

A brief overview of mode of action, side effects and therapeutic uses of the following drugs:

- Antihypertensive, Beta Adrenergic antagonists, Alpha Adrenergic antagonists, Vasodilators, Peripheral Vasodilators, Calcium channel blockers, Antiarrhythmic drugs, Cardiac glycosides
- Sympathetic and non-sympathetic inotropic agents.
- Coronary vasodilators, Antianginals and drugs used in congestive heart failure.
- Lipid lowering & anti-atherosclerotic drugs.

- Drugs used in Haemostasis, anticoagulants,
- Thrombolytics and antithrombolytics
- Cardioplegic drugs - Introduction, principles and types of cardioplagia, primary solutions, drugs used in the treatment of shock.

Unit – 3

Anesthetic Agents and Common Drugss

- Introduction to anesthesia
- Types of anesthesia- general, local, spinal, epidural, regional, caudal and tropical anaesthesia
- General anesthesia- Dose, route and stages of GA administration, methods of GA administration, complications of GA administration and their management
- Clinical indications, dose, frequency, route of administration and counter effects of the following drugs:

  -Ketamine

  -Hydrocortisone

  -Dopamine

  -Atropine Sulphate

  -Propofol

  -Succinilecholine

  -Sodium Thiopentone Ether

  -Nitroglycerine etc

Unit – 4

Analgesics

- Definition and classification, routes, dose, frequency and side effects of administration of analgesics and their management

Unit – 5

Anti-Histaminics and Antiemetic

- Introduction, classification, dose, route of administration, mechanism of action, adverse effects and their management.

Unit – 6

CNS Stimulants and Depressants

- Alcohol, Sedatives, hypnotics and narcotics, CNS stimulant
- Neuromuscular blocking agents and muscle relaxants
- Inhalational gases and emergency drugs
- Pharmacotherapy of respiratory disorders viz. bronchial asthma, cough, bronchiectasis, Bronchospasm etc.
- Mucokinetic and mucolytic agents

- Corticosteroids- Use, classification, dose, frequency, action mechanism, side effects and their management.

Unit-7

Chemoprophylaxis

- Introduction, classification, action mechanism, dose, route of administration, adverse reactions and management of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol and antitubercular drugs.

Unit – 8

Diuretics and Miscellaneous Drugs

- Physiology of Glomerular filtration, introduction to dieuretics, clinical indications, types, dose, frequency, route of administration, mechanism of action, adverse reactions and management of adverse site of action of diuretic drugs, . Adverse effects. Preparation, dose and routes of administration.

Unit – 9

Miscellaneous

- Fluids - Various preparations and their usage.
- Electrolyte supplements, plasma expanders.
- Immunosuppressive agents. New drugs included in perfusion technology.

TEXT BOOKS

1. "Antianginal Drugs: Pathophysiological, Haemodynamic, Methodological, Pharmacological, Biochemical" by Robert Charlier.
2. "Pharmacological Basis of Therapeutics" by Goodman and Goodman
3. "Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations" by Sara E Rosenbaum

REFERENCE BOOKS

1. "Pharmacological Experiments on Intact Preparations" by L J McLeod
2. "Principles of Pharmacology: The Pathophysiologic Basis of Drug Therapy" by Golan
3. Basic and Clinical Pharmacology (Katzung)

WEB LINKS

1. www.cvphysiology.com
2. www.cvpharmacology.com
3. https://medicine.umich.edu/dept/pharmacology 4.https://pharm.virginia.edu
5. https://en.wikipedia.org
6. https://www.pharmacology.ucla.edu
7. https://www.drugs.com
8. https://en.wikipedia.org › wiki › Antianginal

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE-204

COURSE NAME – INTRODUCTION OF CARDIAC CARE TECHNOLOGY

CREDIT HOURS- 4

TOTAL CONTACT HOURS- 160

COURSE OBJECTIVES

To understand ECG and its techniques, Exercise testing, Echocardiography, Doppler Echocardiography ,Contrast Echo and Echo measurements and its application in clinical practice.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENTS

PART-A (ELECTROCARDIOGRAPHY)

Unit – 1

Orientation to Instrumentation in ECG

- Introduction
- Parts of Manual, Semi Automated & Automated ECG Machine
- Mode of Functioning & Advantages & Disadvantages

Unit – 2

ECG Leads, Jelly & ECG Paper

- Unipolar & Bipolar Limb Leads
- Augmentation Leads
- Esophageal Leads
- Color Codes in ECG Leads
- ECG Jelly Its Role
- ECG Paper & Properties
- Normal Paper Speed & Standardization
- Calibration
- Filter

Unit – 3

ECG Techniques

- Basics of ECG Technique
- Getting the Patient Prepared for ECG
- Application of Jelly
- Placement of Chest & Limb Leads
- Parameters for Recording a Good Electrocardiogram

Unit – 4

Normal Electrocardiogram

- Normal P, Q & T Wave
- P-R Interval
- QRS Complex
- QT Interval & ST Segment
- Duration & Amplitude of Different Normal Waves

Unit – 5

Exercise ECG & Tread-Mill Test

- Introduction
- TMT & Exercise ECG

Unit – 6

Abnormal Electrocardiogram & Interpretation

- Abnormal P-Wave & A-V Node
- LBBB & RBBB
- LVH & RVH
- Pulmonary Embolism & COPD
- Myocardial Infarction & Mitral Stenosis
- Sinus Tachycardia & Sinus Bradycardia
- Sick Sinus Syndrome

PART-B (TMT & HOLTER)

Unit – 1

TMT

- Introduction
- Working Principles
- Tread Mill Test
- Stress Test (ECG recording during Exercise)

Unit – 2

Equipment

- Treadmill ECG Machine
- Various parts of ECG Machine
- Ambulatory BP Monitoring Machine
- Computer

Unit – 3

Conducting

TMT

- Preparation of Patient
- Application of Electrodes
- Procedure-entry of patients data
- Choice of Protocol (Bruce, Modified Bruce)

- Precautions while doing TMT

Unit – 4

Other Issues

- Normal and abnormal TMT recording
- Complications while doing TMT

Unit – 5

Holter Techniques

- Introduction
- Holter Instrumentation
- Patient Preparation
- Principles of Holter Recording
- Connections of the Holter recorder
- Holter Analysis Guidelines for ambulatory electrocardiography

PART-C (ECHOCARDIOGRAPHY)

Unit – 1

Introduction

- Basic Principles of USG/Echocardiography
- Clinical uses of echocardiography

Unit – 2

The Type s

- Types of Echocardiography
- Trans Thoracic Echocardiography
- Trans esophageal Echocardiography

Unit – 3

Instrumentation in Echocardiography

- Equipments
- Echo Machine Probe
- Mechanical Probe
- Electronic phased array
- Echocardiography- 2D mode,
- M mode, 3D

Unit – 4

Principles of Doppler

- Introduction
- The Doppler Wave
- Pulse wave Doppler

- Continuous Wave Doppler Color Doppler
- Color M Mode(Q mode)

Unit – 5

Advantages, Maintenance and Patient Preparation

- Advantages of Echocardiography
- Cleaning, Disinfection & Maintenance
- Preparation of Patient
- Approach of Tran thoracic Echocardiography
- Different Views
- Parasternal long Axis View
- Parasternal Short Axis View
- Apical 4 Chamber View
- Sub costal view

Unit – 6

Stress Echocardiography

- Introduction to Stress echo & Contrast echo
- Exercise stress echo
- Cardiac Medications
- Cardiac Emergencies
- Cardiac Revascularization
- Pharmacological Agents for Stress Echo
- Emergency Echocardiography

Unit – 7

Measurement of Cardiac Dimensions

- Evaluation of systolic and diastolic left ventricular function
- Regional wall motion abnormalities
- Stroke volume and cardiac output assessment
- Transvalvular gradients, Orifice area, Continuity equation

Course Outcome

On the successful completion of the course, students will be able to

CLO1.Understand the basics of Electrocardiography(ECG) .(Unit-1)

CLO2. Know the importance of Exercise stress Testing. (Unit-2)

CLO3. Understand about the Echocardiography. (Unit-3)

CLO4.Provide students insight into Doppler Echocardiography. (Unit-4)

CLO5. Appraise various technology of Medical Electronics, Biophysics and Computer Usage relevant to Cardiac diseases. (Unit-5)

TEXT BOOKS

1. Antoni Bayes De Luna, A textbook of Clinical Electrocardiography, 4th edition 2010.
2. Tomas B. Gracia, MD, A textbook of 12 Lead ECG Interpretation, 2nd Edition 2008.
3. Coues, Electrocardiography in Clinical Practice, 6th Edition 2005.

REFERENCE BOOKS

1. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2–e220. [PMC free article] [PubMed]
2. Hamm CW, Bassand JP, Agewall S, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST- segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2011 [PubMed]
3. Patel MR, Peterson ED, Dai D, et al. Low diagnostic yield of elective coronary angiography. N Engl J Med. 2010;362(10):886–895. [PMC free article] [PubMed]
4. Canadian Cardiovascular Society, American Academy of Family Physicians, American College of Cardiology. et al. 2007 focused update of the ACC/AHA 2004 guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.[erratum appears in J Am Coll Cardiol. 2008 Mar 4;51(9):977] J Am Coll Cardiol. 2008;51(2):210–247. [PubMed]

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

https://ecg.bidmc.harvard.edu

https://cardiacos.net › uploads › ArticulosMedicos

https://ecgwaves.com

https://www.wolterskluwer.com › ...

ASSESSMENT METHOD

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE –BCT 205

COURSE NAME – APPLIED MICROBIOLOGY AND PATHOLOGY

COURSE CREDIT HOUR: 2

TOTAL CONTACT HR : 60

COURSE OBJECTIVE

This course will cover common cardiovascular diseases, their related pathology outline of clinical presentation and management of these conditions including medical and surgical interventions and to learn about all aspects of the organisms in order to not only determine how they live in their environment, but also how they impact their respective surroundings and thus other organisms around them (human beings, animals, etc).Microbiology has proved to be one of the most important disciplines in biology, making it possible to identify how some of these organisms cause diseases, discover cures for such diseases and even use some microbes for industrial purposes etc.

COURSE DESCRIPTION

The course has focus on causes and mechanisms of diseases.The knowledge and understanding of Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Microbiology involves the study of common organisms causing diseases including nosocomial infections and precautionary measures to protect one from acquiring infections. The knowledge and understanding of Microbiology & Pathology of diseases is essential to institute appropriate treatment or suggest preventive measures to the patient. Particular effort is made in this course to avoid burdening the student.

COURSE CONTENTS

Unit - I

- **Atherosclerosis**-definition, risk factors, pathogenesis, morphology and complications
- **Ischemic heart disease**: Myocardial infarction - definition, pathogenesis, morphology and complications
- **Hypertension**- Benign and malignant hypertension: pathogenesis, pathology and complication

Unit - 2

- Heart failure - Right and left heart failure: causes, pathophysiology and morphology
- Rheumatic heart disease and infectious endocarditis - definition, etiopathogenesis, morphology and complications
- Congenital heart disease- Types and atrial septal defect; aneurysms - types and morphology; cardiomyopathies in brief

Unit - 3

- Atelectasis - types, Adult respiratory distress syndrome - causes , pathogenesis and morphology; pulmonary edema- classification, causes and morphology
- Chronic obstructive pulmonary disease- Chronic bronchitis, emphysema, asthma, bronchiectasis: Definition, etiopathogenesis and morphology
- Restrictive pulmonary diseases - Definition, categories, pathogenesis and morphology

Unit -4

- Pneumoconiosis - types, asbestosis, coal workers pneumoconiosis - etiopathogenesis and morphology
- Pulmonary embolism, infarction, pulmonary hypertension - Definition, etiopathogenesis and morphology
- Pneumonia - Classification of pneumonias; Lobar pneumonia and bronchopneumonia - etiology, pathology and complications

Unit - 5

- Clinical manifestations of renal diseases
- Glomerular lesions in systemic diseases - diabetes, amyloidosis and systemic lupus erythematosus
- Pericardial and pleural effusions - causes and microscopy

PART – B (APPLIED

MICROBIOLOGY) COURSE

CONTENTS

Unit - 1

- Sterilization and disinfection - classification, principle, methods
- Central sterile supply department

Unit – 2

- Importance of sterilization and disinfection
- Disinfection of instruments used in patient care
- Disinfection of patient care unit
- Infection control measures for ICUs

Unit - 3

- Health care associated infections
- Surgical site infections
- Urinary tract infections
- Ventilator associated pneumonia
- Catheter associated blood stream infections
- Antibiotic associated

diarrhea Unit - 4

- Drug resistant bacteria
- MRSA VRE Drug resistant Gram negative bacteria

Unit - 5

- Occupationally acquired infections and its prevention
- Respiratory route - Tuberculosis, Varicella zoster virus, Influenza, RSV
- Blood borne route - HIV, HBV, HCV, CMV, Ebola
- Orofecal route - Salmonella, Hepatitis A
- Direct contact - Herpes virus

COURSE LEARNING OUTCOMES

CLO 1- To have a brief understanding of pathology of pericardial diseases. (Unit-1)

CLO 2- To learn about the electrical activities of the heart and their disturbances. (Unit-2)

CLO 3- To have a brief knowedge on the different types of hypertension and its corrective treatment. (Unit-3)

CLO 4 and 5- To learn about the myocardial diseases including heart failures and cardiomyopathies and their corrective treatment protocol. (Unit4-5)

TEXT BOOKS

1. Text Book of Medical Praful Godkar Bhalani Publication House, Laboratory Technology
2. Practical Haematology Sir John Dacie.
3. Todd & Sanford, Clinical John Bernard Henry All India Travellar Booksellar, Diagnosis & Management Delhi by Laboratory Methods.

REFERENCE BOOKS

1. Basic Pathology Robbins Saunders an imprint of Elsevier Inc., Philadelphia, USA
2. Text book of Pathology Harsh Mohan Jaypee Brothers, New Delhi
3. Practical Pathology P. Chakraborty, GargiChakraborty New Central Book Agency, Kolkata
4. Text Book of Haematology Dr.Tejinder Singh Arya Publications, Sirmour (H.P) 5 Text Book of Medical Laboratory Technology PrafulGodkar, Bhalani Publication House, Mumbai

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

https://ecg.bidmc.harvard.edu

https://cardiacos.net › uploads › ArticulosMedicos

https://ecgwaves.com

https://www.wolterskluwer.com › ...

ASSESSMENT METHOD

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 301

COURSE NAME- CARDIAC CARE TECHNOLOGY (CLINICAL)

COURSE CREDIT HOUR-4

TOTAL CONTACT HR-160

COURSE OBJECTIVES

To understand interventional cardiology, concepts, equipments and procedures and its application in clinical practice.

COURSE DESCRIPTION

Course will also focus on providing care to patients in ICU, CCU or Cardiac Catheterization Lab; executing needs assessment, organizing patients for medical procedures, monitoring patient's vital signs, operating treatment equipment's, administering Intravenous therapy (IV)" and various tasks to be performed in the Cath-lab for interventional cardiac procedures. As this field is continuously evolving it is essential to keep updated on the latest technologies.

COURSE CONTENTS

Unit – 1

Introduction to interventional Cardiology

- Introduction to interventional Cardiology
- The selection of patient for Interventional Cardiology Technical Consideration for performing
- Percutaneous Coronary Interventions (PCI) Managing Complications in PCI

Unit – 2

Instrumentation

- Types of catheters Catheter cleaning and packing
- Techniques of sterilization-advantages and disadvantages of each
- Setting up the cardiac catheterization laboratory for a diagnostic study
- Table movement Image intensifier movement Image play back

Unit – 3

Basic Cardiac Concept

- Measuring Intra cardiac pressures
- Pressure recording systems
- Fluid filled catheters versus catheter tipped manometers
- Artifacts
- Damping
- Ventricularization
- Pressure gradient recording pullback
- Peak-to peak Cardiac output determination
- Thermo dilution method,
- Oxygen dilution method,
- Principles of oximetry
- Shunt detection and calculations

Unit – 4

Vascular Access for Interventional Procedures

- Vascular Access
- Complications of Vascular Access
- Coronary Artery Access and Guide wire Catheters

Unit - 5

Basic Coronary Balloon Angioplasty

- Overview of basic PCI
- Method Mechanism of Angioplasty
- Indications for PCI
- PCI Equipments
- Stents
- Managing
- Complications
- During Stent Delivery & Implantation
- Clinical Procedures for PCI
- Medical Therapy After PCI

Unit – 6

Angiography for Percutaneous Interventions

- Objectives of PCI Angiography
- Common Angiographic Views for Angioplasty
- Techniques of Coronary Arteriography
- Angiographic & Video Imaging System
- Medications Used in Coronary Angiography
- Pacemakers During PCI

Unit - 7

Complications of Percutaneous Coronary Interventions

- Myocardial Infarction During PCI Hypotension & Arrhythmias
- Peripheral Vascular Complications
- Complications of Radiographic Contrast Media

COURSE LEARNING OUTCOMES

CLO1-Describe clinical significance of electrical deflections on ECG Review, six step systemic approach to interpretation of 12 Lead ECG, components of a normal 12 Lead ECG. (Unit-1)

CLO2- ECG changes in relation to physiological events. (Unit-2)

CLO3- Analyze QRS axis shifts in relation to various disease states. (Unit-3)

CLO4- Evaluate ECG patterns for presence of myocardial ischemia, injury and infarction. (Unit-4)

CLO5-Determine the presence of conduction abnormalities indicating bundle branch block. (Unit-5)

CLO6-7-Determine probability of supraventricular (SVT) vs. ventricular tachycardia (VT), causes, clinical presentation and treatments for QT prolongation, electrical pathway of the heart identify the three planes of electrocardiography: standard limb leads, augmented leads, precordial leads .

TEXT BOOKS

1. Antoni Bayes De Luna, A textbook of Clinical Electrocardiography, 4th edition 2010.
2. Tomas B. Gracia, MD, A textbook of 12 Lead ECG Interpretation, 2nd Edition 2008.
3. Coues, Electrocardiography in Clinical Practice, 6th Edition 2005.

REFERENCE BOOKS

1. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2–e220. [PMC free article] [PubMed]
2. Hamm CW, Bassand JP, Agewall S, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2011 [PubMed]
3. Patel MR, Peterson ED, Dai D, et al. Low diagnostic yield of elective coronary angiography. N Engl J Med. 2010;362(10):886–895. [PMC free article] [PubMed]
4. Canadian Cardiovascular Society, American Academy of Family Physicians, American College of Cardiology. et al. 2007 focused update of the ACC/AHA 2004 guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.[erratum appears in J Am Coll Cardiol. 2008 Mar 4;51(9):977] J Am Coll Cardiol. 2008;51(2):210–247. [PubMed]

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

https://ecg.bidmc.harvard.edu

https://cardiacos.net › uploads › ArticulosMedicos

https://ecgwaves.com

https://www.wolterskluwer.com › ...

ASSESSMENT METHOD

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 351

COURSE NAME- CARDIAC CARE TECHNOLOGY – CLINICAL (PRACTICAL)

COURSE CREDIT HOUR-2

TOTAL LAB HR-40

COURSE OBJECTIVES

To understand interventional cardiology, concepts, equipments and procedures and its application in clinical practice.

COURSE DESCRIPTION

Course will also focus on providing care to patients in ICU, CCU or Cardiac Catheterization Lab; executing needs assessment, organizing patients for medical procedures, monitoring patient's vital signs, operating treatment equipment's, administering Intravenous therapy (IV)" and various tasks to be performed in the Cath-lab for interventional cardiac procedures. As this field is continuously evolving it is essential to keep updated on the latest technologies.

COURSE CONTENTS

Practicals

1. Interpretation of Normal ECG and Basic abnormalities of ECG in RHD, IHD & CHD ECG in myocardial infarction- definition of myocardial infarction, diagnosis of myocardial infarction, ECG criteria for myocardial infarction, ECG in anterior wall, inferior wall, true posterior wall and sub endocardial infarction and RV infarction.

2. ECG in rheumatic heart disease - definition of rheumatic heart disease, valvularinvovement in rheumatic heart disease, ECG in mitral stenosis, mitral incompetence, aortic stenosis and aortic incompetenance

3. ECG in hypertension- definition of hypertension, how to record blood pressure, ECG in hypertension

4. ECG in congenital heart disease- common congenital heart disease ASD, VSD, PDA, pulmonary stenosis, aortic stenosis, coarctation of aorta, TOF, definition of all these conditions , ECG changes in all

these conditions

5. ECG in other conditions - ECG in various types of cardiomyopathy, myxoedema, pericardial effusion, acute pericardities and other vascular diseases. Bundle branch block, WPW syndrome, dextrocardia

6. Trans esophageal echocardiogram - indications, procedure, usefulness and complications one may encounter and its management

7. Stress Echo- procedure and indications and Peripheral Doppler - Procedure and usefulness of peripheral Doppler

8. Coronary angioplasty-procedure, materials used, complication one may encounter and how to manage it

9. Fetal echocardiogram - Procedure, basic interpretation

10. Contrast echocardiogram - procedure and usefulness of contrast echocardiogram

11. Myocardial contrast echo- Basic knowledge

COURSE LEARNING OUTCOMES

CLO1-Describe clinical significance of electrical deflections on ECG Review

CLO2- ECG changes in relation to physiological events

CLO3- Analyze QRS axis shifts in relation to various disease states

CLO4- Evaluate ECG patterns for presence of myocardial ischemia, injury and infarction

CLO5-Determine the presence of conduction abnormalities indicating bundle branch block.

CLO6-Determine probability of Supraventricular (SVT) vs. Ventricular Tachycardia (VT).

CLO7- Describe causes, clinical presentation and treatments for QT prolongation.

CLO8-Describe the electrical pathway of the heart Identify the three planes of electrocardiography: standard limb leads, augmented leads,precordial leads .

CLO9- Describe the components of a normal 12 Lead ECG.

CLO10- Describe the six step systemic approach to interpretation of 12 Lead ECG.

CLO11-Relate coronary artery anatomy to myocardial perfusion.

CLO12-Recognize common ECG patterns associated with various locations of injury/infarction.

CLO13- Interpret various 12 lead ECG examples.

TEXT BOOKS

1. Antoni Bayes De Luna, A textbook of Clinical Electrocardiography, 4th edition 2010.
2. Tomas B. Gracia, MD, A textbook of 12 Lead ECG Interpretation, 2nd Edition 2008.
3. Coues, Electrocardiography in Clinical Practice, 6th Edition 2005.

REFERENCE BOOKS

1. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2–e220. [PMC free article] [PubMed]
2. Hamm CW, Bassand JP, Agewall S, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2011 [PubMed]
3. Patel MR, Peterson ED, Dai D, et al. Low diagnostic yield of elective coronary angiography. N Engl J Med. 2010;362(10):886–895. [PMC free article] [PubMed]
4. Canadian Cardiovascular Society, American Academy of Family Physicians, American College of Cardiology. et al. 2007 focused update of the ACC/AHA 2004 guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.[erratum appears in J Am Coll Cardiol. 2008 Mar 4;51(9):977] J Am Coll Cardiol. 2008;51(2):210–247. [PubMed]

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

ASSESSMENT METHOD

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 302
COURSE NAME – CARDIAC CARE TECHNOLOGY (APPLIED)
COURSE CREDIT HOUR-4
TOTAL THEORY HR-160

COURSE OBJECTIVES

To understand ECG and its techniques, Exercise testing, Echocardiography, Doppler Echocardiography, Contrast Echo and Echo measurements and its application in clinical practice.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENT

Unit – 1

Cardiac Monitoring

- Definition & purpose of cardiac monitoring
- How to Recognize various arrhythmias
- Methods to set up a intensive coronary care unit
- Use fullness of ICCU

Unit – 2

Cardiac Diagnostic Modalities and Diagnosis Interpretation

- Diagnostic Interpretation of TMT report
- Criteria for TMT positive test
- Contraindication for TMT conditions where TMT is not useful
- Complications of TMT room and its management

Unit – 3

Cardiac Emergencies and Management

- Cardiac Arrest – Definition & causes External cardiac massage
- Artificial respiration and other drugs and procedures used in the management of Cardiac arrest
- Use of defibrillator
- Indication
- How to use the defibrillator
- Complications during the procedure and its management

Unit - 4

Management of Angina

- Introduction and Classification of Angina
- Treatment of Stable Angina
- Management of Unstable Angina
- Variant Angina

Unit – 5

Management of Acute Myocardial Infarction

- Introduction to MCI
- Coronary Care Therapeutics
- Limitation of Infarct Size and Increased Survival Drugs in MCI:
- Overview Management of Complications of Infarction.

Unit – 6

Management of Heart Failure

- Introduction
- Diagnosis
- Basic Cause
- Factors Precipitating Heart Failure
- Specific Treatment of Heart Failure
- Vasodilators
- Diuretics
- Beta Blockers
- Management of Pulmonary Edema

Unit – 7

Management of Cardiac Arrhythmias

- Introduction and Classification
- Diagnosis
- Management of Supraventricular Arrhythmia
- Ventricular Arrhythmia
- Ventricular Tachycardia
- Antiarrhythmic Agents and their Classification: Overview

Unit – 8

Cardiac Arrest

- BLS
- ACLS

Unit – 9

Management of Infective Endocarditis

- Introduction, Classification and Diagnosis
- Prophylaxis of Bacterial Endocarditis

Unit – 10

Cardiac Drugs during Pregnancy

- Anti Hypertensive Agents in Pregnancy
- Drug Therapy for Heart Failure in Pregnancy
- Antiarrhythmic Agents in Pregnancy
- Cardiac Drugs during Lactation

COURSE LEARNING OUTCOMES

CLO1. To develop an understanding regarding treadmill test. (Unit-1)

CLO2.To understand regarding different type of stress test. (Unit-2)

CLO3.To understand the procedure for carrying out stress Echo including the placement of leads during the test. (Unit-3)

CLO4.To understand how to prepare the patient for a cardiac stress echo, DSE, etc. (Unit-4)

CLO5.Understand various differences in the findings of a normal and an ischemic heart. (Unit-5)

CLO6.To understand the working & procedure of an isotope stress test. (Unit-6)

CLO7. To develop broad understanding regarding necessary precautions which to be taken while performing an isotope stress test. (Unit-7)

TEXT BOOKS

1.Antoni Bayes De Luna, A textbook of Clinical Electrocardiography, 4th edition 2010.

2.Tomas B. Gracia, MD, A textbook of 12 Lead ECG Interpretation, 2nd Edition 2008.

3.Coues, Electrocardiography in Clinical Practice, 6th Edition 2005.

REFERENCE BOOKS (LATEST EDITION)

1. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2–e220. [PMC free article] [PubMed]
2. 2.Hamm CW, Bassand JP, Agewall S, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2011 [PubMed]
3. Patel MR, Peterson ED, Dai D, et al. Low diagnostic yield of elective coronary angiography. N Engl J Med. 2010;362(10):886–895. [PMC free article] [PubMed]
4. Canadian Cardiovascular Society, American Academy of Family Physicians, American College of Cardiology. et al. 2007 focused update of the ACC/AHA 2004 guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.[erratum appears in J Am Coll Cardiol. 2008 Mar 4;51(9):977] J Am Coll Cardiol. 2008;51(2):210–247. [PubMed

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 302

COURSE NAME – CARDIAC CARE TECHNOLOGY (APPLIED PRACTICAL)

COURSE CREDIT HOUR-2

TOTAL LAB HR-40

COURSE OBJECTIVES

To understand ECG and its techniques, Exercise testing, Echocardiography, Doppler Echocardiography, Contrast Echo and Echo measurements and its application in clinical practice.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENT

PRACTICALS

1. Parts of an ultrasound
2. Monitoring of hemodynamic parameters
3. Identify Parts of a defibrillator
4. Basic Life support
5. Advanced Cardiac Life Support
6. Identify rhythms for defibrillation
7. Perform the procedure for defibrillation.
8. Setting up of a cardiac catheterization unit for PTCA / Angiography
9. Identification of the various instruments used in a cath study / BMV / PTCA
10. Packing and washing of all equipments in a cardiac catheterization lab.
11. Perform an ECHO 2D on a patient - identification of various abnormalities and a Screening ECHO / Bedside ECHO.and the student must be exposed to various abnormalities that can be identified by using the ECHO.
12. Independently maintain the cath lab table and its movements
13. Interpretation of TMT, report – criteria for TMT positive test contraindication for TMT conditions where TMT is not useful, complications that may occur in TMT room and its management
14. Use of defibrillator- indications, how to use the defibrillator, complications during the procedure and its management
15. Cardiac arrhythmias – bradyarrhythmia and tachy arrhythmias and ECG diagnosis of all rhythm disturbances. Sinus arrhythmia, APC, FPC, VPC, VF, VT, AF, SVT, I0HB, II0HB, complete heart block
16. Electrolyte disturbances – ECG in hypokelemia, hyperkelemiaetc,.
17. Device closure of ASD – procedure, indications and materials used for device closure of ASD
18. Device closure of VSD – procedure, indications and materials used for device closure of VSD
19. Oxymetry – handling of the instrument and usefulness of the instrument, normal and abnormal values.
20. Pressure recording- handling of the instrument and pressures in various chambers, normal and abnormal values
21. Procedure during pregnancy- precautions to be followed.

COURSE OUTCOMES

On the successful completion of the course, students will be able to

CLO1. Understand and perform various test and procedures in hospital as well as in community settings

CLO2. Apply their knowledge and skills in research activities ,clinical presentations and preparing case studies in hospital settings.

TEXT BOOKS

1.Antoni Bayes De Luna, A textbook of Clinical Electrocardiography, 4th edition 2010.

2.Tomas B. Gracia, MD, A textbook of 12 Lead ECG Interpretation, 2nd Edition 2008.

3.Coues, Electrocardiography in Clinical Practice, 6th Edition 2005.

REFERENCE BOOKS (LATEST EDITION)

1. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. Circulation. 2012;125(1):e2–e220. [PMC free article] [PubMed
2. 2.Hamm CW, Bassand JP, Agewall S, et al. ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: The Task Force for the management of acute coronary syndromes (ACS) in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J. 2011 [PubMed]
3. Patel MR, Peterson ED, Dai D, et al. Low diagnostic yield of elective coronary angiography. N Engl J Med. 2010;362(10):886–895. [PMC free article] [PubMed]
4. Canadian Cardiovascular Society, American Academy of Family Physicians, American College of Cardiology. et al. 2007 focused update of the ACC/AHA 2004 guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines.[erratum appears in J Am Coll Cardiol. 2008 Mar 4;51(9):977] J Am Coll Cardiol. 2008;51(2):210–247. [PubMed

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT303

COURSE NAME- CARDIAC CARE TECHNOLOGY (ADVANCED)

COURSE CREDIT HOUR-3

TOTAL CONTACT HR-120

COURSE OBJECTIVES

To provide the critical information to students when beginning with interventional cardiology extension of techniques and methods described for diagnostic catheterization and specially related techniques.

COURSE DESCRIPTION

Course will also focus on providing care to patients in ICU, CCU or Cardiac Catheterization Lab; executing needs assessment, organizing patients for medical procedures, monitoring patient's vital signs, operating treatment equipment's, administering Intravenous therapy (IV)" and various tasks to be performed in the Cath-lab. As this field is continuously evolving it is essential to keep updated on the latest technologies.

COURSE CONTENTS

(PART – A)

CARDIAC CATHETERIZATION – I

UNIT – 1

- Cardiac Catheterization: Laboratory Setup / Types of Procedures
- Sterile Techniques in Cath Lab / Sterile Areas, Sterile Procedure, sterile trolley setting, Scrubbing, gowns and Gloves, scrubbing and draping Patients, handling sterile disposables etc.
- Sterilization and re-use of hardware

UNIT – 2

- Equipments: Cath-Lab Equipments
- Defibrillator / Pacemaker / IABP / BOYLE's Apparatus / Suction Machine/ Oxygen
- Infusion Pumps / Programmed Stimulators, Pacing System Analyzers
- Equipments in Cath-Lab
- Hemodynamic Recorders (Physiological Records), Transducers

- Recording of Pressure Wave Form
- Range / Gain / Speed / Systolic / Diastolic And Mean Pressures In Chambers And Vessels

UNIT – 3

- Hazard Management
- Radiation Protection
- Infection Prevention
- Injury Prevention: Electrical /Mechanical
- Wastes Management – Plastics, Biological Wastes, Glass / Needle / Syringes, Metallic Waste

UNIT – 4

- Technician's Role
- Patient monitoring
- Procedure Related : Data collection
- Acquisition and entry of Data, Procedure Books,
- Handling of Equipment
- Log Books, Registers etc.
- Stock of all disposables Eg: Catheters etc.
- Stores (Disposable Items)
- Accounting (Used Items)
- Equipment Maintenance
- Cine Angiography: Cine Filming, Cine Film Processing and Cine Film Viewing , cine film library
- Contrast Media

(PART – B)

Cardiac Catheterization – II

UNIT – 1

- Cardiac Catheterization Procedure: Diagnostic Studies
- Cardiac Catheterization Procedure: Therapeutic / Interventional Procedures

UNIT – 2

- Acquisition of Cath Data : Cardiac Output / Oximetry and Shunts
- Acquisition of Cath Data: Pressures and Wave Forms; Recording Technique, Analysis
- Angiography: Technique / Views / Contrast Media

UNIT – 3

- Cardiac Catheterization
- Application of Echocardiography

- Hardware :Catheters / Connections / Sheaths / Stopcocks / Wires / Angioplasty Catheters
- Complication of Cardiac Catheterization: Recognition and management
- Cardiopulmonary Resuscitation
- Special Procedures: Pericardial Tap, Atrial Septostomy, Endomyocardial Biopsy, Balloon Angioplasty (Valve), Coronary Angioplasty

UNIT – 4

- Case Study of Simple Cardiac Disease
- ASD, MS, Tetralogy of Fallot

UNIT – 5

- Hardware Of Cardiac Catheterization And Interventions
- Venous and Arterial Check Flow Sheaths, Manifolds, 3-Way Stock Cocks etc.
- Guide Wires and Dilators
- Puncture Needles (Vascular Access Needles)
- Woven Dacron Catheters: GL, NIH, Lehman, Woven Dacron Electrode Catheters
- Flow Directed Catheters (Swan Ganz Type) Balloon Angio Catheters
- Polyurethane Catheters: Pig Tail, Judkins, Coronary, Amplatz Coronary, Brachial Coronary, Sones Catheters.
- Guide Wires: Short, Normal Length, Exchange Length 'J' Tipped Movable Core, Tips, Deflectable Types
- Valvuloplasty Catheters, Atrial Septostomy Catheters
- Coronary Angioplasty: Guide Catheters, Guide Wire, Balloon Dilatation Catheters, Indiflators, Y Connectors
- Stents: Bare Stents, Mounted Stents, Other Types of Stents

(PART – C)

CARDIAC CATHETERIZATION - III

Unit – 1

Aortic Angiography

- Aortic root, arch, abdominal aorta
- Peripheral angiography and carbon dioxide angiography
- Catheterization and angiography in children with congenital heart disease,

Unit - 2

Contrast

Agents

- Definition

- Classification- Positive, Negative, HOCM, LOCM, Ionic, Non Ionic

- Routes of Contrast Media Administration
- Reactions of Contrast media
- Management of Contrast Media Reactions ABCD Management

Unit – 3

Coronary angioplasty (PTCA)

- Equipment and hardware used in PTCA
- Setting up the laboratory for a PTCA
- Case Management of complications: Slow flow/no flow, acute stent thrombosis
- Dissection, Perforation

Unit – 4

Pediatric Interventions

- Aortic and pulmonary valvuloplasty
- Coarctation angioplasty and stenting
- Device closure of PDA, ASD, VSD
- Technique and devices used Sizing of devices & Coil

Unit – 5

Balloon Mitral Valvuloplasty (BMV)

- Techniques and hardware used in BMV
- Setting up the laboratory for a BMV case

Unit – 6

Trans Septal Puncturing

- Technique and equipment used for trans-septal puncture
- Recording of transmitral pressure gradients
- Management of cardiac tamponade
- Peripheral interventions, Equipment and techniques used
- Endovascular exclusion of aneurysms

Unit – 7

IABP Techniques

- Self-expanding stents, covered stents and cutting balloons
- Intra-aortic balloon pump (IABP)
- Theory of intra -aortic balloon counters pulsation
- Indications for IABP use
- Setting up the IABP system

Unit – 8

Thromboembolic Diseases & Diagnosis

- Introduction, indications and use of vena caval filters

- Techniques of thrombolysis
- Drug and catheters used
- Thrombus aspirations systems – coronary & peripheral

Unit - 9

Cardiac Pacing

- Arrhythmias: Brady and Tachy Arrhythmias
- Indication For Temporary / Permanent Pacing Technique: Temporary Pacing
- Permanent Pacing: VVI, AAI Pacing (Single Chamber Pacing)
- Permanent Pacing: DDD , other Modes of Pacing
- Septal defect Closure materials
- Pacemaker Clinic: Management of Pacemaker Patients, programmers
- Intracardiac Electrogram – Technique
- Intracardiac Electrogram – Analysis, Intervals etc.
- Electrophysiological Studies
- Radio Frequency Ablation for Arrhythmia's
- Implantable Cardioverter Defibrillator
- Cardiac Arrest
- Cardio Respirator Resuscitation
- Hypotension / Hypertensive Crisis
- Cardiac tamponade
- Cardiac Trauma
- Anaphylaxis
- Emergency Drugs
- Intra-aortic Balloon Pump
- Records Keeping: Indents, Stocks, Log Books, Procedure Books etc.
- Applications of ECMO(Extracorporeal Membraneous Oxygenation)

COURSE LEARNING OUTCOMES

CLO1 & 2: Basics knowledge in Cardiac Catheterization lab, Equipments in Cath-Lab. Log Books, Registers in lab. (Unit1-2)

CLO3 & 4: Detailed knowledge and technical expertise in various diagnostic and theraputic procedures in cathlab, Pacing and Electrophysiology. (Unit3-4)

CLO5 & 6: Basic knowledge in the management of complications in lab, recent advances in cardiovascular technology. (Unit5-6)

CLO7:To understand the indications, risks, and limitations of diagnostic and therapeutic cardiac catheterization. (Unit-7)

CLO8.To be able to effectively communicate the rationale, techniques, and risks/benefits of catheterization to the patient and family. (Unit-8)

CLO9.Obtain skills necessary for insertion and manipulation of intravascular and intracardiac catheters and to understand the uses for the various types of catheters. (Unit-9)

CLO10.To understand the principles and techniques necessary to calculate flows, resistances, cardiac function, and severity of stenoses by catheterization methods. (Unit-10)

CLO11.Understand the uses of appropriate angiography techniques and selective angiography. (Unit-11)

CLO12 & 13. Learn basic principles and techniques of standard interventional therapeutic techniques (balloon atrial Septostomy; balloon valvuloplasty), understand the function of the recording and angiographic equipment used in the catheterization laboratory. (Unit12-13)

TEXT BOOKS

1. A Text book of Cardiovascular Medicine. Dr. Bruanwald's
2. A Text book of Medicine, Davidsons

REFERENCE BOOKS (LATEST EDITION)

1. Hutchison's Clinical Methods
2. A text book of Electrocardiography - Goldberger
3. Nanda's A Text book of Echocardiography
4. A Text of Cardiac Catheterization & Interventions. Dr. W. Grossman's D. Baim
5. A Text book of Cardiovascular Medicine. Dr. Bruanwald's
6. A Text book of Medicine, Davidsons
7. Introduction to Critical Care Nursing - Mary Lou Sole
8. Critical Care Notes: Clinical Pocket Guide - Janice Jones

WEB LINKS

https://www.bc.edu › W-2-Sevigny-Basic ECG

https://medicos.sa.cr › documentos › EMC2018 › ekg

https://en.ecgpedia.org

https://www.elsevier.com

http://www.who.int › hearts › Hearts_package

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 304

COURSE NAME- INTRODUCTION TO QUALITY AND PATIENT SAFETY

COURSE CREDIT HOUR-3

TOTAL CONTACT HR-120

COURSE OBJECTIVES

The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system and understand the basics of emergency care and life supportskills, help prevent harm to workers, property, the environment and the general public.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENTS

UNIT-1. Quality assurance and management

UNIT-2. Basics of emergency care and life support skills

UNIT-3.Biomedical waste management and environment safety

UNIT-4.Infection and prevention control

UNIT-5.Antibiotic resistance

UNIT-6.Disaster preparedness and management

COURSE LEARNING OUTCOMES

CLO 1-6. Upon completion, Students should be able to apply health care quality improvement and patient safety principles, concepts, and methods at the micro and macro-system level. (Unit1-6)

TEXT BOOKS

1. Handbook of Healthcare Quality & Patient Safety by .Gyani G J/ThomasA
2. Quality Management in Hospitals by S. K. Jo

REFERENCES BOOKS

1.Washington Manual of Patient Safety and Quality Improvement Paper blackthorn

2.Understanding Patient Safety, Second Edition by Robert Wachter (Author)

3. HandbookofHealthcareQuality& Patient SafetyAuthor : Girdhar J Gyani, Alexander Thomas

4.Researching Patient Safety and Quality in Healthcare: A Nordic Perspective Karina Aase, LeneSchibevaag

5.Old) Handbook Of Healthcare Quality & Patient Safety by GyaniGirdhar J (Author)

6. Handbook of Healthcare Quality & Patient Safety by .Gyani G J/ThomasA

7. Quality Management in Hospitals by S. K. Jo

WEB LINKS

https://www.cooperhealth.org › ..

https://www.who.int › pa..

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE- BCT 305

COURSE NAME- MEDICAL PSYCHOLOGY,

MEDICAL LAW & ETHICS

COURSE CREDIT HOUR-3

TOTAL CONTACT HR-120

COURSE OBJECTIVES

To understand the initial insights into underlying principles and fundamental theories of organizational behaviour, develop a sense of what falls under the domain of organizational behaviour and understanding of academic views on the behaviour and motivations of people in organizations and the purposes of organizations. This course clearly takes an academic and scientific lens with the aim of understanding human behaviour in organizations.

COURSE DESCRIPTION

The Bachelor of Cardic Care Technology is a clinically oriented course, which trains students in all diagnostic modalities of cardiology.

Current management of various cardiac disorders includes complex diagnostic and therapeutic procedures, which involve use of various equipment's, hardware's, tools, machines, and pharmacological agents Handling of these equipment's and tools as well as their regular maintenance requires advanced and focused knowledge of the scientific principles on which the tests and equipment's function, as well as to have hands- on skill in using these equipment's correctly and safely. The personnel who carryout these responsibilities also must have adequate knowledge of structure and function of the human body, especially the cardiovascular system. Optimal delivery of cardiovascular health care is based on the safe use of the equipment's and devices. This necessitates development of a cadre consisting of science graduates, who obtain focused, relevant knowledge in this specific area of Cardic Care Technology through didactic theoretic learning as well as supervised practical hands on training. The B.Sc. in Cardic Care Technology consists of three years of clinical faculty supervised didactic theoretic learning and practical hands-on training. This enables the student to apply specialized occupational theory, skills and concepts. At the end of three years the candidates will have to pass the University examination to be eligible for the bachelor degree. Upon completion of the 3-year course and one year internship the candidates will evolve in to a full trained, qualified cardiovascular technologist capable of working independently.

COURSE CONTENTS

UNIT-1.Introduction to Psychology
UNIT-2. Intelligence Learning, Memory, Personality, Motiviation
UNIT-3. Body Integrity – one's body image
UNIT-4.The patient in his Millen
UNIT-5.The self-concept of the therapist, Therapist-patient relationship – some guidelines

COURSE LEARNING OUTCOMES

CLO1. Describe and apply motivation theories to team andorganizational scenarios in order achieve a team's or an organization's goals and objectives. (Unit-1)

CLO2.Explain the effect of personality, attitudes, perceptions and attributions on their own and other's behaviours in team and organizationalsettings. (Unit-2)

CLO3. Explain types of teams and apply team development, teameffectiveness, and group decision making models and techniques. (Unit-3)

CLO4.Analyse and apply leadership theories and better understand their own leadership style. (Unit-4)

TEXT BOOKS

1.Organizational Behavior, 9th Ed. - Stephen

Robbins 2.Human Behaviour at work - Davis and

Newstorm 3.Organizational Behaviour - UmaSekaran

4.Organizational Behaviour - FredLuthans

5.Organizational Behaviour - K.Aswathappa

6.Human Behaviour at Work - Keith Davis

7.Organizational Behaviour - Jit S.Chandran

8. Human Relations & Organizational Behaviour -

R.S.Dwivedi 9.Organizational Behaviour – McShane

ASSESSMENT

Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

COURSE CODE: BCT 306

COUSE NAME: RESEARCH METHODOLOGY AND BIOSTATISTICS

CREDIT HOURS: 02

TOTAL THEORY HOUR: 60

COURSE OBJECTIVES:

The objective of this module is to help the students understand the basic principles of research and methodsapplied to draw inferences from the research findings.

COURSE DESCRIPTION:

This course involves a description of principles for conducting research.

COURSE CONTENT

Research Methodology

UNIT 1

Introduction to Research Methodology:

- Meaning of research
- Objectives of research
- Motivation in research
- Types of research & research approaches
- Research methods vs methodology
- Criteria for good research, Problems encountered byresearchers in India.

UNIT 2

Research problem:

- Statement of research problem
- Statement of purpose and objectives of research problem
- Necessity ofdefining the problem

UNIT 3

Research design:

- Meaning of research design
- Need for research design,
- Features for good design
- Different research designs, basic principles of research design.

UNIT 4

Sampling Design:

- Criteria for selecting sampling procedure
- Implications for sample design
- steps in sampling design
- characteristics of good sample design
- Different types of sample design

UNIT 5

Measurement & scaling techniques:

- Measurement in research - Measurement scales
- sources of error in measurement
- Technique of developingmeasurement tools
- Meaning of scaling
- Its classification
- Important scaling techniques.

UNIT 6

Methods of data collection:

- Collection of primary data collection data through questionnaires & schedules,

  Difference betweenquestionnaires & schedules.

UNIT 7

Sampling fundamentals:

- Need for sampling & some fundamental definitions, important sampling distributions.

UNIT 8

Processing & analysis of data:

- Processing operations, problems in processing
- Types of analysis
- Statistics in research
- Measures of centraltendency
- Dispersion, Asymmetry, relationship.

UNIT 9

Testing of hypothesis:

- What is hypothesis?
- Basic concepts concerning testing of hypothesis,
- Procedure of hypothesis testing,measuring the power of hypothesis test,
- Tests of hypothesis, limitations of the tests of hypothesis

UNIT 10

Computer technology:

- Introduction to Computers
- Computer application in research
- Computers & researcher.

Biostatistics UNIT – 1

Introduction:

- Meaning, definition, characteristics of statistics.
- Importance of the study of statistics
- Branches of statistics
- Statistics and health science including physiotherapy
- Parameters and Estimates
- Descriptive and inferentialstatistics
- Variables and their types
- Measurement scales.

UNIT 2

Tabulation of Data:

- Basic principles of graphical representation,
- Types of diagrams – histograms, frequency polygons, smoothfrequency polygon, cumulative frequency curve, Normal probability curve.

UNIT 3

Measure of Central Tendency:

- Need for measures of Central Tendency
- Definition and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped
- Meaning and calculation of mode
- Comparison of the mean, median and mode
- Guidelines for the use of various measures of central tendency.

UNIT 4

Probability and Standard Distributions:

- Meaning of probability of standard distribution, the binominal distribution, the normal distribution
- Divergence from normality – skew ness, kurtosis.

UNIT 5.

Sampling techniques:

- Need for sampling - Criteria for good samples
- Application of sampling in community
- Procedures ofsampling and sampling designs errors
- Sampling variation and tests of significance.

UNIT- 6.

Analysis of variance & covariance:

- Analysis of variance (ANOVA)
- what is ANOVA?
- Basic principle of ANOVA
- ANOVA technique
- Analysis of Co variance (ANACOVA).

UNIT-7

Format of scientific documents:

- Structure of protocols
- formats reporting in scientific journals
- systematic reviews and meta-analysis.

COURSE LEARNING OUTCOMES:

Research Methodology

CLO 1- Meaning and objectives of Research. Types of research and its approaches. Difference between research methods and methodology. (Unit-1)

CLO 2- Develop a research proposal to address or resolve a specific research question or problem. Objectives and purpose of research problem. (Unit-2)

CLO 3- Demonstrate different types of research design and application in various study(Unit-3)

CLO 4- Student will be able to identify characteristics of good sample design, criteria for selection of sampling procedure and step in sampling design. Different types of sampling design. (Unit-4)

CLO 5- Students will be able to explain different types of measuring scales in research and they will be able to implement in data analysis. (Unit-5)

CLO 6- Develop questionnaire for primary data collection. Data collection through schedule. (Unit-6)

CLO 7- Understood the need of sampling and importance of sampling distributions. (Unit-7)

CLO 8- Ability to process and analyse data using various test.(Unit-8)

CLO 9- Understand the concept of hypothesis, null hypothesis and alternate hypothesis. Develop hypothesis in various kind of study. (Unit-9)

CLO 10- Ability to implement data analysis using computer. (Unit-10)

Biostatistics

CLO 1- Define the principal concepts about biostatistics. Recognize the definition of statistics, its subject and its relation with the other sciences. Restate the principal concepts about biostatistics. (Unit-1)

CLO 2 – Students will have the knowledge of graphical representation and different types of graph. They will know how to interpret the graph. (Unit-2)

CLO 3- Ability to demonstrate the finding of mean, median and mode. (Unit-3)

CLO 4 - Collect data relating to variable/variables which will be examined and calculate descriptive statistics from these data. (Unit-4)

CLO 5 - Identify data relating to variable/variables. Identify convenient sample by using sampling theory. (Unit-5)

CLO 6 - Identify distribution form relating to the variable/variables. (Unit-6)

CLO 7 - Recognize normal distribution, interpret data via normal distribution. (Unit-7)

CLO 8 - Define the principal concepts of probability. (Unit-8)

CLO 9 - Recognize the binomial distribution, interpret data via binomial distribution, apply hypothesis testing via some of the statistical distributions, define some concepts about hypothesis testing, apply hypothesis testing to the data through these concepts and arrange the results of the hypothesis testing andmake a statistical decision. (Unit-9)

TEXT BOOKS:

1. Textbook of Biostatistics. A.K.Sharma
2. Textbook of elementary statistics by A.K.Sharma
3. Research Methods for Clinical Therapists. Carolyn M Hicks.
4. Mahajan's Methods in Biostatistics for Medical Students and Research Workers.
5. Handbook of Research In Physical Therapy. CE Bork

REFERENCE BOOKS:

1. An Introduction to Medical Statistics by Martin Bland

2. Biostatistics for the Biological and Health Sciences by Marc M Triola and Mario F Triola
3. Physical Therapy Research: Principles and Application. E Domholdt
4. Introduction to Biostatistics Larry Winner

WEB LINKS

www.slideshare.net

https://www.ncbi.nlm.nih.gov/pmc/

Google scholar

www.researchlink.org

ASSESSMENT

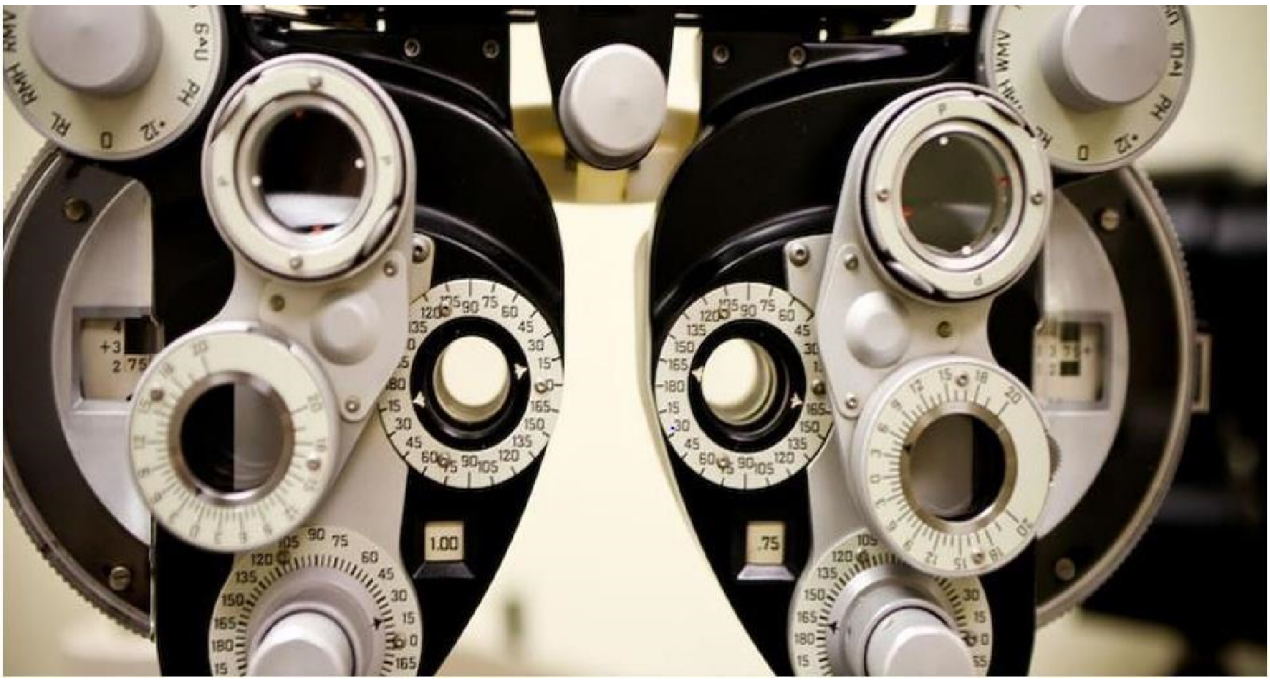
Assessment will be undertaken for theory and practical periodically as per the system and the average marks of the tests will be calculated and reduced to 50 as applicable and the marks are to be communicated to the university.

Assessment	**Grades**
Internal Exam	10
Assignment	5
Extra Curricular activity	5
Attendance	5
Internal Assessment Exam	25

NOIDA INTERNATIONAL UNIVERSITY

SCHOOL OF HEALTH SCIENCES

CURRICULUM FOR BACHELOR OF OPTOMETRY



w.e.f – 2021 - 2022

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

'Allied and healthcare professionals (AHPs) include individuals involved with the delivery of health or healthcare related
services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'[1]

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of "allied and healthcare professionals". In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and need for allied and healthcare professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses. Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out- of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being. Children with communication difficulties, the elderly, cancer

patients, patients with long term conditions such as diabetes, people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and

With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society

Credit hours vs traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance.[17] All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmes', 'joint degrees' and 'study abroad' programmes.[18]

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

Statement of Philosophy– Why this profession holds so much importance

An estimated 456 million people of India's population of 1.12 billion people require vision correction (spectacles, contact lenses or refractive surgery) to be able to see and function for learning, work and life in general. Twenty six million people are blind or vision impaired due to eye disease. A further 133 million people, including 11 million children, are blind or vision impaired simply from lack of an eye examination and an appropriate pair of glasses (uncorrected refractive error).

Blindness and vision impairment place a significant economic burden on families, communities and society at large – due to lost productivity, as well as the cost of education and rehabilitation[22]. About 85% of all vision impairment and 75% of blindness globally could be avoided[23], prevented or cured if the appropriately trained personnel and care facilities existed. The World Health Organisation (WHO) and the International Agency for the Prevention of Blindness (IAPB) launched the global initiative VISION 2020: the Right to Sight to eliminate avoidable blindness and vision impairment.

Uncorrected refractive error is the major cause of avoidable vision impairment, and the second most common cause of blindness. *"Without appropriate optical correction, millions of children are losing educational opportunities and adults are excluded from productive working lives, with severe economic and social consequences. Individuals and families are pushed into a cycle of deepening poverty because of their inability to see"* In 2007, an estimated 456 million people of India's population of 1.12 billion people required vision correction (spectacles, contact lenses or surgery) to be able to see and function for learning, work and general life activities. This included 37 million children younger than 16 years of age. Almost all of these 456 million adults and children would have normal vision if they had access to an eye examination and an appropriate pair of spectacles. However, lack of access has left 133 million of them,

including 11 million children, blind or vision impaired from uncorrected refractive error. The burden of avoidable blindness and vision impairment on the health care system in India is significant, with India currently having the highest number of blind people in the world. The direct and indirect cost, including lost productivity, due to uncorrected refractive error in India has been estimated at $23 billion per year (I$269 billion globally). As the population ages, future demand for eye care services will increase substantially. Enhancing access to these services will require an increase in the number of eye care professionals, as well as more efficient utilisation of existing professionals.

Optometry is recognized by the World Health Organization (WHO) as an independent profession through its ongoing official relations with the World Council of Optometry (WCO) – the international optometric organization which represents almost 300,000 optometrists from 87 member organizations in 47 countries.

Optometry as a profession has the primary public health responsibility for eliminating uncorrected refractive error. To provide excellent vision care to all the people of the country, India needs 116,000 optometrists. India currently has approximately 9,000 4-year trained optometrists and an estimated 30,000 2-year trained eye care personnel.

About Optometry

Optometry means a health care profession that is autonomous and concerned especially with examining the eye for defects and faults of refraction, with prescribing correctional lenses, eye exercises and/or visual rehabilitation care for visually impaired, with diagnosing diseases of the eye, and with treating such diseases or referring them for treatment.

Optometry as a profession has the primary public health responsibility for eliminating uncorrected refractive error (the leading cause of vision impairment globally). As primary eye care practitioners, optometrists have a vital role in detecting potentially serious eye diseases such as cataract, glaucoma and Diabetic retinopathy, age-related maculopathy, as well as general health conditions such as hypertension and diabetes, which means optometrists can also help alleviate the burden of other causes of blindness through diagnosis, referral and in some cases co-management. Optometry can and should play a leading role in eye care provision at the primary level, and can also assist at secondary and tertiary levels where possible, working with ophthalmologists and other eye care providers towards the unified goal of combating blindness.

Syllabus Curriculum

This ordinance may be called the Ordinance relating to Bachelor of Optometry. It shall come into force with effect from academic year 2021 - 2022.
This is a new course and its Ordinance is related to B.Sc.(optometry). Optometry means a health care profession that is autonomous and concerned especially with examining the eye for defects and faults of refraction, with prescribing correctional lenses, eye exercises and/or visual rehabilitation care for visually impaired, with diagnosing diseases of the eye, and with treating such diseases or referring them for treatment.

Optometry as a profession has the primary public health responsibility for eliminating uncorrected refractive error (the leading cause of vision impairment globally). As primary eye care practitioners, optometrists have a vital role in detecting potentially serious eye diseases such as cataract, glaucoma and Diabetic retinopathy, age-related maculopathy, as well as general health conditions such as hypertension and diabetes, which means optometrists can also help alleviate the burden of other causes of blindness through diagnosis, referral and in some cases co-management. Optometry can and should play a leading role in eye care provision at the primary level, and can also assist at secondary and tertiary levels where possible, working with ophthalmologists and other eye care providers towards the unified goal of combating blindness. The program has been developed through inputs from the medical and experts in the field. The faculty comprises experienced trainers available permanently at the campus and also subject

matter experts as visiting faculty. The teaching pedagogy includes theory, practical, case studies, role plays, study material, internship etc to keep the learning experiential and collaborative.

Selection procedure:

He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks (50%) in physics, chemistry, biology.
OR
Diploma in Optometry after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics, chemistry and biology/mathematics provided the candidate has passed in each subject separately.

Candidates who have studied abroad and have passed the equivalent qualification as determined by the Association of Indian Universities will form the guideline to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology/Mathematics and English up to 12th Standard level.
Candidates who have passed the Senior Secondary school Examination of National Open School with a minimum of 5 subjects with any of the following group subjects.

- English, Physics, Chemistry, Botany, Zoology
- English, Physics, Chemistry, Biology/ and any other language
- He/she has attained the age of 17 years as on 31st December of the year of admission.
- He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

Admission to Bachelor in Optometry course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme of CBSE, subject-wise distribution of questions will be as 40% in Physics, 25% in Biology/25% in Chemistry, 10% in English (Language & Comprehension) and 10% in General Awareness about health-related methods.

Successful candidates on the basis of written Test will be called for the interview & shall face an interview board. The interview board will include the Head of the Department of Optometry (Chairman of the Board), senior faculty members along with other nominees, whose recommendations shall be final for the selection of the students.

During subsequent counselling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
Candidates who fail to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year of undergraduate optometry programme for candidates who have passed diploma program (Refraction or its equivalent) from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only if the related subjects have been studied at diploma level.

Teaching Course

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as a professional course in optometry - 4-year programme (including 1 year of clinical training /internship)

The course structure shall be as given below:

B.Sc. Optometry

First year -

S.No.	Course Code	Course Titles	Theory Hours	Practical Hours	Total Hours (Theory + Practical)	Credits	1A*	UE**	Exam Duration (IA/UE)
1	BOP101	General Anatomy	120	30	150	5	25	75	3 Hours
2	BOP102	General Physiology	120	30	150	5	25	75	3 Hours
3	BOP103	General Biochemistry	60	30	90	3	25	75	3 Hours
4	BOP104	General Microbiology	60	0	60	2	25	75	3 Hours
5	BOP105	Nutrition	60	0	60	2	25	75	3 Hours
6	BOP106	Pathology	60	0	60	2	25	75	3 Hours
7	BOP107	Basics of Computers #	30	0	30		100		3 Hours
8	BOP108	English and Communication #	30	0	30		100		3 Hours

- Not included in university exams

*IA – Internal Assessment

**UE-University Examinations

Second Year –

S.No.	Course Code	Course Titles	Theory Hours	Practical Hours	Total Hours (Theory + Practical)	Credits	1A*	UE**	Exam Duration (IA/UE)
1	BOP 201	Geometrical Optics	90	30	120	4	25	75	3 Hours
2	BOP 202	Visual Optics	60	30	90	3	25	75	3 Hours
3	BOP 203	Basic and Ocular Pharmacology	90	0	90	3	25	75	3 Hours
4	BOP 204	Physical Optics	60	30	90	3	25	75	3 Hours
5	BOP 205	Optometric Instruments	120	30	150	5	25	75	3 Hours
6	BOP 206	Practice Management	60	0	60	2	25	75	3 Hours
7	BOP 207	Dispensing Optics and Public Health and Community Optometry	90	0	90	3	25	75	3 Hours
8	BOP 208	Binocular Vision	120	30	150	5	25	75	3 Hours
9	BOP 209	Systemic Disease	90	0	90	3	25	75	3 Hours
10	BOP 251	Core Practical Examination		100	100	2	25	75	3 Hours
		Clinical Postings #		100	100				

Not included in university exams

Note: Clinical postings can be encouraged on Saturdays too.

Third Year –

S.No.	Course Code	Course Titles	Theory Hours	Practical Hours	Total Hours (Theory + Practical)	Credits	1A*	UE**	Exam Duration (IA/UE)
1	BOP 301	Contact Lens	120	30	150	5	25	75	3 Hours
2	BOP 302	Low Vision Care	60	30	90	3	25	75	3 Hours
3	BOP 303	Ocular Disease and Glaucoma	120	30	150	5	25	75	3 Hours
4	BOP 304	Clinical Examination of Visual System	60	0	60	2	25	75	3 Hours
5	BOP 305	Indian Medicine and Telemedicine	60	0	60	2	25	75	3 Hours
6	BOP 306	Optometric Optics	90	0	90	3	25	75	3 Hours
7	BOP 307	Introduction to Quality and Patient Safety	30	0	30	1	25	75	3 Hours
8	BOP 308	Medical Psychology	30	0	30	1	25	75	3 Hours
9	BOP 309	Medical Law and Ethics	60	0	60	2	25	75	3 Hours
10	BOP 310	Geriatric Optometry, Pediatric Optometry & Occupational Optometry	120	30	150	5	25	75	3 Hours
11	BOP 311	Research Methodology and Biostatistics	90	0	90	3	25	75	3 Hours
12	BOP 351	Core Practical Examination		100	100	2	25	75	3 Hours
		Clinical Postings #		100	100				

Not included in university exams
Note: Clinical postings can be encouraged on Saturdays too.

Fourth Year –

S.No.	Course Code	Course Titles	Theory Hours	Practical Hours	Total Hours (Theory + Practical)	Credits	1A*	UE**	Exam Duration (IA/UE)
1	BOP 401	Internship and Research Project#		1500	1500		100		3 Hours

Not included in university exams

SUMMER TRAINING PROJECT REPORT:

After the internal examination, every student during the program will undergo an on-the-clinical posting

and after course completion final examination, every student will go for internship and research project in various organizations & hospitals. Internship is for 12 months (July – June) or 1 year. Total number of days (after deducting for national holidays & Sundays + Examination): 250 days (6 days / week; 6 hours / day) ? = 1500 hours or minimum of 18 weeks /semester (216 days).

Students are encouraged to involve in community outreach activities as part of their clinical postings without absenting himself /herself for the other regular classes.
Project report (thesis) needs to be submitted at the end of internship

During the training, the organization (where the student is undergoing training) will assign a problem/project to the student.

The student, after completion of the training, will submit a report at the end of the session.

The report will have two certificates. One by the Head of the Department and the other by the Reporting Officer of the organization where the student has undergone training. These two certificates should be attached in the beginning of the report.

The report will be evaluated by two external examiners. They shall award marks on the Internship Report independently out of a maximum of 100 marks each. There will be no internal examination.

12. Comprehensive Viva Voce

A comprehensive viva voce shall be conducted at the end the fourth Semester in order to judge the extent to which the student has understood various topics and is judged for application of knowledge gained. This is also to see the student's level of articulation of what is learnt by him. The idea is to ensure that the students assimilate what is being taught and see their relevance in the practical field and also the inter relationships of various parameters.

The viva voce is of 100 marks and will be conducted by the external examiner appointed by the University.

Attendance

The students are expected to attend all the classes and should not have less than 75 % attendance in theory as well as in practical classes, wherever held, to become eligible to appear for the university examination. Short fall in attendance can, however, be condoned in deserving cases to the extent of 10% by the Director/Dean. If the short fall is more than 10% but not more than 15%, the Director/Dean may recommend deserving cases to the Vice Chancellor for condonation. The order of the Vice Chancellor in this regard shall be final.

Examination

The examination in each semester shall be conducted in two parts:

Internal assessment will be of 25 marks as under: -

I. Midterm written test including in-between snap tests if any, shall carry 10 marks independently in each subject.
II. A maximum of 15 marks shall be awarded for class presentation, assignments, extra-curricular activities as well as in the form of teacher's assessment independently in each subject.

University Examination carrying 75 marks.

The marks obtained in the two parts of the examination together shall be aggregated for the purpose of determining the total marks obtained by a student in a particular paper/subject of study.

The student shall have to obtain minimum 50% marks in internal assessment to be eligible for appearing in University Examination.

A special examination may be held in the month of August for the students of the first year of the course to enable them to reappear in those papers in which they had failed or could not appear due to any reason other than shortage of attendance. Students detained due to shortage of attendance may also appear in the special examination provided they make up their attendance by attending extra classes which may be arranged between 15th May to 31st July.

Paper setting & Evaluation

The work of setting the end semester examination papers and evaluation of scripts and conduct of the end semester practical examination shall be assigned to the course teachers as well as to External Experts ordinarily in the ratio of 50:50 for internal and external paper setting & evaluation respectively.

Results

The result shall be prepared at the end of each academic year of the course by aggregating the marks obtained in the theory and practical examinations in all the semesters of the course till date. A candidate shall be declared as passed at the end of an academic year if he/she secures minimum 50% marks in each theory & practical paper separately (including project reports and comprehensive viva) and 50% in aggregate.

If a candidate fails in only one head/subject and having passed in all other head/subject of the given examination of the year than his/her deficiency of maximum five (05) marks may be Fulfilled by grace marks as per university notification no.-

All those who are declared as passed at the end of an academic year shall be promoted to the next academic year

If a student obtained 40% marks in at least 50% of the papers (ignoring fractions), he/she will be provisionally promoted to the next year with carryover papers and will have to appear & obtain pass marks in carryover papers along with the subsequent regular examinations for the relevant semester.

A student not covered by clause (a) to (d) above shall have the following options to complete his/her course –

He/ she may take admission on payment of full annual course fee and repeat the entire year of study. He /She shall be treated as a regular student.

Or

He /She may pay only University exam fee for the End Semester Examination and appear in the End Semester University exams directly. He /She shall not be allowed to attend classes and the Sessional marks obtained earlier shall be retained.

Or

He /She may pay half of the annual course fee and attend classes. The sessional marks obtained by him/her earlier shall be retained. There will not be any requirement of minimum attendance for appearing in the University examination

The examination for students reappearing in any papers shall be held along with the subsequent regular examinations for the relevant semester.

The final result at the end of the course shall be prepared as below by aggregating the marks obtained in all the semesters: -

Power to Modify

In the event of any emergent situation, if any deviation is considered necessary, the Vice Chancellor is authorized to modify the ordinance. Subject to subsequent ratification by the Executive Council

FIRST YEAR

Course code- BOP 101

Course name- General Anatomy

Course credit- 5

Total contact hour - 150 hours

COURSE DESCRIPTION:

General anatomy deals with the entire human anatomy with emphasis on different tissues, blood vessels, glands, nerves and the entire central nervous system in particular.

COURSE OBJECTIVES:

By the end of this course the students will demonstrate the anatomy of the human body regarding upper limb, lower limb thorax, abdomen, and head and neck. Also, students will demonstrate the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body. Course description: It is designed to provide students with the working knowledge of the structure of the human body which is an essential foundation for their clinical studies.

COURSE CONTENT:

UNIT 1

Introduction: human body as a whole –

Theory:

Definition of anatomy and its divisions Terms of location, positions and planes Cell mid its organelles Epithelium-definition, classification, describe with examples, function

Glands- classification, describe serous & mucous glands with examples Basic tissues - classification with examples

Practical:

Histology of types of epitheliums

Histology of serous, mucous & mixed salivary gland

UNIT 2

Locomotion and support

Theory

Cartilage - types with example & histology

Bone - Classification, names of bone cells, parts of long bone, names of all bones, vertebral column, fontanels of fetal skull Joints - Classification of joints with examples, synovial joint (in detail for radiology) Muscular system: Classification of muscular tissue & histology

Names of muscles of the body Practical:

Histology of the 3 types of cartilage

Demo of all bones showing parts, radiographs of normal bones & joints

UNIT 3

Cardiovascular system

Theory:

Heart-size, location, chambers, exterior & interior Blood supply of heart

Systemic & pulmonary circulation

Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery

Peripheral pulse

Inferior vena cava, portal vein, portosystemic anastomosis, Great saphenous vein, Dural venous sinuses Lymphatic system- Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief
Practical:
Demonstration of heart and vessels in the body
Histology of large artery, medium sized artery & vein, large vein
Microscopic appearance of large artery, medium sized artery & vein, large vein pericardium Histology of lymph node, spleen, tonsil & thymus Normal chest radiograph showing heart shadows Normal angiograms

UNIT 4
Gastro-intestinal system
Theory:
Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring) Esophagus, stomach, small and large intestine, liver, gallbladder, pancreas Radiographs of abdomen

UNIT 6 –
Respiratory system
Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments.
Histology of trachea, lung and pleura
Names of paranasal air sinuses.
Practical:
Demonstration of parts of the respiratory system. Normal radiographs of chest
Histology of lung and trachea

UNIT 6
Peritoneum
Theory:
Description in brief Practical:
Demonstration of reflections

UNIT 7
Urinary system
Theory: Kidney, ureter, urinary bladder, male and female urethra
Histology of kidney, ureter and urinary bladder
Practical:
Demonstration of parts of urinary system Histology of kidney, ureter, urinary bladder
Radiographs of abdomen-lVP, retrograde cryptogram

UNIT 8
Reproductive system
Theory:
Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology) Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology) Mammary gland - gross,
Practical:
Demonstration of section of male and female pelvis with organs in situ
Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes and ovary

UNIT 9
Endocrine glands
Theory:
Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal gland - (gross & histology)

Practical:
Demonstration of the glands
Histology of pituitary, thyroid, parathyroid, suprarenal glands

UNIT 10
Nervous system
Theory:
Neuron Classification of NS
Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology) Meninges, Ventricles & cerebrospinal fluid
Practical:
Histology of peripheral nerve & optic nerve Demonstration of all plexuses and nerves in the body Demonstration of all part of brain
Histology of cerebrum, cerebellum, spinal

UNIT 11
Sensory organs
Theory:
Skin: Skin-histology Appendages of skin Eye: Parts of eye & lacrimal apparatus
Ear: parts of ear- external. middle and inner ear and contents
Practical: Histology of thin and thick skin Demonstration and histology of eyeball Histology of cornea & retina

UNIT 12
Embryology
Spermatogenesis & oogenesis, Ovulation, fertilization Fetal circulation Placenta

COURSE LEARNING OUTCOMES:

CLO 1 – Students can demonstrate the location, position and planes. Explain the anatomy, physiology and functions of various Tissues and cell organization of cellular systems. . They will be able to demonstrate epithelial and glands (Unit 1).
CLO 2 - Classify different types of tissue and explain anatomy and physiology of skeletal system, joints and muscular system. Demonstrate the bones of all parts (Unit 2).
CLO 3 - Describe how the heart is positioned in the thoracic cavity. List and describe the layers of the heart wall. Name the chambers of the heart and their valves. Name the major vessels that enter and exit the heart and their branches. Describe blood flow through the heart. Explain how the conduction system of the heart controls proper blood flow (Unit 3).
CLO 4- Identify the organs of the alimentary canal from proximal to distal, and briefly state their function. Identify the accessory digestive organs and briefly state their function. Describe the four fundamental tissue layers of the alimentary canal (Unit 4).
CLO 5 - Outline the forces that allow for air movement into and out of the lungs. Outline the process of gas exchange. Summarize the process of oxygen and carbon dioxide transport within the respiratory system. Create a flow chart illustrating how respiration is controlled (Unit 5).
CLO 6 – What are the nine regions of the abdomen? Explain peritoneum, its layers, peritoneal cavity, blood supply, nerve supply, lymphatic drainage, venous drainage and functions of peritoneum (Unit 6)
CLO 7 - Describe different parts of the urinary system, their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy (Unit 7).
CLO 8 – Describe different parts of male and female reproductive system, their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy (Unit 8).
CLO 9 - Describe different endocrine glands (pituitary, thyroid, parathyroid and suprarenal gland), their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy (Unit 9).

CLO 10 - Identify the anatomical and functional divisions of the nervous system. Relate the functional and structural differences between gray matter and white matter structures of the nervous system to the structure of neurons. List the basic functions of the nervous system (Unit 10).
CLO 11 - Describe different sensory organs (skin, eye and ear), their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy (Unit 11).
CLO 12 - Describe spermatogenesis, oogenesis, ovulation and fertilization. Explain Fetal circulation. Describe placenta and its functions (Unit 12).

TEXT BOOKS:

Human Anatomy by BD Chaurasia (4 Volume)

REFERENCE BOOKS:

Gray's Anatomy by Richard Drake & A. Wayne Vogl & Adam W. M. Mitchell

WEB LINKS:
https://guides.lib.uw.edu
www.linkedin.com ›SlideShare

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code- BOP 102
Course name- General Physiology
Course credit- 5
Total contact hour - 150 hour

COURSE OBJECTIVES:

To provide in-depth instruction in the organization, structures, and functions of the human body. Students will learn the terminology of physiology of each body system and how they interrelate to maintain homeostasis.

COURSE DESCRIPTION:

The student will demonstrate a thorough understanding of the normal physiology of each organ system of the body.

COURSE CONTENT:

UNIT 1.
General Physiology:
Cell: morphology, Structure and function of cell organelles Structure of cell membrane Transport across cell membrane Intercellular communication Homeostasis

UNIT 2.
Blood:
Introduction-composition & function of blood W.B.C., R.B.C, Platelet's formation & functions, Immunity Plasma: composition, formation & functions, Plasma Proteins: -types & functions Blood Groups- types, significance, determination Hemoglobin Hemostasis Lymph-composition, formation, circulation & functions.

UNIT 3.
Cardiovascular system:
Conducting system-components, impulse conduction Heart valves Cardiac cycle- definition, phases of cardiac cycle Cardiac output- definition, normal value, determinants. Stroke volume and its regulation Heart rate and its regulation: Arterial pulse, Blood pressure- definition, normal values, factors affecting blood pressure Shock-definition, classification, causes and features Basic idea of ECG Cardiovascular changes during exercise.

UNIT 4.
Respiratory System:
Mechanics of respiration Lung volumes and capacities Pulmonary circulation, transport of respiratory gases Factors affecting respiration Regulation of respiration-neural regulation, voluntary control and chemical regulation Hypoxia, Hypercapnia, Hypocapnia Artificial respiration Disorders of respiration-dyspnoea, orthopnea, hyperpnea, hyperventilation, apnea, tachypnoea Respiratory changes during exercise.

UNIT 5.
Nerve Muscle Physiology:
Muscles- classification, structure, properties, Excitation contraction coupling Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise Nerve – structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction Concept of nerve injury &

Wallerian degeneration Synapses Electrical events in postsynaptic neurons Inhibition & facilitation at synapses Chemical transmission of synaptic activity Principal neurotransmitters. 6. Nervous system: Introduction, central and peripheral nervous system, functions of nervous system.

UNIT 6.
Reflexes-
Monosynaptic, polysynaptic, superficial, deep & withdrawal reflex Sense organ, receptors, electrical & chemical events in receptors Sensory pathways for touch, temperature, pain, proprioception & others Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions Motor mechanism: motor cortex, motor pathway: the descending tracts-pyramidal & extra pyramidal tracts-origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis. Spinal cord lesions- complete transection & hemi section of the spinal cord Autonomic nervous system: features and actions of parasympathetic & sympathetic nervous system Hypothalamus Higher functions of nervous system Special senses- eye, ear, nose, mouth + - + Water excretion, concentration of urine-regulation of Na, Cl, K excretion

UNIT 7.
Renal System:
Physiology of kidney and urine formation Glomerular filtration rate, clearance, Tubular function.

UNIT 8.
Digestive System:
Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation Functions of Liver & Stomach.

UNIT 9.
Endocrinology:
Physiology of the endocrine glands – Pituitary, Pineal Body, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications and functions.

UNIT 10.
Male & female reproductive system:
Male - Functions of testes, pubertal changes in males, testosterone - action & regulations of secretion. Female - Functions of ovaries and uterus, pubertal changes, menstrual cycle, estrogens and progesterone - action and regulation.

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to...
CLO 1: Describe the structure and function of cellular organelles (Unit 1).
CLO 2: Describe and classify functions of blood and types of cells (Unit 2).
CLO 3: Name the chambers of heart and their valves. Name the major vessels that enter and exit the heart. Describe blood flow through the heart. Describe the stages of cardiac cycle (Unit 3)
CLO 4: Explain the function of respiratory system. Name the organs of the system. Define the parts of internal nose and their functions (Unit 4)
CLO 5: Name the functions of the skeletal system. Describe and compare the basic differences between the anatomy of skeletal, smooth and cardiac muscles. List the structural and functional classification of neurons. Explain how a neuron transmits a nerve impulse (Unit 5).
CLO 6: Describe the structure of spinal cord. Name and number the spinal nerves (Unit 6)
CLO 7: Define the following internal parts of the kidneys: cortex, medulla, medullary pyramids, renal papillae, renal columns and major and minor calyces. Name the parts of a nephron and describe the flow of urine through this renal tubule. List the functions of the nephrons (Unit 7).
CLO 8: Explain the major digestive enzymes and how they function. Explain the functions of the liver (Unit 8)

CLO 9: List the functions of hormones. Describe how the hypothalamus of the brain controls the endocrine system. Name the endocrine glands and state where they are located. List the major hormones and their effects on the body (Unit 9)
CLO 10: Name the internal parts of a testis. Explain the effects of testosterone on the male body. Describe the phases of the menstrual cycle (Unit 10)

PRACTICALS

Examination of pulse, B.P., Respiratory rate.
Reflexes
Spirometer to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on Spirometer.
Estimate of Hemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count. E Blood indices, Blood grouping, Bleeding & Clotting time

TEXT BOOKS:

Textbook of Physiology- AK Jain

Surface and Radiological Anatomy – Hamilton et al (Heffer)

Essentials Of Medical Physiology: by K Sembulingam

Anatomy and Physiology for Nurses

REFERENCE BOOKS:

Essentials of Human Anatomy – Russel

An Atlas of normal radiographic Anatomy – Ross and Wilson

WEB LINKS:

https://www.physoc.org/
http://aups.org.au/
https://www.hapsweb.org/default.aspx

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 103
Course Name- General Biochemistry
Course credit- 3
Total Contact hour - 90 hour

COURSE OBJECTIVES:

Structure, function and interrelationship of bio-molecules and consequences of deviation from normal. Integration of the various aspects of metabolism, and their regulatory pathways.
Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data.

COURSE DESCRIPTION:

This course will be taught in 1st yr. General Biochemistry deals with the biochemical nature of carbohydrates, proteins, minerals, vitamins, lipids etc. A detailed study of these, emphasizing on their chemical composition and their role in metabolism is the required aim of this course.

COURSE CONTENT:

UNIT-1
Biomolecular and the Cell: -
Cell Structure, cell theory, cell membrane, cell organelles and their function.

UNIT-2
Tools of Biochemistry: -
Microscopy- simple & compound microscopy, phase contrast, dark field, florescence & electron microscopy (TEM & SEM).

UNIT-3
Carbohydrates: -
Carbohydrate's classification & properties, chemical structure & properties of monosaccharide, disaccharide & polysaccharide.

UNIT-4
Protein: -
It's properties, function & classification. Amino acids properties, essential & non- essential amino acids.

UNIT-5
Nucleic Acids and Nucleotides: -
Chemical structure & base composition nucleoside & double helical structure- DNA & RNA.

UNIT-6
Lipids: -
Classification & chemical structure & properties of lipids (fatty acids) & biological significance.

UNIT-7
Vitamins & Minerals: -
Properties water- & fat-soluble vitamins, deficiency & their clinical significance. Na, K, Ca, P, Fe, Cu and Se. (requirements, availability and properties)

UNIT-8
Enzymes: -
Properties protein & non protein enzyme, ribozyme, lock & key mechanism & clinical significance.

UNIT-9
Hormones: -
Properties of endocrine glands brief outline of various endocrine glands & secretion of Hormone

PRACTICAL:

Safety of measurements Specimen collection
Introduction to laboratory apparatus
Introduction to instruments
Acids and bases and their indicators
Quality control
Special investigations

COURSE LEARNING OBJECTIVES

At the end of the course, the student should be able to:

CLO 1: Knowledge about Structure, function and interrelationship of bio-molecules and consequences of deviation from normal (Unit 1-9).
CLO 2: Ability to understand Integration of the various aspects of metabolism, and their regulatory pathways (Unit 1-9).
CLO 3: Ability to understand Principles of various conventional and specialized laboratory investigations and instrumentation, analysis and interpretation of a given data (Unit 3).

TEXT BOOKS

Practical Clinical Biochemistry by Harold Varley
Textbook of biochemistry by P. B. Godker
Principal of Biochemistry by u. Satyanarayana
Principal of Biochemistry by M. A. Siddiqi

REFERENCE BOOKS

Instrumental Analysis by Chatwal Anand
Textbook of Medical Biochemistry by Chatterjee, Shinde
Principal of Biochemistry by Lehninger

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books
https://www.slideshare.net/

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10

Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 104
Course Name- General Microbiology
Course credit- 2
Total Contact hour - 60 hour

COURSE DESCRIPTION:
This course covers the basic biological, biochemical and pathogenic characteristics of pathogenic organisms.

COURSE OBJECTIVE:

To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites;
To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice;
To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections and
To understand basic principles of diagnostic ocular microbiology.

COURSE PLAN:

UNIT 1:
Morphology and principles of cultivating bacteria

UNIT 2:
Sterilization and disinfection used in laboratory and hospital practice

UNIT 3:
Common bacterial infections of the eye

UNIT 4:
Common fungal infections of the eye

UNIT 5:
Common viral infections of the eye

UNIT 6:
Common parasitic infections of the eye.

COURSE LEARNING OBJECTIVE:

CLO 1: To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites (Unit 1 and 2)
CLO 2: To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice (Unit 2 – 6)
CLO 3: To understand the pathogenesis of the diseases caused by the organisms in the human body with particular reference to the eye infections (Unit 3-6)
CLO 4: To understand basic principles of diagnostic ocular microbiology (Unit 3-6).

TEXT BOOK:

BURTON G.R.W: Microbiology for the Health Sciences, third edition, J.P. Lippincott Co., St. Louis, 1988.
M J Pelczar (Jr),ECS Chan, NR Krieg : Microbiology, fifth edition, TATA McGRAW-HILL Publisher,

New Delhi,1993

REFERENCE BOOKS:

KJ Ryan, CG Ray: Sherris Medical Microbiology- An Introduction to infectious Diseases, fourth edition, McGRAW HILL Publisher, New Delhi, 1994 MACKIE & McCartney Practical Medical Microbiology SYDNEY M. FINEGOLD & ELLEN JO BARON: Diagnostic Microbiology (DM)

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS

- http://www.freebookcentre.net/Chemistry/BioChemistry-Books
- https://www.slideshare.net/

ASSESSMENT METHOD:

(Continue Internal Assessment=25; final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 105
Course Name- Nutrition
Course credit- 2
Total Contact hour - 60 hour

COURSE OBJECTIVES:
Explain about Balanced diet. Describe Protein
Explain briefly about Carbohydrates Explain Vitamins
Describe Minerals Describe carotenoids.

COURSE DESCRIPTION:

This course covers the basic aspects of Nutrition for good health. It also includes nutrients and nutrient derivatives relevant to ocular health, nutrition deficiency.

COURSE PLAN:

UNIT 1:
Introduction.
History of Nutrition
Nutrition as a science Food groups, RDA
Balanced diet, diet planning. Assessment of nutritional status

UNIT 2:
Energy
Units of energy.
Measurements of energy and value of food Energy expenditure.
Total energy/calorie requirement for different age groups and diseases. Satiety value Energy imbalance-obesity, starvation. Limitations of the daily food guide.

UNIT 3:
Proteins
Sources and functions
Essential and non- essential amino- acids. Incomplete and complete proteins Supplementary foods. PEM and the eye Nitrogen balance
Changes in protein requirement.

UNIT 4:
Fats
Sources and functions Essential fatty acids Excess and deficiency Lipids and the eye. Hyperlipidemia, heart diseases, atherosclerosis.

UNIT 5:
Minerals
General functions and sources
Macro and micro minerals associated with the eye.
Deficiencies and excess –ophthalmic complications (e.g. iron, calcium, iodine etc.)

UNIT 6:
Vitamins
General functions, and food sources
Vitamin deficiencies and associated eye disorders with particular emphasis to Vitamin A Promoting sound habits in pregnancy, lactation and infancy.
Nutrient with antioxidants. Properties Digestion of Proteins, carbohydrates & lipid Essential amino acids.

Miscellaneous
Measles and associated eye disorders, low birthweight

COURSE LEARNING OBJECTIVE:

CLO 1: Knowledge about balanced diet (Unit 1 and 2)
CLO 2: Ability to understand protein (Unit 3)
CLO 3: Ability to understand about carbohydrates (Unit 4)
CLO 4: Ability to understand about minerals (Unit 5)
CLO 5: Ability to understand about vitamins (Unit 6)

TEXT BOOK:

M Swaminathan: Handbook of Food and Nutrition, fifth edition, Bangalore printing & publishing Co.Ltd, Bangalore, 2004

REFERENCE:

C Gopalan, BV Rama Sastri, SC Balasubramanian: Nutritive Value of Indian Foods, National Institute of Nutrition, ICMR, Hyderabad,2004
Frank Eperjesi & Stephen Beatty: Nutrition and the Eye A practical Approach, Elsevier Butterworth-Heinemann, USA, 2006

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books
https://www.slideshare.net/

ASSESSMENT METHOD:

(Continue Internal Assessment=25; Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 106
Course Name- Pathology
Course credit- 2
Total Contact hour - 60 hour

COURSE OBJECTIVE:

Inflammation and repair aspects. Pathology of various eye parts and adnexa.

COURSE DESCRIPTION:
This course describes basic aspects of disease processes with reference to specific entities relevant in this course.

COURSE PLAN:

UNIT 1:
Inflammation and repair

UNIT 2:
Infection in general

UNIT 3:
Specific infections: Tuberculosis, Leprosy, Syphilis, Fungal infection, Viral chlamydial infection

UNIT 4:
Neoplasia, Hematology anemia leukemia

UNIT 5:
Bleeding disorders, Circulatory disturbances, Thrombosis, Infraction and Embolism

UNIT 6:
Clinical pathology, Interpretation of urine report, Interpretation of blood smears

UNIT 7:
Immune system, Shock, Anaphylaxis, Allergy

COURSE LEARNING OBJECTIVES:

CLO 1: Knowledge about Inflammation and repair aspects (Unit 1).
CLO 2: Ability to understand Pathology of various eye parts and adnexa (Unit 2-6).

TEXT BOOKS:

K S Ratnagar: Pathology of the eye & orbit, Jaypee brothers Medical Publishers, 1997

REFERENCE BOOKS:
CORTON KUMAR AND ROBINS: Pathological Basis of the Disease, 7th Edition, Elsevier, New Delhi, 2004
S R Lakhani Susan AD & Caroline JF: Basic Pathology: An introduction to the mechanism of disease, 1993.

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books
https://www.slideshare.net/

Assessment Method:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 107
Course Name- Basics of Computer
Course credit- 1
Total Contact hour - 30 hour

COURSE OBJECTIVE:

The role of computer technology and to some extent able to gain hand-on experience in using computers.

COURSE DESCRIPTION:

The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation.

COURSE PLAN:

UNIT 1:
Introduction to Computer:
Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).
Processor and memory: The Central Processing Unit (CPU), main memory.
Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disc, mass storage devices.

UNIT 2:
Introduction of Windows:
History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

UNIT 3:
Introduction to MS-Word:
Introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

UNIT 4:
Introduction to Excel:
Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

UNIT 5:
Introduction of Operating System:
Introduction, operating system concepts, types of operating system. Computer networks: introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

UNIT 6:
Internet and its Applications:
Definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web

(WWW)), www browsers, use of the internet.
Application of Computers in clinical settings.

COURSE LEARNING OBJECTIVES:

CLO 1: At the end of course, students will able to know about handling of Microsoft office (UNIT 1-6)

TEXT BOOK:

Satish Jain basic computer course made simple

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS:

http://www.freebookcentre.net/Chemistry/BioChemistry-Books
https://www.slideshare.net/

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course Code- BOP 108
Course Name- English and Communication
Course credit- 1
Total Contact hour - 30 hour

COURSE OBJECTIVE:

This course trains the students in oral presentations, expository writing, logical organization and structural support.
By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success.

COURSE DESCRIPTION:

This course deals with essential functional English aspects and nuances of the communication skills essential for the health care professionals.

COURSE PLAN

	Functional English		Topics
	UNIT 1 **Basics of Grammar**		Vocabulary Synonyms, Antonyms, Prefix and Suffix, Homonyms, Analogies and Portmanteau words
	UNIT 2 **Basics of Grammar – Part II**		Active, Passive, Direct and Indirect speech, Prepositions, Conjunctions and Euphemisms

	Functional English		Topics
	UNIT 3 **Writing Skills**		Letter Writing, Email, Essay, Articles, Memos, one-word substitutes, note making and Comprehension
	UNIT 4 **Writing and Reading**		Summary writing, Creative writing, newspaper reading
	UNIT 5 **Practical Exercise**		Formal speech, Phonetics, semantics and pronunciation

	Communication		Topics
	UNIT 6 **Introduction**		Communication process. Elements of communication Barriers of communication and how to overcome them. Nuances for communicating with patients and their attenders in hospitals
	UNIT 7 **Speaking**		Importance of speaking efficiently Voice culture. Preparation of speech. Secrets of good delivery Audience psychology, handling Presentation skills. Individual feedback for each student Conference/Interview technique
	UNIT 8 **Listening**		Importance of listening Self-assessment Action plan execution. Barriers in listening. Good and persuasive listening
	UNIT 9 **Reading**		What is efficient and fast reading Awareness of existing reading habits Tested techniques for improving speed Improving concentration and comprehension through systematic study.
	UNIT 10		Basics of non-verbal communication

Non-Verbal Communication	Rapport building skills using neuro- linguistic programming (NLP)

COURSE LEARNING OBJECTIVES:

CLO 1: At the end of the course students will able to - By acquiring skills in the use of communication techniques the students will be able to express better, grow personally and professionally, develop poise and confidence and achieve success (Unit 1-10).

TEXT BOOK:

Graham Lock, Functional English Grammar: Introduction to Second Language Teachers. Cambridge University Press, New York, 1996.

REFERENCE:

Gwen Van Servellen. Communication for Health care professionals: Concepts, practice and evidence, Jones & Bartlett Publications, USA, 2009

ONLINE LINKS FOR STUDY & REFERENCE MATERIALS

http://www.freebookcentre.net/Chemistry/BioChemistry-Books
https://www.slideshare.net/

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

SECOND YEAR

Course code: BOP-201
Course name: GEOMETRICAL OPTICS
Course credit hours: 4
Total contact hour: 120

COURSE OBJECTIVES:

The objective of this course is to equip the students with a thorough knowledge of mirrors and lenses. At the end of this course, students will be able to predict the basic properties of the images formed on the retina by the optics of the eye.

COURSE DESCRIPTION:

This course will be taught in two consecutive semesters. Geometric Optics is the study of light and its behavior as it propagates in a variety of media. Specifically, the phenomena of reflection and refraction of light at boundaries between media and subsequent image formation will be dealt with in detail. Reflections at plane and spherical surfaces and refractions at plane, spherical, cylindrical and toric surfaces will be studied in this course. Attention will be given to the system of surfaces and/or lenses and their imaging properties. The effect of aperture stops on the quality of images, such as blur and aberrations, depth of field and depth of focus, will also be studied

COURSE CONTENT:

S. No.	Topics
UNIT 1.	Nature of light –light as electromagnetic oscillation; ideas of sinusoidal oscillations; amplitude and phase; speed of light in vacuum and other media; refractive index.
UNIT 2.	Wavefronts–spherical, elliptical and plane; Curvature and vergence; rays; convergence and divergence in terms of rays and vergence; vergence at a distance
UNIT 3.	Refractive index; its dependence on wavelength
UNIT 4.	Fermat's and Huygen's Principle –Derivation of laws of reflection and refraction (Snell's law) from these principles
UNIT 5.	Plane mirrors –height of the mirror; rotation of the mirror
UNIT 6.	Reflection by a spherical mirror –paraxial approximation; sign convention; derivation of vergence equation
UNIT 7.	Imaging by concave mirror, convex mirror
UNIT 8.	Reflectivity; transmissivity; Snell's Law, Refraction at a plane surface
UNIT 9.	Glass slab; displacement without deviation; displacement without dispersion
UNIT 10.	Thick prisms; angle of prism; deviation produced by a prism; refractive index of the prism
UNIT 11.	Prisms; angular dispersion; dispersive power; Abbe's number.
UNIT 12.	Definition of crown and flint glasses; materials of high refractive index
UNIT 13.	Thin prism –definition; definition of Prism diopter; deviation produced by a thin prism; its dependence on refractive index
UNIT 14.	Refraction by a spherical surface; sign convention; introduction to spherical aberration using image formed by a spherical surface of a distance object; sag formula
UNIT 15.	Paraxial approximation; derivation of vergence equation
UNIT 16.	Imaging by a positive powered surface and negative powered surface
UNIT 17.	Vergence at a distance formula; effectivity of a refracting surface
UNIT 18.	Definition of a lens as a combination of two surfaces; different types of lens shapes.

UNIT 19.	Image formation by a lens by application of vergence at a distance formula; definitions of front and back vertex powers; equivalent power; first and second principal planes/points; primary and secondary focal planes/points; primary and secondary focal lengths
UNIT 20.	Newton's formula; linear magnification; angular magnification
UNIT 21.	Nodal Planes
UNIT 22.	Thin lens as a special case of thick lens; review of sign convention
UNIT 23.	Imaging by a thin convex lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
UNIT 24.	Imaging by a thin concave lens; image properties (real/virtual; erect/inverted; magnified/minified) for various object positions
UNIT 25.	Prentice's Rule
UNIT 26.	System of two thin lenses; review of front and back vertex powers and equivalent power, review of six cardinal points.
UNIT 27.	System of more than two thin lenses; calculation of equivalent power using magnification formula
UNIT 28	Vergence and vergence techniques
UNIT 29	Gullstrand's schematic eyes, visual acuity, Stile Crawford
UNIT 30	Emmetropia and ametropia 4. Blur retinal Imaginary
UNIT 31	Correction of spherical ametropia, vertex distance and effective power, dioptric power of the spectacle, to calculate the dioptric power, angular magnification of spectacles in aphakic
UNIT 32	Thin lens model of the eye –angular magnification –spectacle and relative spectacle magnification.
UNIT 33	Aperture stops- entrance and exit pupils.
UNIT 34	Astigmatism. - To calculate the position of the line image in a sphero-cylindrical lens.
UNIT 35	Accommodation –Accommodation formulae and calculations.
UNIT 36	Presbyopia- Spectacle magnification, angular magnification of spectacle lens, near point, calculation of add, depth of field.
UNIT 37	Spatial distribution of optical information- modulation transfer functions- Spatial filtering applications.
UNIT 38	Visual optics of aphakia and pseudophakia

PRACTICAL

Thick Prism – determination of prism angle and dispersive power; calculation of the refractive index Thin Prism – measurement of deviation; calculation of the prism diopter
Image formation by spherical mirrors
Convex lens - power determination using lens gauge, power determination using distant object method; power determination using the vergence formula
Concave lens – in combination with a convex lens – power determination. Construction of a tabletop telescope – all three types of telescopes.
Construction of a tabletop microscope
Imaging by a cylindrical lens – relationship between cylinder axis and image orientation
Imaging by two cylinders in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinders' powers and orientations
Imaging by a spherocylindrical lens – sphere and cylinder in contact – determination of the position of CLC; verification of CLC using a spherical lens with power equal to the spherical equivalent; orientations and position of the line images and their relation to the cylinder's power and orientation

COURSE LEARNING OUTCOMES:

CLO 1 - The candidates should demonstrate fundamental knowledge and insight into geometrical optics

in order for the candidate to be able to understand and solve problems related to the eye and optical instruments/lenses, their function and correction (Unit 1-3).

CLO 2- Knowledge and understanding should be demonstrated in the areas of: (1) refraction at single spherical or plane surfaces, (2) thin lenses, (3) thick lenses, (4) aberrations, (5) apertures, (6) spherocylindrical lenses, (7) thin prisms, (8) mirrors, and ophthalmic and optical instruments (Unit 4-6).

CLO 3 - The aim is to achieve knowledge of the fundamentals of geometrical optics and how they apply to the human eye (Unit 7-9).

CLO 4 -Describe refraction at single spherical or plane surfaces with regard to Curvature and sagitta; Refractive index and rectilinear propagation; Vergence and dioptric power; Object-image relationships, including apparent depth Ray tracing, nodal point, and nodal ray; Lateral (trans linear) and angular magnification; Snell's law of refraction (Unit 10-12).

CLO 5 – Describe Thin lenses with regard to Vergence: dioptric and effective power; Object-image relationships; Lateral (trans linear) and angular magnification; Thin lens systems; Prismatic effect (Prentice's rule and prism effectivity); Ray tracing, optical center, and optic axis (Unit 13-16).

CLO 6 – Describe Thick lenses in terms of Cardinal points; Vertex power and equivalent power; Lateral (trans linear) and angular magnification; Reduced systems (Unit 17-20).

CLO 7 – Describe Aberrations in terms of Spherical; Gama; Oblique astigmatism; Curvature of field; Distortion; Chromatic (longitudinal and lateral); Higher order aberrations (Unit 21-25)

CLO 8 – Describe Apertures with regard to Entrance and exit pupil size and location; Depth of focus, depth of field, hyperfocal distance; Field of view and half illumination (Unit 26-28).

CLO 9 - Describe Spherocylindrical lenses in terms of Location of foci, image planes, principal meridians, and circle of least confusion; Obliquely crossed spherocylindrical lenses; Transposition; Prismatic effect (Unit 29-31).

CLO 10 – Describe Thin prisms with regard to Unit of measurement (prism dioptre); Prism deviation; Combination of thin prisms; Resolution of an oblique prism into horizontal and vertical components; Total internal reflection (Unit 32-34).

CLO 11 – Describe Mirrors in terms of Planar and spherical reflection; Proportion of light reflected from a surface (Fresnel's law); Focal power, focal length, and curvature; Object-image relationships; Magnification; Lens / mirror systems and Ray tracing (Unit 35-36).

CLO 12 – Describe Ophthalmic and optical Instruments in terms of Direct and indirect ophthalmoscopes; Retinoscope; Focimeter; Biomicroscope (Slit-lamp microscope); Radioscope (Micro spherometer); Keratometry (Ophthalmometer); Diagnostic lenses (gonioscopy, fundus, etc.) (Unit 37-38)

TEXT BOOKS:

Tunnacliffe A. H, Hirst J. G, Optics, The association of British Dispensing Opticians, London, U.K., 1990.
2. Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.

REFERENCE BOOKS:

Loshin D. S. The Geometric Optics Workbook, Butterworth-Heinemann, Boston, USA, 1991.
Schwartz S. H. Geometrical and Visual Optics: A Clinical Introduction, McGraw-Hill, New York, USA, 2002.

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10

Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

COURSE CODE: BOP 202
COURSE NAME: VISUAL OPTICS
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE DESCRIPTION:

This course deals with the concept of eye as an optical instrument and thereby covers various optical components of eye, types of refractive errors, clinical approach in diagnosis and management of various types of refractive errors.

COURSE OBJECTIVES:

Upon completion of the course, the student should be able:

1. To understand the fundamentals of optical components of the eye
2. To gain theoretical knowledge and practical skill on visual acuity measurement, objective and subjective clinical refraction.

COURSE PLAN

UNIT 1
Review of Geometrical Optics:
Vergence and power
Conjugacy, object space and image space
Sign convention
Spherical refracting surface
Spherical mirror; catoptric power
Cardinal points
Magnification
Light and visual function
Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism
Aberration and application Spherical and Chromatic

UNIT 2
Optics of Ocular Structure
Cornea and aqueous
Crystalline lens
Vitreous
Schematic and reduced eye

UNIT 3
Measurements of Optical Constants of the Eye
Corneal curvature and thickness
Keratometry
Curvature of the lens and ophthalmodynamometer
Axial and axis of the eye
Basic Aspects of Vision.
Visual Acuity
Light and Dark Adaptation
Color Vision
Spatial and Temporal Resolution
Science of Measuring visual performance and application to Clinical Optometry

UNIT 4
Refractive anomalies and their causes
Etiology of refractive anomalies

Contributing variability and their ranges
Populating distributions of anomalies.
Optical component measurements
Growth of the eye in relation to refractive errors

UNIT 5

Accommodation & Presbyopia
Far and near point of accommodation Range and amplitude of accommodation Mechanism of accommodation
Variation of accommodation with age Anomalies of accommodation
Presbyopia
Hypermetropia and accommodation

UNIT 6
Convergence:
Type, Measurement and Anomalies
Relationship between accommodation and convergence-AC/A ratio

UNIT 7
Objective Refraction (Static & Dynamic)
Streak retinoscopy
Principle, Procedure, Difficulties and interpretation of findings
Transposition and spherical equivalent
Dynamic retinoscopy various methods
Radical retinoscopy and near retinoscopy
Cycloplegic refraction

UNIT 8
Subjective Refraction:
Principle and fogging
Fixed astigmatic dial (Clock dial), Combination of fixed and rotator dial (Fan and block test), J.C.C
Duochrome test
- Binocular balancing- alternate occlusion, prism dissociation, dissociate Duochrome balance,
Borish dissociated fogging
- Binocular refraction-Various techniques

UNIT 9
Effective Power Magnification:
Ocular refraction vs. Spectacle refraction
Spectacle magnification vs. Relative spectacle magnification
Axial vs. Refractive ametropia, Knapp's law
Ocular accommodation vs. Spectacle accommodation
Retinal image blur-Depth of focus and depth of field

COURSE LEARNING OUTCOMES:

CLO 1. What is geometrical optics with regards to vergence and power, conjugacy, object space Conjugacy, object space and image space, Sign convention, Spherical refracting surface, Spherical mirror; catoptric power, Cardinal points, Magnification, Light and visual function, Clinical Relevance of: Fluorescence, Interference, Diffraction, Polarization, Birefringence, Dichroism and Aberration and application Spherical and Chromatic (Unit 1)
CLO 2. Students should know about the detailed anatomy and physiology of optical structures like cornea, aqueous humor, crystalline lens, vitreous humor, schematic and reduced eye (Unit 2).

CLO 3. Students should know how to measure different optical constants of the eye in detail and also about the basic aspects of vision (Unit 3).
CLO 4. Students should know about the etiology, contributing factors of refractive anomalies and the population affected by it. They should also know how to do optical measurements and the relationship between growing eyes and refractive errors (Unit 4).
CLO 5. Students should know about accommodation with regards to far and near accommodation, its range, amplitude, mechanism, variations, anomalies of accommodation (Unit 5).
CLO 6. Students should know about convergence with respect to its types, measurement, anomalies and its relationship with accommodation (Unit 6).
CLO 7. Students should know about the static and dynamic refraction in detail with respect to streak retinoscopy, dynamic retinoscopy, radical retinoscopy and near retinoscopy along with cycloplegic refraction (Unit 7).
CLO 8. Students should know about subjective refraction its principle, fogging, clock dial, fan and block test and douchrome test (Unit 8)
CLO 9. Students should know about the effective power magnification and its different aspects in detail (Unit 9).

TEXT BOOK:

A H Tunnacliffe: Visual optics, The Association of British Optician, 1987
AG Bennett & RB Rabbets: Clinical Visual optics, 3rd edition, Butterworth Heinemann, 1998

REFERENCE BOOKS:

M P Keating: Geometric, Physical and Visual optics, 2nd edition, Butterworth-Heinemann, USA, 2002
HL Rubin: Optics for clinicians, 2nd edition, Triad publishing company. Florida, 1974.
H Obstfeld: Optic in Vision- Foundations of visual optics & associated computations, 2nd edition, Butterworth, UK, 1982.
WJ Benjamin: Borish's clinical refraction,2nd edition, Butterworth Heinemann, Missouri, USA,2006
T Grosvenor: Primary Care Optometry,4th edition, Butterworth –Heineman, USA,2002

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

COURSE CODE: BOP 203
COURSE NAME: BASIC AND OCULAR PHARMACOLOGY
COURSE CREDIT: 3
TOTAL HOURS: 90

COURSE OBJECTIVES-

To know the structural activity relationship of different classes of drugs.

COURSE DESCRIPTION-

This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

COURSE CONTENT:

UNIT 1 –
General concepts about pharmacodynamics and Pharmacokinetics Principles involved in drug activity.

UNIT 2 –
Autonomic nervous system.
Anatomy & functional organisation.
List of drugs acting on ANS including dose, route of administration, indications, contraindications and adverse effects.

UNIT 3 -
Cardiovascular drugs- Enumerate the mode of action, side effects and therapeutic uses of the following drugs.
Antihypertensives
Beta Adrenergic antagonists' Alpha Adrenergic antagonists Peripheral Vasodilators Calcium channel blockers
b. Antiarrhythmic drugs
c. Cardiac glycosides
d. Sympathetic and nonsympathetic inotropic agents.
e. Coronary vasodilators.
f. Antianginal and anti-failure agents
g. Lipid lowering & anti atherosclerotic drugs.
h. Drugs used in Hemostasis - anticoagulants Thrombolytics and antithrombotic. Cardioplegic drugs- History, Principles and types of cardioplegia.
Primary solutions - History, principles & types. Drugs used in the treatment of shock.
Pharmacological protection of organs during CPB

UNIT 4 -
Anesthetic agents.
Definition of general and local anesthetics. Classification of general anesthetics.
Pharmacokinetics and Pharmacodynamics of inhaled anesthetic agents. Intravenous general anesthetic agents.
Local anesthetics - classification mechanism of action, duration of action and methods to prolong the duration of action. Preparation, dose and routes of administration.

UNIT 5 -

Analgesics
Definition and classification
Routes of administration, dose, frequency of administration,
Side effects and management of non-opioid and opioid analgesics

UNIT 6 -
Antihistamines and antiemetics-
Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.

UNIT 7 -
CNS stimulants and depressants
Alcohol
Sedatives, hypnotics and narcotics CNS stimulants
Neuromuscular blocking agents and muscle relaxants. Inhalational gases and emergency drugs.

UNIT 8 -
Pharmacotherapy of respiratory disorders
Introduction - Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone
Pharmacotherapy of bronchial asthma
Pharmacotherapy of cough Mucokinetic and mucolytic agents
Use of bland aerosols in respiratory care.
Corticosteroids - Classification, mechanism of action, adverse effects and complications Preparation, dose and routes of administration.

UNIT 9 –
Pharmacotherapy of renal disorders
Diuretics
Renal physiology
Side of action of diuretics Adverse effects
Preparations, dose and routes of administration.

UNIT 10 -
Chemotherapy of infections
Definition
Classification and mechanism of action of antimicrobial agents Combination of antimicrobial agents
Chemoprophylaxis.
Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol, antitubercular drugs.

UNIT 11 -
Miscellaneous.
IV fluids- various preparations and their usage. Electrolyte supplements
Immunosuppressive agents
New drugs included in perfusion technology. Drugs used in metabolic and electrolyte imbalance.

COURSE LEARNING OUTCOMES:

CLO 1: Define pharmacology & its branches (Unit 1).
CLO 2: Describe autonomic nervous system and affecting drugs (Unit 2)
CLO 3: Able to know Drugs used in treatment of Heart (Unit 3).
CLO 4: Define anesthesia & its types (Unit 4)
CLO 5: Define pain & drugs used for pain relief (Unit 5)
CLO 6: Define vomiting drugs used in gastrointestinal dysfunction (Unit 6)
CLO 7: Define Nervous system & drugs used for Nervous system. (Unit 7)
CLO 8: Define cardiopulmonary bypass & drugs uses (Unit 3).

CLO 9: Mechanism of drugs acting on renal system (Unit 9)
CLO 10: Describe structures of Respiratory tract & drugs used for respiratory disorders (Unit 8).
CLO 12: Define infection & uses of drugs in infection control (Unit 10).
CLO 13: Able to describe mechanism of action of drugs and other new updates in medicines (Unit 11).

TEXT BOOKS:

Essential of Medical Pharmacology- K. D. Tripathi
Pharmacology in Rehabilitation- Ciccone.

REFERENCE BOOKS:

T J Zimmerman, K S Kooner: Text Book of Ocular Pharmacology, Lippincott-Raven, 1997

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 204
Course name: PHYSICAL OPTICS
Course credit hours: 03
Total contact hour: 90

COURSE OBJECTIVES:

The objective of this course is to equip the students with a thorough knowledge of properties of light. At the end of this course, students will be able to predict the distribution of light under various conditions.

COURSE DESCRIPTION:

This course will be taught in one semester. Physical Optics is the study of light, its properties and its interaction with matter. Specifically, the phenomena of interference, diffraction, polarization and scattering will be dealt with in detail

COURSE CONTENT:

S.No.	Topics
UNIT 1.	Nature of light –light as electromagnetic oscillation –wave equation; ideas of sinusoidal oscillations –simple harmonic oscillation; transverse nature of oscillation; concepts of frequency, wavelength, amplitude and phase.
UNIT 2.	Sources of light; Electromagnetic Spectrum.
UNIT 3.	Polarized light; linearly polarized light; and circularly polarized light.
UNIT 4.	Intensity of polarized light; Malus'S Law; polarizers and analyzers; Methods of producing polarized light; Brewster's angle.
UNIT 5.	Birefringence; ordinary and extraordinary rays.
UNIT 6.	Relationship between amplitude and intensity.
UNIT 7.	Coherence; interference; constructive interference, destructive interference; fringes; fringe width.
UNIT 8.	Double slits, multiple slits, gratings.
UNIT 9.	Diffraction; diffraction by a circular aperture; Airy's disc
UNIT 10.	Resolution of an instrument (telescope, for example); Rayleigh's criterion
UNIT 11.	Scattering; Rayleigh's scattering; Tyndall effect.
UNIT 12.	Fluorescence and Phosphorescence
UNIT 13.	Basics of Lasers –coherence; population inversion; spontaneous emission; Einstein's theory of lasers.
UNIT 14.	Radiometry; solid angle; radiometric units; photopic and scotopic luminous efficiency and efficacy curves; photometric units
UNIT 15.	Inverse square law of photometry; Lambert's law.
UNIT 16.	Other units of light measurement; retinal illumination; Trolands

PRACTICAL:

Each practical session could be evaluated for 10 marks and the total could be added to the final evaluations. These practicals could be customized as per the university requirements and spaced apart conveniently. The practical to be done include the following:
Gratings – determination of grating constant using Sodium vapor lamp; determination of wavelengths of light from Mercury vapour lamp
Circular Apertures – measurements of Airy's disc for apertures of various sizes Verification of Malus' Law using a polarizer – analyzer combination Demonstration of birefringence using Calcite crystals
Measurement of the resolving power of telescopes. Newton's rings
Demonstration of fluorescence and phosphorescence using crystals and paints

COURSE LEARNING OUTCOMES:

CLO 1 - The candidates should demonstrate fundamental knowledge and insight into physical optics in order for the candidate to be able to understand and solve problems related to the eye and optical instruments/lenses, their function and correction (Unit 1,2,3).
CLO 2 - Knowledge and understanding should be demonstrated in the areas of: (3) wave optics, (2) interaction of light on matter, (3) polarization, (4) transmission through successive (4) polarizers, and (5) image quality (Unit 4,5).
CLO 3 - The aim is to achieve knowledge of the fundamentals of physical optics and how they apply to the human eye (Unit 6,7,8).
CLO 4 – Explain Wave optics with regard to Characteristics of wave motion; Classifications of the electromagnetic spectrum; Total and partial coherence; Diffraction (single slit, circular aperture, limits of resolution, zone plates); Interference (double slit, multiple slits, thin film, antireflective coatings, holography); Scattering (Rayleigh compared to Tyndall); Dispersion (Unit 9,10)
CLO 5 - Explain Interaction of light and matter in terms of atomic energy levels, absorption and emission line spectra; Continuous spectra (Black body radiator and gray body radiator characteristics); Fluorescence (photons, energy levels); Lasers (theory of operation, speckle pattern); Spectral transmission (Unit 11,12)
CLO 6 – Describe Polarization in terms of Linearly polarized light; Circular and elliptical polarization; Polarization by reflection (glare reduction, Brewster's law); Effects of scattering on polarization; Transmission through successive polarizers (stress analysis, Malus' law) (Unit 13,14).
CLO 7 – Describe Image Quality in terms of Resolving power; Point and line spread function; Modulation transfer function (Fourier optics) (Unit 15,16).

TEXT BOOKS:

Subrahmanyan N, BrijLal, A textbook of Optics, S. Chand Co Ltd, New Delhi, India, 2003.

REFERENCE BOOKS:

Pedrotti L. S, Pedrotti Sr. F. L, Optics and Vision, Prentice Hall, New Jersey, USA, 1998.
Keating NM. P, Geometric, Physical and Visual Optics, Butterworth- Heinemann, Massachusetts, USA, 2002.

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP-205
Course name: OPTOMETRIC INSTRUMENTS
Course credit hours: 05
Total contact hour: 150

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to gain theoretical knowledge and basic practical skill in handling the following instruments

1. Visual Acuity chart/drum
2. Retinoscope
3. Trail Box
4. Jackson Cross cylinder
5. Direct ophthalmoscope

COURSE DESCRIPTION:

This course covers commonly used optometric instruments, its basic principle, description and usage in clinical practice.

COURSE CONTENT:

Refractive instruments -
Optotypes and MTF, Spatial Frequency Test charts standards.
Choice of test charts Trial case lenses
Refractor (phoropter) head units Optical considerations of refractor units Trial frame design
Near vision difficulties with units and trial frames Retinoscope – types available
Adjustment of Retinoscopes- special features Objective optometers.
Infrared optometer devices. Projection charts
Illumination of the consulting room. Brightness acuity test
Vision analyzer Pupilometer
Potential Acuity Meter Aberrometer
Ophthalmoscopes and related devices Design of ophthalmoscopes – illumination Design of ophthalmoscopes- viewing Ophthalmoscope disc
Filters for ophthalmoscopy Indirect ophthalmoscope Lensometer, Lens gauges or clock Slit lamp
Tonometer
Keratometry and corneal topography Refractometer
Orthoptic Instruments (Synoptophore Only) Color Vision Testing Devices
Fields of Vision and Screening Devices Scans
ERG
New Instruments

COURSE LEARNING OUTCOMES:

CLO 1 - Describe Physical characteristics of ophthalmic lenses in terms of Geometry of lens surfaces (spherical, cylindrical, toric, aspheric); Lens form; Lens thickness (centre, edge, gradients); Specification of lens size and shape; Materials (index of refraction, dispersion, hardness, specific gravity)
CLO 2 - Describe Optical characteristics of ophthalmic lenses in terms of Locations of and relationships between the optic axis, optical centre, geometric centre, and major reference points; Principles of corrected curve lens design; Verification of lens prescriptions (focimeter, lens measure); Writing and transposing lens prescriptions; Effect of lens tilt (spheres and spherocylinders about a principal meridian); Effective power (for near and for changes in vertex distances)
CLO 3 – Describe Ophthalmic prisms and prismatic effects of lenses in terms of Thickness differences

across a prism; Prismatic effects in the periphery of a lens (spheres, spherocylinders); Decentration (prism from decentration, decentering to obtain prism, interpupillary distance); Correction of vertical prism effect; Slab off (front, back, top, bottom, reverse); Double slab off; Dissimilar segments; Compensated R segments; Prism segments; Multiple corrections; Fresnel prisms; Fresnel power additions

CLO 4 – Describe Multifocal lenses in terms of Types (fused, 1-piece, progressive power additions and blended lenses); Methods of producing add powers; Segment centre location; Image movement; Total displacement, horizontal and vertical imbalance; Placement of distance and multifocal optical centre; Optical and physical characteristics of segments (design and calculations, progressive adds, aberrations, surface characteristics); Specifying multifocal height, size, shape and location of segment

CLO 5 – Describe Spectacle magnification in terms of Shape and power factors; Iseikonic lens design

CLO 6 – Describe Absorptive lenses in terms of Specification of lens tints and absorptive coatings (including spectral transmission curves); Characteristics of photochromic lenses; Relationship between lens thickness and spectral transmission; Special occupational requirements

CLO 7 – Describe Impact resistance in terms of Degrees of resistance of ophthalmic lens materials; Methods of rendering materials impact resistant; Methods of verifying impact resistance; Performance of materials upon impact and after impact; Specifications of occupational safety lenses.

CLO 8 – Describe Spectacle Applications in terms of Spectacle lens prescriptions for ametropia; Lens problems of aberrations, weight, thickness, limits of field, secondary images, magnification, jump and displacement; Frame and lens design, including types of single vision and multiple focal lenses, kinds of lens materials, base curves and cylinder forms, character and placement of multi-focal, optical centers, and frame specifications. Evaluation of lenses and frames, via focimeter, lens gauge, and observation, for optical center positioning, powers, and other specifications of design Fitting and adjusting frames for the wearer Patient counselling information associated with the dispensing of prescriptions for different ametropias

TEXT BOOKS:

David Henson: Optometric Instrumentations, Butterworth- Heinnemann, UK, 1991

REFERENCE BOOKS:

P R Yoder: Mounting Optics in Optical Instruments, SPIE Society of Photo- Optical Instrumentation, 2002 G Smith, D A. Atchison: The Eye and Visual Optical Instruments, Cambridge University Press, 1997

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 206
Course name: PRACTICE MANAGEMENT
Course credit hours: 02
Total contact hour: 60

COURSE OBJECTIVES:

At the end of the course, students would have gained knowledge on various aspects of private optometric practice from Indian perspective.

COURSE DESCRIPTION:

This course deals with all aspects of optometry practice management - business, accounting, taxation, professional values, and quality & safety aspects.

COURSE CONTENT:

UNIT 1 –
Business Management
Practice establishment and development Stock control and costing
Staffing and staff relations Business computerization

UNIT 2 –
Accounting Principles
Sources of finance
Bookkeeping and cash flow

UNIT 3 -
Taxation and taxation planning

UNIT 4 -
Professionalism and Values
Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
Personal values- ethical or moral values
Attitude and behavior- professional behavior, treating people equally
Code of conduct, professional accountability and responsibility, misconduct Differences between professions and importance of team efforts

UNIT 5 -
Cultural issues in the healthcare environment

COURSE LEARNING OUTCOMES:

CLO 1: Understand the concepts related to Business (Unit 1).
CLO 2: Demonstrate the roles, skills and functions of management (Unit 2).
CLO 3: Analyze effective application of PPM knowledge to diagnose and solve organizational problems and develop optimal managerial decisions (Unit 3).
CLO 4: Understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities (Unit 4,5).

TEXT BOOKS:
Financial & Management Accounting (Theory & Practices)

REFERENCE BOOKS:

Principles and Practice of Management by P. Subba Rao, Hari Shankar Pande

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 207
Course name: DISPENSING OPTICS & PUBLIC HEALTH & COMMUNITY OPTOMETRY
Course credit hours: 03
Total contact hour: 90

COURSE DESCRIPTION:
Introduction to the foundation and basic sciences of public health optometry with an emphasis on the epidemiology of vision problems especially focused on Indian scenario.

COURSE OBJECTIVES:
At the end of the course students will be knowledgeable in the following areas:
1. Community based eye care in India. 2. Prevalence of various eye diseases 3. Developing Information Education Communication materials on eye and vision care for the benefit of the public 4. Organize health education programs in the community 5. Vision screening for various eye diseases in the community and for different age group

DISPENSING OPTICS:

UNIT 1 –
Components of spectacle prescription & interpretation, transposition, Add and near power relation

UNIT 2 –
Frame selection –based on spectacle prescription, professional requirements, age group, face shape

UNIT 3 –
Measuring Interpupillary distance (IPD) for distance & near, bifocal height

UNIT 4 –
Lens & Frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments – facial wrap, pantoscopic tilt

UNIT 5 –
Recording and ordering of lenses (power, add, diameter, base, material, type, lens enhancements)

UNIT 6 –
Neutralization –Hand & lensometer, axis marking, prism marking

UNIT 7 –
Faults in spectacles (lens fitting, frame fitting, patients' complaints, description, detection and correction)

UNIT 8 –
Final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles, Accessories –Bands, chains, boxes, slevets, cleaners, screwdriver kit

UNIT 9 –
Spectacle repairs –tools, methods, soldering, riveting, frame adjustments

UNIT 10 –
Special types of spectacle frames
Monocles
Ptosis crutches
Industrial safety glasses

Welding glasses

UNIT 11 –
Frame availability in Indian market

UNIT 12 –
FAQs by customers and their ideal answers

PUBLIC HEALTH AND COMMUNITY OPTOMETRY
UNIT 13 -
Public Health Optometry: Concepts and implementation, Stages of diseases

UNIT 14 –
Dimensions, determinants and indicators of health

UNIT 15 –
Levels of disease prevention and levels of health care patterns

UNIT 16 –
Epidemiology of blindness – Defining blindness and visual impairment

UNIT 17–
Eye in primary health care

UNIT 18 –
Contrasting between Clinical and community health programs

UNIT 19 –
Community Eye Care Programs

UNIT 20 –
Community based rehabilitation programs

UNIT 21 –
Nutritional Blindness with reference to Vitamin A deficiency

UNIT 22 –
Vision 2020: The Right to Sight

UNIT 23 –
Screening for eye diseases

UNIT 24 –
National and International health agencies, NPCB

UNIT 25 –
Role of an optometrist in Public Health

UNIT 26 –
Organization and Management of Eye Care Programs – Service Delivery models
UNIT 27 –
Health manpower and planning & Health Economics

UNIT 28 –
Evaluation and assessment of health programs

UNIT 29 –
Optometrist's role in school eye health programs

UNIT 30 –
Basics of Tele Optometry and its application in Public Health

UNIT 31 –
Information, Education and Communication for Eye Care programs

COURSE LEARNING OUTCOMES:

CLO 1. By the end of this unit students should be able to know and understand what are the different components of spectacle prescription, their interpretation and transposition. Students should also know about add and near power relationships (Unit 1).

CLO 2. By the end of this unit students should be able to know and understand the different ways of frame selection –based on spectacle prescription, professional requirements, age group and face shape (Unit 2).

CLO 3. By the end of this unit students should be able to know and understand how to measure Interpupillary distance (IPD) for distance & near and bifocal height (Unit 3).

CLO 4. By the end of this unit students should be able to know and understand how to do lens & frame markings, Pupillary centers, bifocal heights, Progressive markings & adjustments related to facial wrap, and pantoscopic tilt (Unit 4)

CLO 5. By the end of this unit students should be able to know and understand how to do recordings and ordering of lenses with regard to power, add, diameter, base, material, type, and lens enhancements (Unit 5)

CLO 6. By the end of this unit students should be able to know and understand what Neutralization is and its different aspects in detail (Unit 6)

CLO 7. By the end of this unit students should be able to know and understand what are different types of faults that can be seen in spectacle lenses and how to correct them (Unit 7)

CLO 8. By the end of this unit students should be able to know and understand how to do final checking & dispensing of spectacles to customers, counseling on wearing & maintaining of spectacles and different accessories available for it (Unit 8)

CLO 9. By the end of this unit students should be able to know and understand what are the different tools, methods and adjustments that can be done for spectacle repair (Unit 9)

CLO 10. By the end of this unit students should be able to know and understand in detail about the special types of spectacle frames (Unit 10)

CLO 11. By the end of this unit students should be able to know and understand what are the different types of frames that are available in Indian market and their quantity (Unit 11)

CLO 12. By the end of this unit students should be able to know and understand what will be the possible questions asked by the subjects and how to answer them (Unit 12)

CLO 13. By the end of this unit students should be able to know and understand public health optometry in detail and also, they should know the different stages of diseases (Unit 13)

CLO 14. By the end of this unit students should be able to know and understand what is health in detail and its dimensions, determinants and indicators (Unit 14)

CLO 15. By the end of this unit students should be able to know and understand how to prevent diseases and what are the different levels of health care patterns (Unit 15)

CLO 16. By the end of this unit students should be able to know and understand in detail about definition, epidemiology of blindness and visual impairment (Unit 16)

CLO 17. By the end of this unit students should be able to know and understand in detail about primary care of eye (Unit 17)

CLO 18. By the end of this unit students should be able to know and understand about what are the different community-based rehabilitation programs for such patients (Unit 18)

CLO 19. By the end of this unit students should be able to know and understand in detail about different types of nutritional diseases and their management with emphasis on Vitamin A deficiency (Unit 19)

CLO 20. By the end of this unit students should be able to know and understand the act - VISION 2020 in detail (Unit 20)

CLO 21. By the end of this unit students should be able to know and understand what are the different

methods for screening eye diseases (Unit 21)
CLO 22. By the end of this unit students should be able to know about the National and International agencies dealing with these patients (Unit 22)
CLO 23. By the end of this unit students should be able to know about the role of optometrist in the community (Unit 23)
CLO 24. By the end of this unit students should be able to know in detail about eye care programs organizations and their management (Unit 24)
CLO 25. By the end of this unit students should be able to know about health economics, manpower and planning in detail (Unit 25)
CLO 26. By the end of this unit students should be able to know how to evaluate and access health programs (Unit 26)
CLO 27. By the end of this unit students should be able to know about the role of optometrist in school health care programs (Unit 27)
CLO 28. By the end of this unit students should be able to know and understand about tele optometry and its application in the health care system (Unit 28)
CLO 29. By the end of this unit students should be able to know and understand in detail about eye care programs with regards to information, education and communication (Unit 29,30,31)

TEXT BOOKS:

GVS Murthy, S K Gupta, D Bachani: The principles and practice of community Ophthalmology, National programme for control of blindness, New Delhi, 2002
Newcomb RD, Jolley JL : Public Health and Community Optometry, Charles C Thomas Publisher, Illinois, 1980
Jalie MO: Ophthalmic lens and Dispensing, 3rd edition, Butterworth –Heinemann, 2008
Troy E. Fannin, Theodore Grosvenor: Clinical Optics, 2nd edition, Butterworth – Heinemann, 1996
C W Brooks, IM Borish: System for Ophthalmic Dispensing, 3rdedition, Butterworth - Heinemann, 2007
Michael P Keating: Geometric, Phisical& Visual Optics, 2nd edition, Butterworth – Heinemann, 2002

REFERENCE BOOKS:

MC Gupta, Mahajan BK, Murthy GVS, 3rd edition. TextBook of Community Medicine, Jaypee Brothers, New Delhi, 2002

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 208
Course name: BINOCULAR VISION
Course credit hours: 05
Total contact hour: 150

COURSE OBJECTIVES:

On successful completion of this module, a student will be expected to be able to: -
1. Demonstrate an in-depth knowledge of the gross anatomy and physiology relating to the extraocular muscles.
2. Provide a detailed explanation of, and differentiate between the etiology, investigation and management of binocular vision anomalies.
3. Adapt skills and interpret clinical results following investigation of binocular vision anomalies appropriately and safely.

COURSE DESCRIPTION:

This course provides theoretical aspects of Binocular Vision and its clinical application. It deals with basis of normal binocular vision and space perception, Gross anatomy and physiology of extraocular muscles, various binocular vision anomalies, its diagnostic approaches and management.

COURSE CONTENT:

UNIT 1 –
Binocular Vision and Space perception.
Relative subjective visual direction.
Retino motor value
Grades of BSV
SMP and Cyclopean Eye Correspondence
Fusion, Diplopia, Retinal rivalry Horopter
Physiological Diplopia and Suppression Stereopsis, Panum's area, BSV.
Stereopsis and monocular clues - significance. Egocentric location, clinical applications.
Theories of Binocular vision.

UNIT 2 –
Anatomy of Extra Ocular Muscles. Rectus and Obliques, LPS. Innervation & Blood Supply.

UNIT 3 –
Physiology of Ocular movements. Center of rotation, Axes of Fick. Action of individual muscle.

UNIT 4 –
Laws of ocular motility Donder's and Listing's law Sherrington's law
Hering's law

UNIT 5 –
Uniocular & Binocular movements - fixation, saccadic & pursuits. Version And Vergence.
Fixation & field of fixation

UNIT 6 –

Near Vision Complex Accommodation Definition and mechanism (process). Methods of measurement.
Stimulus and innervation.
Types of accommodation.
Anomalies of accommodation – etiology and management.

UNIT 7 –

Convergence
Definition and mechanism.
Methods of measurement.
Types and components of convergence - Tonic, accommodative, fusional, proximal Anomalies of Convergence – aetiology and management.

UNIT 8 –

Sensory adaptations
Confusion

UNIT 9 –

Suppression Investigations
Management
Blind spot syndrome

UNIT 10 –

Abnormal Retinal Correspondence Investigation and management
Blind spot syndrome

UNIT 11 –

Eccentric Fixation Investigation and management

UNIT 12 –

Amblyopia Classification Etiology Investigation Management

UNIT 13 –

Neuro-muscular anomalies Classification and etiological factors
History – recording and significance.

UNIT 14 –

Convergent strabismus - Accommodative convergent squint, Classification, Investigation and Management, non-accommodative convergent squint – Classification, Investigation and Management
Divergent Strabismus – Classification, A&V phenomenon Investigation and Management
Vertical strabismus – Classification, Investigation and Management
Paralytic Strabismus - Acquired and Congenital Clinical Characteristics
Distinction from combatant and restrictive Squint
Restrictive Strabismus – Features, Musculo-fascial anomalies Duane's Retraction syndrome Clinical features and management
Brown's Superior oblique sheath syndrome Strabismus fixus
Congenital muscle fibrosis
Surgical and Non- Surgical management of Squint
Investigations History and symptoms Head Posture Diplopia Charting PBCT
Nine directions Binocular field of vision

UNIT 16 -

Nystagmus

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about-Relative subjective and visual direction; About the Fusion, Diplopia, Retinal rivalry; Physiological Diplopia and Suppression.; Egocentric location, clinical applications (Unit 1)
CLO 2 - After completion of this unit students will be able to know about- Anatomy of Extra Ocular Muscles (Unit 2)
CLO 3 - After completion of this unit students will be able to know about- Physiology of center of rotation and Axes of Fick Action of ocular muscles (Unit 3)
CLO 4 - After completion of this unit students will be able to know about- Different laws related to ocular motility (Unit 4)
CLO 5 - After completion of this unit students will be able to know about- fixation, saccadic & pursuits of ocular movements (Unit 5)
CLO 6 - After completion of this unit students will be able to know about- Mechanism of near vision complex; Different methods of near vision measurement; Types, Anomalies and management of near vision complex accommodation (Unit 6)
CLO 7 - After completion of this unit students will be able to know about- Convergence in detail (Unit 7)
CLO 8 - After completion of this unit students will be able to know about- Sensory adaptations in detail (Unit 8)
CLO 9 - After completion of this unit students will be able to know about- suppression in detail (Unit 9)
CLO 10 - After completion of this unit students will be able to know about- Abnormal Retinal correspondence, its investigation, management, and Blind spot syndrome (Unit 10)
CLO 11 - After completion of this unit students will be able to know about- Eccentric Fixation, its investigation and management (Unit 11)
CLO 12 - After completion of this unit students will be able to know about- Amblyopia, neuro muscular anomalies, strabismus, nystagmus in detail (Unit 12 - 16).

TEXT BOOKS:

Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
Gunter K. V. Mosby Company

REFERENCE BOOKS:

Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers
C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002
Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://www.sciencedirect.com/topics/neuroscience/binocular-vision
http://webeye.ophth.uiowa.edu/eyeforum/tutorials/bhola-binocularvision.htm
https://www.artisanpediatriceyecare.com/specialty-services/binocular-vision-assessment/
www.slideshare.com

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 209
Course name: Systemic Diseases
Course credit hours: 03
Total contact hour: 90

COURSE DESCRIPTION:

This course deals with definition, classification, clinical diagnosis, complications and management of various systemic diseases. In indicated cases ocular manifestations also will be discussed.

COURSE OBJECTIVES:

At the end of the course, students should get acquainted with the following:

1. Common Systemic conditions: Definition, diagnostic approach, complications and management options
2. Ocular findings of the systemic conditions
3. First Aid knowledge

COURSE PLAN

UNIT 1 –
Hypertension
Definition, classification, Epidemiology, clinical examination, complications, and management. Hypertensive retinopathy

UNIT 2 –
Diabetes Mellitus
Classification, pathophysiology, clinical presentations, diagnosis, and management, Complications Diabetic Retinopathy

UNIT 3 –
Thyroid Disease
Physiology, testing for thyroid disease, Hyperthyroidism, Hypothyroidism, Thyroiditis, Thyroid tumors Grave's Ophthalmopathy

UNIT 4 –
Acquired Heart Disease
Ischemic Heart Disease, Congestive heart failure, Disorders of cardiac rhythm Ophthalmic considerations

UNIT 5 –
Cancer:
Incidence Etiology Therapy
Ophthalmologic consideration

UNIT 6 –
Connective Tissue Diseases Rheumatic arthritis
Systemic lupus erythematosus Scleroderma
Polymyositis and dermatomyositis Sjogren syndrome
Behcet's syndrome
Eye and connective tissue disease

UNIT 7 –
Tuberculosis
Aetiology, pathology, clinical features, pulmonary tuberculosis, diagnosis, complications, treatment tuberculosis and the eye.

UNIT 8 –

Herpes virus (Herpes simplex, Varicella Zoster, Cytomegalovirus, Epstein Barr Virus) Herpes and the eye

UNIT 9 –
Hepatitis
Hepatitis A, B, C

UNIT 10 –
Acquired immunodeficiency syndrome

UNIT 11 –
Anemia
Diagnosis, clinical evaluation, consequences, Sickle cell disease, treatment, Ophthalmologic considerations

UNIT 12 –
Common Tropical Medical Ailments
Malaria
Typhoid Dengue Filariasis Onchocerciasis Cysticercosis Leprosy

UNIT 13 –
Nutritional and Metabolic disorders:
Obesity Hyperlipidemias Kwashiorkor
Vitamin A Deficiency Vitamin D Deficiency Vitamin E Deficiency Vitamin K Deficiency Vitamin B1, B2, Deficiency Vitamin C Deficiency

UNIT 14 –
Myasthenia Gravis

UNIT 15 –
First Aid General Medical Emergencies
Preoperative precautions in ocular surgeries

UNIT 16 –
Psychiatry
Basic knowledge of psychiatric condition and Patient Management

UNIT 17 –
Genetics
Introduction to genetics Organization of the cell
Chromosome structure and cell division
Gene structure and basic principles of Genetics. Genetic disorders and their diagnosis.
Genes and the eye
Genetic counseling and genetic engineering.

COURSE LEARNING OUTCOMES:
CLO 1 - After completion of this unit students will be able to know about- Management of hypertensive patient in details; Hypertensive retinopathy (Unit 1)
CLO 2 - After completion of this unit students will be able to know about-Management of diabetes mellitus; Diabetic retinopathy (Unit 2)
CLO 3 - After completion of this unit students will be able to know about-Physiology of thyroid disorders; Grave's Ophthalmopathy in details (Unit 3)
CLO 4 - After completion of this unit students will be able to know about- Acquired Heart Diseases and their ophthalmic considerations (Unit 4)
CLO 5 - After completion of this unit students will be able to know about- Incidence, etiology, and

therapies for cancer; Ophthalmic considerations in cancer disease (Unit 5)
CLO 6 - After completion of this unit students will be able to know about- Common connective tissue disorders and their management; Connective tissue diseases in relation to eyes (Unit 6)
CLO 7 - After completion of this unit students will be able to know about- Tuberculosis disease and its management in details; Tuberculosis and its impact in ophthalmology (Unit 7)
CLO 8 - After completion of this unit students will be able to know about- Herpes virus and its different forms, and their effect on eyes (Unit 8)
CLO 9 - After completion of this unit students will be able to know about- Hepatitis and its management in details (Unit 9)
CLO 10 - After completion of this unit students will be able to know about-acquired immunodeficiency syndrome and its management in details (Unit 10)
CLO 11 - After completion of this unit students will be able to know about- Anemia, its management in detail and Ophthalmologic considerations in regard with anemia (Unit 11)
CLO 12 - After completion of this unit students will be able to know about-Common Tropical Medical Ailments and their ophthalmic considerations (Unit 12)
CLO 13 - After completion of this unit students will be able to know about- Common Nutritional and Metabolic disorders in details and their ophthalmic considerations (Unit 13)
CLO 14 - After completion of this unit students will be able to know about-Common Nutritional and Metabolic disorders in details and their ophthalmic considerations (Unit 13)
CLO 15 - After completion of this unit students will be able to know about-Myasthenia Gravis and its ophthalmic considerations (Unit 14)
CLO 16 - After completion of this unit students will be able to know about- First Aid in General Medical Emergencies and their ophthalmic considerations (Unit 15)
CLO 17 - After completion of this unit students will be able to know about- Basic knowledge of psychiatric conditions and their management (Unit 16)
CLO 18 - After completion of this unit students will be able to know about- Basics of Genetics and its implications in ophthalmology (Unit 17)

TEXT BOOKS:

Pradeep Sharma: Strabismus simplified, New Delhi, First edition, 1999, Modern publishers. Fiona J. Rowe: Clinical Orthoptics, second edition, 2004, Blackwell Science Ltd
Gunter K. V. Mosby Company

REFERENCE BOOKS:

Mitchell Scheiman; Bruce Wick: Clinical Management of Binocular Vision Heterophoric, Accommodative, and Eye Movement Disorders, 2008, Lippincott Williams & Wilkins publishers
C Haslett, E R Chilvers, N A boon, N R Coledge, J A A Hunter: Davidson's Principles and Practice of Medicine, Ed. John Macleod, 19th Ed., ELBS/Churchill Livingstone. (PPM), 2002
Basic and clinical Science course: Update on General Medicine, American Academy of Ophthalmology, Section 1, 1999

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://www.sciencedirect.com/topics/neuroscience/binocular-vision
http://webeye.ophth.uiowa.edu/eyeforum/tutorials/bhola-binocularvision.htm
https://www.artisanpediatriceyecare.com/specialty-services/binocular-vision-assessment/
www.slideshare.com

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

THIRD YEAR

Course code: BOP - 301

Course name: CONTACT LENS

Course credit hours: 05

Total contact hour: 150

COURSE OBJECTIVES:

Upon completion of the course, the student should be able to:
Understand the basics of contact lenses
List the important properties of contact lenses
Finalize the CL design for various kinds patients
Recognize various types of fitting
Explain all the procedures to patient
Identify and manage the adverse effects of contact lens

COURSE DESCRIPTION:

The subject provides the student with suitable knowledge both in theoretical and practical aspects of Contact Lenses

COURSE CONTENT:

UNIT 1 –
Introduction to Contact lenses - Definition. Classification / Types

UNIT 2 –
History of Contact Lenses

UNIT 3 –
Optics of Contact Lenses - Magnification & Visual field, Accommodation & Convergence. Back & Front Vertex Power / Vertex distance calculation

UNIT 4 –
Review of Anatomy & Physiology of - Tear film, Cornea, Lids & Conjunctiva

UNIT 5 –
Introduction to CL materials - Monomers, Polymers

UNIT 6 –
Properties of CL materials - Physiological (Dk, Ionicity, Water content), Physical (Elasticity, Tensile strength, Rigidity), Optical (Transmission, Refractive index)

UNIT 7 –
Indications and contraindications

UNIT 8 –
Parameters / Designs of Contact Lenses & Terminology

UNIT 9 –
RGP Contact Lens materials

UNIT 10 –
Manufacturing Rigid and Soft Contact Lenses – various methods

UNIT 11 –
Pre-Fitting examination – steps, significance, recording of results

UNIT 12 –
Correction of Astigmatism with RGP lens

UNIT 13 –
Types of fit – Steep, Flat, Optimum – on spherical cornea with spherical lenses

UNIT 14 –
Types of fit – Steep, Flat, Optimum – on Toric cornea with spherical lenses

UNIT 15 –
Calculation and finalising Contact lens parameters

UNIT 16 –
Ordering Rigid Contact Lenses – writing a prescription to the Laboratory

UNIT 17 –
Checking and verifying Contact lenses from Laboratory

UNIT 18 –
Modifications possible with Rigid lenses

UNIT 19 –
Common Handling Instructions -Insertion & Removal Techniques, Do's and Don'ts

UNIT 20 –
Care and Maintenance of Rigid lenses -cleaning agents & Importance, Rinsing agents & Importance. Disinfecting agents & importance, Lubricating & Enzymatic cleaners

UNIT 21 –
Follow up visit examination

UNIT 22 –
Complications of RGP lenses

UNIT 23 –
SCL Materials & Review of manufacturing techniques

UNIT 24 –
Comparison of RGP vs. SCL

UNIT 25 –
Pre-fitting considerations for SCL

UNIT 26 –
Fitting philosophies for SCL

UNIT 27 –
Fit assessment in Soft Contact Lenses: Types of fit – Steep, Flat, Optimum

UNIT 28 –
Calculation and finalising SCL parameters - Disposable lenses, Advantages and availability

UNIT 29 –
Soft Toric CL - Stabilization techniques, Parameter selection, Fitting assessment

UNIT 30 –
Common Handling Instructions - Insertion & Removal Techniques, Do's and Don'ts

UNIT 31 –
Care and Maintenance of Soft lenses - cleaning agents & Importance, rinsing agents & Importance, disinfecting agents & importance, Lubricating & Enzymatic cleaners

UNIT 32 –
Follow up visit examination

UNIT 33 –
Complications of Soft lenses

UNIT 34 –
Therapeutic contact lenses – Indications, Fitting consideration

UNIT 35 –
Specialty fitting – Aphakia, Pediatric, Post refractive surgery

UNIT 36 –
Management of Presbyopia with Contact lenses

PRACTICAL

Measurement of Ocular dimensions Pupillary diameter and lid characteristics Blink rate and TBUT
Schirmer's test, Slit lamp examination of tear layer
Placido's disc
Soft Contact Lens fitting – Aspherical
Soft Contact Lens fitting – Lathe Cut lenses Soft Contact Lens over refraction
Lens insertion and removal Lens handling and cleaning Examination of old soft Lens RGP Lens fitting
RGP Lens Fit Assessment and fluorescein pattern
Special RGP fitting (Aphakia, pseudophakia & Keratoconus) RGP over refraction and Lens flexure
Examination of old RGP Lens RGP Lens parameters
Slit lamp examination of Contact Lens wearers Examination of old soft Lens
RGP Lens Fit Assessment and fluorescein pattern
Special RGP fitting (Aphakia, pseudophakia & Keratoconus) RGP over refraction and Lens flexure
Examination of old RGP Lens RGP Lens parameters
Fitting Cosmetic Contact Lens
Slit lamp examination of Contact Lens wearers Fitting Toric Contact Lens
Bandage Contact Lens
SPM & Pachymetry at SN During Clinics Specialty Contact Lens fitting (at SN during clinics

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about definition, classification of the contact lenses in detail (Unit 1)
CLO 2 - After completion of this unit students will be able to know about the history of the contact lenses (Unit 2)

CLO 3 - After completion of this unit students will be able to know about Optics of Contact Lenses in terms of Magnification, Visual field, Accommodation, Convergence, Back & Front Vertex Power and Vertex distance calculation (Unit 3)
CLO 4 - After completion of this unit students will be able to know about detailed anatomy and physiology of Tear film, Cornea, Lids & Conjunctiva (Unit 4)
CLO 5 - After completion of this unit students will be able to know about the materials used in the formation of contact lens mainly monomers and Polymers (Unit 5)
CLO 6 - After completion of this unit students will be able to know about properties of contact lens materials with regard to physiological (Dk, Ionicity, Water content) properties, physical (Elasticity, Tensile strength, Rigidity) properties and Optical (Transmission, Refractive index) properties (Unit 6)
CLO 7 - After completion of this unit students will be able to know about indications and contraindications of contact lens (Unit 7)
CLO 8 - After completion of this unit students will be able to know about parameters and designs of contact lenses and definition of basic terminologies used (Unit 8)
CLO 9 - After completion of this unit students will be able to know about detailed composition and properties of RGP contact lenses (Unit 9)
CLO 10 - After completion of this unit students will be able to know about various methods to manufacture rigid and soft contact lenses (Unit 10)
CLO 11 -After completion of this unit students will be able to know about various steps involved in pre-fitting examination as well as recording of results. The students will also explain the significance of the pre- fitting examination (Unit 11)
CLO 12 - After completion of this unit students will be able to know about detailed management of correction of astigmatism by the help of RGP lenses (Unit 12)
CLO 13 - After completion of this unit students will be able to know about types of fitting (steep, flat, optimum) on spherical cornea with spherical lenses (Unit 13)
CLO 14 - After completion of this unit students will be able to know about types of fitting (steep, flat, optimum) on toric cornea with spherical lenses (Unit 14)
CLO 15 - After completion of this unit students will be able to know about calculation and finalising Contact lens parameters (Unit 15)
CLO 16 - After completion of this unit students will be able to know about writing prescription for ordering of rigid contact lenses (Unit 16)
CLO 17 - After completion of this unit students will be able to know about how to check and verify contact lenses (Unit 17)
CLO 18 - After completion of this unit students will be able to know about modifications that are possible with rigid lenses according to the patient situations (Unit 17)
CLO 19 - After completion of this unit students will be able to know about the handling of the contact lens; how to insert the lens and what are the possible do's and don'ts that the patient should be aware of (Unit 19)
CLO 20 - After completion of this unit students will be able to know about how to take care of rigid lenses and maintenance of the lens with regard to cleaning agents & their importance, rinsing agents & their importance, disinfecting agents & their importance, lubricating & enzymatic cleaners (Unit 20)
CLO 21 - After completion of this unit students will be able to know about the detailed procedure of patient follow-up and examination (Unit 21)
CLO 22 - After completion of this unit students will be able to know about the complications associated with RGP lenses and their management (Unit 22)
CLO 23 - After completion of this unit students will be able to know about the detailed composition of SCL Materials and the different techniques involved in manufacture of these materials (Unit 23)
CLO 24 - After completion of this unit students will be able to know about the differences and similarities between RGP and SCL (Unit 24)
CLO 25 - After completion of this unit students will be able to know about what are the basic and advance considerations that they have to keep in mind when working with pre fitting of SCL (Unit 25)
CLO 26 - After completion of this unit students will be able to know about the different philosophies given for dealing with SCL (Unit 26)
CLO 27 - After completion of this unit students will be able to know about how to perform the detailed assessment for soft contact lenses and the different types of fit (steep, flat, optimum) (Unit 27)

CLO 28 - After completion of this unit students will be able to know about the calculations to be done for SCL parameters and how to finalize it. They should also know about disposable lenses - their advantages and availability (Unit 28)
CLO 29 - After completion of this unit students will be able to know about the soft toric contact lenses in terms of stabilization techniques, parameter selection and fitting assessment (Unit 29)
CLO 30 - After completion of this unit students will be able to know about common handling instructions for insertion and removal of lenses and do's and don'ts with that (Unit 30)
CLO 31 - After completion of this unit students will be able to know about how to take care of soft lenses and maintenance of the lens with regard to cleaning agents & their importance, rinsing agents & their importance, disinfecting agents & their importance, lubricating & enzymatic cleaners (Unit 31)
CLO 32 - After completion of this unit students will be able to know about the detailed procedure of patient follow-up and examination in case of soft lenses (Unit 32)
CLO 33 - After completion of this unit students will be able to know about the complications associated with soft lens and their management (Unit 33)
CLO 34 - After completion of this unit students will be able to know about the therapeutic contact lenses - their indications and fitting considerations (Unit 34)
CLO 35 - After completion of this unit students will be able to know about lens fitting in aphakia, pediatric and post refractive surgery patients (Unit 35)
CLO 36 - After completion of this unit students will be able to know about detailed management of Presbyopia with contact lenses (Unit 36)

TEXT BOOKS:

IACLE modules 1 - 10
CLAO Volumes 1, 2, 3

REFERENCE BOOKS:

Anthony J. Phillips : Contact Lenses, 5thedition, Butterworth-Heinemann, 2006 Elisabeth A. W. Millis: Medical Contact Lens Practice, Butterworth-Heinemann 2004
E S. Bennett ,V A Henry :Clinical manual of Contact Lenses, 3rd edition, Lippincott Williams and Wilkins, 2008

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

a. https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP - 302
Course name: LOW VISION CARE
Course credit hours: 03
Total contact hour: 90

COURSE OBJECTIVES:

At the end of the course, the student will be knowledgeable in the following:

1. Definition and epidemiology of Low Vision
2. Clinical examination of Low vision subjects
3. Optical, Non-Optical, Electronic, and Assistive devices.
4. Training for Low Vision subjects with Low vision devices
5. Referrals and follow-up

COURSE DESCRIPTION:

This course deals with the definition of low vision, epidemiology aspect of visual impairment, types of low vision devices and its optical principles, clinical approach of the low vision patients, assistive devices for totally visually challenged, art of prescribing low vision devices and training the low vision patients and other rehabilitation measures.

COURSE CONTENT:

UNIT 1-
Definitions & classification of Low vision

UNIT 2 –
Epidemiology of low vision

UNIT 3 –
Model of low vision service

UNIT 4 –
Pre-clinical evaluation of low vision patients – prognostic & psychological factors; psycho-social impact of low vision

UNIT 5 –
Types of low vision aids – optical aids, non-optical aids & electronic devices

UNIT 6 –
Optics of low vision aids

UNIT 7 –
Clinical evaluation – assessment of visual acuity, visual field, selection of low vision aids, instruction & training

UNIT 8 –
Pediatric Low Vision care

UNIT 9 –
Low vision aids – dispensing & prescribing aspects

UNIT 10 –

Visual rehabilitation & counseling

UNIT 11 –
Legal aspects of Low vision in India

UNIT 12 –
Case Analysis

PRACTICALS

Practical 1: Attending a low vision care clinic and history taking.

Practical 2:
2.1 Determining the type of telescope and its magnification (Direct comparison method & calculated method)
2.2 Determining the change in field of view with different magnification and different eye to lens distances with telescopes and magnifiers.

Practical 3:
3.1 Inducing visual impairment and prescribing magnification.
3.2 Determining reading speed with different types of low vision aids with same magnification.
3.3 Determining reading speed with a low vision aid of different magnifications.

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about the detailed definition of low vision and different types of low vision (Unit 1)
CLO 2 - After completion of this unit students will be able to know about epidemiology of low vision (Unit 2)
CLO 3 - After completion of this unit students will be able to know about different models for the service of low vision (Unit 3)
CLO 4 - After completion of this unit students will be able to know about the clinical evaluation of low vision patients along with prognostic and psychological factors associated with low vision. They will also know about the psycho-social impact of low vision on patients (Unit 4)
CLO 5 - After completion of this unit students will be able to know about the detailed aids available for low vision patients including optical aids, non-optical aids and electronic devices (Unit 5)
CLO 6 - After completion of this unit students will be able to know about detailed optics of low vision aids. (Unit 6)
CLO 7 - After completion of this unit students will be able to know about clinical evaluation of low vision in terms of assessment of visual acuity, visual field, selection of low vision aids, instruction and training (Unit 7)
CLO 8 - After completion of this unit students will be able to know about the management and care given to pediatric low vision patients (Unit 8)
CLO 9 - After completion of this unit students will be able to know about the detailed prescribing and dispensing aspects for low vision aids. (Unit 9)
CLO 10 - After completion of this unit students will be able to know about the rehabilitation and counselling that should be done for low vision patients (Unit 10)
CLO 11 - After completion of this unit students will be able to know about the legal aspects of low vision in India (Unit 11)
CLO 12 - After completion of this unit students will be able to know about case analysis in detail (Unit 12)

TEXT BOOKS:

Christine Dickinson: Low Vision: Principles and Practice Low vision care, 4th edition, Butterworth-

Heinemann, 1998
Sarika G, Sailaja MVSE Vaithilingam: practice of Low vision –A guide book, Medical Research Foundation, 2015.

REFERENCE BOOKS:

Richard L. Brilliant: Essentials of Low Vision Practice, Butterworth-Heinemann, 1999
Helen Farral: optometric Management of Visual Handicap, Blackwell Scientific publications, 1991 A J Jackson, J S Wolffsohn: Low Vision Manual, Butterworth Heinnemann, 2007

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 303
Course name: OCULAR DISEASE AND GLAUCOMA
Course credit hours: 05
Total contact hour: 150

COURSE DESCRIPTION:

This course deals with various ocular diseases affecting various parts of the eyes. It covers clinical signs and symptoms, cause, pathophysiological mechanism, diagnostic approach, differential diagnosis and management aspects of the ocular diseases.

COURSE OBJECTIVES:

At the end of the course the students will be knowledgeable in the following aspects of ocular diseases:

1. Etiology
2. Epidemiology
3. Symptoms
4. Signs
5. Course sequelae of ocular disease
6. Diagnostic approach and
7. Management of the ocular diseases

COURSE PLAN

UNIT 1

Orbit

Applied Anatomy
Proptosis (Classification, Causes, Investigations)
Enophthalmos
Developmental Anomalies (craniosynostosis, Craniofacial Dysostosis, Hypertelorism, Median facial cleft syndrome)
Orbital Inflammations (Preseptal cellulitis, Orbital cellulitis Orbital Periostitis, cavernous sinus Thrombosis)
Grave's Ophthalmopathy
Orbital tumors (Dermoid, capillary hemangioma, Optic nerve glioma)
Orbital blowout fractures
Orbital surgery (Orbitotomy)
Orbital tumors
Orbital trauma
Approach to a patient with proptosis

UNIT 2

LIDS

Applied Anatomy
Congenital anomalies (Ptosis, Coloboma, Epicanthus, Distichiasis, Cryptophthalmos)
Oedema of the eyelids (Inflammatory, Solid, Passive edema)
Inflammatory disorders (Blepharitis, External Hordeolum, Chalazion, Internal hordeolum, Molluscum Contagiosum)
Anomalies in the position of the lashes and Lid Margin (Trichiasis, Ectropion, Entropion, Symblepharon, Blepharophimosis, Lagophthalmos, Blepharospasm, Ptosis).

Tumors (Papilloma, Xanthelasma, Haemangioma, Basal carcinoma, Squamous cell carcinoma, sebaceous gland melanoma)

UNIT 3

Lacrimal System
Applied Anatomy
Tear Film
The Dry Eye (Sjogren's Syndrome)
The watering eye (Etiology, clinical evaluation)
Dacryocystitis
Swelling of the Lacrimal gland (Dacryoadenitis)

UNIT 4

Conjunctiva
Applied Anatomy
Inflammations of conjunctiva (Infective conjunctivitis – bacterial, chlamydial, viral, Allergic conjunctivitis, Granulomatous conjunctivitis)
Degenerative conditions (Pinguecula, Pterygium, Concretions)
Symptomatic conditions (Hyperemia, Chemosis, Ecchymosis, Xerosis, Discoloration)
Cysts and Tumors

UNIT 5
Cornea
Applied Anatomy and Physiology
Congenital Anomalies (Megalocornea, Microcornea, Cornea plana, Congenital cloudy cornea)
Inflammations of the cornea (Topographical classifications: Ulcerative keratitis and Non ulcerative Etiological classifications: Infective, Allergic, Trophic, Traumatic, Idiopathic))
Degenerations (classifications, Arcussenilis, Vogt's white limbal girdle, Hassal-henle bodies, Lipoid Keratopathy, Band shaped keratopathy, Salzmann's nodular degeneration, Droplet keratopathy, Pellucid Marginal degeneration)
Dystrophies (Reis Buckler dystrophy, Recurrent corneal erosion syndrome, Granular dystrophy, Lattice dystrophy, Macular dystrophy, cornea guttata, Fuch's epithelial endothelial dystrophy, Congenital hereditary endothelial dystrophy)
Keratoconus, Keratoglobus
Corneal oedema, Corneal opacity, Corneal vascularisation
Penetrating Keratoplasty

UNIT 6
Uveal Tract and Sclera
Applied Anatomy,
Classification of uveitis
Etiology
Pathology
Anterior Uveitis
Posterior Uveitis
Purulent Uveitis
Endophthalmitis
Panophthalmitis
Pars Planitis
Tumors of uveal tract (Melanoma)
Episcleritis and scleritis
Clinical examination of Uveitis and Scleritis

UNIT 7
Retina and Vitreous:
Applied Anatomy

Congenital and Developmental Disorders (Optic Disc: Coloboma, Drusen, Hypoplasia, Medullated nerve fibers; Persistent Hyaloid Artery)
Inflammatory disorders (Retinitis: Acute purulent, Bacterial, Virus, mycotic) Retinal Vasculitis (Eales's)
Retinal Artery Occlusion (Central retinal Artery occlusion)
Retinal Vein occlusion (Ischaemic, Non Ischaemic , Branch retinal vein occlusion)
Retinal degenerations: Retinitis Pigmentosa, Lattice degenerations
Macular disorders: Solar retinopathy, central serous retinopathy, cystoid macular edema, Age related macular degeneration.
Retinal Detachment: Rhegmatogenous, Tractional, Exudative)
Retinoblastoma Diabetic retinopathy

UNIT 8
Ocular Injuries:
Terminology: Closed globe injury (contusion, lamellar laceration) Open globe injury (rupture, laceration, penetrating injury, perforating injury)
Mechanical injuries (Extraocular foreign body, blunt trauma, perforating injury, sympathetic ophthalmitis)
Non-Mechanical Injuries (Chemical injuries, Thermal, Electrical, Radiational)
Clinical approach towards ocular injury patient

UNIT 9
Lens:
Applied Anatomy and Physiology
Clinical examination Classification of cataract
Congenital and Developmental cataract Acquired (Senile, Traumatic, Complicated, Metabolic, Electric, Radiational, Toxic)
Morphological: Capsular, Subcapsular, Cortical, Supranuclear, Nuclear, Polar.
Management of cataract (non-surgical and surgical measures; preoperative evaluation, Types of surgeries,)
Complications of cataract surgery
Displacement of lens: Subluxation, Displacement
Lens coloboma, Lenticonus, Microspherophakia

UNIT 10

Clinical Neuro-ophthalmology
Anatomy of visual pathway
Lesions of the visual pathway
Pupillary reflexes and abnormalities (Amaurotic light reflex, Efferent pathway defect, Wernicke's hemianopic pupil, Marcus gunn pupil. Argyll Robetson pupil, Adie's tonic pupil)
Optic neuritis, Anterior Ischemic optic neuropathy, Pappilloedema, optic atrophy
Cortical blindness
Malingering
Nystagmus
Clinical examination

UNIT 11
Glaucoma
Applied anatomy and physiology of anterior segment
Clinical Examination Definitions and classification of glaucoma
Pathogenesis of glaucomatous ocular damage
Congenital glaucoma
Primary open angle glaucoma
Ocular hypertension
Normal Tension Glaucoma
Primary angle closure glaucoma (Primary angle closure suspect, Intermittent glaucoma, acute congestive,

chronic angle closure)
Secondary Glaucoma's Management: common medications, laser intervention and surgical techniques

COURSE LEARNING OUTCOMES:

CLO 1. By the end of this unit students should be able to know and understand in detail about the orbit with respect to its anatomy, physiology, anomalies, tumors, trauma, and approach to such patients (Unit 1)
CLO 2. By the end of this unit students should be able to know and understand in detail about lids with respect to its anatomy, physiology, anomalies, tumors, trauma, and approach to such patients (Unit 2)
CLO 3. By the end of this unit students should be able to know and understand the lacrimal system with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 3)
CLO 4. By the end of this unit students should be able to know and understand conjunctiva with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 4)
CLO 5. By the end of this unit students should be able to know and understand cornea with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 5)
CLO 6. By the end of this unit students should be able to know and understand uveal tract and sclera with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 6)
CLO 7. By the end of this unit students should be able to know and understand retina and vitreous with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 7)
CLO 8. By the end of this unit students should be able to know and understand in detail about the ocular injuries and their management (Unit 8)
CLO 9. By the end of this unit students should be able to know and understand the lens with respect to its anatomy, physiology. anomalies and their etiology, tumors, trauma, and approach to such patients (Unit 9)
CLO 10. By the end of this unit students should be able to know and understand in detail about the neuro ophthalmology with regards to different anomalies present in such patients and their management (Unit 10)
CLO 11. By the end of this unit students should be able to know and understand in detail about glaucoma with regards to its anatomy, physiology, classification, etiology and management (Unit 11)

TEXT BOOK:
Patricia Barkway. Psychology for health professionals, 2 nd edition, Elsevier, 2013

REFERENCE BOOKS:
Stephen J. Miller : Parsons Diseases of the Eye, 18th edition, Churchill Livingstone, 1990
Jack J. Kanski Clinical Ophthalmology: A Systematic Approach, 6th edition, Butterworth - Heinemann, 2007

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 304
Course name: CLINICAL EXAMINATION OF VISUAL SYSTEMS
Course credit hours: 02
Total contact hour: 60

COURSE DESCRIPTION:
This course covers various clinical optometry procedures involving external examination, anterior segment and posterior segment examination, neuro ophthalmic examination, pediatric optometry examination, and Glaucoma evaluation.

COURSE OBJECTIVES:
At the end of the course the students will be skilled in knowing the purpose, setup and devices required for the test, indications and contraindications of the test, step-by-step procedures, documentation of the findings, and interpretation of the findings of the various clinical optometry procedure

COURSE CONTENT:
History taking
Visual acuity estimation
Extraocular motility, Cover test, Alternating cover test
Hirschberg test, Modified Krimsky
Pupils Examination
Maddox Rod
Van Herrick
External examination of the eye, Lid Eversion
Schirmer's, TBUT, tear meniscus level, NITBUT (keratometry),
Color Vision
Stereopsis
Confrontation test
Photo stress test
Slit lamp biomicroscope
Ophthalmoscopy
Tonometry
ROPLAS
Amsler test
Contrast sensitivity function test
Saccades and pursuit test

COURSE LEARNING OUTCOMES:
CLO 1. By the end of this subject the students should know in detail about the assessment and examination of the visual system in detail. They should know the different methods and approaches for the same.

TEXT BOOK:
T Grosvenor: Primary Care Optometry, 5th edition, Butterworth –Heinneman, USA, 2007.

REFERENCE BOOKS:
A K Khurana: Comprehensive Ophthalmology, 4th edition, New age international(p) Ltd. Publishers, New Delhi, 2007
D B. Elliott :Clinical Procedures in Primary Eye Care,3rd edition, Butterworth-Heinemann, 2007
Jack J. Kanski Clinical Ophthalmology: A Systematic Approach,6th edition, ButterworthHeinemann, 2007

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 305
Course name: INDIAN MEDICINE AND TELEMEDICINE
Course credit hours: 02
Total contact hour: 60

COURSE DESCRIPTION:
This course insight into the existing healthcare system in India.

COURSE OBJECTIVES:
At the end of the course students will be aware of the traditional and the latest healthcare system. The student also will get basic knowledge about the telemedicine practices in India especially in eye care.

COURSE CONTENT:

UNIT 1
Introduction to healthcare delivery system
Healthcare delivery system in India at primary, secondary and tertiary care
Community participation in healthcare delivery system
Health systems in developed countries.
Private Sector
National Health Mission
National Health Policy
Issues in Health Care Delivery System in India

UNIT 2
National Health Programme
Background objectives, action plan, targets, operations, achievements and constraints in various National Health Programme.

UNIT 3
Introduction to AYUSH system of medicine
Introduction to Ayurveda.
Yoga and Naturopathy
Unani
Siddha
Homeopathy
Need for integration of various systems of medicine

UNIT 4
Health scenario of India
Past, present and future

UNIT 5
Demography & Vital Statistics
Demography – its concept
Vital events of life & its impact on demography
Significance and recording of vital statistics
Census & its impact on health policy

UNIT 6
Epidemiology
Principles of Epidemiology
Natural History of disease
Methods of Epidemiological studies

Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

COURSE LEARNING OBJECTIVES:

CLO 1. Students should know about the healthcare delivery system in India and developed countries with regards to community participation. They should also know about national health mission, policy and issues faced during delivering healthcare (Unit 1)
CLO 2. Students should know in detail about the national health programs (Unit 2)
CLO 3. Students should know in detail about the AYUSH with regards to ayurveda, yoga, naturopathy, unani, siddha, homeopathy and its need (Unit 3)
CLO 4. Students should know in detail about the scenario of the health system in India (Unit 4)
CLO 5. Students should know about the demography and vital statistics in detail with regards to its concepts, vital events, their impact, significance and census (Unit 5)
CLO 6. Students should know in detail about epidemiology with regard to principle, natural history, methods as well as epidemiology of communicable and non-communicable diseases (Unit 6)

TEXT BOOK:
Margie Lovett Scott, Faith Prather. Global health systems comparing strategies for delivering health services. Joney & Bartlett learning, 2014

REFERENCE:
1. TELEMEDICINE FOR AYURVEDA, SIDDHA & UNANI PRACTITIONERS
2. TELEMEDICINE FOR DOCTORS

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 306
Course name: OPTOMETRIC OPTICS
Course credit hours: 03
Total contact hour: 90

COURSE DESCRIPTION:

This course deals with understanding the theory behind spectacle lenses and frames, their materials, types, advantages and disadvantages, calculations involved, when and how to prescribe. It will impart construction, design application and development of lenses, particularly of the methods of calculating their power and effect.

COURSE OBJECTIVES:

Skills/knowledge to be acquired at the end of this course: -

1. Measurement of lens power, lens centration using conventional techniques
2. Transposition of various types of lenses •Knowledge to identify different forms of lenses (equi- convex, plano convex, periscopic, etc.)
3. Knowledge to select the tool power for the grinding process.
4. Measurement of surface powers using lens measure.
5. Method of laying off the lens for the glazing process.
6. Ophthalmic prism knowledge –effects, units, base-apex notation, compounding and resolving prisms.
7. Knowledge of prism and decentration in ophthalmic lenses
8. Knowledge of different types of materials used to make lenses and its characteristics
9. Knowledge lens designs –single vision, bifocals, progressive lens
10. Knowledge on tinted and protective lenses
11. Knowledge on special lenses like iseikonic, spectacle magnifiers.
12. Knowledge on spectacle frames –manufacture, materials

COURSE PLAN:

UNIT 1
Introduction –Light, Mirror, Reflection, Refraction and Absorption

UNIT 2
Prisms –Definition, properties, Refraction through prisms, Thickness difference, Base-apex notation, uses, nomenclature and units, Sign Conventions, Fresnel's prisms, rotary prisms

UNIT 3
Lenses –Definition, units, terminology used to describe, form of lenses

UNIT 4
Vertex distance and vertex power, Effectivity calculations

UNIT 5
Lens shape, size and types i.e., Spherical, cylindrical and Sphero-cylindrical

UNIT 6
Transpositions –Simple, Toric and Spherical equivalent

UNIT 7
Prismatic effect, centration, decentration and Prentice rule, Prismatic effect of Plano Cylinder and Spherocylindrical Lenses

UNIT 8

Spherometer & Sag formula, Edge thickness calculations

UNIT 9
Magnification in high plus lenses, Magnification in high minus lenses

UNIT 10
Tilt induced power in spectacles

UNIT 11
Aberration in Ophthalmic Lenses

UNIT 12
Spectacle Lenses - Manufacture of glass; Lens materials; Lens surfacing; Principle of surface generation and glass cements; Terminology used in Lens workshop; Lens properties; Lens quality; Faults in lens material; Faults on lens surface; Methods of Inspecting the quality of lenses; Safety standards for ophthalmic lenses (FDA, ANSI, ISI, Others)

UNIT 13
Spectacle Frames: Types and parts; Classification of spectacle frames-material, weight, temple position, Coloration; Frame construction; Frame selection Size, shape, mounting and field of view of ophthalmic lenses.

UNIT 14
Tinted & Protective Lenses Characteristics of tinted lenses Absorptive Glasses Polarizing Filters, Photochromic & Reflecting filters Safety Lenses -Toughened lenses, Laminated Lenses, CR 39, Polycarbonate lenses

UNIT 15
Multifocal Lenses: Introduction, history and development, types Bifocal lenses, Trifocal & Progressive addition lenses

UNIT 16
Reflection from spectacle lens surface & lens coatings: Reflection from spectacle lenses - ghost images- Reflections in bifocals at the dividing line Antireflection coating, Mirror coating, Hard Multi Coating [HMC], Hydrophobic coating

UNIT 17
Miscellaneous Spectacle: Isokonic lenses Spectacle magnifiers Recumbent prisms Fresnel prism and lenses Lenticular Vs Aspherical Lenses High Refractive index glasses.

COURSE LEARNING OUTCOMES:

CLO 1 - By the end of this unit students should know and understand the definition, classification and working principles (Unit 1)
CLO 2 - By the end of this unit students should know and understand the definition, key terms, principle of working, properties, classification of prisms (Unit 2)
CLO 3 - By the end of this unit students should know and understand the definition, key terms, principle of working, properties, classification of lens (Unit 3)
CLO 4 - By the end of this unit students should know and understand the definition, key terms, principle of working, properties, classification, calculation of vertex distance and power (Unit 4)
CLO 5 - By the end of this unit students should know and understand the lens type, shapes and forms (Unit 5)
CLO 6 - By the end of this unit students should know and understand the definition, classification and working principles of transpositions (Unit 6)

CLO 7 - By the end of this unit students should know and understand the prismatic effects in detail (Unit 7)
CLO 8 - By the end of this unit students should know and understand definition, key terms, principle of working, properties, classification, calculation of spherometer (Unit 8)
CLO 9 -By the end of this unit students should know and understand the concept and calculation of magnification in lens (Unit 9)
CLO 10 - By the end of this unit students should know and understand the tilt induced power in spectacles (Unit 10)
CLO 11 - By the end of this unit students should know and understand the aberration in Ophthalmic Lenses (Unit 11)
CLO 12 - By the end of this unit students should know and understand the definition, key terms, principle of working, properties, classification, faults in spectacle lens (Unit 12)
CLO 13 - By the end of this unit students should know and understand the definition, key terms, principle of working, properties, classification, calculation of spectacle frames (Unit 13)
CLO 14 - By the end of this unit students should know and understand the definition, properties, filters and safety of tinted and protective lens (Unit 14)
CLO 15 - By the end of this unit students should know and understand the definition, history, properties, classification and working principles of multifocal lenses (Unit 15)
CLO 16 - By the end of this unit students should know and understand the definition, classification and working principles of reflection from spectacle lens surface & lens coatings (Unit 16)
CLO 17 - By the end of this unit students should know and understand the definition, classification and working principles of miscellaneous spectacles (Unit 17)

TEXT BOOK:
Jalie M: The Principles of Ophthalmic Lenses, The Association of Dispensing Opticians, London, 1994.

REFERENCE BOOKS:
David Wilson: Practical Optical Dispensing, OTEN- DE, NSW TAFE Commission,1999
C V Brooks, IM Borish: System for Ophthalmic Dispensing, Second edition, Butterworth Heinemann, USA, 1996

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 307
Course name: INTRODUCTION TO QUALITY AND PATIENT SAFETY
Course credit hours: 01
Total contact hour: 30

COURSE DESCRIPTION:
This course deals with various aspects of quality and safety issues in health care services.

COURSE OBJECTIVES:
At the end of the course, students have gained introductory knowledge about quality and patient safety aspects from Indian perspectives.

COURSE PLAN:

UNIT 1
Quality assurance and management

UNIT 2
Basics of emergency care and life support skills

UNIT 3
Biomedical waste management and environment safety

UNIT 4
Infection and prevention control

UNIT 5
Antibiotic resistance

UNIT 6
Disaster preparedness and management

COURSE LEARNING OUTCOMES:
CLO 1 - By the end of this unit students should know and understand definition, key terms, principles, components, process, models, levels of evaluation, approaches, barriers and role in quality assurance and management (Unit 1)
CLO 2 - By the end of this unit students should know and understand goals, objectives, aims, components, equipment, techniques, key concepts and responsibilities during emergency care and life support (Unit 2)
CLO 3 - By the end of this unit students should know and understand the definition, causes, classification, sources, effects, disposal and management (Unit 3)
CLO 4 - By the end of this unit students should know and understand the concepts, importance, goals and routine of prevention (Unit 4)
CLO 5 - By the end of this unit students should know and understand the concepts, classification, causes, sources and management of antibiotic resistance (Unit 5)
CLO 6 - By the end of this unit students should know and understand the concepts, risk factors, aims, classification, why and how to get prepare, plan, approaches, management and agencies for disaster preparedness and management (Unit 6)

TEXTBOOK:

Textbook of Patient Safety and Clinical Risk Management Editors: Donaldson, L., Ricciardi, W., Sheridan, S., tartaglia, r. (Eds.)

REFERENCE:

Handbook of Healthcare Quality & Patient Safety 2nd Edition 2017

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:

https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 308
Course name: MEDICAL PSYCHOLOGY
Course credit hours: 01
Total contact hour: 30

COURSE DESCRIPTION:
This course covers various aspects of medical psychology essential for the optometrist.

COURSE OBJECTIVES:
At the end of the course, the student would have gathered knowledge of various aspects of medical psychology essential for him to apply in the clinical scenario during his clinical postings.

COURSE PLAN:

UNIT 1
Introduction to Psychology

UNIT 2
Intelligence Learning, Memory, Personality, Motivation

UNIT 3
Body Integrity – one's body image

UNIT 4
The patient in his Milen

UNIT 5
The self-concept of the therapist, Therapist-patient relationship – some guidelines

UNIT 6
Illness, its impact on the patient

UNIT 7
Maladies of the age and their impact on the patient's own and others' concept of his body image

UNIT 8
Adapting changes in Vision

UNIT 9
Why does Medical Psychology demand commitment?

COURSE LEARNING OUTCOMES:
CLO 1- Describe various Branches of Psychology and its importance (Unit 1)
CLO 2 - Describe Motivation, learning, intelligence, memory and personality and their different theories (Unit 2).
CLO 3- Discuss Growth and Development (Unit 3)
CLO 4- Describe patient and his milen (Unit 4)
CLO 5- Discuss self-concept of therapist, their relationship with patients (Unit 5)
CLO 6- Discuss illness and its impact on patients (Unit 6)
CLO 7-Describe in detail about aging and its impact on patients' health and body image (Unit 7)
CLO 8- Describe adaptation in detail (Unit 8)
CLO 9- Discuss medical psychology and its commitment (Unit 9)

TEXT BOOK:
Patricia Barkway. Psychology for health professionals, 2 nd edition, Elsevier, 2013

REFERENCE BOOKS:
Psychology for Physiotherapists by Dibyendu Narayan Bid, Thangamani Ramalingam
Psychologically Informed Physiotherapy 1st Edition Embedding psychosocial perspectives within clinical management

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:
(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 309
Course name: MEDICAL LAWS AND ETHICS
Course credit hours: 02
Total contact hour: 60

COURSE OBJECTIVES:
Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.

COURSE DESCRIPTION:
Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice". Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum.

COURSE CONTENT:

UNIT 1-
Medical ethics - Definition - Goal - Scope

UNIT 2 –
Introduction to Code of conduct

UNIT 3 –
Basic principles of medical ethics –Confidentiality

UNIT 4 –
Malpractice and negligence - Rational and irrational drug therapy

UNIT 5 –
Autonomy and informed consent - Right of patients

UNIT 6 –
Care of the terminally ill- Euthanasia

UNIT 7 –
Organ transplantation

UNIT 8 –
Medico legal aspects of medical records –Medico legal case and type- Records and documents related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

UNIT 9 –
Professional Indemnity insurance policy

UNIT 10 –
Development of standardized protocol to avoid near miss or sentinel events

UNIT 11 –
Obtaining an informed consent

COURSE LEARNING OUTCOMES:
CLO 1 - After completion of this unit students will be able to know about the medical ethics its definition, goal and scope (Unit 1)
CLO 2 - After completion of this unit students will be able to know about the code of conduct (Unit 2)
CLO 3 - After completion of this unit students will be able to know about what are the basic principles of ethics in detail (Unit 3)
CLO 4 - After completion of this unit students will be able to know about the meaning and objectives of malpractice and negligence (Unit 4)
CLO 5 - After completion of this unit students will be able to know about the rights and responsibilities of patients (Unit 5)
CLO 6 - After completion of this unit students will be able to know about the care for critically ill patient (Unit 6)
CLO 7 - After completion of this unit students will be able to know about the rules and regulations for organ transplantation (Unit 7)
CLO 8 - After completion of this unit students will be able to know about what are the medico legal aspects of a medical record, its types, ownership, confidentiality, privilege, communication and release of information (Unit 8)
CLO 9 - After completion of this unit students will be able to know about different insurance policies in detail (Unit 9)
CLO 10 - After completion of this unit students will be able to know about how to develop standardized protocol to avoid near miss or sentinel events (Unit 10)
CLO 11 - After completion of this unit students will be able to know about how to obtain informed consent from the population (Unit 11)

TEXT BOOKS:
Medical Law and Ethics by Bonnie F. Fremgen

REFERENCE BOOKS:
Leadership Roles and Management Functions in Nursing with Access Code: Theory and Application by Bessie L Marquis, RN, Cnaa, Msn, Carol J Huston, Msn, Mpa, Dpa

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 310
Course name: GERIATRIC OPTOMETRY PEDIATRIC OPTOMETRY AND OCCUPATIONAL OPTOMETRY
Course credit hours: 05
Total contact hour: 150

COURSE OBJECTIVES:

The student on taking this course should

1. Be able to identify, investigate the age-related changes in the eyes.
2. Be able to counsel the elderly
3. Be able to dispense spectacles with proper instructions.
4. Adequately gained knowledge on common ocular diseases.

COURSE DESCRIPTION:

This course deals with general and ocular physiological changes of ageing, common geriatric systemic and ocular diseases, clinical approach of geriatric patients, pharmacological aspects of ageing, and spectacle dispensing aspects in ageing patients.

GERIATRIC OPTOMETRY

COURSE CONTENT:

UNIT 1-
Structural, and morphological changes of eye in elderly

UNIT 2 –
Physiological changes in the eye in the course of aging.

UNIT 3 –
Introduction to geriatric medicine – epidemiology, need for optometry care, systemic diseases (Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD)

UNIT 4 –
Optometric Examination of the Older Adult

UNIT 5 –
Ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye

UNIT 6 –
Contact lenses in elderly

UNIT 7 –
Pharmacological aspects of aging

UNIT 8 –
Low vision causes, management and rehabilitation in geriatrics.

UNIT 9 –
Spectacle dispensing in elderly – Considerations of spectacle lenses and frames

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about the detailed structural and

morphological changes that occur in the eyes of elderly (Unit 1)
CLO 2 - After completion of this unit students will be able to know about detailed physiological changes that occur in the eyes of elderly (Unit 2)
CLO 3 - After completion of this unit students will be able to know about the definition, classification, epidemiology, prevalence, incidence, pathophysiology, signs and symptoms, clinical presentation, laboratory investigations, medical and surgical management, precautions, complications and need for optometry care in diseases like Hypertension, Atherosclerosis, coronary heart disease, congestive Heart failure, Cerebrovascular disease, Diabetes, COPD in elderly population (Unit 3)
CLO 4 - After completion of this unit students will be able to know about the detailed optometric examination in elderly patients (Unit 4)
CLO 5 - After completion of this unit students will be able to know about the ocular diseases common in old eye, with special reference to cataract, glaucoma, macular disorders, vascular diseases of the eye - their definition, classification, epidemiology, prevalence, incidence, pathophysiology, signs and symptoms, clinical presentation, laboratory investigations, medical and surgical management, precautions, complications and need for optometry care (Unit 5)
CLO 6 - After completion of this unit students will be able to know about the need, advantages and disadvantages and complications of contact lenses in elderly (Unit 6)
CLO 7 - After completion of this unit students will be able to know about the pharmacological management of various diseases in elderly (Unit 7)
CLO 8 - After completion of this unit students will be able to know about the etiological factors responsible for low vision in elderly; their management and rehabilitation (Unit 8)
CLO 9 - After completion of this unit students will be able to know about the spectacle dispensing in elderly with regards to considerations of spectacle lenses and frames (Unit 9)

TEXT BOOKS:
A.J. ROSSENBLOOM Jr & M.W. MORGAN: Vision and Aging, Butterworth-Heinemann, Missouri, 2007.

REFERENCE BOOKS:
OP Sharma: Geriatric Care –A textbook of geriatrics and Gerontology, viva books, New Delhi, 2005 VS Natarajan: An update on Geriatrics, Sakthi Pathipagam, Chennai, 1998
DE Rosenblatt, VS Natarajan: Primer on geriatric Care A clinical approach to the older patient, Printers Castle, Cochin, 2002

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

PEDIATRIC OPTOMETRY

COURSE DESCRIPTION:
This course is designed to provide the students adequate knowledge in theoretical and practical aspects of diagnosis, and management of eye conditions related to the pediatric population. Also, it will inculcate the skill of transferring / communicating the medical information to the attender / patient by the students. The scope of this subject is to train the optometrists to develop a systematic way of dealing with children below 12, so as to implement primary eye care and have better, specialized management of anomalies.

COURSE OBJECTIVES:
At the end of the course the student is expected to:
Have a knowledge of the principal theories of childhood development, and visual development
Have the ability to take a thorough pediatric history which encompasses the relevant developmental, visual, medical and educational issues
Be familiar with the accommodative-vergence system, the genesis of ametropia, the disorders of refraction, accommodation and vergence, and the assessment and management of these disorders

Be familiar with the etiology, clinical presentation and treatment of amblyopia, combatant strabismus and commonly presenting incitant strabismus
Have a knowledge of the epidemiology of eye disease in children, the assessment techniques available for examining visual function of children of all ages and an understanding varied management concepts of pediatric vision disorders
Have knowledge of the art of dispensing contact lens, low vision aids and referral to the surgeon or other specialists at the appropriate timing.
Have a capacity for highly evolved communication and co-management with other professionals involved in pediatric assessment and care

COURSE CONTENT:

UNIT 1-
The Development of Eye and Vision

UNIT 2 –
History taking Pediatric subjects

UNIT 3 –
Assessment of visual acuity

UNIT 4 –
Normal appearance, pathology and structural anomalies of
Orbit, Eyelids, Lacrimal system,
Conjunctiva, Cornea, Sclera Anterior chamber, Uveal tract, Pupil
Lens, vitreous, Fundus Oculomotor system
UNIT 5 –
Refractive Examination

UNIT 6 –
Determining binocular status

UNIT 7 –
Determining sensory motor adaptability

UNIT 8 –
Compensatory treatment and remedial therapy for: Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia

UNIT 9 –
Remedial and Compensatory treatment of Strabismus and Nystagmus

UNIT 10 –
Pediatric eye disorders: Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetics

UNIT 11 –
Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma, Albinism

UNIT 12 –
Spectacle dispensing for children

UNIT 13 –
Pediatric contact lenses

UNIT 14 –
Low vision assessment in children

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about the development of eye and vision in pediatric population (Unit 1)
CLO 2 - After completion of this unit students will be able to know about the how to take history of pediatric population (Unit 2)
CLO 3 - After completion of this unit students will be able to know about how to take detailed assessment of visual acuity (Unit 3)
CLO 4 - After completion of this unit students will be able to know about normal appearance, pathology and structural anomalies with regard to orbit, eyelids, lacrimal system, conjunctiva, cornea, sclera anterior chamber, uveal tract, pupil, lens, vitreous and fundus Oculomotor system (Unit 4)
CLO 5 - After completion of this unit students will be able to know about the refractive examination (Unit 5)
CLO 6 - After completion of this unit students will be able to know about how to determine the binocular status in pediatric population (Unit 6)
CLO 7 - After completion of this unit students will be able to know about sensory and motor adaptability in pediatric (Unit 7)
CLO 8 - After completion of this unit students will be able to know about conventional, medical and surgical treatment as well as preventive measures for Myopia, Pseudo myopia, Hyperopia, Astigmatism, Anisometropia, Amblyopia (Unit 8)
CLO 9 - After completion of this unit students will be able to know about conventional, medical and surgical treatment as well as preventive measures for Strabismus and Nystagmus (Unit 9)
CLO 10 - After completion of this unit students will be able to know about the definition, classification, epidemiology, prevalence, incidence, pathophysiology, signs and symptoms, clinical presentation, laboratory investigations, medical and surgical management, precautions, complications and need for optometry care in pediatric eye disorders like Cataract, Retinopathy of Prematurity, Retinoblastoma, Neuromuscular conditions (myotonic dystrophy, mitochondrial cytopathy), and Genetic diseases (Unit 10)
CLO 11 - After completion of this unit students will be able to know about the definition, classification, epidemiology, prevalence, incidence, pathophysiology, signs and symptoms, clinical presentation, laboratory investigations, medical and surgical management, precautions, complications and need for optometry care in Anterior segment dysgenesis, Aniridia, Microphthalmos, Coloboma and Albinism (Unit 11)
CLO 12 - After completion of this unit students will be able to know about the spectacle dispensing for children (Unit 12)
CLO 13 - After completion of this unit students will be able to know about the measurements, insertion, removal, advantages, disadvantages and precautions for contact lenses in pediatric (Unit 13)
CLO 14 - After completion of this unit students will be able to know about the detailed assessment of children with low vision (Unit 14)

TEXT BOOKS:
Pediatric Optometry - JEROME ROSNER, Butterworth, London 1982
Paediatric Optometry –William Harvey/ Bernard Gilmartin, Butterworth –Heinemann, 2004

REFERENCE BOOKS:
Binocular Vision and Ocular Motility - VON NOORDEN G K Burian Von Noorden, 2nd Ed., C.V. Mosby Co. St. Louis, 1980.
Assessing Children's Vision. By Susan J Leat, Rosalyn H Shute, Carol A Westall.45 Oxford: Butterworth-Heinemann, 1999.
Clinical pediatric optometry. LJ Press, BD Moore, Butterworth- Heinemann, 1993

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

OCCUPATIONAL OPTOMETRY

COURSE DESCRIPTION:
This course deals with general aspects of occupational health, Visual demand in various job, task analyzing method, visual standards for various jobs, occupational hazards and remedial aspects through classroom sessions and field visit to the factories

COURSE OBJECTIVES:
At the end of the course the students will be knowledgeable in the following aspects: To identify occupational causes of visual and eye problems;
To be able to prescribe suitable corrective lenses and eye protective wear
To set visual requirements, standards for different jobs.

COURSE CONTENT:

UNIT 1-
Introduction to Occupational health, hygiene and safety, international bodies like ILO, WHO, National bodies etc. Acts and Rules - Factories Act, WCA, ESI Act.

UNIT 2 –
Electromagnetic Radiation and its effects on Eye

UNIT 3 –
Light – Definitions and units, Sources, advantages and disadvantages, standards

UNIT 4 –
Color – Definition, Color theory, Color coding, Color defects, Color Vision tests

UNIT 5 –
Occupational hazards and preventive/protective methods

UNIT 6 –
Task Analysis

UNIT 7 –
Industrial Vision Screening – Modified clinical method and Industrial Vision test

UNIT 8 –
Vision Standards – Railways, Roadways, Airlines

UNIT 9 –
Visual Display Units

UNIT 10 –
Contact lens and work

COURSE LEARNING OUTCOMES:

CLO 1 - After completion of this unit students will be able to know about the introduction to occupational health, hygiene and safety, and international bodies like ILO, WHO, National bodies etc their rules and acts for occupational health (Unit 1)
CLO 2 - After completion of this unit students will be able to know about what are the electromagnetic radiations and what are their therapeutic and harmful results (Unit 2)
CLO 3 - After completion of this unit students will be able to know about the definitions, units, sources, advantages and disadvantages of light (Unit 3)
CLO 4 - After completion of this unit students will be able to know about the color with regard to its definition, color theory, color coding, color defects and color vision tests (Unit 4)
CLO 5 - After completion of this unit students will be able to know about what are the different types of occupational hazards and different protective and preventive mechanisms for them (Unit 5)
CLO 6 - After completion of this unit students will be able to know about how to perform task analysis. (Unit 6)
CLO 7 - After completion of this unit students will be able to know about how to perform industrial vision screening especially modified clinical methods and industrial vision tests (Unit 7)
CLO 8 - After completion of this unit students will be able to know about what are the vision standards according to railways, roadways and airways administration (Unit 8)
CLO 9 - After completion of this unit students will be able to know about the visual display units (Unit 9)
CLO 10 - After completion of this unit students will be able to know about working of the contact lenses (Unit 10)

TEXT BOOKS:
PP Santanam, R Krishnakumar, Monica R. Dr. Santanam's textbook of Occupational optometry. 1st edition, Published by Elite School of optometry, unit of Medical Research Foundation, Chennai, India, 2015
R V North: Work and the eye, Second edition, Butterworth Heinemann, 2001

REFERENCE BOOKS:
G W Good: Occupational Vision Manual available in the following website: www.aoa.org
N.A. Smith: Lighting for Occupational Optometry, HHSC Handbook Series, Safchem Services, 1999 J Anshel: Visual Ergonomics Handbook, CRC Press, 2005
G Carson, S Doshi, W Harvey: Eye Essentials: Environmental & Occupational Optometry, Butterworth-Heinemann, 2008

ONLINE LINK FOR STUDY AND REFERENCE MATERIALS:
https://guides.lib.uw.edu

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

Course code: BOP 311
Course name: RESEARCH METHODOLOGY AND BIOSTATISTICS
Course credit hours: 03
Total contact hour: 90

COURSE DESCRIPTIONS:

This course involves a description of principles for conducting research. The goal of the research is to Describe or define a particular phenomenon. In this case, descriptive research would be an appropriate strategy. A descriptive may, for example, aim to describe a pattern. Descriptive research has many useful applications, and you probably rely on findings from descriptive research without Even being aware that that is what you are doing.

COURSE OBJECTIVES

1. Identify and discuss the role and importance of research in the social sciences.
2. Identify and discuss the issues and concepts salient to the research process.
3. Identify and discuss the complex issues inherent in selecting a research problem, selecting an appropriate research design, and implementing a research project.
4. Identify and discuss the concepts Identify and discuss the complex issues inherent in selecting a research problem,
5. Selecting an appropriate research design, and implementing a research project. Identify and discuss the concepts and procedures of sampling, data collection, analysis, and reporting.
6. To familiarize participants with the basics of research and the research process.
7. To enable the participants in conducting research work and formulating research Synopsis and report.
8. To familiarize participants with Statistical packages such as SPSS/EXCEL.
9. To impart knowledge for enabling students to develop data analytics skills

COURSE CONTENT:

RESEARCH METHODOLOGY

UNIT 1:

Introduction to Research methodology

Meaning of research, objectives of the research, Motivation in research, Types of research & research approaches, Research methods vs methodology, Criteria for good research, Problems encountered by researchers in India.

UNIT 2:

Research problem

Statement of the research problem, Statement of purpose and objectives of the research problem, Necessity of defining the problem

UNIT 3:

Research design

Meaning of research design, need for research design, Features for good design, Different research designs, Basic principles of research design

UNIT 4:

Sampling Design

Criteria for selecting sampling procedure, Implications for sample design, steps in sampling design, characteristics of good sample design, Different types of sample design

UNIT 5:

Measurement & scaling techniques

Measurement in research - Measurement scales, sources of error in measurement, Technique of developing measurement tools, Meaning of scaling, its classification. Important scaling techniques.

UNIT 6:

Methods of data collection

Collection of primary data, collection data through questionnaires & schedules, Difference between questionnaires & schedules.

UNIT 7:

Sampling fundamentals

Need for sampling & some fundamental definitions, important sampling distributions.

UNIT 8:

Processing & analysis of data

Processing operations, problems in processing, Types of analysis, Statistics in research, Measures of central tendency, Dispersion, Asymmetry, relationship.

UNIT 9:

Testing of hypothesis

What is a hypothesis? Basic concepts concerning testing of hypothesis, Procedure of hypothesis testing, measuring the power of hypothesis test, Tests of hypothesis, limitations of the tests of hypothesis

Unit 10:

Computer technology

Introduction to Computers, computer application in research, computers & researcher

BIOSTATISTICS

UNIT 1:

Introduction

Meaning, definition, characteristics of statistics., Importance of the study of statistics, Branches of statistics, Statistics and health science including physiotherapy, Parameters and Estimates, Descriptive and inferential statistics, Variables and their types, Measurement scales.

UNIT 2:

Tabulation of Data

Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

UNIT 3:

The measure of Central Tendency

Need for measures of central Tendency, Definition, and calculation of mean – ungrouped and grouped, Meaning, interpretation and calculation of median ungrouped and grouped., Meaning and calculation of mode, Comparison of the mean, median, and mode, Guidelines for the use of various measures of central tendency.

UNIT 4:

Probability and Standard Distributions

Meaning of probability of standard distribution, the binomial distribution, the normal distribution, Divergence from normality – skewness, kurtosis.

Sampling techniques: Need for sampling

Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling design errors, Sampling variation, and tests of significance.

UNIT 5:

Analysis of variance & covariance

Analysis of variance (ANOVA), what is ANOVA? The basic principle of ANOVA, ANOVA technique, Analysis of Covariance (ANCOVA).

UNIT 6:

Format of scientific documents

Structure of protocols, formats reporting in scientific journals, systematic reviews, and meta-analysis

COURSE LEARNING OUTCOMES:

Students who successfully complete this course will be able to:

CLO 1. Explain key research concepts and issues (UNIT1), (UNIT 2,3)
CLO 2. Read, comprehend, and explain research articles in their academic discipline. (UNIT 4)
CLO 3. Develop an understanding of various kinds of research, objectives of doing research, Research process, research designs, and sampling. (UNIT5)
CLO 4. They have basic knowledge of qualitative research techniques (UNIT8)
CLO 5. They have adequate knowledge of measurement & scaling techniques as well as quantitative data analysis (UNIT7)
CLO 6. Have a basic awareness of data analysis and hypothesis testing procedures. (UNIT9)
CLO 7. Basics knowledge of Analysis of variance & covariance. (UNIT6)

TEXTBOOKS:

Handbook Of Research In Physical Therapy. CE Bork

REFERENCE BOOKS:

Physical Therapy Research: Principles And Application. E Domholdt Research Methodology For Physical Therapists. C Hicks.
Kothari, C.R. Research Methodology (Methods and Techniques), New Age Publisher. Fundamentals of modern statistical methods by Rand R.wilcox

WEB LINKS:
https://scholar.google.com/ https://pubmed.ncbi.nlm.nih./ https://www.researchgate.com

ASSESSMENT METHOD:

(Continue Internal Assessment=25, Final Examination=75)

Internal exams	10
Assignments	05
Extra-curricular activities	05
Attendance	05
Total Internal Assessment	25

RESEARCH PROJECT/DISSERTATION

Team of students will be doing a research project under the guidance of a supervisor (who could be optometrists/vision scientists/ ophthalmologist). Students will get the experience of doing research in systematic approach – identifying the primary question, literature search, identifying the gaps in the literature, identifying the research question, writing up the research proposal, data collection, data analysis, thesis writing and presentation.

CLINICAL OPTOMETRY

The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. Practical aspects of contact lens, low vision care, geriatric optometry, pediatric optometry and occupational optometry will be covered under the studentship.

NOMENCLATURE BASED ON CAREER PROGRESSION FOR OPTOMETRIST (PROPOSED)

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	Academic	Industry/ Management	
Level 4	Ophthalmic Assistant			Diploma with 0 - 5 years' experience post Diploma
Level 5	Junior optometrist	Clinical Instructor	Optometrist / Junior Manager	B. Optom (or equivalent). With more than 5 years of experience based on the performance of the individual as evaluated by the head of the department, promotion to the next one level possible.
Level 6	Consultant Optometrist	Assistant Professor 1	Skill development officer/Manager	M. Optom /M Sc Optom/ M Phil Optom/Equivalent (0-2 years' experience)
Level 7	Senior consultant Optometrist	Assistant Professor 2	Project officer/Manager	M. Optom/M Sc Optom/ M Phil Optom/Equivalent (3-6 years' experience)
Level 8	Chief consultant Optometrist	Associate Professor	Project Manager/Chief Optometry Manager	M Optom/M Sc Optom/ M Phil Optom/Equivalent (7- 10 years' experience, PhD desirable/not mandatory)
Level 9	Associate Director	Professor Senior	Project Manager	M Optom/M Sc Optom/ M Phil Optom/Equivalent (11-14 years' experience, with PhD desirable not mandatory) *
Level 10	Director	Principal/ Dean/ Director	Director	M. Optom//M Sc Optom/ M Phil Optom/Equivalent (15 years or more of experience) with PhD *

Clinical cadre needs clinical experience, academic needs teaching experience and industry can have either clinical/teaching experience with managerial skills based on the need.

* In absence of PhD or desirable experience post qualifications specified, the rules can be relaxed for initial 10 years. On Job upgradation of degree may be considered as mandatory till the profession has enough numbers to fulfil the requirements.

Optom/Equivalent will still remain to be a mandatory requirement for academic positions. According to International standard classification of Occupations (ISCO -08, Volume I, International Labour Office, Geneva, 2012, Page 13,14), optometry is classified under occupations (Major Group : Professionals(2); Sub Major Group : Health Professionals(22); Minor Group : Other Health professionals (226) ; Unit Group : Optometrist (ISC code-2267))at Skill Level 4 typically involving the performance of tasks that require complex problem-solving, decision making and creatively based on an extensive body of theoretical and factual knowledge in a specialised field.

Such skill is usually obtained as the result of study at a higher educational institution for a period of 3-6 years leading to the award of a first degree or higher qualification (ISCED-97 Level 5a or higher)

NOIDA INTERNATIONAL UNIVERSITY

CURRICULUM FOR BACHELOR OF SCIENCE

MEDICAL RADIOLOGY AND IMAGING

w.e.f. 2021-2022

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety thedefinition of an allied and healthcare professional based on the fore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now asfollows-

'Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related Services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in

Scope and need for allied and healthcare professionals in the Indian healthcare system

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improvingaccess to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being. Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment.
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Credit hours vs. traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance. All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmes', 'joint degrees' and 'study abroad' programmes.

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

*Scheme of Evaluation& Grading – as per the university Ordinance

Background of the profession

Statement of Philosophy– Why this profession holds so much importance

Medical Radiology and Imaging Technology is the health profession concerned with the direct administration of radiation, primarily x-rays in disease diagnosis and injury assessment and treatment. From the humble beginnings of plain film techniques, we are now with a widearray of imaging methods using Conventional and Digital X-rays, ultrasound, magnetic resonance imaging and Radionuclide. Modern diagnostic radiography and Medical Imaging forms an integral part of medical practice, both in making diagnosis and also in treatment. The term "diagnostic radiography" is used to describe a variety of radiographic or x-ray examinations. These simple procedures as well as those which require the use of contrast agents, make it possible to study organs that otherwise cannot be seen. These professionals are at the heart of modern medicine.

Diagnostic radiographers employ a range of different imaging techniques and sophisticated equipment to produce high quality images of an injury or disease. They take the images using range of techniques including: X-rays, Mammography, Fluoroscopy, CT (computed tomography), MRI (magnetic resonance imaging), Nuclear medicine, Angiography etc. Medical imaging studies have been a cornerstone in medical diagnosis for decades; however, technological advances and the addition of new imaging modalities now place medical imaging among the most dynamic, expanding and high demand fields in clinical medicine.

About Medical Radiology and Imaging Technology

Radiology is a branch of medicine that uses radiation and imaging technology to diagnose and treat disease. It allows the radiologic technologist to produce images of various internal parts of the body to aid in the detection of injury or disease by using radiations. Radiology is central to the clinical practice of medicine across a wide range of disciplines. It is the best practical way to diagnose, monitor treatment and detect progression or relapse of many important and common diseases in a minimally invasive and anatomically precise manner. As a consequence of the increasing sophistication and accuracy of clinical imaging, the utilization and importance of radiology has increased dramatically and consistently over the last 20 years. In recent years, the increasing complexity of radiologic procedures has made Medical Radiology and Imaging technology a highly specialized and sophisticated science requiring competently trained personnel to maintain a high degree of accuracy in radiographic positioning and exposure technique. A qualified Medical Imaging Technologist is skilled in both interventional and Diagnostic Radiology.

Scope of practice

Diagnostic Radiographers/technologists possess, utilize and maintain knowledge of radiation protection and safety. Radiographers have an extremely thorough understanding of the structure of the body, how the body can be affected by injury, and causes and effects of disease when taking X-ray images. Their work does include a wide range of different imaging modalities. Radiographers are the primary liaison between patients, radiologist and other members of the support team. They remain sensitive to needs of the patient through good communication, patient assessment, patient monitoring and patient care skills. As members of the health care team, diagnostic radiographer /technologist participate in quality improvement processes and continually assess their professional performance. They engage in continuing education to include their area of practice to enhance patient care, public education, knowledge and technical competence. Diagnostic radiographers use a range of imaging technology:

- X-ray - Penetrate through the body to examine and view internalstructures
- Fluoroscopy uses X-rays to obtain real-time moving images of the internal parts of the body.
- CT (Computed Tomography) provides cross-sectional views / images of the body using computer with the help of X-Rays.
- MRI (Magnetic Resonance Imaging) - images of the different tissue types within the body using strong magnet and RF waves.
- Ultrasound – uses high frequency sound waves to produce images of the structure within the body. It is well known for its use in obstetrics and gynecology. Also used to check circulation and examine the heart.
- Angiography – radiological study which is used to investigate blood vessels.

- Mammography-Imaging of the soft tissue breast.
- DEXA—Bone Densitometry.

Recognition of Title and qualification

The practice of medical radiography is performed by health care professionals responsible for the administration of ionizing radiation for diagnostic purposes. In addition to medical radiology and imaging technologists, they are also known as Diagnostic Radiographers/ Imaging Technologist/ Radio-Diagnosis Technologist.

The recommended title thus stands as the Medical Radiology and Imaging Technologists for this group of professionals.

A medical radiology and imaging technologist performs radiographic procedures at the request of practitioner. They form an indispensable part of the medical team.
It is a known fact that with the career advancement, the nomenclature will also vary and will also depend on the sector and profile of the professional. Considering the 10 NSQF levels designed by the NSDA, the following level progression table has been proposed by the taskforce to map the nomenclature, career pathways and progression in different sectors of professional practice for medical radiology and imaging technologist. **The proposed progression is for further discussion and deliberation, the implementation time of the same may vary depending on the current system and regulations in place**.

The table 2 below indicates the various channels of career progression in three distinct sectors such as clinical setting, academic and industry (management/sales or technical) route. It is envisaged that the radiology and imaging technologist will have two entry pathways – students with diploma or baccalaureate. The level of responsibility will increase as the career progresses and will starts with **level four (4)** for diploma holders and **level five (5**) for baccalaureate holders. The table also indicates the corresponding level of qualification with experience required by the professional to fulfill the requirements of each level. Considering the degree of patient dealing, the government aims to phase out the Diploma and PG Diploma level courses and promote Bachelor and Master Degree courses. In the academic front, as per UGC guidelines, to work at the position of a Lecturer/Assistant Professor, the candidate must attain a Master's degree. At present as there are limited master degree seats in medical radiology and imaging technology thus it has been decided that eventually provisions will be made to provide bridge courses for PG Diploma holder for certain number of years to bring them at par with the master's level courses and universities will be promoted to start master degree courses. The table also indicates that career progression is up to the level 10, however it needs to be stated that the ultimate signatory authority on patient prescription stands with the physician/doctor (radiologist) on role in terms of the clinical interpretation, the director of the unit (clinical route) will be the ultimate authority for the management responsibilities, the final authority for the clinical decisions will be with the radiologist. However, the technologist may sign the computer generated report considering the fact that there is no interpretation of the report needed at that point.

Table 2 Nomenclature based on career progression for medical radiology and imaging technologist (Proposed)

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	Academic	Industry/ Management	
Level 4	Junior Medical Radiology and Imaging Technologist (Jr.MRIT)(Grade-A to Grade-B to Grade-C promotion every 4 Years)	-	Technical Associate	Diploma in Medical Radiology and Imaging Technology, (DMRIT)
Level 5	Medical Radiology and Imaging Technologist (MRIT)	-	Medical Radiology and Imaging Technologist	BSc.inMedical Radiology& Imaging Technology (BSc. MRIT)
Level 6	Senior Medical Radiology and Imaging Technologist (Sr. MRIT) (Grade-A to Grade-B to Grade-C promotion every 4 Years for BSc. MRIT only)	Tutor/ Demonstrator	Senior Medical Radiology and Imaging Technologist	BSc. MRIT with 4 Years of experience at Level 5 / BSc.MRIT with MSc in Medical Radiology & Imaging Technology (MSc. MRIT) for academic.
Level 7	MRIT Technical Officer (MRIT TO)	Assistant Professor (PG only)	MRIT Technical Officer	4 years of experience at level 6 with MSc. MRIT or preferably PhD with MSc. MRIT for academic.
Level 8	MRIT Senior Technical Officer (MRIT STO)	Associate Professor	MRIT Senior Technical Officer	4 years of experience at level 7 with MSc. MRIT or PhD in the specialty with MSc. MRIT with 4 years' experience at level 5/6 /7 for academic
Level 9	MRIT Chief Technical Officer (MRIT CTO)	Additional Professor	Additional Director MRIT	4 years of experience at level 8 with MSc. MRIT or PhD in the specialty with MSc. MRIT with 4 years of experience at level 8 for academic
Level 10	Chief Manager/ MRIT Head/ Director	Professor /Principal	Director – MRIT	4 years of experience at level 9 with MSc. MRIT and PhD in the specialty

Definition of Medical Radiology and Imaging Technology professionals

A radiographer or medical imaging technologist is a trained health professional who Performs medical imaging by producing high quality X-ray pictures or images used to diagnose and treat injury or disease

It is an important part of medicine and a patient's diagnosis and treatment is often dependent on the X-ray images produced. They are responsible for producing high quality medical images that assist medical specialists and doctors to diagnose or monitor a patient's injury or illness treatment. They operate extremely technologically advanced equipment such as CT (computed tomography), MRI (magnetic resonance imaging) DSA, DEXA, mammography, CR, DR, fluoroscopy and digital mobile X-ray machines. Their roles are diverse and challenging, as radiographers are often trained in several specialist areas such as trauma radiography, mobile radiography, CT, MRI, Fluoroscopy, angiography, intervention and operation theatre, mammography, DEXA etc.

Education of these professionals

When developing any education program it is necessary that program planning should be outcome-based, meeting local and national manpower requirements, personal satisfaction and career potential for the professionals with supporting pathway in the development of the profession. One of the major changes is the shift from a focus based on traditional theoretical knowledge and skills to competency based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a givensituation.

Thus the following curriculum aims to focus on skills and a competency based approach for learning and is designed accordingly. The curriculum is prescriptive and is designed with an aim to standardize the content across the nation.

Entry requirements

- Candidate should have passed 10 + 2 with science.
- Minimum percentage of marks: 50% aggregate and 55%in PCB.
- Separate entrance exam should be incorporated for these student who wants to purse allied and healthcare course,

OR

- Direct entry for the student who has appeared and cleared national level entrance exam ,on basis of ranks and limited seats would be offered to such students.

Course duration

It is recommended that any program developed from this curriculum should have a minimum of the following duration to qualify as an entry level professional in Medical Radiology and Imaging Technology.

- 2.5 year program (including 6 months of clinical training/internship)- Diploma level
- 3.5 year program **(including 6 months of clinical training/internship)-** Bachelor's degree level
- 2 year program – Master's level

The emphasis during the initial year should be on the academic content establishing a strong scientific basis and engagement with the course principles. During the second and third years of training, emphasis should be laid on process to refine the acquired theoretical knowledge and its application to clinical/reflective practice. In Bachelor degree program minimum one year should be devoted to clinical practice and this should be on a continuum of rotation from theory to practice over the program. The aim of the 4 year degree program is to enable the development of the medical radiology and imaging technologist as a key member of the multidisciplinary team and to enable him/her to execute advanced preparation/ planning/delivery as well as qualityassurance.

With the change in the disease dynamics and multifold increase in the cases needing diagnostic medical imaging and evaluation, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. **Thus, a master's degree programme is recommended with minimum of two years of education in specialized field of medical radiology and imaging technology.** The post graduate students can contribute significantly in research and academics.

PhD also play a significant role in the academic system, however the curriculum has not indicated any prescriptive guidelines for that level apart from mapping it on the career and qualification map.

Teaching faculty and infrastructure

One of the important recommendation of the task force members was that the all the NIAHS and RIAHS should mandatorily beassociated withthestatemedicalcolleges whereby they can make use of the available patient load and medical infrastructure as a part of their training curriculum. For the institutes to be capable of providing high quality training to the student and exposure to all the related modalities, it should have the following:

- Conventional X-ray Unit for routine X-ray and IVU
- Mobile X-ray unit
- Fluoroscopic unit
- Ultrasonography, Color Doppler Equipment
- Multi-slice C.T. Scan,
- Mammography
- MRI (preferably)
- DSA(preferably)

The teaching faculty for the department should have a minimum of

- 1 Professor
- 1 Additional prof.
- 1 Assoc. Professor/ reader
- 4 Asst. Professorforlecturesindifferentsubjects, includingmedicalphysics, biomedical engineering
- 8 demonstrators
- 16 MRIT's

Method of teaching and learning-

- Lecture
- Tutorial
- Problem based learning
- Small group teaching and learning
- Continuous interactive learning
- Case-based
- Project based
- Research project- Research was considered by the group to be very important in order to keep pace with other professions and to generate a research background for our own profession.
- Seminars
- Clinical conferences
- E-learning
- Skills laboratory

Job availability-

Diagnostic radiography is a fast-moving and continually changing profession, and long-term career prospects include: management, research, clinical work, teaching etc.

Employment opportunities available in a variety of settings in both rural and urban areas include:

- More generalized practice in medium to small hospitals.
- Specialized clinical practice in large academic medical hospitals and trauma centers.
- Clinics and free-standing imaging centers which may offer both special and general practice opportunities or
- Clinical practice coupled with expanded responsibilities in quality control, education, data management and supervision, particularly in large hospitals.

Thedemand forqualified radio-imaging technologist isonthe rise and such jobs come with well- paid salary packages. The job profile may vary according to the modality and scope of practice.

The program aims to train human resources with requisite skills in the area of medical radiology& imaging technology who can be hired in all kinds of healthcare settings including:

- Hospitals
- Diagnostic and Medical Labs
- Medical Records and Transcription organizations
- Clinical and Medical Research organizations
- Pharma and Bio-Tech companies
- Medical equipment and device companies

Diagnostic radiographers provide a service for most departments within the hospital including, accident and emergency, outpatients, operating theatres and wards. Close liaison and collaboration with a wide range of other health care professionals is therefore vital. After completion of this curriculum, a Medical Radiology & Imaging Technologist gets opportunities to work at various health care institutes under designations as:

- Radiographer
- Radiological Technologist
- X-ray Technologist
- CT scan Technologist
- MRI Technologist
- Mammography Technologist
- Cathlab Technologist
- Ultrasonography Technologist
- Applications Specialist
- Radiological Safety Officer
- Interventional Technologist
- Quality control Technologist
- PACS manager
- Sales and marketing of radiology industry
- Diagnostic Manager, etc.
- Other Administrative posts in Medical Imaging department & hospital.
- Teaching & research faculty in Medical colleges
- Research Scientists in Medical imaging industry

BSc. in Medical Radiology and Imaging Technology

Introduction:

Learning Objectives:

The Aim of B.Sc. in Medical Radiology and Imaging Technology program is to provide highest and Atomic Energy Regulatory Board (AERB) accredited educational process throughformal didactic and state-of-the-art clinical experiencesthatwill renderqualified, patient focused, compassionate, critical thinkers Medical Radiology and Imaging Technologist for the community whoare engagedinlifelong learning. The graduates ofthe program are prepared to apply for the Level I Radiation Safety Officer (RSO) as per AERB norms.

The objectives of the program are to:

1. Provide the profession and community with trained qualifiedtechnologist
2. Provide education a comprehensive program that promotes problem solving, critical thinking and communication skills in the clinical environment
3. Students will demonstrate quality patient care skills including professionalism and Ethical behaviors as specified in the code of ethics
4. Graduate students with specific skills necessary to be competent entry level

Expectation from the future graduate in the providing patient care.

1. Should be able to undertake Mammography, CT scan and MRI procedures independently.
2. Assist in specialized radiological procedures.
3. Able to do the image processing.
4. Should be able to handle all radiological and imaging equipment independently.
5. Should ensure radiation protection and quality assurance
6. Undertake care and maintenance of all radiological and imaging equipment
7. Able to evaluate images for technical quality
8. Able to identify and manage emergencysituations.
9. Abletoreceiveanddocumentverbal, writtenandelectronicordersinthepatient's medical record.
10. Should have computer skills.
11. Should be able to provide empathetic professional patient care.
12. Able to demonstrate professional growth, sense of professionalism and desire to learn
13. Able to demonstrate the core values of caring, integrity and discovery.
14. To exhibit keen interest, initiative & drive in the overall development of the Department and 'Leadership Qualities' for others to follow.
15. He / She is expected to be confident and to perform all the duties diligently with utmost sincerity and honesty.
16. Any other duty/task/work assigned by any higher authority like Director, Dean, Medical Superintendent, Head of the Department from time to time; either in "Public Interest" or in the interest of upkeep / development of the Department / Institutions.

Eligibility for admission:

Selection procedure:

1. He/shehaspassedthe Higher Secondary(10+2) orequivalentexaminationrecognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, Biology
   OR
   Diploma in Medical Radiology and Imaging Technology after completing 12th class/ 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics chemistry and biology provided the candidate has passed in each subject separately.
2. Candidateswhohavestudiedabroadandhavepassedtheequivalentqualificationas determined by the Association of Indian Universities will form the guideline to determinethe eligibility and must have passedinthe subjects: Physics, Chemistry, Biology and English up to 12th Standardlevel.
3. Candidateswhohavepassedthe Senior Secondaryschool Examinationof National Open School with a minimum of 5 subjects with any of the following group subjects.
   a. English, Physics, Chemistry, Botany, Zoology
   b. English, Physics, Chemistry, Biology and any other language
4. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.
5. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.
6. Admissionto B.Sc. Medical Radiologyand Imaging Technologycourseshallbemade on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.
   a. Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme of CBSE, subject-wise distribution of questions will be as 30% in Physics, 30% in biology, 30% in Chemistry, 5% in English (Language & Comprehension) and 5% in General Awareness about health related methods.
   b. Successful candidatesonthebasisofwritten Testwill becalledfortheinterview & shall have face an interview board. The interview board will include the Head of the Department of medical imaging (Chairman of the Board) along with the Principal / chief faculty as well as Chief of MRIT apart from other nominees, whose recommendations shall be final for the selection of the students..
   c. During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
   d. Candidatewhofailstoattendthe Medical Examinationonthe notifieddate(s) will forfeit the claim for admission and placement in the waiting list

e. Except permitted by the competent authority under special circumstances.
f. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year for allied and healthcare science courses for candidates who have passed diploma program from the Government Boards and recognized by State/Central University, fulfillingthe conditionsspecifiedandthesestudentsareeligibletotakeadmission on lateral entry system only if the same subject have been studied at diploma level.

There may be need of deliberation on the inclusion of a few bridging courses are advisable for those having less qualified subjects.

Duration of the course
Duration of the course: 3.5 Years ((including 6 months of clinical training/internship)

Medium of instruction:
English shall be the medium of instruction for all the subjects of study and for examination of the course.

Scheme of Examination:

There shall be Three Examination one each at the end of 1st, 2nd & 3rd year.

Subjects Having Maximum Marks-75		
Type of question	No. of Questions	Mark for Each Questions
Short Answers	2*10 (20)	2
Short Essay	6*5 (25) (1 optional)	5
Long Essay	3*15 (30) (1 optional)	15

Attendance:
A candidate has to secure minimum 80% attendance in overall with at least-

1. 75% attendance in theoretical
2. 80% in Skills training (practical) for qualifying to appear for the final examination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Assessment:
Assessments should be completed by the academic staff, based on the compilation of the student's theoretical &clinical performance throughout the training programme. To achieve this, all assessment forms and feedback shouldbe included and evaluated. Student must **attain atleast 50%** marksineach Theory, Internal assessment and Practicalindependently/ separately for each individual subject.

Internal Assessment (IA): Theory-25 marks Practical-25 marks*.

There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an academic year. The average marks of the two/three tests will be calculated and reduced to 20. The marks of IA shall be communicated to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of such periodical tests.

If a candidate is absent for any one of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test within a fortnight.

IA Marks Distribution:

S.NO.	ASSESMENT	MARKS
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

Table- I Distribution of IA &UE marks and Teaching Hours/Credits in First Year Subjects (w.e.f 2021-2022)

Sl. No	Course code	Main Subjects	Theory Hours	Practical Hours (Tutorial & Demonstration)	Total Hours (Theory & Practical)	Credits	IA* Marks	UE* Marks	Exam Duration (IA/UE)
1	BMRIT 101	Human Anatomy	100	50	150	4	25	75	3 hours
2	BMRIT 102	Human Physiology	100	50	150	4	25	75	3 hours
3	BMRIT 103	Fundamental of Medical Imaging & Radiotherapy	90	60	150	4	25	75	3 hours
4	BMRIT 104	Basics Radiation Physics	90	60	150	4	25	75	3 hours
5	BMRIT 105	Practical(Basic Radiation Physics)	0	150	150	4	25	75	3 hours
6	BMRIT 106	English	30	0	30	1	25	75	3 hours
7	BMRIT 107	Computer	30	0	30	1	25	75	3 hours
		*Clinical posting		200	200				

Total Hours-1010
***Clinical Posting-Not Included in University Examination**
***IA-Internal Assessment**
***UE- University Examination**

Table-II Distribution of Teaching Hours in Second Year Subjects (w.e.f 2021-2022)

Sl. No	Course code	Main Subjects	Theory Hours	Practical Hours (Tutorial & Demonstration)	Total Hours	Credits	IA* Marks	UE* Marks	Exam Duration (IA/UE)
1	BMRIT 201	Clinical Radiography	100	60	160	4	25	75	3 hours
2	BMRIT 202	Patient care & Radiation Protection	100	50	150	4	25	75	3 hours
3	BMRIT 203	Equipment of Radiotherapy	100	50	150	4	25	75	3 hours
4	BMRIT 204	Special Radiographic Technique & Procedures	100	60	160	4	25	75	3 hours

5	BMRIT 205	x-ray film/image processing techniques including dark room	100	50	150	4	25	75	3 hours
6	BMRIT 206	Practical(Clinical Radiography)	0	0	100	4	25	75	3 hours

		*Clinical posting		200	200				

Total Hours-1070
***Clinical posting-Not Included in University Examination**

Table -III Distribution of Teaching Hours in Third Year Subjects (w.e.f 2021-2022)

Sl. No	Course code	Main Subjects	Theory Hours	Practical Hours(Tutorial & Demonstration)	Total Hours	Credits	IA* Marks	UE* Marks	Exam Duration (IA/UE)
1	BMRIT 301	Radiotherapy Planning and Quality Control	100	50	150	4	25	75	3 hours
2	BMRIT 302	Modern imaging techniques and recent trends in imaging	100	80	180	4	25	75	3 hours
3	BMRIT 303	Interventional Radiology , radiobiology and radiation safety in radio diagnosis imaging	100	80	180	4	25	75	3 hours
4	BMRIT 304	Radiotherapy & Brachy-therapy Techniques in Malignant and Non-Malignant Diseases	100	50	150	4	25	75	3 hours
5	BMRIT 305	Orientation in Para-Clinical Sciences ,Clinical Sciences &Community Healthcare	100	20	120	4	25	75	3 hours
6	BMRIT 306	Practical (Main subject)	0	0	100	4	25	75	3 hours
		*Clinical Posting		200	200				

Total Hours-1080
***Clinical posting-Not Included in University Examination**

INTERNSHIP – minimum 6 Months
Students have to undertake the rotational postings during which students have to work under Supervision of an experienced staff in the following areas:

Postings Duration:

1 Conventional radiography	**1months**
2 Radiographic special procedures including diagnostic and Therapeutic Interventional	**2months**
3 CR, DR and PACS	**2 month**
4 Nuclear Medicine	**1 month**
5 Ultrasonography	**1 month**
6 Doppler Imaging	**1 month**
7 Computed Tomography	**2 months**
8 Magnetic Resonance Imaging	**2 months**

Schedule of Examination:

The university shall conduct two internal examinations & annual University Examination at an interval of not less than 4 to 6 months as notified by the university from time to time. A candidate who satisfies the requirement of attendance, progress and conduct as stipulated by the university shall be eligible to appear for the university examination. Certificate to that effect shall be produced from the Dean of the School along with the application for Examination and the prescribed fee.

SYLLABUS FOR B.SC.MEDICAL RADIOLOGY IMAGING AND TECHNOLOGY

1ST YEAR SYLLABUS

COURSE CODE: BMRIT101
COURSE NAME: HUMAN ANATOMY
COURSE CREDIT HOURS: 4
TOTAL CONTACT HOUR: 150 HOUR (THEORY:100 HOURS PRACTICAL:50HOURS)

COURSE OBJECTIVES:

By the end of this course the students will demonstrate the anatomy of the human body regarding upper limb, lower limb, thorax, abdomen, and head & neck. Also, students will demonstrate the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body.

COURSE DESCRIPTION: It is designed to provide students with the working knowledge of the structure of the human body which is an essential foundation for their clinical studies.

COURSE CONTENT:

UNIT 1

Introduction: human body as a whole –

Theory:
Definition of anatomy and its divisions Terms of location, positions and planes
Cell & its organelles and their functions
Epithelium-definition, classification, describe with examples, function
Glands- classification, describe serous & mucous glands with examples
Basic tissues - classification with examples
Practical:
Histology of types of epithelium
Histology of serous, mucous & mixed salivary gland

UNIT 2

Locomotion and support

Theory
Cartilage - types with example & histology
Bone - Classification, names of bone cells, parts of long bone, names of all bones, vertebral column, fontanels of fetal skull Joints - Classification of joints with examples, synovial joint (in detail for radiology) Muscular system: Classification of muscular tissue & histology
Names of muscles of the body
Practical:
Histology of the 3 types of cartilage

Demo of all bones showing parts, radiographs of normal bones & joints

UNIT 3

Cardiovascular system

Theory:
Heart-size, location, chambers, exterior & interior
Blood supply of heart
Systemic & pulmonary circulation
Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery
Peripheral pulse
Inferior vena cava, portal vein, portosystemic anastomosis, Great saphenous vein, Dural venous sinuses
Lymphatic system- Histology of lymphatic tissues, Names of regional lymphatics, axillary and inguinal lymph nodes in brief
Practical:
Demonstration of heart and vessels in the body
Histology of large artery, medium sized artery & vein, large vein
Microscopic appearance of large artery, medium sized artery & vein, large vein pericardium
Histology of lymph node, spleen, tonsil & thymus Normal chest radiograph showing heart shadows
Normal angiograms

UNIT 4

Gastro-intestinal system

Theory:
Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring) Oesophagus, stomach, small and large intestine, liver, gallbladder, pancreas
Radiographs of abdomen
Unit 5 - Respiratory system
Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments
Histology of trachea, lung and pleura
Names of paranasal air sinuses
Practical:
Demonstration of parts of the respiratory system.
Normal radiographs of chest
Histology of lung and trachea

UNIT 6

Peritoneum

Theory:
Description in
brief Practical:
Demonstration of reflections

UNIT 7

Urinary system

Theory

Kidney, ureter, urinary bladder, male and female urethra

Histology of kidney, ureter and urinary bladder

Practical:

Demonstration of parts of urinary system Histology of kidney, ureter, urinary bladder Radiographs of abdomen-lVP, retrograde cryptogram

UNIT 8

Reproductive system

Theory:

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)

Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology) Mammary gland - gross,

Practical:

Demonstration of section of male and female pelvis with organs in situ Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary Radiograph.

UNIT 9

Endocrine glands

Theory:

Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal gland - (gross & histology)

Practical:

Demonstration of the glands

Histology of pituitary, thyroid, parathyroid, suprarenal glands

UNIT 10

Nervous system

Theory:

Neuron

Classification of NS

Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology) Meninges, Ventricles & cerebrospinal fluid

Practical:

Histology of peripheral nerve & optic nerve Demonstration of all plexuses and nerves in the body

Demonstration of all part of brain

Histology of cerebrum, cerebellum, spinal

UNIT 11

Sensory organs

Theory:

Skin: Skin-histology Appendages of skin

Eye: Parts of eye & lacrimal apparatus
Ear: parts of ear- external. middle and inner ear and contents
Practical:
Histology of thin and thick skin Demonstration and histology of eyeball Histology of cornea & retina

UNIT 12

Embryology

Spermatogenesis & oogenesis, Ovulation, fertilization Fetal circulation Placenta

COURSE LEARNING OUTCOMES:

- **CLO 1** – Students can demonstrate the location, position and planes. Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system. . They will be able to demonstrate epithelial and glands.
- **CLO 2** - Classify different types of tissue and explain anatomy and physiology of skeletal system, joints and muscular system. Demonstrate the bones of all parts.
- **CLO 3** - Describe how the heart is positioned in the thoracic cavity. List and describe the layers of the heart wall. Name the chambers of the heart and their valves. Name the major vessels that enter and exit the heart and their branches. Describe blood flow through the heart. Explain how the conduction system of the heart controls proper blood flow.
- **CLO 4-** Identify the organs of the alimentary canal from proximal to distal, and briefly state their function. Identify the accessory digestive organs and briefly state their function. Describe the four fundamental tissue layers of the alimentary canal.
- **CLO 5** - Outline the forces that allow for air movement into and out of the lungs. Outline the process of gas exchange. Summarize the process of oxygen and carbon dioxide transport within the respiratory system. Create a flow chart illustrating how respiration is controlled.
- **CLO 6** – The nine regions of abdomen. Explain peritoneum, its layers, peritoneal cavity, blood supply, nerve supply, lymphatic drainage, venous drainage and functions of peritoneum.
- **CLO 7** - Describe different parts of the urinary system, their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.
- **CLO 8** – Describe different parts of male and female reproductive system, their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.
- **CLO 9** - Describe different endocrine glands (pituitary, thyroid, parathyroid and suprarenal gland), their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.
- **CLO 10** - Identify the anatomical and functional divisions of the nervous system. Relate the functional and structural differences between gray matter and white matter structures of the nervous system to the structure of neurons. List the basic functions of the nervous system.
- **CLO 11** - Describe different sensory organs (skin, eye and ear), their further subdivisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy.
- **CLO 12** - Describe spermatogenesis, oogenesis, ovulation and fertilization. Explain fetal circulation. Describe placenta and its functions

TEXT BOOKS:

- HumanAnatomy by BD Chaurasia (4 Volume)

REFERENCE BOOKS:

Gray's Anatomy by Richard Drake & A. Wayne Vogl & Adam W. M. Mitchell

WEB LINKS:

1. YouTube channel by Dr. Peter de Souza and Dr. Jack Hurley, U.K. Medical doctors.
2. https://guides.lib.uw.edu
3. www.linkedin.com ›slideshare

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT -102
COURSE NAME: HUMAN PHYSIOLOGY
COURSE CREDIT HOURS: 4
TOTAL CONTACT HOURS: 150(THEORY: 100 HOURS, PRACTICAL: 50 HOURS)

COURSE OBJECTIVES:

To provide in-depth instruction in the organization, structures, and functions of the human body. Students will learn the terminology of physiology of each body system and how they interrelate to maintain homeostasis..

COURSE DESCRIPTION:

The student will demonstrate a thorough understanding of the normal physiology of each organ system of the body.

COURSE CONTENT:

UNIT1.
General Physiology: Cell: morphology, Structure and function of cell organelles Structure of cell membrane Transport across cell membrane Intercellular communication Homeostasis

UNIT2.
Blood: Introduction-composition & function of blood W.B.C., R.B.C, Platelets formation & functions, Immunity Plasma: composition, formation & functions, Plasma Proteins:-types & functions Blood Groups- types, significance, determination Hemoglobin Haemostasis Lymph-composition, formation, circulation & functions.

UNIT3.
Cardiovascular system: Conducting system-components, impulse conduction Heart valves Cardiac cycle- definition, phases of cardiac cycle Cardiac output- definition, normal value, determinants. Stroke volume and its regulation Heart rate and its regulation: Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure Shock-definition, classification, causes and features Basic idea of ECG Cardiovascular changes during exercise.

UNIT4.
Respiratory System: Mechanics of respiration Lung volumes and capacities Pulmonary circulation, transport of respiratory gases Factors affecting respiration Regulation of respiration-neural regulation, voluntary control and chemical regulation Hypoxia, Hypercapnia, Hypocapnia Artificial respiration Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation, apnoea, tachypnoea Respiratory changes during exercise.

UNIT 5.

Nerve Muscle Physiology: Muscles- classification, structure, properties, Excitation contraction coupling Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise Nerve –structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction Concept of nerve injury & Wallerian degeneration Synapses Electrical events in postsynaptic neurons Inhibition & facilitation at synapses Chemical transmission of synaptic activity Principal neurotransmitters. 6. Nervous system: Introduction, central and peripheral nervous system, functions of nervous system.

UNIT 6.

Reflexes- monosynaptic, polysynaptic, superficial, deep & withdrawal reflex Sense organ, receptors, electrical & chemical events in receptors Sensory pathways for touch, temperature, pain, proprioception & others Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions Motor mechanism: motor cortex, motor pathway: the descending tracts-pyramidal & extra pyramidal tracts-origin, course, termination & functions. Upper motor neuron and lower motor neuron paralysis. Spinal cord lesions- complete transection & hemi section of the spinal cord Autonomic nervous system :features and actions of parasympathetic & sympathetic nervous system Hypothalamus Higher functions of nervous system Special senses- eye, ear, nose, mouth + - + Water excretion, concentration of urine-regulation of Na , Cl , K excretion

UNIT 7.

Renal System: Physiology of kidney and urine formation Glomerular filtration rate, clearance, Tubular function .

UNIT 8.

Digestive System: Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation Functions of Liver & Stomach.

UNIT 9.

Endocrinology Physiology of the endocrine glands – Pituitary, Pineal Body, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications and functions.

UNIT 10.

Male & female reproductive system Male - Functions of testes, pubertal changes in males, testosterone - action & regulations of secretion. Female - Functions of ovaries and uterus, pubertal changes, menstrual cycle, estrogens and progesterone - action and regulation.

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to...

- **CLO1:** Describe the structure and function of cellular organelles. (UNIT 1)
- **CLO2:** Describe the functions of blood.
  Classify the different types of blood cells
  (UNIT 2)
- **CLO3:** Name the chambers of the heart and their valves.

Name the major vessels that enter and exit the heart.
Describe blood flow through the heart.
Describe the stages of a cardiac cycle (UNIT 3)

- **CLO4:** Explain the function of the respiratorysystem.
  Name the organs of the system.
  Define the parts of the internal nose and their functions (UNIT 4)
- **CLO5:** Name the functions of the skeletal system.

  Describe and compare the basic differences between the anatomy of skeletal, smooth and cardiac muscles
  List the structural and functional classification ofneurons.
  Explain how a neuron transmits a nerveimpulse(UNIT 5)
- **CLO6:** Describe the structure of the spinal cord. Name and number the spinal nerves. (UNIT 6)
- **CLO7:** Define the following internal parts of the kidneys: cortex, medulla, medullary pyramids, renal papillae, renal columns and major and minor calyces.
  Name the parts of a nephron and describe the flow of urine through this renal tubule.
  List the functions of the nephrons.(UNIT 7)
- **CLO8:** Explain the major digestive enzymes and how they function. Explain the functions of the liver (UNIT 8)
- **CLO9:** List the functions of hormones.
  Describe how the hypothalamus of the brain controls the endocrine system.
  Name the endocrine glands and state where they are located.
  List the major hormones and their effects on the body (UNIT 9)
- **CLO10:** Name the internal parts of a testis.
  Explain the effects of testosterone on the male body. Describe the phases of the menstrual cycle. (UNIT10)

PRACTICALS

- Examination of pulse, B.P., Respiratoryrate.
- Reflexes
- Spirometer to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on Spirometer.
- Estimate of Haemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count. E Blood indices, Blood grouping, Bleeding & Clotting time

TEXT BOOKS:

1. Anatomy and Physiology for Nurses
2. Surface and Radiological Anatomy – Hamilton et al (Heffer)
3. Essentials Of Medical Physiology: by K Sembulingam
4. Textbook of Physiology- AK Jain

REFERENCE BOOKS :

1. Essentials of Human Anatomy – Russel
2. An Atlas of normal radiographic Anatomy – Ross and Wilson

WEB LINKS:

- https://www.physoc.org/
- http://aups.org.au/
- https://www.hapsweb.org/default.aspx

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 103
COURSE NAME: FUNDAMENTALS OF MEDICAL IMAGING AND RADIOTHERAPY
COURSE CREDIT HOURS: 04
TOTAL CONTACT HOURS:150 (THEORY:90 HOURS, PRACTICAL:60 HOURS)

COURSE OBJECTIVE:

- To introduce students with various instruments, equipment's and high tech machineries used in radiology.
- To teach them principles and physics behind various types of radiologicaltests
- To teach and demonstrate different radiological tests.

COURSE DESCRIPTION:

- Beginning with the fundamentals of tomographic reconstruction, this presentation is followed byone-hour discussions of the medical imaging modalities of X-ray, CT, single-photon emission computed tomography (SPECT), positron emission mammography (PET), and nuclear magnetic resonance imaging (MRI),
- The class begins with a brief overview of the various technologies used to obtain medical images.
- Basic principles of commonly used techniques instrument design, performance criteria, and clinical applications.
- Advantages and disadvantages of commonly used techniques

COURSE CONTENT:

UNIT1.

C.R -principle, equipment & imaging.

UNIT2.

DIGITAL RADIOGRAPHY - principle, equipment & imaging.

UNIT3.

MAMMOGRAPHY- basic principle, equipment & image acquisition.

UNIT4.

CT - Basic physics –Tomography principle - basics of plain studies, contrast studies, Special procedures.

UNIT5.

MRI - basic principle – imaging methods - slice section- plain & contrast studies – image contrast –

factors affecting image quality.

UNIT6.

USG -Basic acoustics - ultrasound terminologies – Interaction of US with matter – Ultrasound display modes etc.

UNIT7:

FLUOROSCOPY: Fluorescence and phosphorescence - description, fluorescent materials used in fluoroscopic screens, construction of fluoroscopic screen and related accessories, tilting table, dark adaptation. Image intensifier - Construction and working, advantages over fluoroscopic device, principles and methods of visualizing intensified image, basic principles of closed circuit television camera and picture tube. Vidicon camera, CCD. Automatic brightness control, automatic exposure control, chamber selection during fluoroscopy. Serial radiography: Manual cassette changer, rapid automatic film changer, basic principles of cine fluoroscopy and angiography use of grid controlled x- ray tube.

UNIT8.

DEXA: Introduction, basic principle T-SCORE, Z- SCORE etc.

UNIT9.

Basic Radiation Therapy Physics:
Historical developments in Radiotherapy, Physical components of telecobalt Unit/ Linear Accelerator Unit/ Remote after loading Brachytherapy Unit, / Gamma Knife Unit / Simulator and their descriptions. Various types of sources used in Radiotherapy and their properties, Physics of Photons, electrons, protons and neutrons in radiotherapy, Physical parameters of dosimetry such as percentage depth dose, Tissue-Air Ratio, Tissue maximum Ratio, Physics of Bolus and phantom materials, Compensators, Wedges, Shielding Blocks, Patient immobilization devices, Port film, processing and development, Special techniques in Radiotherapy such as SRS, SRT, IMRT, IGRT and Tomotherapy.

COURSE LEARNING OUTCOMES:

- At the completion of this course, the student should be –
- **CLO1:** Basics of principles of computed radiography techniques. (**UNIT1**)
- **CLO2:** Explain the basics principle of digital radiography **(UNIT2**)
- **CLO3:** Explain the basics principle of mammography **(UNIT3**)
- **CLO4:** She/he to assist the use of X-ray, CT scan, angiography, fluoroscopy, ultrasound and MRI to produce images of organs and body parts. (**UNIT4, UNIT5 and UNIT6**)
- **CLO5:** Demonstrate the fluoroscopy techniques.(**UNIT 7)**
- **CLO6:** Explain basic principle and working mechanism of DEXA scan**.** (**UNIT** 8)
- **CLO7:** Describe immobilization devices, gamma knife unit, and simulator. (**UNIT 9)**

PRACTICAL

Study with charts, models & power point presentations

- Tabletop exposure rate measurement in fluoroscopy.
- Demonstration of basic procedures with all radiographic equipment. Examples- demonstration of CT scan, MRI, C.R. D.R.
- Demonstration of basic Radiotherapy units.

TEXT BOOKS:

- Clark's Handbook for Radiographers – Charles Sloane, Ken Holmes & Craig Anderson, Hodder Educations, UK
- K. Thayalan - Basic radiological physics
- Concise textbook of Basic Radiography –Lalit Agarwal

REFERENCE BOOKS:

- Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn), Churchill Livingstone.
- steward c. Bushong: radiologic science for technologists, physics , biology , protection
- physics of radiation therapy, Faiz M. Khan, 4th edition (2010), Lippincott, Williams and Wilkins, USA.
- Christensen's Physics of Diagnostic Radiology – Christensen.

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 104
COURSE NAME: BASIC RADIATION PHYSICS
COURSE CREDIT: 4
TOTAL HOURS: 150(THEORY: 90 HOURS, PRACTICAL: 60 HOURS)

COURSE OBJECTIVES:

- To understand the general physics related to Medical imaging technology.
- Application of Equipment in Medical Imaging Technology.
- To introduce students with various instruments and high tech machineries used in radiology.
- To teach them principles and physics behind various types of radiologicaltests.

COURSE DESCRIPTION:

Basic principles of radiation physics: radioactivity, the physics of ionizing radiation, radiation dosimeter, imaging equipment and radiation detectors. The course will include lectures and demonstrations of clinical equipment applications.

COURSE CONTENT:

UNIT1.

BASIC CONCEPTS: Basic Units, Heat, Acoustics etc. Basic concepts of power, work, force, energy Einstein's formula - Electronics, Electricity & Magnetism, -electromagnetic waves - Units and measurements - temperature and heat-SI units of above parameters- Atomic structure- Nucleus - Atomic Number, Mass Number electron orbit and energy levels-Periodic table
-Isotopes-Isobars-Ionization and excitation.

UNIT2.

ELECTROMAGNETIC INDUCTION: Electric charges-electric induction - electric potential-capacitance and capacitors. Electrical energy and power - unit of current-resistance and Ohm's law - circuit laws - heating effect of current - sources of electrical energy - e.m.f. Magnetism-Magnetic effect of an electric current - applications of magnetic field. Electro-magnetic induction, laws of mutual induction and self-induction. Alternating current-transformers theory and losses - practical aspects-reactance –resonance - impedance and power factors.

Electromagnetic waves: Introduction, Maxwell's equation, electromagnetic waves, energy density and intensity, electromagnetic spectrum and radiation in the Atmosphere.

UNIT3.

RADIOACTIVITY: Natural and artificial radioactivity-alpha decay-beta decay and spectra – emission-positron decay electron capture and internal conversion-Exponential decay- Half life-Unit of activity-specific activity. Nuclear Fission-Nuclear reactor. Radiation sources-Naturaland artificial-production of radioisotopes-reactor produced isotopes- Fission products-Gammaray source for Medical uses.

UNIT4:

RADIATION QUANTITIES AND UNITS: Radiation intensity-exposure, roentgen, its limitations-kerma and absorbed dose-electronic equilibrium-rad, gray, conversion factor for roentgen to rad-quality factor-dose equivalent-rem, Sievert.

UNIT5:

X-RAYS: Discovery of x-rays-X-ray production and properties: Bremsstrahlung radiations-Characteristics X-Rays, factors affecting X-ray emission spectra, X-ray quality and quantity, HVL measurements, heel effect, soft and hard X-Rays.

UNIT6

X-RAY TUBE: historical aspects, construction of X-ray tubes, requirements for X- ray production(Electron source, target and anode material), tube voltage, current, space charge, early X-ray tubes(Coolidge tubes, tube envelop and housing) cathode assembly, Production of x-rays, X-ray production efficiency, advances in X-ray tubes, anode angulation and rotating tubes-line focus principle-space charge effect, tube cooling-Modern X-ray tubes-stationary anode, rotating anode, grid controlled X- ray tubes, heel effect, off focus radiation, tube insert and housing-Tube rating charts- Quality and intensity of x-rays-factors influencing them.

UNIT7.

INTERACTION OF X-AND GAMMA RAYS: Attenuation of X-ray or Gamma rays-absorption and scattering-half value layer-coherent scattering-Photoelectric absorption-compton scattering-pair production and photoelectric disintegration. X-Ray transmission through medium-linear and mass attenuation coefficients. HVT - TVT and interaction of charged particles and neutrons with matter. Interaction of X-and Gamma rays in body-fat-soft- tissue-bone-contrast medium-Total attenuation coefficient. Relatives are important for different types of interactions.

UNIT8

X-RAY GENERATORS AND CIRCUITS-Filament current and voltage, X-Ray circuits -primary circuit-auto transformer-switch , Fuses, switches and interlocks-Exposure switching and -HT cables-earthing. and timers- principle of automatic exposure control and practical operation - filament circuit -high voltage circuits - half wave & full wave rectification -three phase circuits. Types of generators, 3 phase, 6 and 12 pulse circuits- falling load generators-capacitors discharge and grid control systems. X-ray tables- floating top table & variable height table.

UNIT9.

SCATTERED RADIATION -Significance of scatter – Beam limiting devices.-Grid principle and structure – Types of Grids - vertical Bucky- versatile Bucky -Stationary grid, parallel grid, focused grid – crossed grid, moving grid – Potter Bucky Diaphragm- Control of scattered radiation and grids/Bucky - Methods of minimizing formation of scatter radiation, types of grids and grid ratio- use of cones – diaphragm/ light beam devices - effectiveness of collimation - limitations of the primary beam/the light beam diaphragm - filtration -Effects of scatter radiation on radiograph image quality, patient dose and

occupational exposure.

UNIT10.

RADIATION DETECTION AND MEASUREMENTS: Principle of radiation detection-Basic principles of ionization chambers, proportional counters, G.M counters and scintillation detectors. Measuring system: free ionization chamber-thimble ion chamber-condenser chamber-secondary standard dosimeter-film dosimeter- chemical dosimeter-Thermoluminescent Dosimeter-Pocket dosimeter.

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to...

- **CLO1:** Describe the principle related to basic physics.(unit 1 and 2)
- **CLO2:** Describe general physics related to imaging. (unit 1 and 2)
- **CLO3:** Differentiate between within general radiation.(unit2)
- **CLO4:** describe basics and general principle of radioactivity.(unit3)
- **CLO5:** Basic knowledge of radiation units.(unit 4)
- **CLO6:** Describe production of x-rays.(unit 5)
- **CLO7:** Differentiate between x-ray equipment and other radiology related Equipment. (unit6)
- **CLO8:** Identify construction of radiology equipment.(unit 6)
- **CLO9:** Interpret the various type of interaction between matter and radiation**.(**unit7)
- **CLO10:** Describe circuit system of radiology equipment.(unit 8)
- **CLO11:** describe and identify various devices to reduce scattered radiation.(unit 9)
- **CLO12:** identify various radiation measuring devices.(unit10)

PRACTICALS

Study with charts, models & power point presentations Atomic structure, X-ray tubes, X-ray circuits involving students to present and discuss. Examples—

- Congruence of Radiation and optical field and beam.
- Determination of focal spot size of diagnostic X-ray tube.
- KV and exposure time testing.
- Linearity testing of the timer.
- Consistency of mA loading.
- Consistency of Radiation output.
- Evaluation of total filtration of the tube

TEXT BOOKS:

- K. Thayalan - Basic radiological physics
- Curry and Dowdey Christinsens physics of diagnostic radiology
- D.N. And M.O. Chesney, X-Ray Equipment for Student Radiographers(Cbs)

REFERENCE BOOKS :

- Physics for Radiography - Hay and Hughs.
- Ball and moore's essential physics radiographers, IV edition, Blackwell publishing.
- Basic Medical Radiation physics – Stanton.
- Christensen's Physics of Diagnostic Radiology – Christensen.

***Latest editions of all the suggested books are recommended.**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/d.

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 105

COURSE NAME: PRACTICAL (BASIC RADIATION PHYSICS)

COURSE CREDIT: 4

TOTAL CONTACT HOURS: 150

COURSE OBJECTIVES:

- To understand the general physics related to Medical imaging technology.
- Application of Equipment in Medical Imaging Technology.
- To introduce students with various instruments and high tech machineries used in radiology.
- To teach them principles and physics behind various types of radiologicaltests.

COURSE DESCRIPTION:

Basic principles of radiation physics: radioactivity, the physics of ionizing radiation, radiation dosimeter, imaging equipment and radiation detectors. The course will include lectures and demonstrations of clinical equipment applications.

COURSE CONTENT:

Study with charts, models & power point presentations Atomic structure, X-ray tubes, X-ray circuits involving students to present and discuss. Examples—

- Congruence of Radiation and optical field and beam.
- Determination of focal spot size of diagnostic X-ray tube.
- KV and exposure time testing.
- Linearity testing of the timer.
- Consistency of mA loading.
- Consistency of Radiation output.
- Evaluation of total filtration of the tube

COURSE LEARNING OUTCOMES:

- **CLO1:** Describe the importance of congruency of field to ensure reproducibility from image to image and to have the ability to collimate as much as possible.
- **CLO2:** To assure that the tube focal spot size is in acceptable limit.
- **CLO3:** To determine the accuracy of indicated exposure time and the reproducibility of exposure.
- **CLO4:** To determine the production of radiation output for the same kvp.

TEXT BOOKS:

- K. Thayalan - Basic radiological physics
- Curry and Dowdey Christinsens physics of diagnostic radiology
- D.N. And M.O. Chesney, X-Ray Equipment for Student Radiographers(Cbs)

REFERENCE BOOKS :

- Physics for Radiography - Hay and Hughs.
- Ball and moore's essential physics radiographers, IV edition, Blackwellpublishing.
- Basic Medical Radiation physics – Stanton.
- Christensen's Physics of Diagnostic Radiology – Christensen.

***Latest editions of all the suggested books are recommended.**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/d.

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 106
COURSE NAME: ENGLISH
COURSE CREDIT HOURS: 01
TOTALCONTACT HOURS: 30

COURSE OBJECTIVES:

To educate the student in both the artistry and the utility of the English Language through the study of literature. To make students aware of the different communicative skills and make them effectively communicate in written and spoken modes. To provide students with the critical faculties necessary in an academic environment, while at job and in an increasingly complex and interdependent world.

COURSE DESCRIPTION:

This course emphasizes the fundamental language skills of reading, writing, speaking, listening, thinking, viewing and presenting. An emphasis on vocabulary and composition skills will be an on-going part of the program. The development of critical reading and writing skills is a major emphasis of the course.

COURSE CONTENT:

UNIT - I
INTRODUCTION :
Study Techniques
Organization of effective note taking and logical processes of analysis and synthesis Use of the dictionary Enlargement of vocabulary Effective diction

UNIT - II
APPLIED GRAMMAR :
Correct usage
The structure of sentences The structure of paragraphs Enlargements of Vocabulary

UNIT - III
WRITTEN COMPOSITION :
Precise writing and summarizing Writing of bibliography Enlargement of Vocabulary

UNIT - IV
READING AND COMPREHENSION :
Review of selected materials and express oneself in one's words. Enlargement of Vocabulary.

UNIT - V
THE STUDY OF THE VARIOUS FORMS OF COMPOSITION :
Paragraph, Essay, Letter, Summary, Practice in writing

UNIT - VI
VERBAL COMMUNICATION :
Discussions and summarization, Debates, Oral reports, use in teaching

COURSE LEARNING OUTCOMES:

- **CLO 1** - To develop the students' abilities in grammar, oral skills, reading, writing and study skills.
- **CLO 2** - To improve their accuracy and fluency in producing and understanding spoken and written English.
- **CLO 3** - To become a more competent, efficient, and perceptive academic reader who is able to communicate to others through writing and speaking the contents and main ideas of what is read.
- **CLO 4** – To develop skills that enable them to communicate effectively in writing. They will learn to present ideas clearly and logically to achieve a specific purpose and to be appropriate for an intended audience.
- **CLO 5** - Develop abilities as a critical reader and writer.
- **CLO 6** - Develop public speaking abilities by giving opportunities to speak in class, both informally and formally.

TEXT BOOKS:

Fundamentals of Effective Communication by Dr M.P. Sinha

REFERENCE BOOKS:

- English Grammar Collins, Birmingham University, International Language DataBase, Rupa & Co.1993
- Wren and Martin - Grammar and Composition, 1989, Chanda & Co, Delhi
- Letters for all Occasions. A S Myers. Pub - Harper Perennial
- Spoken English V. Sasikumar and P V Dhamija. Pub. By: Tata Mcgraw Hill, New Delhi
- Journalism Made Simple DWainwright
- Writers Basic Bookshelf Series, Writer's Digestseries
- Interviewing by Joan Clayton Platkon
- Penguin Book of Interviews.

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 107
COURSE NAME: COMPUTER
COURSE CREDIT HOURS: 01
TOTALCONTACT HOURS: 30

COURSE OBJECTIVES:

The course enables the students to understand the fundamentals of the computer and its applications.

COURSE DESCRIPTION:

Deal with computer science: the study of the theoretical foundations of information and computation, and of practical techniques for their implementation and application in computer systems.

COURSE CONTENT:

UNIT1.
Introduction to Data processing:
Features of computers, Advantages of using computers. Getting data into / out of computers. Role of computers.
Data processing ,Application areas of computers involved in Data processing. Common activities in processing. Types of Data processing, Characteristics of information, Hardware and Software.

UNIT2.
Hardware Concepts :
Architecture of computers, Classification of computers, Concept of damage. Types of storage devices. Characteristics of disks, tapes, Terminals, Printers, Network. Applications of networking concept of PC System care, Floppy care, Data care.

UNIT3.
Concept of Software.
Classification of software : System software. Application of software. Operating system. Computer system. Computer virus. Precautions against viruses. Dealing with viruses. Computers in medical electronics

UNIT4.
Basic Anatomy of Computers
Principles of programming
Computer application - principles in scientific research ; work processing, medicine, libraries, museum , education, information system.

UNIT5.
Data processing
Computers in physical therapy - principles in EMG, Exercise testing equipment, Laser. Scheme of Examination for medical, electronics and computer applications.

COURSE LEARNING OUTCOMES:

- **CLO1**: Describe various features of computer and basic knowledge of data processing.
- **CLO2**: Basic knowledge of computer hardware including types of storage
- **CLO3**: Basic knowledge of software and protection against viruses.
- **CLO4**: Describe principle of programming, work processing etc.
- **CLO5**: Concept of use of computer in physicaltherapy.

TEXT BOOKS:

- **Computer Fundamentals**(Goel, Anita Pearson)
- **Computer Fundamentals: Concepts, Systems & Applications**(Sinha, P. K. BPB)
- **Computer Fundamentals: Concepts, Systems & Applications**
  Sinha, P. K/ Sinha, P. 4th ed BPB
- **Computer Fundamentals: Concepts, Systems & Applications**
  Sinha, P. K/ Sinha, P. 4th ed BPB

REFERENCE BOOKS

- **Introduction To Computers**(Norton, Peter 6th edTMH)

WEB LINKS:

- https://edu.gcfglobal.org/en/computerbasics/about-this-tutorial/1/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

2ND YEAR SYLLABUS

COURSE CODE: BMRIT 201
COURSE NAME: CLINICAL RADIOGRAPHY
COURSE CREDIT: 4
TOTAL HOURS: 160 (THEORY: 100 HOURS, PRACTICAL: 60 HOURS)

COURSE OBJECTIVES:

- To understand the basic patient positioning and scanning in radiology departments.
- To apply special positioning skills for different pathological and physical conditions.
- Application of Equipment's while working in radiology departments.

COURSE DESCRIPTION:

Clinical radiology is a specialized branch of medicine that uses state of the art equipment and a range of techniques to capture images of the inside of the body. Medical radiography is a broad term that covers several types of studies that require the visualization of the internal parts of the body using x-ray techniques. Radiography means a technique for generating and recording an x-ray pattern for the purpose of providing the user with a static image(s) after termination of the exposure.

COURSE CONTENTS:

UNIT1.

- Techniques, Preparations, Instructions, Positioning of patient for conventional and digital radiography in the imaging of following-
- CONVENTIONAL NON CONTRAST RADIOGRAPHY-
- **Upper limb**: Technique for hand, fingers, thumb, wrist joint carpal bones, forearm, elbow joint, radio ulnar joints and humerus supplementary techniques for the above.
  E.g. Carpal tunnel view, ulnar groove, head of the radius, supracondylar projections.
- **Lower limb**: Technique for foot, toes, great toe, tarsal bones, calcaneum, ankle joint, lower leg, knee, patella & femur. Supplementary techniques: Stress view for torn ligaments, Inter condylar projection of the knee.
- **Shoulder girdle and thorax**: Technique for shoulder joint, scapular, clavicle, acromio clavicular joints, sternum, ribs, sterno-clavicular joint. Supplementary projections and techniques
- **Vertebral column**: Technique for atlanto-occipital joint, cervical spine, cervico thoracic spine, thoracic spine, thoraco- lumber spine, lumbo sacral spine, sacrum and coccyx.
- **Pelvic girdle and hip region**: Technique for whole pelvis. Ilium, ischium, pubic bones, sacroiliac joint, symphysis pubis, hip joint, acetabulum neck of femur, greater and lesser trochanter.
- **Skull Radiography** – general, sella – temporal bone – mastoid – optic foramen – Internal auditory

- canal – Superior and inferior orbital fissure – base of skull – facial bones – petrous apex – Zygomatic bone, nasal bone, sinuses of skull – mandible – Tempro-mandibular joint – Paranasal sinuses Radiography

- **Chest Radiography** –Basic views (PA & AP) - inspiratory & expiratory films- special chest views & their significance – larynx- trachea- thoracic inlet -Sternum - Ribs – Heart and great vessels – **mediastinum -Diaphragm – double exposure technique.**

- **Abdomen & Pelvic Radiography** – all projection – the acute abdomeninvestigation.

UNIT 2.

- **Soft tissue radiography**:
- Preparations, Instructions, Various techniques, positioning of patient for conventional and digital mammography, High and low KV Technique – differential filtration – multiple radiography – technique for steep range radiography – Duplication – arrangement of intensifying screen.

UNIT3.

- **Stereo Radiography:**
- Principle – tube shifting relation of patient – correct making and viewing of stereo radiographs application.
- Macro radiography: Principle sizes of focal spot limitations in its application. High kv technique: technique & usefulness.

UNIT4.

- **Foreign body localization:**
- Preparation – Anatomical localization – various projections – use of skin markers – Tangential projection – uses – opaque – foreign bodies.
- Dental radiography-types of equipment –techniques- indications-films-dental radiography in trauma patients.

COURSE OUTCOMES

At the end of the course students will be able to...

- **CLO1:** Understand the basic patient positioning during radiographic investigation.(UNIT 1AND 2)
- **CLO2:** Apply special positioning skills for different pathological and physical conditions. .(UNIT 1 AND 2)
- **CLO3:** Application of equipment while working in radiology departments. .(UNIT 1 AND 2)
- **CLO4:** Choose proper position during radiography. .(UNIT 1 AND 2)
- **CLO5:** Explain relative positions of x-ray tube and patient relevant exposure factors during radiography. .(UNIT 1 AND 2)
- **CLO6:** Explain the use of accessories. .(UNIT 1 AND 2)
- **CLO7:** Explain the anatomic and physiological basis of the procedure to be undertaken. .(UNIT 1 AND 2)
- **CLO8:** Explain the radiographic appearances of both normal and commonabnormal conditions. .(UNIT 1 AND 2)
- **CLO9:** Understand the dental radiography.(UNIT 4)
- **CLO10:** Basic principle of macro radiography.(UNIT 3)

- **CLO11:** Positioning for mammogram.(UNIT 2)

PRACTICAL

Practical involving patients not less than 10 numbers must be prescribed to students. The title and nature of practical may be framed by the respective institution conducting the course.

TEXT BOOKS:

- Philip W. Ballinger: Atlas of Radiographic Positioning and Radiological
- Procedures (Mosby)
- Ra Swallow, E Naylor: Clarks Positioning In Radiography
- Ross and Gailway: A Handbook of Radiography(Lewis)
- Glenda J.Bryan: Diagnostic Radiography (Mosby)
- Meril's Atlas of radiographic positioning and Radiological procedure)

REFERENCE BOOKS:

- Clark's Handbook for Radiographers – Charles Sloane, Ken Holmes & Craig Anderson, Hodder Educations, UK
- Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn), Churchill Livingstone

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 202
COURSE NAME: PATIENT CARE & RADIATION PROTECTION COURSE CREDIT: 4
TOTAL HOURS: 150 (THEORY: 100 HOURS, PRACTICAL: 50 HOURS)

COURSE OBJECTIVES:

- To know the basic needs and care for the patients inside the radiology
- departments.
- Preparation of patients for various radiological examinations.
- Knowledge of the transferring patients before and after the radiological
- examination and restraining of patients at the time ofexamination.
- Knowledge of radiation protection principles and their application inradiology
- department.
- Knowledge of departmental layouts for protection of patients, occupational
- workers and general public.

COURSE DESCRIPTION:

Radiation protection, also known as radiological protection, is defined by the International Atomic Energy Agency (IAEA) as "The protection of people from harmful effects of exposure to ionizing radiation, and the means for achieving this". Exposure can be from a source of radiation external to the human body or due to internal irradiation caused by the ingestion of radioactive contamination. Radiation protection aims to reduce unnecessary radiation exposure with a goal to minimize the harmful effects of ionizing radiation. Patient care refers to the prevention, treatment, and management of illness and the preservation of physical and mental well-being through services offered by health professionals.

COURSE CONTENTS:

UNIT1.

PATIENT CARE & MEDICAL ETHICS:

- Patient vital signs - temperature, pulse, respiration and blood pressure - normal values and methods of taking and recording them.
- Development of communication skills with patient- general comfort and reassurance to the patient- patient education and explaining about the study-drugs used in the preparation of the patient. Handling of an unconscious patient-shifting of patients - hazards of lifting and maneuvering patients - rules for correct lifting- transfer from chair/wheel chair or trolley to couch and vice-versa - safety of patient and worker while lifting & shifting of patients- handling of geriatric, pediatric and trauma patients -handling female patients-pregnant women.
- **Communicable diseases** - hygiene in the department-cross infection and prevention-handling of infectious patients in the department -application of asepsis.
- **Ethics of medical practice**- Radiography professionalism-essential qualities of the radiographer-
- improving professional and personal qualities- Radiographer as a part of Hospital /Organization-

responsibilities. Medico-legal considerations - radiographers clinical and ethical responsibilities-misconduct and malpractice.

- **First aid**: Aims and objectives of first aid; wounds and bleeding, dressing and bandages; pressure and splints, supports etc. Shock; insensibility; asphyxia; convulsions; resuscitation, use of suction apparatus, drug reactions; prophylactic measures; administration of oxygen; electric shock; burns; scalds; hemorrhage; pressure points; compression band. Fractures; splints, bandaging; dressing, foreignbodies; poisons.

- **Drugs in the department:** Storage: classification; labelling and checking, regulations regarding dangerous and other drugs; units of measurement, special drugs, anti- depressive, anti-hypertensiveetc.

UNIT 2.

PRINCIPLES OF MEDICAL EMERGENCIES

Trauma care & Emergency Radiography: procedures in the event of an accident- Special positioning procedures & projections - modification of techniques needed for seriously injured patients. Radiographic factors - patient care & responsibilities-Search of profession confidence-maintenance decorum of the job responsibility - the importance of records maintenance. Fluoroscopy and its application in emergency radiology - Medicolegal aspects of the radiographers work. Common medical emergencies-helping in first aid & zero hour care / know to help in critical hour care -Trauma patients handling – trauma ward bed X-rays – mass casualty management-selection of study / procedures & radiographic views. Knowing the emergency care places in the hospital & pre planning- checking & readiness of mobile units in functioning status -screening of the high risk patients in various procedure- supportive facilities to encounter emergency-practical training.

UNIT 3.

RADIATION PROTECTION

- Definition of radiation hazards maximum permissible dose and annual limit of intake (ALI) permissible dose levels on and around sealed source housing and installation principles of radiation protection and MPD of different ICRP rules, stochastic and non-stochastic effects.
- Importance of 'ALARA' physical principles of design and planning of installation safe work practice in diagnostic radiology.
- Shielding materials Radiation survey and personnel monitoring devices film badge, TLD badges pocket dosimeter .Measurement of radiation and dosimetry procedures.
- Radiation detectors and their principles of working.

COURSE OUTCOMES:

At the end of the course students will be able to...

- **CLO1**: Know the basic needs and care for the patients inside theradiology departments. .(UNIT 1AND 2)
- **CLO2**: Preparation of patients for various radiological examinations. .(UNIT2)
- **CLO3**: Knowledge of the transferring patients before and after the radiological

examination and restraining of patients at the time of examination. . (UNIT2)

- **CLO4**: Knowledge of radiation protection principles and their application in radiology department.(UNIT 3)
- **CLO5**: Knowledge of departmental layouts for protection of patients, occupational workers and general public. .(UNIT 3)
- **CLO6**: Students will be able to transfer the patients without causing any Complications and can restrain the uncooperative patients during radiologicalexaminations. .(UNIT2)
- **CLO7**: Protecting the patients, occupational workers and general public from secondary radiation. .(UNIT 3)
- **CLO8**: Regulation of radiation practices according to internationallyaccepted methods. .(UNIT 3)
- **CLO9**: Obtaining vital signs, handling equipments used for various procedures.(UNIT 1)
- **CLO10**: Management and Care of patient during emergency situations.(UNIT2)
- **CLO11**: Using sterilised techniques to reduce the chances of infection in work practices. .(UNIT 1)

PRACTICALS

- Perform and execute the patient care techniques.
- plan and perform the radiation protection using the monitoringdevices.

TEXT BOOKS:

Radiation Protection

- Physics of diagnostic Radiology- Christenson
- ICRP manual
- Radiation protection in medical radiography- Mosby Elsevier publication

Patient Care

- Care of Patients in Diagnostic Radiology- Gunn
- Patient care in radiography- Mosby Elsevier publication

REFERENCE BOOKS:

- Notes on Radiological Emergencies – Ansell and Churchill
- Care of patients in diagnostic Radiography – Chesney &Chesney.
- First Aid – Haugher and Gardner.
- .steward c. Bushong:radiologic science for technologists, physics , biology , protection

*** Latest editions of all the suggested books are recommended**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 203
COURSE NAME: EQUIPMENTS OF RADIOTHERAPY
COURSE CREDIT: 4
TOTAL HOURS: 150 (THEORY: 100 HOURS, PRACTICAL: 50 HOURS)

COURSE OBJECTIVES

Introduction to the use of ionizing radiation for the management of cancer. To get exposure to different types of clinical radiation generators. Use of radioactive sources for the management of malignant and non-malignant diseases

COURSE DESCRIPTION:

Provide the student with the fundamentals of radiation oncology. The history of cancer and radiation therapy will be discussed. Technical aspects of treatment machines and the effects of combined therapies will be discussed. In addition, this course will review calculations necessary for the various patient setups and treatments.

COURSE CONTENTS:

UNIT1.
Orthovoltage equipment with special reference to physical design equipment of tube and its accessories and interlocks, gamma ray sources used radiotherapy especially cobalt 60 source its construction and source housing and handling mechanism.

UNIT2.
Principles of isocentric Tele-isotope machines, megavoltage x-ray and electron beam accelerators and betatron.

UNIT3.
Salient features of components of Linear Accelerator like tube design, wake guide, target design, beam bending system.

UNIT4.
Radio-frequency generators like magnetron and klestron.

UNIT5.
Basic principle of remote after-loading system/machines and sources used.

UNIT6
Principles of simulators and vacuum forming machines for making casts.

UNIT7.
Sterofoam template cutting system introduction to radio-surgery.

UNIT8.
Equipment and dosimetry equipment.

COURSE OUTCOMES

- **CLO1:** Describe the all components of the radiotherapy machine**. (UNIT1)**
- **CLO2:** Basics techniques radiotherapy treatment (orthovoltage, linear accelerator, brachytherapy**) (UNIT1)**
- **CLO3:** Describe the construction and working mechanism of LINAC**.(UNIT 3)**
- **CLO4:** The knowledge of microwave production of microwaves . **(UNIT4)**
- **CLO5:** Describe the basics principle of remote afterloading and brachytherapy techniques during treatments**. (UNIT5)**
- **CLO6.**Demonstrate ability to operate radiation producing equipment in all phases of treatment set-up and delivery (**UNIT5**)
- **CLO:** Use of simulators in radiotherapy and types of simulator.(**UNIT6)**
- **CLO6.** Demonstrate proper utilization of immobilization and beam directional device(**UNIT6)**
- **CLO7:** Principle and types of radiosurgery and its advantages over other cancer treatment units**.(UNIT 7)**
- **CLO8:** Demonstrate proper utilization of procedures for protection from sources of radiation exposure(**UNIT8**)

PRACTICALS

Demonstrate the equipment of radiotherapy

TEXTBOOK :

- Faiz M Khan , Textbook of Radiotherapy
- Mohanti, ATextbook of Radiation Oncology
- K.Thalayan, Textbook of Radiological Safety
- Ballinger, Textbook of Radiation Oncology

REFERENCE BOOKS:

- Krishan, Step by Step Management of Chemo and Radiotherapy
- Lele, Principle and Practice of Nuclear Medicine and Correlative Medical Imaging

*** Latest editions of all the suggested books are recommended.**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 204
COURSE NAME: SPECIAL RADIOGRAPHIC TECHNIQUE & PROCEDURES
COURSE CREDIT: 4
TOTAL HOURS: 160 (THEORY: 100 HOURS, PRACTICAL: 60

HOURS) COURSE OBJECTIVES:

- To know management and positioning of patients whileperforming
- radiological procedures.
- Knowledge of indications, contraindications contrast media, radiation dose,
- exposure timing and radiation safety measures for different radiological
- procedures. Regulations and Curriculum –MIT
- To understand the patient preparations needed before any radiological
- examination.
- .Knowledge of post procedural care.

COURSE DESCRIPTION:

Special Procedures is a diagnostic and minimally invasive procedure branch of Radiology used for evaluation and treatment of many medical conditions. We utilize the expertise of our specialty trained radiologists to perform over sixty different procedures.. Although some procedures may require recovery in the OutPatient Services area, most take 30-45 minutes to perform and you are able to go home shortly thereafter.

COURSE CONTENTS:

UNIT 1.

- Responsibility of Radiographer during Radiological Procedures.
- Preparation of Patients for Different Procedures.
- Contrast Media - Positive and Negative, Ionic & Non – Ionic
- Adverse Reactions To Contrast Media and Patient Management
- Emergency Drugs in the Radiology Department
- Emergency Equipments In the Radiology Department

Indications, contraindications, basic techniques and relationship to other techniques of the following special procedures

Excretory System

- IVP
- RGU
- MCU

G.I. Tract

- Barium Swallow
- Barium Meal Series

- Barium Meal Follow Through
- Barium Enema
- Small bowel enema
- Female reproductive system: Hysterosalpingography.
- Salivary glands: Routine technique, procedure – sialography
- Sinusography: Routine technique and procedure.
- Dacrocystography: Routine technique and procedure.
- Central Nervous System: Myelography.

Biliary system:

- Intravenous cholangiography
- Endoscopic retrograde cholangio-pancreatography (ERCP)
- Post-Operative cholangiography (T - tube Cholangiography)
- Oral Cholecystography
- Percutaneous Trans hepatic Cholecystography

UNIT3.

- Guideline for design and location of X-ray equipment

UNIT4

- Dark Room designing
- Outline structure of Dark Room
- Material used Miscellaneous

COURSE OUTCOMES

At the end of the course students will be able to...

- **CLO1:** Prepare management and positioning of patients whileperforming radiological procedures.(UNIT 1 AND 2)
- **CLO2:** Correlate of indications, contraindications, contrast media, radiation dose,
- exposure timing and radiation safety measures for different radiological procedures. .(UNIT 1 AND 2)
- **CLO3:** Understand the patient preparations needed before anyradiological examination. .(UNIT 1 AND 2)
- **COL4:** Generalize knowledge of post Procedural care. .(UNIT 1 AND 2)
- **CLO5:** Students will be able position the patients for radiological procedures. .(UNIT 1 AND 2)
- **CLO6:** Knowledge of image quality in radiological images. .(UNIT 1 AND 2)
- **CLO7:** Management of patients in the radiology department for various procedures. .(UNIT 1 AND 2)
- **CLO8:** Ability to handle emergency situations in the radiology department. .(UNIT 1 AND 2)
- **CLO9:** Precautions and care required in interventional suits. .(UNIT 1 AND 2)
- **CLO10:** Describe construction and working of darkroom/x-ray room and knowledge about darkroom /x-ray room accessories.(UNIT3 and 4)

PRACTICALS

- Radiography in various positions for all the special radiological procedures, using contrast media as per syllabus.
- Positioning and treatment of various cases patients by using:
- Prescribed filters and wedges
- Protection of various organs

TEXT BOOKS:

- Bhushan n Lakhkar Radiological procedures
- Chapman A guide to radiological procedures

REFERENCE BOOKS:

- Clark, Radiographic Positioning and Special Procedure
- Krishnamurthy, Medical Radiographic Technique & Darkroom Practice

*** Latest editions of all the suggested books are recommended.**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 205
COURSE NAME: X-RAY FILM/IMAGE PROCESSING TECHNIQUES INCLUDING DARK ROOM
COURSE CREDIT: 4
TOTAL HOURS: 150 (THEORY: 100 HOURS PRACTICAL: 50 HOURS)

COURSE OBJECTIVES:

- To know basic physics of radiography
- Construction and working of film, intensifying screen, cassette, dark room,
- Computed radiography, direct radiography, and automatic processor.
- To understand radiographic film Processingchemistry.
- To study the factors affecting image quality in radiographic image and their application.

COURSE DESCRIPTION:

This Radiographic photography syllabus is intended as a guide to the theory and practical knowledge required by the students. Appreciation and application of all the factors listed below will enable the technologist to produce x-ray films of good quality and diagnostic value. The lectures should be linked with practical demonstration to illustrate the importance of all that goes to make up correct exposure conditions.

COURSE CONTENT:

UNIT1.
X-Ray film
X-ray film construction and film characteristics – Composition of single and double coated radiographic films -structure of emulsion- film characteristics; speed, base fog, gamma, latitude -effect of grain size on film response to exposure, interpretation of characteristics curve- exposure to x-rays. Sensitometer: Photographic density-characteristic curve-information from the characteristic curve-speed Vsdefinition.

UNIT2.
Types of Radiographic Films-
Applications -advantages/limitations of different types Structure, properties of different parts-Film storage - handling -film wrappings- handling of exposed and unexposed films -safe light requirements. Storage of X-ray film.

UNIT3.
Radiographic Image:
Meaning of radiographic image contrast, density, resolution, sharpness, magnification and distortion of image, noise and blur. Primary radiological image formation- Image quality – unsharpness- resolution – fog and noise - use of contrast media-density- contrast – brightness- optical density measurements- Image recording devices.

UNIT4:

Image processing– Film developing principles- acidity, alkalinity, pH, the processing cycle- process of film developing - development -developer solution- constituents of developer. Fixing- fixer solution- composition of fixer –washing – drying replenishment -checking and adjusting replenishment rates - other processing solution – effect of temperature and development time - film processing methods -common errors and faults while processing manual and automatic processing-latent image formation–
silver recovery and economics.

UNIT5

Automatic processing - Automatic film handling systems -Automated Processors - equipment for Film Processing-functions of various components- film roller transport - transport time -film feed system-Importance and relation to temp, fixed and variable time cycles-Care and maintenance -cleaning routine and methods of cleaning.

UNIT6

Intensifying screens: Structure and functions, common phosphors used-types, screen mounting, care and maintenance of film screen contact. Intensifying factor-speed and detail-crossover effect-resolution-mottle-reciprocity-screen asymmetry-cleaning. New phosphor technology-influence of kilo voltage. Photo-stimulable phosphor Imaging.

Cassettes: Structure and function-Types-single, gridded, film holder-Design features and consideration with loading/unloading-Care and maintenance (cleaning).

Presentation of radiographs-opaque letters and markers-Identification of dental films- preparation of stereo radiographs-viewing conditions

UNIT7:

Film achieving systems- Image recording devices-Laser imager/camera functioning. Multiformatter-Optical Disc. System
Film archieving systems - MOD/disc/PACS etc

UNIT8

Radiographic illuminators: and viewing conditions, visual acuity and resolution.

UNIT9

Dark Room

- The processing area.
- Dark room design, construction, illumination, entrance safe lighting-types.
- Room storage, shelving of films.
- Cleaning and maintenance.
- Instruction to Staff, Dry Bench, Drawer, Cupboard.
- Loading and Unloading Cassettes.
- Hangers, Types of Hangers and Storage of Hangers
- Wet Bench Cleanliness, Control of Dust, Dark Room Sink
- Hatches and Drier

- Safe Lights, Direct and Indirect, Uses, Factors Affecting Safelight Performance, Safelight Tests.
- Viewing Room, Film Dispensing

COURSE OUTCOMES:

At the end of the course students will be able to...

- **CLO1**: Know basic physics of radiography processing system.(UNIT 3 AND 4)
- **CLO2**: Describe construction and working of film, intensifying screen, cassette, dark
- room, computed radiography, direct radiography and automatic processor.(UNIT 1,2, 6AND 9)
- **CLO3**: Explain radiographic film Processing chemistry.(UNIT 4)
- **CLO4**: Discuss the factors affecting image quality in radiographic image andtheir
- application.(UNIT 3)
- **CLO5**: Operate the workflow in x-ray imaging.(UNIT 9)
- **CLO6**: Apply knowledge for the use of radiation factors.(UNIT 3)
- **CLO7**: Demonstrate process the radiographic film in different systems(UNIT 4 AND 5)
- **CLO8**: Describe the film archieving system and components.(UNIT 7)
- **CLO9**: apply knowledge of radiographic illuminators.(UNIT 8)
- **CLO10**: Prepare care and maintenance of radiographic films, cassettes, intensifying screens, darkroom accessories and X-ray equipment.(UNIT 1,2,6 AND 9)

PRACTICAL

Practical involving not less than 10 numbers must be prescribed to the students.
The title and nature of practical may be framed by the respective institution conducting the course. Study with charts, models & power point presentations involving students to present and discuss.

TEXT BOOKS:

- Radiographic Imaging - Chesney & Chesney, Blakwell scientific publications, oxford(1981)
- Photographic processing, quality control and evaluation of photographic material -J.E. Gray 3.Photographic processing Chemistry - L.F.A. Mason.
- Physical and photography principles of Medical Radiography - Seeman & Herman.

REFERENCE BOOKS:

- Radiographic latent image processing – W. E. JMckinney
- Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn), Churchill Livingstone

*** Latest editions of all the suggested books are recommended.**

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- **https://www.radiologyeducation.com/**

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 206

COURSE NAME: CLINICAL RADIOGRAPHYPRACTICAL

COURSE CREDIT: 4

TOTAL HOURS: 100

COURSE OBJECTIVES:

- To understand the basic patient positioning and scanning in radiology departments.
- To apply special positioning skills for different pathological and physical conditions.
- Application of Equipment's while working in radiology departments.

COURSE DESCRIPTION:

Clinical radiology is a specialized branch of medicine that uses state of the art equipment and a range of techniques to capture images of the inside of the body. Medical radiography is a broad term that covers several types of studies that require the visualization of the internal parts of the body using x-ray techniques. Radiography means a technique for generating and recording an x-ray pattern for the purpose of providing the user with a static image(s) after termination of the exposure.

Practical involving not less than 10 numbers must be prescribed to the students.
The title and nature of practical may be framed by the respective institution conducting the course. Study with charts, models & power point presentations involving students to present and discuss.

COURSE CONTENT:

- **UPPER LIMB:**
  - Clinical demonstration of Arm,
  - Clinical demonstration of forearm,
  - Clinical demonstration of elbow joint
  - Clinical demonstration of shoulder
- **LOWER LIMB:**
  - Clinical demonstration of Femur
  - Clinical demonstration of tibia
  - Clinical demonstration of fibula
  - Clinical demonstration of knee join
  - Clinical demonstration of ankle and foot

- **THORAX:**
  - Clinical demonstration of Ribs
  - Clinical demonstration of Clavicle
  - Clinical demonstration of lungs
- **VERTEBRAL COLUMN:**
  - Clinical demonstration of Cervical spine
  - Clinical demonstration of thoracic spine
  - Clinical demonstration of lumbar spine
  - Clinical demonstration of sacrum spine
  - Clinical demonstration of coccyx spine
- **PELVIC GIRDLE AND HIP REGION:**
  - Technique for whole pelvis demonstration.
- **SKULL RADIOGRAPHY:**
  - Demonstration of skull views
  - Demonstration of Para nasal sinuses
- **SOFT TISSUE RADIOGRAPHY**
  - Demonstration of routine and special views of mammography.

COURSE LEARNING OUTCOMES:

- **CLO1:** Understand the basic patient positioning during radiographic investigation.
- **CLO2:** Apply special positioning skills for different pathological and physical conditions.
- **CLO3:** Application of equipment while working in radiology departments.
- **CLO4:** Choose proper position during radiography.
- **CLO5:** Explain relative positions of x-ray tube and patient relevant exposure factors during radiography.
- **CLO6:** Explain the radiographic appearances of both normal and commonabnormal conditions.
- **CLO7:** Explain the positioning for mammogram.

TEXT BOOKS:

- Philip W. Ballinger: Atlas of Radiographic Positioning and Radiological
- Procedures (Mosby)
- Ra Swallow, E Naylor: Clarks Positioning In Radiography
- Ross and Gailway: A Handbook of Radiography(Lewis)
- Glenda J.Bryan: Diagnostic Radiography (Mosby)
- Meril's Atlas of radiographic positioning and Radiological procedure)

REFERENCE BOOKS:

- Clark's Handbook for Radiographers – Charles Sloane, Ken Holmes & Craig Anderson, Hodder Educations, UK
- Diagnostic Radiography – A concise practical Manual – Glenda J. Bryan (4th edn), Churchill Livingstone

WEB LINKS:

- http://www.wikiradiography.net/page/Main_Page
- https://radiopaedia.org/
- https://quizlet.com/408928314/radiology-flash-cards/
- https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

3RD YEAR SYLLABUS

COURSE CODE: BMRIT-301
COURSE NAME: RADIOTHERAPY PLANNING AND QUALITY CONTROL
COURSE CREDIT: 04
TOTAL CONTACT HOURS: 150 HOURS (THEORY: 100 HOURS, PRACTICAL: 50 HOURS)

COURSE OBJECTIVES:

To familiarize the student with the need and the concept of a quality system in radiotherapy as well as with recommended quality procedures and tests.

COURSE DESCRIPTION:

The principles of radiation physics apply to the treatment and care of the cancer patient.
In radiotherapy, radiation treatment planning (RTP) is the process in which a team consisting of radiation oncologists, radiation therapist, medical physicists and medical dosimetrists plan the appropriate external beam radiotherapy or internal brachytherapy treatment technique for a patient with cancer.
Quality Control (QC) refers to the specific test required to ensure effective and safe equipment performance. QC tests check the performance of the equipment under routine clinical conditions, following established protocols for facilities, equipment and procedures.

COURSE CONTENTS:

UNIT1.

Definition of treatment planning.Principles of positioning and immobilization Positioning aids-Breast boards,Lung boards, Belly boards, Head-and-neck fixation devices, Vacuum packs, Stereotactic systems Internal organ motion control- Bite blocks, Gating systems, Active breathing control, Diaphragm compression, Prostate immobilization, Tracking systems. Laser/ positioning systems

UNIT2.

Planning procedure in general with special emphasis on turnout localization and target volume measurement by conventional radiographic method and simulator imaging.

UNIT3.

Role of special contrast medium base radiotherapy.

UNIT4.

CT/MRI/Ultrasound/ radionuclide imaging methods physical and clinical requirements of field selection of treatment in Teletherapy, role of portal films in treatment planning. Choice of central axis percentage depth dose data and isodose curve form a spectrum of radiotherapy beams used for treatment.

UNIT5.

Requirement and practice of organ shielding single multiple fields, and rotational field therapy, planning procedures.

UNIT6.

Computerized treatment planning system choice of dose, time and fraction.

UNIT7.

Safety of critical organs in planning methods, Role of treatment shell immobilization devices and laser in patients set up and positioning

UNIT8.

Acceptance tests on therapy simulator telescope megavoltage X-ray and electron beam machines.

UNIT9.

Contribution of technologist in radiation calibration of quality control assurance in execution of radiation treatment.

COURSE LEARNING OUTCOMES:

- **CLO1:** Review components of conventional simulator during planning of target volume of tumor. (**UNIT2)**
- **CLO2:** Understand how some conventional tests should be modified for a digital radiographic system integrated into an electronic image management system. (**UNIT7**)
- **CLO3**: Identify key references and standards that can be useful in QA of DR activities that ensure consistent, maximum performance from physician and imaging facility **(UNIT5)**
- **CLO4:** Acceptance Test on radiotherapy equipments **(UNIT8**)
- **CLO5:** Computerized treatment planning systems with Quality Control (QC). (**UNIT6**)
- **CLO6:** Vehicle for providing highest quality medical care(**UNIT9**)
- **COL7**: Describe the steps of treatment planning during treatment of cancer**. (UNIT1)**
- **COL8:** Radiation Calibration of quality control of CT simulator,(**UNIT9)**
- **COL9**: Describe the role of contrast media in procedure**. (UNIT3)**

PRACTICAL

Practical involving not less than 10 numbers must be prescribed to the students.
The title and nature of practical may be framed by the respective institution conducting the course. Study with charts, models & power point presentations involving students to present and discuss.

TEXTBOOK:

1. Mohanti, ATextbook of Radiation Oncology
2. K.Thalayan , Textbook of Radiological Safety
3. Faiz M Khan, Textbook of Radiotherapy andTreatment Planning

REFERENCE BOOKS:

1. RoyH.Decker,MD,PhD-Pocket Guide to RadiationOncology
2. Joel E. Tepper MD ,Gunderson & Tepper- Clinical Radiation Oncology

WEB LINKS:

4. http://www.wikiradiography.net/page/Main_Page
5. https://radiopaedia.org/
6. https://quizlet.com/408928314/radiology-flash-cards/
7. https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT-302

COURSE NAME: MODERN IMAGING TECHNIQUES AND RECENT TRENDS IN IMAGING

COURSE CREDIT: 04

TOTAL CONTACT HOURS: 180 HOURS (THEORY: 100 HOURS, PRACTICAL: 80 HOURS)

COURSE OBJECTIVES:

Explore significant technology innovations that will help improve diagnosis while keeping dose as low as possible. They are:

- Faster acquisition enables improved image quality
- Gains in optimal dose efficiency
- 2D image capture evolving to 3D
- AI as a supplemental lens for medical image analysis

COURSE DESCRIPTION:

A large variety of imaging techniques is an integral part of modern medicine. Introducing radiological imaging techniques into the dissection course serves as a basis for improved learning of anatomy and multidisciplinary learning in pre-clinical medical education.

COURSE CONTENTS:

UNIT 1.

Mammography:

The Mammography system - construction/types accessories tube, compression, grids, AEC etc l-immobilization and identification techniques- film processing - image quality - image recording devices positioning techniques for various projections - exposure factors- Conventional & Digital studies- quality and advantage- diagnosis and screening- Characteristics of benign and malignant lesions – patient care – female attendant - interventional procedures - radiation dose- recent advances in mammography techniques -mammo tomogram & Sonomammography procedures- advantages & limitations.

UNIT2.

Ultrasonography/ Doppler studies:

Transducers; principle design and types, Electronics, Matching Layers, Image acquisition and display; A-mode, M-mode, B-mode, Linear and Curvilinear Arrays, Phased Arrays, Annular Arrays, The Near Field, the Far Field, Focused Transducers, Image Data Acquisition: Signal Acquisition, Pre-amplification and Analog to Digital Conversion, Time Gain Compensation, Logarithmic Compression,

Demodulation and Envelope Detection, Rejection, Processed Signal . Techniques of sonography-selection- Preparations - instructions and positioning of patient for TAS,
TVS, TRUS, neck USG and extremities- patient care and maintenance protocols-clinical applications display methods –quality image reproducible extend -assurance to patients. Doppler - Doppler Theory,
Doppler-Frequency Shift, Reflector Velocity Dependence, Doppler Angle Dependence, Spectral Analysis, Continuous Wave (CW) Doppler, Pulsed Doppler, Pulse Transmission and Range Gating, Aliasing, Duplex Scanning, Color Flow Imaging, Power Doppler. Image quality and artefacts. Reverberation, lateral and axial resolution, time gain compensation.

UNIT3.

CT scan studies acquisition/ protocols /techniques:
Computerized tomography - basic principles, advantages and limitations. X-ray tubes & detectors,data acquisition, generations, image reconstruction. Basic principles of image reconstruction: back projection, analytical an iterative methods – MPR – MIP – volume rendering – surface shaded display (SSD) – bone reconstruction . CT artefacts: motion artefacts, streak artefacts, ring artefacts, partial volume artefacts etc . Dose and Dosimetry, CT Dose Index (CTDI, etc.), Multiple Scan Average Dose (MSAD), Dose Length Product (DLP), Dose Profile, Effective Dose, Phantom Measurement Methods, Dose for Different Application Protocols, Technique Optimization . CT of head and neck – thorax – abdomen – pelvis – musculo skeletal system – spine – PNS. Anatomy – clinical indications and contraindications – patient preparation – technique – contrast media-types, dose, injection technique; timing, sequence - image display – patient care – utilization of available techniques & image processing facilities to guide the clinician-CT anatomy and pathology of different organ systems.

UNIT4.

MRI Scanners:
Basic MR Image formation - RF Excitation – Relaxation (T1 and T2) – Computation and,display - Free induction decay - k-space – RF wave form designs.
Introduction to pulse sequencing - Spin echo sequence – T1w image – T2W image Proton density - Gradient echo sequence – Inversion recovery
Methods of MRI imaging methods – Head and Neck , Thorax, Abdomen, Musculoskeletal System imaging - Clinical indications and contraindications- types of common sequences-effects of sequence on imaging - Protocols for various studies- slice section- patient preparation-positioning of the patient - patient care-calibration - paramagnetic agents and dose, additional techniques and recent advances in MRI - ARTIFACTS - Cause of artifacts. MR safety – instrumentation and biologicaleffects

image acquisition-modification of procedures in an unconscious or un co-operative patient - plain studies-contrast studies -special procedures- reconstructions- 3D images- MRS blood flow imaging, diffusion/perfusion scans - strength and limitations of MRI- role of radiographer.

UNIT5.

Angiography and Cine Studies /DSA

Conventional / DSA studies- Abdominal, visceral, peripheral, cerebral and cardiac angiography - arterial/venous anatomy, physiology-clinical indications and contraindications - patient preparation-positioning of the patient -patient care-contrast media - types of contrast - dosage - accessories catheters, guide wires- pressure injection- control of radiographic and fluoroscopic equipment - exposure factors for serial programmes-programming-injection protocols- outline on each radiological procedure-radiographer's role- patient management before -during and after the procedure - venography-interventional angiography in hepatobiliary, GIT, urology and vascular system- coils/stents etc-indications and contraindications - role of radiographer-radiation safety.

UNIT5.

Nuclear Scintiscan procedures:

SPECT-CT & PET-CT studies, protocols, Basics of common clinical Nuclear Medicin procedures/techniques–comparison with different structural imaging studies-advantages andlimitations.

UNIT6.

Recent Advances in Imaging

Dynamic CT & MRI studies

Per operative application of various imaging systems including detector probes application in Nuclear Medicine

Imaging guidance in therapeutic procedures-IGRT, TACE & TARE etc.

PRACTICAL

Practical involving not less than 10 numbers must be prescribed to the students. The title and nature of practical may be framed by the respective institution conducting the course.

COURSE LEARNING OUTCOMES:

- **CLO1:** Ability to properly perform a mammogram(UNIT1)
- **CLO2:** Recognize the risks of mammography(UNIT1)

- **CLO3:** Understand ultrasound principles and explain the basic physical properties of ultrasound. (UNIT2)
- **CLO4:** Describe various types of ultrasound-guided diagnostic and therapeutic procedures. (UNIT2)
- **CLO5:** Define basic principle and physics of Computed Tomography scan(UNIT3)
- **CLO6:** Recognize protocols needed for Computed Tomography examination (UNIT3)
- **CLO7:**Prepare and positioning for Computed Tomography examination(UNIT3)
- **CLO8:**Define basic principle and physics of Magnetic Resonance Imaging. (UNIT4)
- **CLO9:** Recognize protocols needed for Magnetic Resonance Imaging examination. (UNIT4)
- **CLO10:** Prepare and positioning for Magnetic Resonance Imaging examination. (UNIT4)
- **CLO11:**Interpret post processing of Magnetic Resonance Imaging images. (UNIT4)
- **CLO12:**Basics knowledge of DSA.(UNIT5)
- **CLO13**: Clinical indication and contraindication for the procedure, patient positioning,(UNIT5)
- **CLO14:**Basics knowledge of radiopharmaceuticals and distributions used for specific nuclear medicine procedures. (UNIT5)
- **CLO15:** describe the protocols of SPECT and PET scan **(UNIT5)**
- **CLO16;** Advantage and limitations of structural imaging studies. . (UNIT5)
- **CLO17:** Describe dynamic CT & MRI studies. .(UNIT6)

TEXT BOOKS :

1. .Stuwart C Bushong MRI Physics and Biological Principle
2. Catherine Westbrook & Caralyn Kaut MRI in Practice
3. Christensen, Curry & Dowdey : An Introduction of Physics to Diagnostic Radiography
4. Seeram CT, Euclid Seeram
5. Spiral CT protocols- a practical approach – Jaypee publications

REFERENCE BOOKS:

1. Frederick W Kremkau Diagnostic Ultrasound Principles and Instruments
2. Roger C. Sounders: Clinical Sonography : A Practical Guide (Little Brown & Company)
3. Palmer : Manual of Diagnostic Ultrasound (WHO)
4. James A Sorenson, Simon R Cherry, Michael E Phelps Physics in Nuclear Medicine:,
5. Gopal B Saha Fundamentals of Nuclear Pharmacy
6. Catherine Westbrook Protocols in MRI
7. Bradley Physics of MRI
8. Spiral CT protocols- a practical approach – Jaypee publications
9. Tomography and Magnetic Resonance Imaging of the Whole Body (Vol.1 &II) (Saunders).

WEB LINKS:

1. http://www.wikiradiography.net/page/Main_Page
2. https://radiopaedia.org/
3. https://quizlet.com/408928314/radiology-flash-cards/
4. https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT-303
COURSE NAME: INTERVENTIONAL RADIOLOGY, RADIOBIOLOGY AND RADIATION SAFETY IN RADIODIAGNOSIS IMAGING
COURSE CREDIT: 04
TOTAL CONTACT HOURS: 180 HOURS (THEORY: 100 HOURS, PRACTICAL: 80 HOURS)

COURSE OBJECTIVES:

1) Knowledge about radiation , its units and radiation effects on the human body.
2) To know management and positioning of patients while performing interventional radiological procedures.
3) Knowledge of indications, contraindications, contrast media, radiation dose, exposure timing and radiation safety measures for different interventional radiological procedures.
4) To understand the patient preparations needed before any interventional radiological examination.
5) Knowledge of post procedural care.

COURSE DESCRIPTION:

Interventional radiology comprises image-guided therapeutic interventions. Access is percutaneous and these procedures are therefore usually performed under local anaesthesia and/or sedation. Originally, guidance was provided by X-ray fluoroscopy, but more recent procedures also employ ultrasound, computerized tomography (CT), and magnetic resonance imaging (MRI) guidance. Radiation protection aims to reduce unnecessary radiation exposure with a goal to minimize the harmful effects of
ionizing radiation. In the medical field, the use of ionizing radiation has become an inescapable tool used for the diagnosis and treatment of a variety of medical conditions.

COURSE CONTENTS:

UNIT 1.

1. Radiation Quantities and Units

Radiation- Radioactivity- Sources of radiation - natural radioactive sources -cosmic rays-terrestrial radiation - - man made radiation sources. Units of radiation - Quality factor - Flux-Fluence-Kerma-Exposure- Absorbed dose- Equivalent Dose- Weighting Factors-Effective Dose - Occupational Exposure Limits - Dose limits to the public.

UNIT 2.

2. Biological Effects of radiation

Ionization, excitation and free radical formation, hydrolysis of water, action of radiation on cell - Chromosomal aberration and its application for the biological dosimetry- Effects of whole body and

acute irradiation, dose fractionation, effects of ionizing radiation on each of major organ system including fetus -Somatic effects and hereditary effects- stochastic and deterministic effects-Acute exposure and chronic exposure-LD50 - factors affecting radio-sensitivity. Biological effects of non-ionizing radiation like ultrasound, lasers, IR, UV and magnetic fields.

UNIT 3.

3.Radiation detection and Measurements: Ionization of gases- Fluorescence and Phosphorescence -Effects on photographic emulsion. Ionization Chambers – proportional counters- G.M counters- scintillation detectors – liquid semiconductor detectors – Gamma ray spectrometer. Measuring systems – free air ionization chamber – thimble ion chamber – condenser chamber – Victorian electrometer – secondary standard dosimeters – film dosimeter – chemical dosimeter- thermoluminescent Dosimeter. -Pocket dosimeter-Radiation survey meter- wide range survey meter - zone monitor-contamination monitor -their principle-function and uses. Advantages & disadvantages of various detectors & its appropriateness of different detectors for different type of radiation measurement.

UNIT4

Radiation protection: Radiation protection of self and patient- Principles of radiation protection, time - distance and shielding, shielding - calculation and radiation survey –ALARA- personnel dosimeters (TLD and film batches)- occupational exposure

UNIT4.

INTERVENTIONAL RADIOLOGY

1. Interventional Radiology
    a) Definition
    b) Indication
    c) Contraindication
    d) Equipment's
    e) Clinical Application
    f) Name of different type of procedure

UNIT5.

ANAESTHESIA IN DIAGNOSTIC RADIOLOGY

1 Facilities regarding general Anesthesia in the X-ray Department.

2 Anesthetic Problems associated with specific technique-

a) Vascular Studies

b) Carotid Angiography

c) Venography

d) T and NMR

COURSE LEARNING OUTCOME:

At the end of the course, students will have abundant knowledge on.

CLO1: Details knowledge of radiation, its types of radiation and unit of radiation**. (UNIT1**)

CLO2: Knowledge of biologicals effects to the radiation (**UNIT2**)

CLO3: Describe the radiation protection devices and monitoring devices. (**UNIT3**)

COL4: Basics of interventional radiological procedure. (**UNIT4)**

CLO5: Some knowledge of anaesthesia drugs in the radiology department.(**UNIT5)**

PRACTICAL

Involving not less than 10 numbers must be prescribed to the students. The title and nature of practical may be framed by the respective institution conducting the course as follows-

1. Time, Dose, Shielding, Measurement of HVT & TVT
2. Familiarization of Radiation Survey meters and their functionalperformance checks
3. Radiological Protection Survey of Diagnostic X-Ray installation
4. Diagnostic Imaging: Quality Assurance – M. M Rehani
5. AERB safety requirements- Atomic Energy Act, Radiation protectionrules.

TEXT BOOKS:

1. Text Book of Radiological Safety – K. Thaylan (2010) Jaypee Brothers and medical Publishers, New Delhi.
2. Handbook of Interventional Radiologic Procedures Kandarpa
3. Radiological Procedures - A Guideline by Bhushan N. Lakhkar (Author)

REFERENCE BOOKS:

1. Radiologic science for technologists –9edition (2008) Stewart Carlyle Bushong, Mosby Elsevier, UK.
2. Diagnostic and Interventional Radiology 1st ed. 2016 Edition by Thomas J. Vogl (Editor), Wolfgang Reith (Editor), Ernst J. Rummeny (Editor)

WEB LINKS:

1. http://www.wikiradiography.net/page/Main_Page
2. https://radiopaedia.org/
3. https://quizlet.com/408928314/radiology-flash-cards/
4. https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT-304

COURSE NAME: RADIOTHERAPY & BRACHYTHERAPY TECHNIQUES IN MALIGNANT ANDNON-MALIGNANT DISEASES

COURSE CREDIT: 04

TOTAL CONTACT HOURS:150 HOURS (THEORY: 100 HOURS, PRACTICAL: 50 HOURS)

COURSE OBJECTIVES:

- Demonstrate the understanding of various steps required in planning a radiotherapy treatment process
- Be able to correctly position the patient.
- Be able to conduct the simulation and mark-up procedure for all standard treatmenttechniques
- Be able to accurately position and immobilize all patients as perinstructions.

COURSE DESCRIPTION:

Students will learn the principles of radiation physics as they apply to the treatment and care of the cancer patient. Course will include a thorough review of x-ray production, fundamental principles, concepts and terminology. Topics studied include measurements, general principles, structure of the atom, structure of the matter, electrostatics, magnetism, electrodynamics, electromagnetism, rectification and production and properties of radiation and radiographic techniques.

COURSE CONTENTS:

Unit 1.

Orthovoltage techniques in skin tumours, and cancers of the breast Advantages and disadvantages of orthovoltage in radiotherapy.

Unit 2.

Tele isotope cobalt therapy techniques in skin and deep sealed tumours parallel opposed fields and small beam directed therapy and wedge field techniques in head and neck tumours especially cancers of larynx treatment techniques for cancer of maxillary antrum and pituitary tumours.

Unit 3.

Treatment techniques in cancer of breast by telecobalt and low energy megavoltage X-rays and electron beams.

Unit4.

Tele and brachy-therapy techniques of treatment of different stages of carcinoma cervix uteri with special emphasis on HDR and LDR brachytherapy.

Unit 5.

Three field techniques in cancer of esophagus and bladder.

Unit 6.

Radiotherapy technique in medulloblastoma. Whole body and hemi body radiation techniques.

Unit 7.

Treatment techniques of malignant and non-malignant conditions in ovarian and kidney tumours.

Unit 8.

Radiation treatment techniques of lymphomas with special emphasis on mantle field irradiation radiotherapy techniques in head and neck cancer

Unit 9.

Salient features of computers in radiotherapy and its application.

1. Introduction to computer, Hardware and software components.
2. Input and output data systems computerized treatment planning systems in tale, brachytherapy and documentations.

Unit 10.

Radiological protection

1. Dose limits of occupational workers & Publics.
2. Principle & Method of Protection.
3. Monitoring devices.

COURSE LEARNING OBJECTIVES:

At the end of the course, students will have abundant knowledge on.

- **CLO 1**: Students in this professional degree program learn to demonstrate the appropriate knowledge of radiation therapy procedures. (**UNIT1**)
- **CLO2**: apply principles of radiation protection for patient, self and others. **(UNIT10)**
- **CLO3**: perform radiation therapy simulation procedure; perform basic radiation therapy dose calculations and access treatment plans. (**UNIT1)**
- **CLO4.**Tele and brachy-therapy techniques Treatment(**UNIT2**)
- **CLO5**: Knowledge of Brachytherapy is a type of internal radiation therapy that is often used to treat cancers of the head and neck, breast, cervix, prostate, and eye. (**UNIT4)**
- **CLO6:** Radiation treatment techniques for lymphomas and head and neck cancer. (**UNIT8**)
- **CLO7**: Describe three field techniques in esophagus and urinary bladder cancer. (**UNIT5)**
- **CLO8**: Explain the orthovoltage techniques for breast cancer.(**UNIT3**)
- **CLO9:** Basic knowledge of computer in radiotherapy(**UNIT9**)
- **CLO10**: Planning of radiation therapy treatment techniques for cervix and kidneycarcinoma**.** **(UNIT6**)

TEXTBOOK

1. Mohanti, ATextbook of Radiation Oncology
2. K.Thalayan, Textbook of Radiological Safety
3. Faiz M Khan, Textbook of Radiotherapy and Treatment Planning

4. Ballinger, Textbook of Radiation Oncology

REFERENCE BOOKS

1. Brachytherapy Techniques and Evidences Editors: **Yoshioka**, Y., **Itami**, J., **Oguchi**, M., **Nakano**,
2. Brachytherapy Techniques-Müller, Reinhold g

WEB LINKS:

8. http://www.wikiradiography.net/page/Main_Page
9. https://radiopaedia.org/
10. https://quizlet.com/408928314/radiology-flash-cards/
11. https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT 305
COURSE NAME:- ORIENTATION IN PARA CLINICAL SCIENCES, CLINICAL SCIENCES & COMMUNITY HEALTH CARE
COURSE CREDIT:-4
TOTAL CONTACT HOUR: 120 HOURS (THEORY: 100 HOURS, PRACTICAL: 20 HOURS)

COURSE OBJECTIVE:

- To prepare the students' understanding in basic knowledge of pregnancy, intranatal , intrapartum & postnatal period for women.
- To perform skills for diagnosis during pregnancy for alltrimesters.
- To make students better communicators with pregnant women while preparing them for diagnostic purposes.
- To make students better understand a dose of drugs and their mechanism ofaction.
- To impart knowledge of various pathogenic microorganisms and address the fundamental mechanism of their pathogenicity.
- To understand the basic pathologic process in the patient body for systemic diseases.
- To provide basic knowledge of musculoskeletal disorders , diagnosis and management of the orthopaedics department.
- To introduce students to the basic social processes of society ,social institutions and patterns of social behaviour.
- To enable students to cope effectively with the socio cultural and Interpersonal processes of constantly changing complex society.

COURSE DESCRIPTION:

This course is designed to help students gain knowledge and understanding of study of parasites, types , morphology and physiology of bacteria .This course provides knowledge of the pathology of systemic diseases, treatment and mechanism of action of drugs for different dyes used in radiologic investigation. This course helps to perform diagnostic investigation for pregnant women during antenatal, intranatal, postnatal period .This course helps to understand the health, national health programs, social and cultural change, consequences of the social problem in relation to sickness & disability.

COURSE CONTENT:

UNIT1
PARASITOLOGY Entamoeba Histolytica , Leishmania, Material Parasites of man, Helminthology,Taenia Saginata, Taenia Solium,Echinococcus granulosus,Ascaris

Lumbricoides,Ancylostoma duodenale, Strongyloides stercoralis

UNIT2

MICROBIOLOGY
Morphology & Physiology of Bacteria, Staphylococcus, Streptococcus, Mycobacterium tuberculosis, Spirochetes, Corynebacterium Diphtheriae

UNIT-3
VIRUS
General Properties of Virus, Herpes virus, Poliovirus, Hepatitis virus, oncogenic virus, HIV

UNIT-4 PATHOLOGY
Inflammation, Neoplasia, Osteomyelitis, Fractures, Osteoporosis, Rickets, Osteomalacia,Tumours of Bone, Rheumatoid Arthritis, Gout, Osteoarthritis.

UNIT5
PHARMACOLOGY
Pharmacokinetics of Drugs
Absorption
Distribution
Metabolism
Excretion
Adverse drug reactions & Management ,Pharmacology of different dyes used in Radiological procedures

UNIT6
MEDICINE
Pericarditis, Valvular diseases, Rheumatic Heart Disease, Heart failure, Chronic Bronchitis, Emphysema, Bronchitis, Pneumonia, Tuberculosis, Pleural effusion, Empyema, Spontaneous Pneumothorax

UNIT-7
Achalasia cardia, Peptic ulcer, Intestinal obstruction, Crohn's disease ,Ulcerative colitis, Pancreatitis, Portal Hypertension, Ascitis, Cirrhosis, Cholecystitis

UNIT-8
UTI
Glomerulonephritis, Nephrotic Syndrome, Urinary calculi, Polycystic Kidney disease, Cerebral Vascular Disorders, Meningitis, Encephalitis
ORTHOPAEDICS
Fracture,Type Mechanism, Healing, Delayed Union, Non- complication, Injuries of the shoulder girdle, Dislocation of shoulder, Number of Humerus, Elbow Forearm,Number of Distal Radius & ulna, Injuries of the carpal, Dislocation of Hip, Femur, Tibia, Ankle, calcaneum, Acute & chronic osteoarthritis, Rheumatoid arthritis, Paget's Disease, Ankylosing spondylitis, Club foot, Bone Tumour-Benign Malignant

UNIT- 9

Surgery, Cholelithiasis, Peritonitis, Supraphrenic Abscess, Appendicitis, Benign Hypertrophy prostate, Sinusitis

UNIT10.

OBSTETRICS
Diagnosis of Pregnancy, Normal Labour
Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept.
National Health Policy
National Health Programmers (Briefly Objectives and Scope)
Population of India and Family welfare programme in India.
Family:
The family, meaning and definitions
Functions of types of family
Changing family patterns
Influence of family on Individuals Health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their Importance to physiotherapy.
Community:
Rural community: Meaning and features – Health hazards to rural communities, health hazards to tribal communities.
Urban community – Meaning and features – Health hazards of urbanities
Culture and Health Disorders
Social Change:
Meaning of social changes
Factors of social changes
Human adaptation and social changes
Social changes and stress
Social changes and deviance
Social changes and health programme
The role of social planning in the Improvement of health and rehabilitation
Social Problems of disabled:
Consequences of the following social problems in relation to sickness and disability
Population explosion.

COURSE LEARNING OUTCOMES (CLOS):

- **CLO-1**: Gaining knowledge for types of parasite and relateddiseases.(UNIT-1)
- **CLO-2:** Gaining knowledge and understanding morphology and physiology of bacteria & their pathogenicity.(UNIT - II)
- **CLO-3** : Getting knowledge to understand the pathogenesis of viral infection.(UNIT-III)
- **CLO-4:** Demonstrate skills and knowledge the methodological approaches in radiologic investigation of infectious disease(UNIT-IV)
- **CLO- 5:** Gaining understanding for pathology of systemic diseasesand related diagnostic

investigation.(UNIT - VI)

- **CLO- 6**: Describe pathologic processes that apply to individual patients, analyse laboratories and clinical data. (UNIT - VII)
- **CLO- 7:**Gaining knowledge & understanding mechanism of action of drugs, side-effects, indications for different dyes used in radiologic investigation. (UNIT -V)
- **CLO-8**:Demonstrate the ability and skills for orthopaedic disorder & their related diagnostic procedures.(UNIT- VIII)
- **CLO-9**:Understanding and skills about pregnancy and diagnostic procedure for all trimester.(UNIT - IX)
- **CLO -10**: Describe population and policy and apply this to critically evaluate the complexity of Policy and human population issues.(UNIT-IX)
- **CLO-11**: Ability to discuss the social history of emunsements and conditions necessary to create a truly 'popular culture.(UNIT -IX)
- **CLO- 12**: Ability to understand changing the family patterns.(UNIT-IX)

TEXT BOOKS:

1. Robbins & Cotran, Pathologic Basis & Diseases
2. Harsh Mohan, Pathologic Basis & Diseases
3. Todd & Sanford, Clinical Diagnosis by Laboratory Method
4. Ramanik Sood, Laboratory Technology Methods and Interpretation
5. Anand Narayan and Panikar, Textbook ofMicrobiology
6. Baweja, Medical Microbiology
7. Arora, Medical Lab Technology
8. Krishna Das, Textbook of Medicine
9. Kathale, Essentials of clinical medicine
10. Gopalan, Handbook of Orthopaedics
11. Shenoy, Essential of Orthopaedics
12. K.Perks ,Textbook of Preventive Social Medicine 12.Sunder Lal ,Adarsh, Pandey
13. Jacob Anthikad textbook of psychology andsociology.
14. Harsh mohan textbook of pathology.

REFERENCES BOOK:

1. DC Dutta's textbook of obstetrics, Hiralalal konar 6th edition , Jaypeepublication.
2. Annamma Jacob , midwifery & gynaecology nursing , Jaypeepublication.
3. Farsi & Lewis's textbook of pathology

WEB LINKS:

1. www.slideshare.com
2. www.wikipedia.com
3. YouTube/prepmedic

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

COURSE CODE: BMRIT-306

COURSE NAME: PRACTICAL (MODERN IMAGING TECHNIQUES AND RECENT TRENDS IN IMAGING)

COURSE CREDIT: 04

TOTAL CONTACT HOURS: 100

Practical involving not less than 10 numbers must be prescribed to the students. The title and nature of practical may be framed by the respective institution conducting the course.

COURSE OBJECTIVES:

Explore significant technology innovations that will help improve diagnosis while keeping dose as low as possible. They are:

- Faster acquisition enables improved image quality
- Gains in optimal dose efficiency
- 2D image capture evolving to 3D
- AI as a supplemental lens for medical image analysis

COURSE DESCRIPTION:

A large variety of imaging techniques is an integral part of modern medicine. Introducing radiological imaging techniques into the dissection course serves as a basis for improved learning of anatomy and multidisciplinary learning in pre-clinical medical education.

COURSE CONTENTS:

- **MAMMOGRAPHY:**
  - Clinical demonstration of special views of mammography
  - Quality control and quality check of mammography tube
- **ULTRASONOGRAPHY/ DOPPLER STUDIES:**
  - Clinical demonstration and preparation needed for ultrasound procedure
  - Clinical demonstration of Doppler study
- **CT Scan:**
  - Clinical demonstration and preparation needed for CT protocols
  - Quality control and quality check for CT gantry
- **MRI scan:**
  - Clinical demonstration and preparation needed for MRI protocols
  - Quality control and quality check for MRI machine
- **ANGIOGRAPHY STUDIES:**
  - Clinical demonstration and preparation needed for angiographic procedures

COURSE LEARNING OUTCOMES:

- **CLO1:** Ability to properly perform a mammogram

- **CLO2:** Recognize the risks of mammography
- **CLO3:** Understand ultrasound principles and explain the basic physical properties of ultrasound

- **CLO4:** Describe various types of ultrasound-guided diagnostic and therapeutic procedures.
- **CLO5:** Recognize protocols needed for Computed Tomography examination
- **CLO6:**Prepare and positioning for Computed Tomography examination
- **CLO7:** Recognize protocols needed for Magnetic Resonance Imaging examination.
- **CLO8:** Prepare and positioning for Magnetic Resonance Imaging examination.

TEXT BOOKS :

1. .Stuwart C Bushong MRI Physics and Biological Principle
2. Catherine Westbrook & Caralyn Kaut MRI in Practice
3. Christensen, Curry & Dowdey : An Introduction of Physics to Diagnostic Radiography
4. Seeram CT, Euclid Seeram
5. Spiral CT protocols- a practical approach – Jaypee publications

REFERENCE BOOKS:

1. Frederick W Kremkau Diagnostic Ultrasound Principles and Instruments
2. Roger C. Sounders: Clinical Sonography : A Practical Guide (Little Brown & Company)
3. Palmer : Manual of Diagnostic Ultrasound (WHO)
4. James A Sorenson, Simon R Cherry, Michael E Phelps Physics in Nuclear Medicine:,
5. Gopal B Saha Fundamentals of Nuclear Pharmacy
6. Catherine Westbrook Protocols in MRI
7. Bradley Physics of MRI
8. Spiral CT protocols- a practical approach – Jaypee publications
9. sTomography and Magnetic Resonance Imaging of the Whole Body (Vol.1 &II) (Saunders).

WEB LINKS:

1. http://www.wikiradiography.net/page/Main_Page
2. https://radiopaedia.org/
3. https://quizlet.com/408928314/radiology-flash-cards/
4. https://www.radiologyeducation.com/

Assessment method (Continue Internal Assessment=25 Marks , final Examination=75 Marks)

S.no.	Internal Assessment	Marks
1.	Attendance	5
2.	Extracurricular Activities	5
3.	Assignment/quiz/Test	5
4.	Internal Examination	10

PRACTICAL

Skills based outcomes and monitor able indicators for Medical Radiology and Imaging Technologist

Competency statements

1. Should be able to undertake Mammography, CT scan and MRIprocedures independently.
2. Assist in specialised radiological procedures.
3. Able to do the image processing.
4. Should be able to handle all radiological and imaging equipment independently.
5. Should ensure radiation protection and quality assurance
6. Undertake care and maintenance of all radiological and imaging equipment
7. Able to evaluate images for technical quality
8. Able to identify and manage emergency situations.
9. Able to receive and document verbal, written and electronic ordersin thepatient's medical record.
10. Implements health and safety procedures
11. Demonstrates ability to interpret, apply and disseminate information as a member of the medical imaging team
12. Ensures radiation protection legislation is adhered to
13. Demonstratesknowledgeandskillstocarryoutthedaily/weekly Quality Control(QC) checks
14. Participates in research activities

S. no.	Learning Outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
1	Be able to interpret and evaluate a prescription	Identify the area for treatment.	Determining x-ray, CT scan or MRI scan needs of patient	200
		Quantify the practical problems associated with machine and accessory equipment limitations	Understand and interpret instructions and requirements documented by the physician in the patient's prescription	
2	Operate and oversee operation of radiologic equipment	Selecting and performing basic views (projections) and conventional contrast studies using appropriate radiographic parameters and equipment	Reliably perform all non-contrast plain Radiography, conventional contrast studiesandnon-contrastplain radiography in special situations	200
		Carrying out routine proceduresfor troubleshooting and maintenance of imaging and processing systems	Control and manipulate parameters associated with exposure and processing to produce a required image of desirable quality	

S. no.	Learning Outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
			Apply quality control procedures for all radiologic equipment	
3	Be able to transfer all relevant information and complete accurate documentation	Recognizetheimportanceofaccurate transfer of information to allow for accurate treatment set-up according to the treatment plan and prescription	Construct the most appropriate device for the individual patient within the context of the protocol	100
		Know what should be included	Apply the necessary precautions in production	
		Know to whom or where the documentation and information should be sent	Implement correct QC, storage and handling procedures for shielding devices	
		Beawareofthelegalissuesrelatingto documentation		
4	Be able to prepare the diagnostic machinery	Know the shielding devices/methods available	Construct the most appropriate device for the individual patient within the context of the protocol	100
		Know how to use these devices	Apply the necessary precautions in production	
		Recognize the associated health and safety issues	Implement correct QC, storage and handling procedures for immobilization devices	
5	Be able to carry out the daily organization of the treatment Unit	Recognizetheimportance ofteam interactions	Participate in the organization of the daily work schedule to maximize efficiency	50
		Explaintheprinciplesofeffective communication	Inform the patient about the procedure	
		Review the individual patient requirements		
	Be able to accurately and	Able to interpret the set-up information	Interpret thediagnosticplan and set-up the patient accordingly	

6	consistently set-up and produce a good quality radiological image	Apply knowledge of radiographic imaging to the production of radiographs and the assessment of image quality	Carrying out quality control tests on images obtained	200

S. no.	Learning Outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
7	Be able to prepare and position the patient for the procedure	Be familiar with the treatment plan	Explain the anatomic and physiological basis of the procedure to be undertaken	200
		Identify preparatory procedures	Identify and explain the possiblesideeffectstoeach patient	
			Check all preparatory procedures have been completed	
		Befamiliarwiththediagnosticplans for all patients on the treatment unit	Identify the patient in accordance with recognized procedures and consistent with the department protocol	
		Recognizethesignsandsymptoms associated with treatment in different sites	Analyze the information and integrate to define the optimal patient position	
		Discuss the importance of patientidentification andhowit should be carried out	Interpret the diagnostic plan and use the equipment accordingly	
8	Be able to complete accurate treatment documentatio n	Recognize the importance of accurate documentation	Complete the treatment documentation accurately	50
		Know what should be included	Ensure all legal requirements have been met	
		Beawareofthelegalissuesrelatingto treatment documentation		
		List support groups that might benefit patients		
9	Advise patient on appropriate nutrition, sexual function, rest, skin care, nausea and other symptoms	Explain the impact of nutritional statusonpatient tolerance of treatment	Assess the patient's nutritional status	50
10	Monitor and assure quality	Monitor treatment process/outcomes	Identify needs and expectations ofpatient/health care professionals	50
		Identify problems in treatment process/outcomes	Solve treatment process/outcome problems	

		Knowwhat patient care is relevant for the procedure	Evaluate potential solutions thoroughly	

S. no.	Learning Outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
11	Be able to carry out the necessary data transfer checks	Define and explain the data that must be transferred	Check and verify all parameters	50
			Confirm approval and signatures	
12	Be able to process radiographic images	Apply knowledge of radiographic imaging to the production of radiographs and the assessment of image quality	Perform X-ray film / image processing techniques (including dark room techniques)	50
		Control and manipulate parameters associated with exposure and processing to produce a required image of desirable quality	Acquire an appropriate image as per instructions	
13	Recognise contrast induced adverse reactions	Promptlyrecognizeandassessthe reactions	Know the correct medications and other treatment options	50
		Taking precautionary measures to avoid the reactions	Recognise the contraindications of allergic reactions	
14	Be able to carry out corrective actions as per instructions	Recognize the critical structures on the verification images	Make corrections in accordancewiththeprotocol	50
		Identify the correct imaging protocol	Record any corrections	
15	Be able to implement health and safety Procedures	Explainthehealthandsafetyissues for patients and staff	Assess the safety features to ensure they are in place and adhered to	50
16	Be able to interpret, apply and disseminate information as a member of the medical imaging team	Define and explain the data that must be disseminated	Identify the appropriate personneltowhomspecific information should be disseminated	50
			Communicate the correct, relevant and appropriate information	
17	Be able to demonstrat e	Explain the legal and ethical guidelines related to the profession	Practice in accordance with legislation regulations and ethical guidelines	100
		Be aware of your own competency levels	Promote collaborative practice	

	professiona l behavior	Identifytheelementsthatreflect professional appearance and manner		

S. no.	Learning outcomes	Knowledge/comprehension	Applications / synthesis /evaluation	Hours
18	Be able to demonstrate a sensitive and caring attitude to patients	Explain the components of good communication	Self-awareness of their own personality traits	50
		Describe the main personality types	Analyze how the differences in personality influence approach	
		Be aware of the patient' gender, age, cultural background, educational level and social situation		
19	Be able to ensure radiation protection legislation is adhered to	Describe the radiation hazards and how they are managed	Routinely inspectthearea to ensure that radiation protection measures arein place and functional	50
		Explain the legislation relating to radiation protection		
20	Be able to carry out the daily/weekly Quality Control (QC) checks	Explain Quality Management System (QMS), Quality Assurance (QA) and Quality Control (QC	Perform the daily/weekly/monthly QC procedures	50
21	Be able to review the literature	Define searchtermsforspecific treatment sites	Identify the appropriate literature in the area of interest	30
22	Be able to suggest implementation of research findings	Identify relevant sources of Research	Evaluate research with respect to current departmental practice	10
23	Be able to suggest/ initiate topics for medical imaging research	Identifyliteraturetosupportresearch proposal	Reviewtheliteratureinthe area	10
		Define the necessary steps in preparing and carrying out research	Formulate a research question	

Job Description for all levels (Proposed)

Level 4

1. The post of JMRIT with DMRIT qualification shall be available in PHC, Civil hospital only.
2. Should be able to perform radiographic procedures and assist in other radiological procedures apart from care and maintenance of equipments, Interpret the requisition form,
3. These tasks will be performed under the supervision of a qualified Medical Radiology and Imaging Technologist (MRIT) or medical specialists.
4. To enter report on Radiology Info. System (RIS), answering telephone requests from medical and nursing staff, providing results from the Radiology IT system and relaying routine information where appropriate.
5. Maintaining stock levels of some in-use consumables which will require a lifting, carrying and issuing from the store.
6. To undertake training and competency assessment in relevant tasks
7. Assist in the training of new staff in the Reception area and acclimatize them in their place of posting.
8. To refer to a senior member of staff when a matter is beyond their level of competence
9. To participate in audit
10. To participate in annual staff performance reviews
11. Must enjoy interacting with others and be team players. They must also be polite and be able to calm and placate upset individuals. They should be able to remain standing for long periods of time and must have strength to transfer and position patients for scans. They should have the capacity to visualize two and three-dimensional spatial relationships.

Level 5

In addition to level 4 must be able to perform:

1. Mammography, CT scan and MRI independently
2. Assist in specializedradiological procedures.
3. Image processing, Computer skills
4. Independent handling of all radiological and imaging equipment
5. Ensure radiation protection and quality assurance
6. Care and maintenance of all radiological and imaging equipment
7. Evaluating images for technicalquality
8. Ensuring proper identification,
9. Identifying and managing emergencysituations.
10. Receiving and documenting verbal, written and electronic orders in the patient's medical record.

Level 6

In addition to level 5

1. Verifying informed consent, assuming responsibility for patient needs during procedures, preparing patients for procedures.
2. Applying principles of ALARA to minimize exposure to patient, self and others. Starting and maintaining intravenous access as prescribed, Identifying, preparing and/or administering medications as prescribed
3. Evaluating images for technical quality, ensuring proper identification is recorded.
4. Identifying and managing emergency situations.
5. Providing education. Educating and monitoring students and other health care providers.
6. Performing ongoing quality assuranceactivities.

7. Performing diagnostic radiographic and non-interpretive fluoroscopic procedures.
8. Orientation and teaching students and new employees.

9. Research and development of new techniques and procedures as assigned.
10. Follows established safety practices including biohazards, exposure control plan
11. Promotes effective working relationships and works effectively as part of a department / unit / team inter and intra departmentally to facilitate the department/unit's ability to meet its goals and objectives.
12. Attends all in service education required as per hospital policy.
13. Demonstrates respect and regard for the dignity of all patients, families, visitors and fellow employees to ensure a professional, responsible and courteous environment.
14. To supervise and allocate responsibilities to level 4 and level 5.

Level 7

In addition to level 6 responsibilities, level 7 will perform as under

1. Employ professional judgment to adapt imaging procedures to improve diagnostic quality
2. Determines the need for and selects supplies, accessory equipment, shielding and immobilization devices.
3. Determines the course of action for an emergency or problem situation. Determines that all procedural requirements are in place to achieve a quality diagnostic.
4. Reviews lab reports prior to administering medication and beginning specialized radiologic procedures.
5. Determines type and dose of contrast agent to be administered, based on the patient's age, weight and medical/physical status.
6. Verifies that exposure indicator data for digital radiographic systems has not been altered or modified and is included in the Digital Imaging Communications in Medicine (DICOM) header and on images printed
7. Analyzes digital images to determine utilization of appropriate imaging parameters.
8. To ensure implementation of internal quality control and quality assurance programmes.
9. To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.
10. To assist the ASSOCIATE PROFESSORS / PROFESSORS / HEADS OF THE DEPARTMENT in Complete management of a Full-time Unit in such a way that there is no "Medical Negligence" in patient care service as a result of breach / violation / infringement of any Act / Code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
11. It is binding to attend to Emergency calls as and when required even beyond duty hours.
12. To provide the Radiology records as and when required by the Administration.
13. To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
14. To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.

Level 8

In addition to supervisory responsibilities of at level 7, will perform as under:

1. Procurement and Purchase of Equipment, prescribing Technical Specifications ,
2. Supervision of subordinates with specialized role in advanced Radiological & Imaging Modalities.
3. Incorporating new design and ideas,
4. Conflict management,
5. Handling of Medical Legal cases and coordinate with the hospital administration
6. Participation in CPD, National Conferences / International Conference and Publications etc.
7. Ensures orientation and training of students/ new recruits.
8. Participation in Research and development.
9. To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.

10. In Complete management of a Full-time Unit in such a way that there is no "Negligence" in patient care service as a result of breach / violation / infringement of any Act / Code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
11. It is binding to attend to Emergency calls as and when required even beyond duty hours.
12. To provide the radiology records as and when required by the Administration.
13. To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
14. To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.
15. Supervise the Work of Assistant Professors, Students
16. To assist the head of the department perform all such duties to ensure continued enhancement in the quality of performance of teaching as well as non-teaching staff of the Department.
17. Planning, proposing, processing the proposals, procuring & to supervise maintenance of equipment & instruments.
18. To work on various Hospital/Institute Committees like Local Tender Committee, Radiation safety committee Hospital Infection Control Committee, Grievance Committee, Sexual Harassment Committee etc.
19. To exercise authority in Administrative control of the Department :
    a) To maintain 'Personal Files' of all teaching as well as non-teaching staff of the Dept.
    b) To recommend or refuse any kind of Leave (Casual Leave/Special Leave/Earned Leave to any staff member of the Dept. as per rules in that regard.
20. To maintain Muster Roll of teaching as well as non-teaching staff of the Department; to conduct periodic audit of the timings of arrival / departure of the staff; to mark any Sanctioned Leave or Absence Without Leave (AWL) – which is Unauthorised Absence – of the employee as the case may be and to report to the Competent Leave-sanctioning Authority i.e. Dean, any irregularity in attendance or punctuality in respect of a defaultingemployee.
21. To serve a memorandum to the undisciplined employee giving him / her a chance to improve.
22. To write annual 'Confidential Report' (Performance Appraisal / Work Audit) of the employees working in the Dept. as well as your own "Self-Appraisal / Assessment" as per the guiding principles in that regard; to inform the erring member about the adverse remarks, if any, immediately through a memorandum.
23. To organise / conduct / encourage "Core Competency Development Programmes" for Faculty Development; also training programmes for other non-teaching staff of the Dept.
24. Whenever ordered by the higher authorities , to conduct "Preliminary Inquiry" into a particular untoward incidence or in respect of a particular employee and to submit report in time as per the rules in that regard.

Level 9

1. In addition to level 8 responsibilities, level 9 (MRIT CTO) will perform as under:
2. Sorting of anomalies and Discrepancies if any in Breakdown of Equipment and Maintenance Contracts.
3. Ensures overall performance of Radiology and Imaging as per Good Radiological Practice.
4. Attend and organize various in-service Workshops and up gradation required from time to time.
5. To direct and allocate responsibilities to staffthrough level 8.
6. To undertake any task entrusted by AHP Board like working on "Inspection Committee" for Laboratories in other Institutes/Hospitals with the permission of the Principal/Dean /Director or any other competent authority.
7. Participation and to ensure Research and development i.e. Research Projects & their presentation at various National/ international Conferences and its publication and to participate in various "Research committees".
8. To undertake any other task entrusted by University/ Institute like working on "Local Inquiry Committee", "Ethics Committee", and "Staff Welfare-related Committees" and to enforce discipline among departmental staff.
9. To perform all such duties as at level 8 to ensure continued improvement in the quality of Medical Education & Research.

10. Teaching & training Undergraduate students including Interns/ Postgraduate students so as to achieve the Educational Objectives i.e. to develop their knowledge, skills & attitude.
11. To do periodic evaluation / assessment through examination/to conduct examination/to maintain attendance & academic (including Internship) record of individual Undergraduate & Postgraduate student for the minimum period as per Govt. rules.
12. To work on the College Council , Undergraduate & Postgraduate Academic Committees , Medical Education, Library Committee , toorganize/ participate inteaching programmes like Lectures / Tutorials/Group Discussions Demonstrations/ Practicals and other academic activities like Seminars / Symposia / Panel Discussions / Workshops / Guest Lectures / Conferences/ Continuing Medical Education Programmesetc. andtomaintaina Departmental Library for students as well as teaching staff.
13. To participate in conduct academic Examinations of other State Health Universities / National Board as an External Examiner with the permission / under the direction of the Dean availing the facility of Special leave.
14. To undertake any task entrusted by AHP Board like working on "Inspection Committee" for inspection of Colleges in other States with the permission of the Principal/Dean/Director.
15. To undertake any other task entrusted by University/ Institute like working on "Local Inquiry Committee" for inspection of Colleges.
16. To conduct Research Projects – clinical research, and contribute to medical knowledge by scientific paper publications in indexed journals & their presentation at various local / state / international Conferences.
17. To work on various Research-related Committees like Ethics Committee , Research Society of the institute
18. To work on various Students' Welfare-related Committees like "Anti-Ragging Committee" and to enforce discipline among medical students.
19. To perform all such duties to ensure continued enhancement in the quality of patient care through efficient Health care delivery system.
20. In Complete management of a Full-time Unit in such a way that there is no "Negligence" in patient care service as a result of breach / violation / infringement of any Act / Code of professional ethics which brings disgrace to the reputation of the Institute / Hospital.
21. It is binding to attend to Emergency calls as and when required even beyond duty hours.
22. To provide the radiology records as and when required by the Administration.
23. To suggest / recommend use of certain managerial tools / techniques / skills to upgrade the quality of patient care services.
24. To ensure implementation of quality control and quality assurance procedures as per requirements including calibration of instrument.
25. Supervise the Work of Assistant , Associate Professors, Students
26. To assist the head of the department perform all such duties to ensure continued enhancement in the quality of performance of teaching as well as non-teaching staff of the Department.
27. Planning, proposing, processing the proposals, procuring & to supervise maintenance of equipment & instruments.
28. To work on various Hospital/Institute Committees like Local Tender Committee, Hospital Infection Control Committee, Grievance Committee, Sexual Harassment Committee etc.
29. To exercise authority in Administrative control of the Department :
30. To maintain 'Personal Files' of all teaching as well as non-teaching staff of the Dept.
31. To recommend or refuse any kind of Leave (Casual Leave/Special Leave/Earned Leave to any staff member of the Dept. as per rules in that regard.
32. To maintain Muster Roll of teaching as well as non-teaching staff of the Department; to conduct periodic audit of the timings of arrival / departure of the staff; to mark any Sanctioned Leave or Absence Without Leave (AWL) – which is Unauthorized Absence – of the employee as the case may be and to report to the Competent Leave-sanctioning Authority i.e. Dean, any irregularity in attendance or punctuality in respect of a defaultingemployee.
33. To serve a memorandum to the undisciplined employee giving him / her a chance to improve.
34. To write annual 'Confidential Report' (Performance Appraisal /Work Audit) of the employees working in the Dept. as well as your own "Self-Appraisal / Assessment" as per the guiding principles in that regard; to inform the erring member about the adverse remarks, if any, immediately through a memorandum.

35. To organize / conduct / encourage "Core Competency Development Programmes" for Faculty Development; also training programmes for other non-teaching staff of the Dept.
36. Whenever ordered by the higher authorities , to conduct "Preliminary Inquiry" into a particular untoward incidence or in respect of a particular employee and to submit report in time as per the rules in that regard.

Level 10

1. Overall operation and administration
   Take responsibility for overall operation and administration of radiology unit, including employment of personnel competent to perform test procedures, record and report test results, promptly, accurately and proficiently.
2. Definition/retention of others' duties
   If desired, delegate / Specify / reapportion, in writing responsibilities, authorities and duties of each consultant and person engaged in any phase of testing.
3. Licensure and accreditation
   Assure compliance with applicable regulations.
4. Personnel Management & Authorization
   Identify which examinations and procedures each individual is authorized to perform.
5. Training & Competency Assessment
   Ensure all personnel have appropriate education, experience and training for type & complexity of services, in order to perform testing reliably and report accurate results.
6. Supervision
   Ensure on-site supervision of high complexity testing. Identify supervision required for specimen processing, test performance or result reporting. Identify supervisory or director review required prior to reporting patient test results.
7. Adequate and Appropriate Staffing
   Employ sufficient/appropriate personnel with education, training, and experience to provide consultation, supervise and perform tests, and report test results.
8. Monitoring Competency
   Ensure policies and procedures for monitoring individuals to assure competency and to assure identification of needs for remedial training or continuing education.
9. Facilities & Safety
   Ensure physical and environmental conditions are appropriate and provide a safe environment in which employees are protected from physical, chemical, and biological hazards.
10. Quality Management System
    Ensure that all the services of the imaging department are as per Quality Management system which includes: Quality control, Quality assurance, Quality improvement, proficiency testing etc. etc.
11. Interaction withothers
    Relate and function effectively with accrediting regulatory agencies, administrative officials, medical community, medical device industry, and patient population.
12. Strategic Planning
    Perform planning for setting goals and developing and allocating resources appropriate to Institute/hospital/Diagnostic laboratory environment i.e. Operational Management + Financial Management +
13. Administration and Management
    Provide effective and efficient administration, including budget planning and control with responsible financial management. Define, implement, and monitor standards of performance in cost-effectiveness of lab services.
14. Research and Development
    Plan and direct research and development appropriate to the facility.
15. Education Ensure proper planning and implementation of teaching system for Medical Radiology and imaging Technology students/staff, and participate in educational programs of the institution

NOIDA INTERNATIONAL UNIVERSITY

gg

Curriculum for Bachelor of Science

RENALDIALYSISTECHNOLOGY

`

w.e.f. 2021-2022

Who is an Allied and Healthcare Professional?

TheMinistryofHealthandFamilyWelfare, accepted inattentively thedefinitionofanalliedand healthcareprofessionalbasedon the fore -mentioned report, thoughthesamehasevolvedafter multipleconsultationsandtheircommendeddefinitionisnowasfollows-

> 'Allied and healthcare professionals (AHPs) include individuals involved with the delivery of health or healthcare related
> services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health

Sincethepastfewyears, manyprofessionalgroupshavebeeninteractingandseekingguidanceon all those who would qualify under the purview of "allied and healthcare professionals". In the healthcaresystem, statutory bodies existforclinicians, nurses,pharmacistsanddentalpractitioners; butaregulatorystructureforaround50 professions is absentinIndia.Currently, the Government is considering these professions under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly newtechnologiesandnewclinical avenues are expandingglobally, creating newer cadres ofsuch professionals.

Scopeandneedforalliedandhealthcareprofessionalsintheindianheal thcar e system

Thequalityofmedicalcarehasimproved term tenuously inthelastfewdecadesduetotheadvancesintechnology,thuscreatingfreshchallengesinthefieldofhealt hcare.Itisnowwidely recognized thathealthservicedeliveryisateameffortinvolvingbothcliniciansandnon-clinicians,andisnot the sole duty of physicians and nurses.Professionals that can competently handle sophisticated machinery and advanced protocols are now in high demand. Infect,diagnosisisnowsodependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacitytofunction asinine gratedteam. For instance, intheUK, morethan84,000AHPs, witha range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and communitycare. Australia'shealthsystemismanagednotjustbytheir doctors and nurses, but also bythe90,000university-trained, autonomousAHPsvitaltothesystem.

AstheIndiangovernmentaimsforUniversalHealthCoverage, thelackofskilledhumanresourcemayprovetobethebigamendmentinitspathtoachieve targetedgoals. The benefits of having AHPs in the healthcare system are still unexplored in India.

AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help theme turntowell-being.Childrenwithcommunicationdifficulties, theelderly,cancerpatients, patientswithlongtermconditionssuchasdiabetespeoplewithvisionproblemsandamputees; the listofpeopleandpotentialpatientswhobenefitfromAHPs isindefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Acrossthe age span ofhumandevelopmentfromneonate tooldage;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings;and
- Withanunderstandingofthehealthcareissuesassociatedwithdiversesocio-economies and cultural norms within thesociety.

Credit hours vs. traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance. All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of UniversityCredits,theCreditAccumulationandTransferSystem(CATS)intheUKaswellasthe systemsoperatingintheUS,Japan,etc.areexamplesofthese.Globally,aneednowexistsforthe useofafullyconvertiblecredit-basedsystemthatcanbeacceptedatotheruniversities.Ithasnow become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmers', 'joint degrees' and 'study abroad' programmers.

Inordertoensureglobalacceptabilityofthegraduates, thecurrentcurriculum structure isdivided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various othercountries.

***Credit and grade system will be as per university norms**

Background of the profession

Statement of Philosophy– Why this profession holds so much importance?

Historically, dialysis treatment has been viewed as a life-sustaining therapy that aims to extend survivalandimprovethequalityoflife. However,therigorsofdialysistreatment,psychosocialand vocation maladjustments, loss of independence and functional status, and metabolic derangements as aresultofkidneydiseasearenowsignificantcontributorstothedecreaseinhealth- relatedqualityof life(HRQOL).

Patients with limited health literacy – the ability to obtain, process, and understand health information in order to make appropriate health decisions – may not fully understand written medical information, may not be able to communicate effectively with healthcare providers. Health literacy is particularly importantforkidneypatientsundergoingdialysis.

About Dialysis Therapy Technology

Dialysis is intended to keep the body running as normal as possible while the kidneys are under repairorwhileapersonwaitsforakidneytransplant. Withoutworkingkidneysordialysis,saltsand other waste products would accumulate in the blood and poison the person. Typicalhemodialysis treatments (using an artificial kidney) last about four hours and are needed about three times a week.

Scope of practice

Dialysis Assistants work with the Dialysis Therapy Technologist to plan implementation of the dialysis prescription, perform hemodialysis, manage various intra-dialytic complications and document patient data.

TheDialysisTherapyTechnologistworkswiththeHeadofDepartment/SeniorDialysisTherapy Technologisttosupervisethehemodialysisassistantsandauxiliarypersonnelmanageintra-dialytic complications, documents and maintains dialysis patientrecords.

Nomenclature based on career progression for Dialysis Therapy Technologist (Proposed)

Levels	Nomenclature in various sectors			Qualification and experience
	Clinical	Academic	Industry/ Management	
Level 4	Dialysis Assistant (Diploma)			Diploma with 0-4 years' experience post Diploma
Level 5	Dialysis Therapy Technologist	Demonstrator	Dialysis Technologist	BSc. DTT with 0-4 years' experience post BSc. DTT
Level 6	Senior Dialysis Therapy Technologist	Clinical Instructor (Degree) /Lecturer (Post Graduate only)	Senior Dialysis Technologist	*BSc. DTT with 4 years' experience post BSc. DTT *MSc. DTT with 0-1 years post MSc. DTT
Level 7	Chief Dialysis Therapy Technologist	Senior Clinical Instructor (Degree) or Assistant Professor (Post Graduate only)	Chief Dialysis Technologist	*BSc. DTT with 8 years' experience post BSc. DTT *MSc.DTTwith4yearspost MSc.DTT *PhD with 0-1 years post PhD
Level 8	Deputy Manager for Dialysis Therapy Unit	Associate Professor (Post Graduate only)	Deputy Manager for Dialysis Technology	*BSc. DTTwith12years' experience post BSc. *MSc.DTTwith8yearspost MSc.DTT *PhD with 4 years post PhD
Level 9	Additional Director for Dialysis Therapy Unit	Professor (Post Graduate only)	Additional Director for Dialysis Technology	*BSc. DTT with 16 years' experience post BSc. DTT *MSc.DTTwith12yearspost MSc.DTT *PhD with 8 years post PhD
Level 10	Directorfor Dialysis Therapy Unit(HOD)	Dean / Principal) (Post Graduate only)	Directorfor Dialysis Technology	*BSc. DTT with 20 years' experience post BSc. DTT *MSc. DTT with 16 years post

Definition of Renal DialysisTechnologist

"Renal Dialysis Technologists" means a person having

Graduate degree in Dialysis therapy technology obtained after the completion of a full-time course of
3.5 years(baccalaureate) which includes supervised clinical training from any university recognized by the university grants commissionestablishedundertheuniversitygrantscommissionact1956; or

Post graduate degree in Dialysis therapy technology after completion of a full-time course of two years.

Dialysis Therapy Technologists were also referred previously as "Dialysis Technologist", or

Education

Whendevelopinganyeducationalprogramme, itisnecessarythatitshouldbeplannedsuchthatitis outcome-based, and it meets not just the local and national manpower requirements, but also provides personal satisfaction and career potential for professionals with supporting pathwaysfor their development. One of the major changes is the paradigm shift of the focus from traditional theoretical knowledge to one on skills- and competency-based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in ordertobeabletoperformaprofessionalactadequatelyinagivensituation.

Thus, thefollowingcurriculumhasbeen design accordingly prescriptivefashion, withanaim to standardize the content across thenation.

Entry requirements

It is recommended that the students entering this programme should have completed the recognized secondary school studies as the qualification stipulated for the Dialysis Therapy Technology course (diploma/degree), i.e.,**10+2 with science or equivalent examination with science subject** from a recognized university or board which would provide the foundation for and prepare them for higher education studies.

Course duration

Itisrecommendedthatanyprogrammedevelopedfromthiscurriculumshouldhave minimumof thefollowingdurationtoqualifyAs an entry levelcoursein Renal DialysisTechnology-

- **2.5-yearprogramme(including 6-monthsofclinicaltraining/internship)- Diploma level**
- **3.5-yearprogramme(including 6-months of clinical training/internship)- Bachelor's degree level**

Initially, theacademiccontentshouldemphasizeonestablishingastrin scientific basis andinthelatteryear, itshouldfocusonthe application 0ftheorytoclinical/reflective practice. Three-month degree programme is to enable the development of the Dialysis Therapy Technologist as a key member of the multidisciplinary team and to enable him/her to prepare in advance, plan and execute the dialysis treatment, and assurequality.

With the change in the disease dynamics and multifold increase in the cases needing dialysis treatment, it is imperative that a well-structured programme of postgraduate education is also encouraged so as to enhance research capacity within the country to widen the scope of clinical practice for the profession. Thus, **a master's degree programme is recommended with minimum of two years of education in specialized field of dialysis therapy technology**. The post graduate students can contribute significantly in research and academics.

PhDalsoplayasignificant role intheacademicsystemofdialysistherapytechnology, however thecurriculums to indicate any prescriptiveguidelinesforthatlevelapartfrom mapping ton the career and qualificationmap.

Teaching faculty and infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.
Teaching areas should facilitate different teaching methods. While students may share didactic lectures with other disciplines in large lecture theatres, smaller teaching areas should also be providedfortutorialandproblem/case-basedlearningapproaches.Inallvenuesthataccommodate students, health and safety standards must be adhered to. It is recommended that a faculty and student ratio of 1:10 be followed.

Job availability

As per the ILO documentation, employers worldwide are not looking for job applicants who can only apply technical skills in the workplace, but for those who can also communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.

Graduates can expect to be employed in hospitals and private practices as Dialysis Therapy Technologist.Acareerinresearch, followingthecompletionofahigher degree such asaPhD,isan option chosen by some graduates. Graduates are eligible for employment overseas where their qualifications, training and experience are highly regarded.

Graduates have good employment prospects, and will enter a field in which the demand for professionals has increased in recent years. Increase in the number of patients with renal failure, stage 5 chronic kidney disease, and end-stage renal ensures a large demand for future graduates.

Bachelor of Science in Renal Dialysis Technology (BSc.RDT)

Introduction:

Learning Objectives: At the completion of this course, the student should be –

1. Understandandapplytheprinciplesofdialysisandskillsnecessaryto give safe and effective care to the individual undergoing hemodialysistreatments
2. Demonstrate the use of hemodialysis equipment with an understanding of the process of operating dialysis equipment and alternate dialysisprocedures
3. Functionasadialysisprofessionalunderthesupervisionofthephysician or nephrologists in a dialysis facilitythatprovidesdialysistreatmenttotheindividualsdiagnosedwithacute or chronic kidneydisease.
4. Assess the patient for any complications with an understanding of the problem and recognizetheneedtoreportthecomplicationstothephysicianornephrologists.
5. Respondeffectivelytothephysicalandemotionalneedsoft he patient undergoingdialysis treatment.
6. Develop the ability to understand operation, routine maintenance, identification of malfunction in equipment, troubleshooting and minor repair in equipment used indialysis unitsuchhemodialysismachine, watertreatmentplant, dialyzers processingmachine, etc.

Expectation from the future graduate in the providing patient care

1. The primary goal of the Degree in Renal Dialysis Therapy Technology program is to prepare accomplished professionals in Renal Dialysis Therapy Technology with a specific emphasis on clinical skills and technicalknowledge.
2. Traineesacquiretheknowledgeandproceduralskillsnecessarytodeliverahighstandardof caretothepatientswithchronickidneydiseaserequiringrenalreplacementtherapy.
3. Theywillalsoreceivetrainingtoconductresearchinthe fieldofdialysis.
4. This course involves all aspects of care for patients undergoing chronic hemodialysis and continuous ambulatory peritoneal dialysis (CAPD).
5. Overallgoalofthistrainingistofosterthetrainee'sdevelopmentintoan independent care provider in the field ofdialysis.
6. The program intends for its graduates to contribute to a new generationofacademicdialysisprofessionalequippedto address the challengingproblemsinrenalreplacementtherapy.

Eligibility for admission:

Selection procedure:

1. Candidateshouldhavepassed10+2withscienceor have done Diploma in RenalDialysisTechnology
2. Minimum percentage of marks: 50% aggregate inPCM/B
3. Reservation for SC/ST/OBC categories: As per Govt. of Indiarules.

Provision of Lateral Entry:

There should be a provision for lateral entry for the students who have successfully completed Diploma in Dialysis Therapy Technology and would like to pursue B.Sc. Renal Dialysis Technology/BSc.RDT.Insuchacase, theycandirectlyenterin to the secondyearor3rdsemester.

Duration of the course
Duration of the course: 4 years. (900 hours of Theory & 2340 hours of Practical Classes) and 1440 hours (minimum) of internship

Total hours - 4680

Medium of instruction:
Englishshallbethemediumofinstructionforallthesubjectsofstudy andforexaminationofthe course.

Attendance:
A candidate has to secure minimum 80% attendance in overall with at least-

1. 75% attendance intheoretical
2. 80%inSkillstraining(practical)forqualifyingtoappearforthefinalexamination.

No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition, etc.

Assessment:
Assessmentsshouldbecompletedbytheacademicstaff, basedonthecompilationofthestudent's theoretical and clinical performance throughout the training programme. To achieve this, all assessment forms and feedback should be includedand evaluated.

Curriculum Outline

B.Sc. of Renal dialysis technology

I. Distribution of Teaching Hours in First Year Subjects (w.e.f 2021-2022)

Sl. No.	Course Titles	Hours			Credit	IA	UE
		T	P	Total			
RDT-101	Introduction to Healthcare Delivery System in India	60	0	60	2	25	75
RDT-102	Basic computers and information Science	10	40	50	2	25	75
RDT-103	Communication , soft skills, Professionalism and values	20	10	30	1	100	0
RDT-104	Medical Terminology and Record keeping (including anatomical terms)and Medical Law and Ethics	40	0	40	1	100	0
RDT-105	Introduction to Quality and Patient safety and Principals of Management	30	10	40	1	100	0
RDT-106	Research Methodology and Biostatistics	40	20	60	2	25	75
RDT-107	Community orientation and clinical visit (including related practical to course RDT101)	0	100	100	3	25	75
RDT-108	Human anatomy	40	80	120	4	25	75
RDT-109	Physiology	40	80	120	4	25	75
RDT-110	Applied anatomy & physiology related to Dialysis Therapy Technology	40	80	120	4	25	75
RDT-111	Biochemistry	30	50	80	2	25	75
	BSc.DTT Directed Clinical Education–part I (studentship)***	-	100	100			
	TOTAL	350	570	920			

Total Hours-1080
IA-Internal Assessment
UE- University Examination
*****Clinical Posting & Practical-Not Included in University Examination**
NOTE: -ONLY CODED RDT-110 COUMMNITY PRACTCAL WILL BE Included in University

Examination

II Distribution of Teaching Hours in Second Year Subjects (w.e.f 2021-2022)

Sl. No.	Course Titles	Hours			credit	IA	UE
		T	P	Total			
RDT-201	Pathology	50	80	130	4	25	75
RDT-202	Microbiology	50	80	130	4	25	75
RDT-203	Applied pathology & microbiology related to Dialysis Therapy Technology	50	80	130	4	25	75
RDT-204	General Pharmacology	30	30	60	2	25	75
RDT-205	Pharmacology related to dialysis technology	50	-	50	2	25	75
RDT-206	Concepts of renal disease, dialysis & nutrition	60	-	60	2	25	75
RDT-207	Applied Dialysis Therapy Technology – Part I	50	80	130	4	25	75
	BSc.DTT Directed Clinical Education – part II (studentship)***	-	390	390	-		
	TOTAL	340	740	1080			

Total Hours-1080
IA-Internal Assessment
UE- University Examination
*****Clinical Posting & Practical-Not Included in University Examination**
NOTE: -ONLY CODED RDT-110 COUMMNITY PRACTCAL WILL BE Included in University Examination

II. Distribution of Teaching Hours in Third Year Subjects (w.e.f 2021-2022)

Sl. No.	Course Titles	Hours			Credit	IA	UE
		T	P	T			
RDT-301	Applied Dialysis Therapy Technology – Part II	50	100	150	4	25	75
RDT-302	Applied Dialysis Therapy Technology – Part III	50	100	150	4	25	75
	BSc.DTT Directed Clinical Education – Part III (studentship)***	-	780	780			
	TOTAL	100	980	1080			

Total Hours-1080
IA-Internal Assessment
UE- University Examination
*****Clinical Posting & Practical-Not Included in University Examination**
NOTE: -ONLY CODED RDT-110 COUMMNITY PRACTCAL WILL BE Included in University Examination

III. Distribution of Internship Hours for six months (w.e.f 2021-2022)

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
	BSc.DTT Internship		720	720

INTERNSHIP–minimum720hours (calculated based on 8hours per day, if 90working days in a six month)

Comprehensive Viva Voce

I. A comprehensive viva voce shall be conducted at the end the fourth Semester in order to judge the extent to which the student has understood various topics and is judged for application of knowledge gained. This is also to see the student's level of articulation of what is learnt by him. The idea is to ensure

that the students assimilate what is being taught and see their relevance in the practical field and also the inter relationships of variousparameters.

II. The viva voce is of 100 marks and will be conducted by the external examiner appointed by theUniversity.

Attendance

The students are expected to attend all the classes and should not have less than 75 % attendance in theory as well as in practical classes, wherever held, to become eligible to appear for the university examination. Short fall in attendance can, however be condoned in deserving cases to the extent of 10% by the Director/Dean. If the short fall is more than 10% but not more than 15%, the Director/Dean may recommend deserving cases to the Vice Chancellor for condonation. The order of the Vice Chancellor in this regard shall be final.

Examination

The examination in each year shall be conducted intwoparts:

A. Internal assessment will be of 25 marksasunder: -

Assessment-1	Assignment/Test/Quiz	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

B. University Examination carrying75marks.

The marks obtained in the two parts of the examination together shall be aggregated for the purpose of determining the total marks obtained by a student in a particular paper/subject of study.

The student shall have to obtain minimum 50% marks in internal assessment to be eligible for appearing inUniversityExamination.

Paper setting & Evaluation

The work of setting the end semester examination papers and evaluation of scripts and conduct of the end semester practical examination shall be assigned to the course teachers as well as to External Experts ordinarily in the ratio of 50:50 for internal and external paper setting &evaluation respectively.

Results

The result shall be prepared at the end of each academic year of the course by aggregating themarks

Obtained in the theory and practical examinations in all the semesters of the course till date.

A candidate shall be declared as passed at the end of an academic year if he/she secures minimum 50% marks in each theory & practical paper separately (including project reports and comprehensive viva) and 50% in aggregate.

a) If a candidate fails in only one head/subject and having passed in all other head/subject of the given examination of the year than his/her deficiency of maximum five (05) marks may be fulfilled by grace marks as per university notificationno.

b) All those who are declared as passed at the end of an academic year shall be promoted to the next academicyear

c) If a student obtained 40% marks in at least 50% of the papers (ignoring fractions), he/she will be provisionally promoted to the next year with carryover papers and will have to appear & obtain pass marks in carryover papers along with the subsequent regular examinations for the relevantsemester.

d) A student not covered by clause (a) to (d) above shall have the following options to

complete his/hercourse-

(i) He/ she may take admission on payment of full annual course fee and repeat the entire year of study. He /She shall be treated as a regularstudent.

O
r

(ii) He /She may pay only University exam fee for the End Semester Examination and appear in the End Semester University exams directly. He /She shall not be allowed to attend classes and the Sessional marks obtained earlier shall beretained.

O
r

(iii) He /She may pay half of the annual course fee and attend classes. The sessional marks obtained by him/her earlier shall be retained. There will not be any requirement of minimum attendance for appearing in the Universityexamination

e) The examination for students reappearing in any papers shall be held along with the subsequent regular examinations for the relevantsemester

Thefinalgradinganddivisionofthestudentsshallbedeterminedasinclauseaboveonthe basis of the total marks obtained in the examinations after substituting the marks obtained in carryover papers. The degree awarded to the successful students shall indicate thegradingaswellasthedivisionalongwithanextract ofclauseandasanexplanation.
The entire course has to be completed within a maximum of six years from the date of original admission in thecourse.

Power to Modify

In the event of any emergent situation, if any deviation is considered necessary, the Vice Chancellor is authorized to modify the ordinance. Subject to subsequent ratification by the ExecutiveCouncil.

FIRST YEAR

Course code-RDT-101

Course Name-Introduction to Healthcare Delivery System in India
Course credit-02
Total Contact Hours- 60

COURSE OBJECTIVE:

The course provides the students abasic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world.

COURSE DESCRIPTION:

•Explore the health care delivery system in India atprimary, secondary and tertiary levels.

•Understand the various National Health programmed its targets and achievements.

•Learn about various system of medicine and its importance to health.

•Gain the knowledge regarding Health scenario of India.

•StudythesignificanceofDemography&VitalStatisticsandunderstandtheCensus&itsimpactonhealth.

•LearnthehistoryofEpidemiology,principlesanditsmethods**.**

COURSE CONTENT:

The course provides the students a basic insight intothe main features of Indian healthcaredelivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
    a. Healthcaredelivery systemin India at primary,secondaryandtertiarycare
    b. Community participation in healthcare delivery system
    c. Health system in developed countries.
    d. Private Sector
    e. National Health Mission
    f. National Health Policy
    g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Metaprogramme.
3. Introduction to AYUSH system of medicine
    a. Introduction to Ayurveda.
    b. Yoga and Naturopathy

c. Unani
d. Siddha
e. Homeopathy
f. Need for integration of various system of medicine

4. Health scenario of India- past, present and future
5. Demography &Vital Statistics-
   a. Demography – its concept
   b. Vital events of life & its impact on demography
   c. Significance and recording of vital statistics
   d. Census & its impact on health policy
6. Epidemiology
   a. Principles of Epidemiology
   b. Natural History of disease
   c. Methods of Epidemiological studies
   d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring andsurveillance.

Courselearning Outcomes (CLOs):

CLO-1: At the end of the unit, the students will be able to Definehealthandhealthcaredeliverysystem.UnderstandHealthcaredeliverysysteminIndiaatprimary,secondaryandtertiarycare. StudyaboutCommunityparticipationinhealthcaredeliverysystem. DiscussHealthsystemindevelopedcountriesandhowPrivateSectorworks. ExplainNationalHealthMissionandNationalHealthPolicyindetail. LearntheIssuesinHealthCareDeliverySysteminIndia.(1)

CLO-2: At the end of the unit, the students will be able todescribe various National Health Programme, its background objectives, action plan, targets, operations, achievementand constraints in various National Heath Programme.(2)

CLO-3: At the end of the unit, the students will be able to learn about AYUSH system of medicine.(3)

CLO-4: At the end of the unit, the students will be able to discuss Health scenario of India-past, present and future.(4)

CLO-5: At the end of the unit, the students will be able to describe the concept of Demography&VitalStatisticslearnthesignificanceandrecordingofvitalstatisticsstudyaboutcensus&itsimpactonhealthpolicy.(5)

CLO-6: At the end, the students will be able to learn the history, principles and methods of Epidemiology.(6)

Textbooks:

K. Park, EssentialsofCommunityHealthNursing,6th Edition, M/s Banarsidas Bhanot Publishers, ISBNno.978-93-82219-00-2.

Ska Malam, EssentialsinCommunityHealthNursingPractice,3rd Edition, JaypeeBrothersMedicalPublishers(P)Ltd., ISBNno.978-93-85891-76-2

Referencebook:

BTBasavanthappa, CommunityHealthNursing,2ndEdition, Jaypee Brothers Medical Publishers, ISBNno.81-8448-096-2.

Onlinelinkforstudyandreferencematerials:

https://www.slideshare.net/SridharD9/health-care-delivery-system-70245869

https://www.slideshare.net/ManjuPilania/ayush-43609271

https://en.wikipedia.org/wiki/Epidemiology

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-102

Course Name -Basic computers and information science
Coursecredit-2
Totaltheoryhour-10 practicalhour–40

COURSE OBJECTIVE:

Thecourseenablesthestudents to understand thefundamentalsofcomputerand its applications.

COURSE DESCRIPTION:

Dealwithcomputerscience: thestudyofthetheoreticalfoundationsofinformationandcomputation, andofpracticaltechniquesfortheirimplementationandapplicationincomputersystems.

COURSE CONTENT:

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computerlanguages.
2. Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-inputdevices), output devices (monitors, pointers, plotters,screenimageprojector,voiceresponsesystems).
3. Processorandmemory:TheCentralProcessingUnit (CPU), main memory.
4. StorageDevices: Sequentialanddirectaccessdevices, magnetictape, magneticdisk,optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing.).
6. IntroductiontoMS-Word: introduction,componentsofawordwindow,creating,opening andinsertingfiles,editingadocumentfile, pagesettingandformattingthetext,savingthedocument, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creatinggraphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide withgraphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operatingsystem.

10. Computer networks: introduction, types of networks (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring,bus,mesh,tree,hybrid), components ofnetwork.
11. Internetandits Applications: definition, brief history, basic services (E-Mail,FileTransferProtocol, telnet,theWorldWide Web (WWW)), www browsers,useoftheinternet.
12. . ApplicationofComputersin clinical settings. Practical on fundamentals of computers-

1. Learningtouse MS office: MS word, MS PowerPoint, MS Excel.
2. To install differentsoftware.
3. Data entryefficiency

COURSELEARNINGOUTCOMES:

CLO1:Describevariousfeaturesofcomputerandbasicknowledgeofdataprocessing. (1)
CLO2: Basicknowledgeofcomputerhardwareincludingtypesofstorage (2,3&4)
CLO3: Basicknowledgeofsoftwareofcomputersandprotectionagainstvirus. (5&6)
CLO4: Describeprincipleofprogramming,work processing etc. (7,8&9)
CLO5: Conceptofuseofcomputerinphysicaltherapy. (10.11&12)

TEXTBOOKS:

ComputerFundamentals(Goel, AnitaPearson)**: Concepts,Systems&Applications** (Sinha, P.K.BPB)
ComputerFundamentals: Concepts, Systems &Applications Sinha,P.K/Sinha, P.4thedBPB

REFERENCEBOOKS

IntroductionToComputers (Norton,Peter6thedTMH)

WEBLINKS:

https://edu.gcfglobal.org/en/computerbasics/about-this-tutorial/1/
https://www.slideshare.net/SridharD9/health-care-delivery-system-70245869

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total internal assessment-	Total	25

Course code-RDT-103

Course Name-Communication, soft skills, Professionalism and values
Course credit-1
Total theory hour-30

COURSE OBJECTIVE:

This course trains the students in oral presentations, expository writing,logicalorganizationandstructuralsupport.

By acquiring skills in the use of communication techniques the students will be able to express better, growpersonally and professionally, develop poise and confidence and achieve success. Resolvethemoralissuesintheprofession.

Justifythemoraljudgmentconcerningtheprofession

COURSE DESCRIPTION:

ThiscoursedealswithessentialfunctionalEnglishaspectsandnuancesofthecommunicationskillsesse ntial for the health care professionals. Toteach *professional*ethical values, codes of ethics, responsibilities,safety,rightsandrelatedglobalissues

COURSE CONTENT:

Major topics to be covered under Communication and professionalism course–

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations,pronunciation.
3. Teaching the different methods of writing like letters, E-mails,report,casestudy,collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of goodcommunication
5. Special characteristics of healthcommunication
6. Types & process ofcommunication
7. Barriers of communication & how toovercome
8. Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
9. Personal values- ethical or moral values
10. Attitude and behavior- professional behavior, treating peopleequally.
11. Code of conduct,professionalaccountabilityandresponsibility,misconduct
12. Differences between professions and importance of team efforts
13. Cultural issues in the healthcare environment

Courselearning objectives:

CLO 1:Byacquiringskillsintheuseofcommunicationtechniquesthestudentswillbeabletoexpressbetter, grow personally and professionally, develop poise and confidence and achieve success. (1-7)
CLO2: Itensuresstudentssustainedhappinessthroughidentifyingtheessentialsof humanvalues andskills. (8&9)
CLO3: Ithelpsstudentsunderstandpracticallytheimportanceoftrust,mutuallysatisfying humanbehaviorandenrichinginteractionwithnature. (10&11)
CLO4: To provide knowledge to students about the importance of team efforts. (12)
CLO5: To provide knowledge about cultural issues in health care environment. (13)

TEXTBOOK:

GrahamLock,FunctionalEnglishGrammar: IntroductiontosecondLanguageTeachers.CambridgeUniversity Press, NewYork,1996.
GwenVanServellen.CommunicationforHealthcareprofessionals: Concepts, practiceandevidence, Jones&BartlettPublications, USA,2009

Reference Book:

Gwen Van Servellen. Communication for Healthcare professionals: Concepts, practice and evidence, Jones&Bartlett Publications, USA,2009
PollakVE,LorchJA.Effectivecomputerizedpatientrecordimprovespatient wellbeing andfinancialperformance.
B.C.Bhagavan(2017) Text BookofRenalDialysis,ClementPublications.

Onlinelinks for study&referencesmaterials:
www.slideshare.com
www.wikipedia.com

Assessment method (Continue Internal Assessment=100%)

Assessment-1	Assignment	20
Assessment-2	Attendance	20
Assessment-3	Extra-curricular activities	20
Assessment-4	Internals	20
Assessment-5	Grooming	20
Total Internal Assessment-	Total	100

Course code-RDT-104

Course Name -Medical terminologies and record keeping and Medical Law and Ethics

Coursecredit-01

Totalcontacthour-40

COURSE OBJECTIVE:

- To impartknowledgeaboutmaintainproperreportsandrecordswhileusingmedicalterminologies.
- Tomakethestudentsawareofeffectivemedicalterminologies.
- Tosharpenthestudent'scommunicationskill.
- Tocreateresponsibleprofessionalcompetentto underset andhowtofollowmedicalterminologiesfordialysisinan acute care environment.
- Toprovidecompleteknowledgeaboutassistingdialysiswith proper medical termsand in handling emergencies, takingcareofmedicalanddiagnosticsupplies.
- Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patientcare. Advances in medical sciences, growing sophistication of the modern society's legalese work, increasing awareness of human rights and changing moral principles of the community.

COURSE DESCRIPTION:

- Thiscourseisdesignedtohelpstudentgainingknowledgeandunderstandingofcomplexitiesofmedicalterminologiesrelated to renal dialysis, andsharpeningcognitivetohandleemergenciesandpatientbreakdownsduringcomplexdialysisprocedures.
- Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside.
- The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".
- Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal frame work to regulate medical practice.

COURSE CONTENT:

This course introduces the elements of medical terminology Laws and ethis. Emphasis is placed onbuildingfamiliaritywithmedicalwordsthroughknowledgeofroots, prefixes,andsuffixes.Topicsinclude: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminologyspecifictothestudent'sfieldofstudy.Spellingis critical and will be counted when grading tests. Topics to be covered under the subject are as follows:

1. Derivation of medicalterms.
2. Define word roots, prefixes, andsuffixes.

3. Conventions for combined morphemes and the formation ofplurals.
4. Basic medicalterms.
5. Formmedicalterm subtilizing roots, suffixes,prefixes,andcombiningroots.
6. Interpret basic medicalabbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system,respiratorysystem,cardiovascular system, nervous system, and endocrinesystem.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.
10. Medical **ethics - Definition - Goal -Scope**
11. **Introduction** to Code ofconduct
12. **Basic** principles of medical ethics –Confidentiality
13. **Malpracticeandnegligence**-Rationalandirrationaldrugtherapy
14. **Autonomy** and informed consent - Right ofpatients
15. **Care** of the terminally ill-Euthanasia
16. **Organ**transplantation
17. **Medico** legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.

CourseLearningOutcomes (CLOs)

CLO1 :Applytheknowledgeandskillsofhandlingrenaldialysistoprovidesafeandeffectivecare. (1)

CLO2: Demonstrate relative knowledgeandunderstandingofmedicalterminologies (2&3)

CLO3: Skill toassess, analyseandevaluatethe information gatheredduringthetreatment. (4&5)

CLO4: Demonstratetheabilitytoplan, organizeandrepeatdifferentdiagnosisrelatedtotreatment. Andmaintain its properrecordandreport (6&7)

CLO5: Understand professionalandethicalresponse. (8&9)

CLO6: To provide the students' knowledge about the medical ethics, and to introduce about the code of conduct. (10 & 11)

CLO7: Toprovide knowledge regarding principles of medical ethics and about medical negligence and malpractice. (12&13)

CLO8: Toprovidestudentswith Rights of patient and clinical experiencethroughrotationsinvariousclinicalsettings. (14&15)

CLO9: Toassiststudentin organ transplantation and to make them aware about the medico legal aspects of medical records and about the policies of patients. (16,17)

TextBooks-

PollakVE, LorchJA.Effectivecomputerizedpatientrecordimprovespatient well-being andfinancialperformance. .

ReferencesBook:
B.C.Bhagavan(2017) TextBookofRenalDialysis,ClementPublications.

Onlinelinksforstudy&referencesmaterials:
www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=100%)

Assessment-1	Assignment	20
Assessment-2	Attendance	20
Assessment-3	Extra-curricular activities	20
Assessment-4	Internals	20
Assessment-5	Grooming	20
Total Internal Assessment-	Total	100

Course code-RDT-105

Course Name-Introduction to Quality and patient safety and Principals of mangement

Coursecredithours:1

Totalhours:40

COURSE OBJECTIVE:

- Strengtheningtheroleofleadership,
- Strengtheningtheroleofmanagement
- Strengtheningtheroleofgovernance.
- Buildingnationalcapacitiesinthefieldofhealth quality.
- Support of evidence-basedscientificresearchandstudies.
- Empowermentof patients andcommunityparticipation.
- the principles, techniques, and concepts needed for managerial analysis and decision-making. It highlights the effective management of planning, organizing, influencing, and controlling related to the internal and external environment and issues of ethics and social responsibility

COURSE DESCRIPTION:

ThiscourseisdesignedtohelpstudentgainingknowledgeandunderstandingofItaimstopreventandreducerisks, errorsand harm thatoccurto patientsduringprovisionofhealthcare, Cornerstoneofthedisciplineiscontinuousimprovementbasedonlearningfromerrorsandadverseevents. Patientsafety isfundamentaltodelivering qualityessential healthservices.

course aims to provide students with the basic managerial knowledge necessary for Business student. Upon successful completion of this course, students will be able to: Demonstrate theoretical knowledge in management course. Gain practical skills and personal attributes and competencies that is required for managerial position

COURSE CONTENT:

1: Quality assurance and management

- Concepts of Quality of Care
- Quality Improvement Approaches
- Standards andNorms
- Quality ImprovementTools
- Introduction to NABHguidelines

2: Basics of emergency care and lifesupport skills-Basiclife support (BLS), sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automatedexternaldefibrillator (AED). Vital signs and primary assessment

- Basic emergency care – first aid and triage
- Ventilations including use of bag-valve-masks (BVMs)
- Choking, rescue breathingmethods
- One- and Two-rescuer PR
- Using an AED (Automated external defibrillator).
- Managing an emergency including moving patient

At the end of this topic, focusshouldbetoteachthestudentstoperformthemaneuversin simulation lab and to test their skills with focus on airways management and chest compressions. Attend ofthefoundationcourse,eachstudentshouldbeabletoperform and execute/operate on the above-mentioned modalities.

3: Biomedicalwastemanagementandenvironmentsafety
4: Disaster preparedness and management- The objective of this section will be to provide knowledgeontheprinciplesofon-sitedisastermanagement
Conceptstobetaughtshould include-

- Fundamentals of emergencymanagement
- Psychological impact management,
- Resource management,

5. The basic principles of Management

- 1: Introduction tomanagement
- 2:StrategicManagement
- 3: Foundations ofPlanning
- 4: Planning Tools andTechniques
- 5: Decision Making, conflict and stressmanagement
- 6: Managing Change andInnovation
- 7: Understanding Groups andTeams
- 8: Leadership
- 9: Time Management Costand efficiency

CourseLearningOutcomes (CLOs)
CLO1 Applytheknowledgeandskillsofhandlingrenaldialysistoprovidesafeandeffectivecare. (1&2)
CLO2 Skilltoassess,analyseandevaluatethe information a there during thetreatment. (4)
CLO3 Demonstrate the ability to plan, organize and repeat different diagnosis related to treatment. And maintain its proper record and report and care of BMW. (3)
CLO4 Understandprofessionalandethicalresponsibilitiesin patient care.(4)
CLO5: To describe the primary functions of management and roles of managers,
To describe the foundations of decision making, conflict and the management of stress,
To explain how managers align the planning the planning process with mission and values.
To explain the components and considerations of managing changes and innovation and leadership. (5)

Textbooks:
Pollak VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance
VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance.

References Book:
B.C. Bhagavan (2017) Text Book of Renal Dialysis,ClementPublications.

Onlinelinks for study&referencesmaterials:
www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=100%)

Assessment-1	Assignment	20
Assessment-2	Attendance	20
Assessment-3	Extra-curricular activities	20
Assessment-4	Internals	20
Assessment-5	Grooming	20
Total Internal Assessment-	Total	100

Course credit-RDT-106

Course Name-Research Methodology and Biostatistics

Coursecredit:02

Totalhours:60hrs

COURSE OBJECTIVE:

- Identifyanddiscusstheroleandimportanceof research hinthe social sciences.
- Identifyanddiscusstheissuesandconceptssalienttotheresearchprocess.
- Identifyresearchdesign,andimplementingaresearchproject.
- Identifyanddiscusstheconceptsandproceduresofsampling.
- Datacollection,analysis,andreporting.
  Tofamiliarizeparticipantswiththebasicsofresearchandtheresearchprocess.

- Toenabletheparticipants in conducting researchworkandformulatingresearchsynopsisandreport.
- TofamiliarizeparticipantswithStatisticalpackagessuchasSPSS/EXCEL.

COURSE DESCRIPTION:

Thiscourse involves description of principles for conducting research. The goal of the research is to describe or define particular phenomenon.Inthis case, descriptive research would be an appropriate

strategy. A descriptive may, for example, aim to describeapattern. Descriptiveresearchhasmanyusefulapplications,andyouprobably relyon findingsfromdescriptiveresearchwithoutevenbeingawarethatthatiswhatyouaredoing**.**

COURSE CONTENT:

Theobjectiveofthisistohelpthestudentsunderstandthebasicprinciplesofresearchandmethods applied to draw inferences from the researchfindings.

1. Introduction to researchmethods
2. Identifying researchproblem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

COURSELEARNINGOUTCOMES

Studentswhosuccessfullycompletethiscoursewillbeableto:

CLO.1. Explainkeyresearchconcept sand issues (1), (2,3)

CLO2.Read, comprehend, and explain research articles in their academic discipline. (4)

CLO3.Develop an understanding of various kinds of research, objectives of doing research, research process,researchdesigns,and sampling. (5 ,6&7)

CLO4.Theyhavebasicknowledgeofqualitativeresearch techniques (8)

CLO5.Theyhave adequate knowledge ofmeasurement&scalingtechniquesaswellas quantitative analysis (9)

CLO6.Have a basic awareness of dataanalysisand hypothesis istestingprocedures. (9)

TEXTBOOKS:

HandbookOfResearchinPhysicalTherapy.CEBork

REFERENCEBOOKS:

Physical Therapy Research:

PrinciplesAndApplication.EDomholdtResearchMethodologyFor

PhysicalTherapists. C Hicks.

Kothari, C.R. Research Methodology (MethodsandTechniques),

NewAgePublisher.FundamentalsofmodernstatisticalmethodsbyRandR. Wilcox

WEBLINKS:

https://scholar.google.com/ht

tps://pubmed.ncbi.nlm.nih.go

v/https://www.researchgatet/

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-107

Course Name-Community orientation and clinical visit
Course credit hours: 3
Total hours: 100

COURSE OBJECTIVE:

- Describe the concept of health, community health and role of renal assistant in community.
- State the principles of epidemiology and epidemiological methods in community hospital settings.
- Explain the various services provided to the community.

COURSE DESCRIPTION:

This course is designed to help students gain an understanding of the concept of community health in order to introduce them to the wider horizons of rendering services in a community set – up, both in urban and rural areas. Acquire the concept of health education and develop an ability to select and/or prepare appropriate audio-visual aids and use them effectively to communicate with the individuals and community. Understand the principles of communication and counseling.

COURSE CONTENT:

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactivefor a role plays and clinical bed-side demonstrate

1: The community orientation and clinical visit will include visit to the entire chain of healthcaredeliverysystem-Subcenter, PHC,CHC,SDH,DHandMedicalCollege, private hospitals, dispensaries and clinics.

2: The studentwillalsobebriefedregarding governance at villagelevelincludinginteraction andgroupdiscussionwithvillagepanchayatandfrontlinehealthworkers.

3: Clinicalvisittotheirrespectiveprofessionaldepartmentwithinthehospital.

COURSE LEARNING OUTCOME

CLO-1: This course is designed to help students to develop an ability to meet basic health needs and services provided in community (UNIT1)
CLO-2: Acquire knowledge about basic needs of patient regard to care given in community. (1)
CLO-3: To develop skill in the communication and counselling in public health. (2)
CLO-4: Recognize& utilize opportunities for planning & implementing the programmes and policies in community. (3)
CLO-5: To acquire knowledge about to communicate & create IPR with patient and their relatives. (3)

TEXTBOOKS:

Textbook of community health nursing k park 2nd edition published by Jaypee
Clinical Nursing Procedures: The Art of Nursing Practice Paperback – 1 January 2019
by Annamma Jacob (Author)

Reference Books:

1Textbook Of Community Health Nursing (Pb 2020)
by MANIVANNAN S.D
2-A Comprehensive Textbook Of Community Health Nursing (As Per Inc Syllabus)
by Dash Bijayalakshmi

Online links for study and reference materials

1- *https://en.wikipedia.org/wiki/Community*
2-*https://www.imdb.com/title/tt1439629/episodes?season=1*

Assessment method (Continue Internal Assessment=25%, final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-108

Course Name-Human Anatomy

Course credit hours: 4

Total hours: 120(theory: 40 hours practical: 80 hours)

COURSE OBJECTIVE:

By the end of this course the students will demonstrate the anatomy of the human body regarding upper limb, lower limb thorax, abdomen, and head and neck. Also, student will demonstrate the ability to gain practical skills enabling them to recognize and differentiate bones, muscles, vessels, nerves and viscera of the body. The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body.

COURSE DESCRIPTION:

It is designed to provide students with the working knowledge of the structure of the human body which is essential foundation for their clinical studies.

COURSE CONTENT:

1: Introduction: Human body as a whole

a. Theory:

- Definitionofanatomyanditsdivisions.
- Termsoflocation, positionsandplanes.

- Cell and itsorganelles.
- Epithelium: definition,classification,describewithexamples,function.
- Glands: classification, describe serous,mucous&mixedglandswithexamples.
- Basic tissues: classification withexamples.

b. Practical:

- Histology of types ofepithelium.
- Histology of serous, mucous & mixed salivary gland.

2: Locomotionand support

c. Theory:

- Cartilage: types with example &histology.
- Bone: classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, inter-vertebral disc, fontanelles of fetal skull.
- Joints: classification of joints with examples, synovial joint (in detail for radiology).
- Muscular system:classificationofmusculartissue&histology,namesofmuscles of thebody.

d. Practical:

- Histology of the 3 types ofcartilage.
- Demoofallbonesshowingparts,radiographsofnormalbones&joints.
- Histology of compact bone (TS &LS).
- Demonstration of all muscles of thebody.
- Histologyofskeletal,smooth&cardiac muscle (TS&LS).

3: Cardiovascular system

e. Theory:

- Heart: size,location,chambers,exterior&interior,bloodsupplyofheart.
- Systemic & pulmonary circulation, branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, peripheral pulse, inferior vena cava, portal vein, Porto-systemic anastomosis, great saphenous vein, Dural venous sinuses. Lymphatic system: cisternachyli& thoracic duct, histologyoflymphatictissues, names of regional lymphatics, axillary and inguinal lymph nodes in brief. Anatomy correlated to vascular access to be emphasized.

f. Practical:

- Demonstration of heart and vessels in the body.
- Histologyof large artery,mediumsizedartery&vein, large vein.
- Histology of lymph node, spleen, tonsil &thymus.
- Normal chest radiograph showing heartshadows.
- Relationship to vascular access in dialysis

4: Gastro-intestinal system

g. Theory:

- PartsofGIT, oral cavity,lip, tongue (with histology),tonsil,dentition,pharynx,

salivary glands,Waldeyer'sring, oesophagus, stomach,smallandlargeintestine, liver, gall bladder, pancreas, radiographs ofabdomen.

h. Practical:

- Demonstration of parts of gastro intestinal system.
- Normal radiographs of gastro intestinal system.
- Histology of gastro intestinal system.

5: Respiratory system

i. Theory:

- Parts of RS, nose, nasal cavity, larynx, trachea, lungs, broncho-pulmonary segments,histology of trachea,lung and pleura,namesof paranasal air sinuses.

j. Practical:

- Demonstration of parts of respiratory system.
- Normal radiographs of chest.
- Histology of lung and trachea.

6: Peritoneum

k. Theory:

- Description in brief.

l. Practical:

- Demonstration of reflections.

7:Urinary system

m. Theory:

- Kidney, ureter, urinary bladder, male and female urethra. Histology ofkidney, ureter and urinary bladder.

n. Practical:

- Demonstration of parts of urinary system.
- Histology of kidney, ureter, urinary bladder.
- Radiographs of abdomen-IVP, retrograde cystogram.

8: Reproductive system

o. Theory:

- Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross histology).Partsof female productivesystem,uterus, fallopian tubes, ovary (gross & histology). Mammary gland: gross.

p. Practical:

- Demonstrationofsectionofmaleandfemalepelviswithorgan sinister.
- Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tube, ovary.

9: Endocrine glands

q. Theory:

- Endocrineglands:pituitarygland, thyroid gland, parathyroid gland,suprarenal glad (gross &histology).

r. Practical:
- Demonstration of the glands.
- Histology of pituitary, thyroid, parathyroid, suprarenal glands.

10: Nervous system

s. Theory:
- Neuron, classification of nervous system, cerebrum,cerebellum,midbrain,pons, medulla oblongata, spinal cord with spinal nerve (gross&histology), meninges, ventricles & cerebrospinal fluid, names of basal nuclei, blood supply of brain, cranialnerves.
- Sympathetic trunk & names of parasympatheticganglia.

t. Practical:
- Histology of peripheral nerve &optic nerve.
- Demonstration of all plexuses and nerves in the body.
- Demonstration of all parts of brain.
- Histology of cerebrum, cerebellum, spinal cord.

11:Sensory organs:

u. Theory:
- Skin: histology, appendages of skin.
- Eye: partsofeye&lacrimalapparatus. Extra-ocularmuscles&nervesupply.
- Parts of ear: external, middle and inner ear and contents.

v. Practical:
- Histology of thin and thickskin.
- Demonstration and histology ofeyeball.
- Histology of cornea &retina.

12: Embryology:

w. Theory:
- Spermatogenesis &oogenesis.
- Ovulation,fertilization.
- Fetalcirculation.
- Placenta.

x. Practical:
- Demonstration ofmodels.

COURSE LEARNING OUTCOMES:

CLO 1. Students can demonstrate the location, position and planes. Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system. They will be able to demonstrate epithelial and glands. (1)

CLO 2. Classify different types of tissue and explain anatomy and physiology of skeletal system, joints and muscular system. Demonstrate the bones of all parts. (2)

CLO 3. Describe how the heart is positioned in the thoracic cavity. List and describe the layers of the heart wall. Name the chambers of the heart and their valves. Name the major vessels that enter and exit the heart and their branches. Describe blood flow through the heart. Explain how the conduction system of the heart controls proper blood flow. (3)

CLO 4. Identify the organs of the alimentary canal from proximal to distal, and briefly state their function. Identify the accessory digestive organs and briefly state their function. Describe the four fundamental tissue layers of the alimentary canal. (4)

CLO 5. Outline the forces that allow for air movement into and out of the lungs. Outline the process of gas exchange. Summarize the process of oxygen and carbon dioxide transport within the respiratory system. Create a flow chart illustrating how respiration is controlled. (5)

CLO 6. What are the nine regions of abdomen? Explain peritoneum, its layers, peritoneal cavity, blood supply, nerve supply, lymphatic drainage, venous drainage and functions of peritoneum. (6)

CLO 7. Describe different parts of urinary system, their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy (7}.

CLO 8. Describe different parts of male and female reproductive system, their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy. (8)

CLO 9. Describe different endocrine glands (pituitary, thyroid, parathyroid and suprarenal gland), their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy. (9)

CLO 10. Identify the anatomical and functional divisions of the nervous system. Relate the functional and structural differences between gray matter and white matter structures of the nervous system to the structure of neurons. List the basic functions of the nervous system. (10)

CLO 11. Describe different sensory organs (skin, eye and ear), their further sub divisions, dimensions, weight, size, shape, location, relations, functions, blood supply, nerve supply, lymphatic drainage, venous drainage and applied anatomy. (11)

CLO 12. Describe spermatogenesis, oogenesis, ovulation and fertilization. Explain Fetal circulation. Describe placenta and its functions (12)

TEXT BOOKS:

Human Anatomy by BD Chaurasia (4 Volume)

REFERENCE BOOKS:

Gray's Anatomy by Richard Drake & A. Wayne Vogl & Adam W. M. Mitchell

WEB LINKS:

- YouTube channel by Dr. Peter de Souza and Dr. Jack Hurley, U.K. Medical doctors
- https://guides.lib.uw.edu

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-109

Course Name -Physiology
Course credit: 4
Total hours: 120(Theory: 40 hours practical: 80 hours)

COURSE OBJECTIVE:

To provide in-depth instruction in the organization, structures, and functions of the human body. Students will learn the terminology of physiology of each body system and how they interrelate to maintain homeostasis.

COURSE DESCRIPTION:

The student will demonstrate a thorough understanding of the normal physiology of each organ system of the body.

COURSE CONTENT:

Emphasis on plain and cross-sectional radiographic anatomy

1. Blood
    a. Introduction: composition and function ofblood.
    b. Red blood cells: erythropoiesis, stages of differentiation, function, count, physiologicalvariation.
    c. Structure, function, concentration,physiologicalvariation,methodsofestimationof hemoglobin.
    d. White blood cells: production,function,lifespan,count,differentialcount.
    e. Platelets: origin, normal count, morphologyfunctions.
    f. Plasma proteins: production, concentration, types, functions, albumin, globulin, fibrinogen,prothrombin.
    g. Haemostasias: definition, normal haemostasis, clotting factors, mechanism of

clotting, disorders of clotting factors.

h. Blood bank:
i. Blood groups: ABO system, Rh System.
j. Blood grouping & typing, crossmatching.
k. Rh system: Rh factor, Rhin-compatibility.
l. Blood transfusion: indication, universal donor and recipientconcept.
m. Selection criteria of a blood donor, transfusionreactions.
n. Anticoagulants: classification, examples anduses.
o. Anemia: morphological and etiological classification, effects of anemia on body.
p. Blood indices: colour index, MCH, MCV, andMCHC.

q. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values, definition,determination.
r. Blood volume: normal value, determination of blood volume and regulation of blood volume.
s. Body fluid: pH, normal value, regulation and variation.
t. Lymph: lymphoid tissue formation, circulation,compositionandfunctionoflymph.

2. Cardiovascular system
   a. Heart: physiological anatomy, nerve supply.
   b. Properties of cardiac muscle, cardiac cycle: systole, diastole. Intra-ventricular pressure curves.
   c. Cardiac output (only definition).
   d. Heart sounds, normal heart sounds, areas of auscultation.
   e. Blood pressure: definition, normal value, clinical measurement of blood pressure.
   f. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension.
   g. Pulse: jugular, radial pulse, triple response.
   h. Heart sounds: normal heart sounds, causes, characteristics and significance, heart rate.
   i. Electrocardiogram (ECG)significance.

3. Digestive System
   a. Physiological anatomy of gastrointestinal tract, functionsof digestive system.
   b. Salivary glands: structure and functions,deglutition:stagesandregulation.
   c. Stomach: structure and functions.
   d. Gastric secretion: compositionfunctionregulationof gastric juice secretion.
   e. Pancreas: structure,function,composition, regulation of pancreatic juice.
   f. Function so liver, Bilesecretion, composition,function,regulationofbilesecretion, bilirubin metabolism, types of bilirubin, Vandenberg reaction, jaundice: types, significance.
   g. Functions of gallbladder.
   h. Small intestine: functions, digestion, absorption, movements.
   i. Largeintestine: functions,digestionandabsorptionofcarbohydrates,proteins,fats, lipids, defecation

4. Respiratory system
    a. Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles.
    b. Respiratory organs: lungs,alveoli,respiratorymembrane, stagesofrespiration.
    c. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall.
    d. Transportation of respiratory gases: transportation of oxygen: direction, pressure gradient, forms of transportation, oxygenation of Hb. Quantity of oxygen transported. Lung volumes andcapacities.
    e. Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory center, Herring–Breuerreflex.

f. Applied physiology and respiration: hypoxia, cyanosis, asphyxia, dyspnea, dysbarism, artificial respiration, and apnea.

5. Endocrine System
   a. Definition, classification of endocrine glands & their hormones, properties of hormones.
   b. Thyroid gland hormone: physiological anatomy, hormone secreted, physiological function, regulationofsecretion,disorders:hypoandhypersecretionofhormone.
   c. Adrenal cortex: physiological anatomy of adrenal gland, adrenal cortex, cortical hormones, functions and regulation.
   d. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and noradrenaline.
   e. Pituitary hormones: anterior and posterior pituitary hormones,secretion,function.
   f. Hormones of pancreas.
   g. Insulin: secretion, regulation, function and action.
   h. Diabetes mellitus: regulation of blood glucose level.
   i. Parathyroid gland: function,action,regulationofsecretionofparathyroidhormone
   j. Calcitonin: function andaction.

6. Special senses
   a. Vision: structure of eye, function of different parts.
   b. Structure of retina.
   c. Hearing: structure and function of ear, mechanism of hearing.
   d. Taste buds: functions.
   e. Smell: physiology, receptors.
   f. Skin-Structure and function, body temperature measurement, physiological variation, regulationofbodytemperaturebyphysicalchemicalandnervousmechanisms. Role of hypothalamus, hypothermia and fever.

7. Nervous system
   a. Functions of nervous system, neuron:structure,classificationandproperties.
   b. Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory.
   c. Velocity of impulse transmission and factors affecting.
   d. Synapse: structure, types, properties.
   e. Receptors: definition, classification,properties.
   f. Reflex action: unconditioned properties of reflex action. Babinski's sign.
   g. Spinal cord nerve tracts. Ascending tracts, descending tracts.
   h. Pyramidal tracts
      - Extrapyramidal tracts, functions of medulla,pons, hypothalamic disorders.
      - Cerebral cortex lobes and functions, sensory cortex, motor cortex, cerebellum, functions of cerebellum. Basal ganglion: functionsEEG.
      - Cerebro Spinal Fluid (CSF):

formation,circulation,properties,compositionand functions.

- Lumbar puncture.

i. Autonomic Nervous System:

- Sympatheticandparasympatheticdistributionandfunctionsandcomparisonof functions.

8. Excretory System
   a. Functions of kidneys, nephron, vasa recta, cortical and juxtamedullary nephrons, comparison, juxta glomerular apparatus: structure and function. Renal circulation peculiarities.
   b. Mechanism of urine formation: ultrafiltration criteria for filtration GFR, plasma fraction,
   c. GFR, factorseffectingGFR.DeterminationofGFRselectivereabsorption–sitesof reabsorption, substance reabsorbed, mechanisms of reabsorption of glucose, urea, H+, Cl- amino acids etc. TMG, tubular lead, renal threshold % of reabsorption of different substances, selective secretion.
   d. Properties and composition of normal urine, urine output.Abnormal constituents inurine, mechanism of urine concentration. Counter-current mechanisms: micturition, innervation of bladder,cystometrogram.
   e. Diuretics: water, diuretics,osmoticdiuretics,artificialkidney,renalfunctiontests: plasma clearance,actionsofADH,aldosteroneandPTHonkidneys.
   f. Renal function tests.

9. Reproductivesystem
   a. Function of reproductive system,puberty.
   b. Malereproductivesystem: functionsoftestes,spermatogenesis:site,stages,factors influencing, semen. Endocrine functions oftestes
   c. Androgens: testosterone structure andfunctions
   d. Female reproductive system: ovulation, menstrual cycle: physiological changes during pregnancy, pregnancy test.
   e. Lactation: composition of milk, factors controlling lactation.

10. Muscle nerve physiology
    a. Classification of muscle, structure of skeletal muscle, sarcomere contractile proteins, neuromuscular junction. Transmission across neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone,fatigue,rigor mortis.

Practical

1. Hemoglobinometry.
2. White blood cell count.
3. Red blood cell count.
4. Determination of blood groups.

5. Leishman's staining and differential WBCcount.
6. DeterminationofpackedcellVolume.
7. Erythrocyte sedimentation rate (ESR).
8. Calculation of blood indices.
9. Determination of clotting time, bleeding time.
10. Blood pressure recording.
11. Auscultation for heart sounds.
12. Artificial respiration.
13. Determination of vital capacity.

COURSE LEARNING OUTCOMES:

At the end of the course students will be able to…

CLO1.

Describe the structure and function of cellular organelles.(1)

CLO2.

- Describe the functions of blood.
- Classify the different types of blood cells(2)

CLO3.

- Name the chambers of the heart and their valves.
- Name the major vessels that enter and exit the heart.
- Describe blood flow through the heart.
- Describe the stages of a cardiac cycle(3)

CLO4.

- Explain the function of the respiratory system.
- Name the organs of the system.
- Define the parts of the internal nose and their functions.(4)

CLO5.

- Name the functions of the skeletal system.
- Describe and compare the basic differences between the anatomy of skeletal, smooth and cardiac muscles
- List the structural and functional classification of neurons.
- Explain how a neuron transmits a nerve impulse.(5)

CLO6.

- Describe the structure of the spinal cord.
- Name and number the spinal nerves.(6)

CLO7.

- Define the following internal parts of the kidneys: cortex, medulla, medullary pyramids,renal papillae, renal columns and major and minor calyces.
- Name the parts of a nephron and describe the flow of urine through this renal tubule.
- List the functions of the nephrons.(7)

CLO8.

- Explain the major digestive enzymes and how they function.
- Explain the functions of the liver.(8)

CLO9.

- List the functions of hormones.
- Describe how the hypothalamus of the brain controls the endocrine system.
- Name the endocrine glands and state where they are located.
- List the major hormones and their effects on the body.(9)

CLO10.

- Name the internal parts of a testis.
- Explain the effects of testosterone on the male body.
- Describe the phases of the menstrual cycle.(10)

PRATICALS

- Examination of pulse, B.P., Respiratory rate.
- Reflexes
- Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on spirometry.
- Estimate of Hemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count. E Blood indices, Blood grouping, Bleeding & Clotting time

TEXT BOOKS:

- Anatomy and Physiology for Nurses
- Surface and Radiological Anatomy – Hamilton et al (Heffer)
- Essentials Of Medical Physiology: by K Sembulingam
- Textbook of Physiology- AK Jain

REFERENCE BOOKS:

- Essentials of Human Anatomy – Russel

- An Atlas of normal radiographic Anatomy – Ross and Wilson

WEB LINKS:

- https://www.physoc.org/
- http://aups.org.au/
- https://www.hapsweb.org/default.aspx

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-110

Course Name-Applied anatomy & Physiology related to Dialysis Therapy Technology

Course credit: 4

Total hours: 120

COURSE OBJECTIVE:

The student can gain skill in reading and understanding radiological images of the body and identify through palpation the anatomical landmarks on the surface of the body. Students will learn the terminology of physiology of each body system and how they interrelate to maintain homeostasis.

COURSE DESCRIPTION:

The course describes the anatomical structures and physiological features of the urinary system

COURSE CONTENT:

Applied anatomy

:1Basic anatomy of urinary system: structural anatomy of kidney,bladder,ureter, urethra,prostate.

2Histology of kidney.

3Blood supply of kidney.

4: Development of kidney in brief.

5: Anatomy of peritoneum including concept of abdominalhernias.

6: Anatomy of vascularsystem:

a. Upper limb vessels: course,distribution,branches,origin&abnormalities.

b. Neckvessels:course,distribution,branches,origin&abnormalities.

c. Femoral vessels: course,distribution,branches,origin&abnormalities.

Physiology

7: Mechanism of urine formation.

8: Glomerular filtration rate (GFR).

9: Clearance studies.

10: Physiological values of urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose; 24 hours urinary indices – urea, creatinine, electrolytes, calcium, magnesium.

11: Physiology of renal circulation

a. Factors contributing & modifying renal circulation.

b. Auto regulation.

12: Hormonesproducedbykidney&physiological iterationsin pregnancy.

13: Haemostasias: coagulation cascade, coagulation factors, autoregulation, BT, CT, PT, PTT, thrombin time.

14: Acid base balance: basic principles & common abnormalities like hypokalemia, hyponatremia, hyper kalmia,hypernatremia,hypocalcemia,hypercalcemia,pH, etc.

15: Basic nutrition in renaldiseases.

COURSE LEARNING OUTCOMES:

CLO 1. Students can demonstrate the location, position and planes. Explain the anatomy, physiology and functions of various Tissues and cell, organization of urinary system. (1,2&3)

CLO 2. Classify different types of tissue and explain anatomy and physiology of kidneys. Demonstrate the bones of all parts. (4)

CLO 3. Students can explain the anatomy of the vascular system. (6)

CLO 4. Students explain about the mechanism of urine formation,GFR and clearance studies of urinary system. (7,8,9&10)

CLO 5. Students can explain the Physiology of renal circulation andHormones produced by kidney & physiologic alterations in pregnancy.
11&12)

CLO 6.Students can explain the hemostasis, acid base balance and the nutrition required in renal diseases.(13,14&15)

TEXT BOOKS:

- Anatomy and Physiology for Nurses
- Surface and Radiological Anatomy – Hamilton et al (Heffer)
- Essentials Of Medical Physiology: by K Sembulingam
- Textbook of Physiology- AK Jain

REFERENCE BOOKS:

- Essentials of Human Anatomy – Russel
- An Atlas of normal radiographic Anatomy – Ross and Wilson

WEB LINKS:

- https://www.physoc.org/
- http://aups.org.au/
- https://www.hapsweb.org/default.aspx

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT 111
Course Name-Biochemistry
Course credit: 2
Total hours: 80

COURSE OBJECTIVE:

The students will learn the details about metabolism of carbohydrates, proteins, lipids, nucleic acids, enzymes & the deficiency diseases related to This subject shall give information about all the major metabolic pathways occurring in our body.

COURSE DESCRIPTION:

This course involves a study of the metabolism of carbohydrates, proteins, fats, minerals, vitamins and essential enzymes. The role of these in the functioning of the human body will be discussed.

COURSE CONTENT:

1. Specimen collection:
   a. Pre-analytical variables.
   b. Collection of blood.
   c. Collection of CSF &other fluids.
   d. Urine collection.
   e. Use of preservatives.
   f. Anticoagulants.

2. Introduction to laboratory apparatus
   a. Pipettes: different types (graduated,volumetric,Pasteur, automaticity.)
   b. Calibration of glass pipettes.
   c. Burettes, beakers, petri dishes, depression plates.
   d. Flasks: different types (volumetric,roundbottomed,Erlin Meyer conicaletc.).
   e. Funnels: different types (conical, Buchner.).
   f. Bottles: reagent bottles – graduated and common, wash bottles – different type specimen bottles

3. Measuring cylinders, porcelain dish
   a. Tubes: test tubes, centrifuge tubes, test tube draining rack.
   b. Tripod stand, wire gauze, Bunsen burner.
   c. Cuvettes,significanceofcuvettes in colorimeter,cuvettesforvisibleandUVrange. Cuvette holder racks: bottle, test tube, pipette, desiccator, stop watch, timers, scissors.
   d. Dispensers: reagent andsample.
   e. Maintenance of lab glass ware andapparatus.
   f. Glass and plastic ware inlaboratory.
   g. Use of glass: significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions ofglass.
   h. Careandcleaningof plasticware, differentcleaningsolution.

4. Instruments (Theory and demonstration) Diagrams to be drawn
    a. Use, care and maintenance of: water bath, oven & incubators, water distillation plant, water deionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pHmeterandelectrodes.
    b. Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversionofGtoRPMand vice versa, different types of centrifuges.
    c. Manual balances: single pan, double pan, triple balance, direct read out electrical balances.
    d. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids, hygroscopiccompounds etc.
    e. Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types,guidelinestobefollowedandprecautionsto be taken while using.
5. Safety of measurements
6. Conventional and SIunits
7. Atomic structure
    a. Dalton's theory, properties of electrons, protons, neutrons, and nucleus, Rutherford'smodelofatomicstructure, Bohr'smodelofatomicstructure,orbitand orbital quantum numbers, Heisenberg's uncertainly principle. Electronic configuration, Aufbau principle.
    b. Pauli's exclusion principle, etc.
    c. Valency and bonds: different types of strong and weak bonds in detail with examples.
    d. Theory & Practical for all the following under this section: molecular weight, equivalentweightofelementsandcompounds, normality, molarity. Preparation ofmolar solutions (mole/lit resolution) e.g.:1MNaCl,0.15MNaCl,1MNaOH,0.1 M HCl, 0.1 M H2S04etc.
    e. Preparation of normal solutions. e.g., 1N Na2CO3, O.1N Oxalic acid, 0.1 N HCl, 0.1N H2SO4, 0.66 N H2S04 etc., percent solutions. Preparation of different solutions: v/vw/v(solids, liquids and acids).Conversion of percent solution into a molar solution.
8. Dilutions
    a. Diluting solutions: e.g. preparationof0.1NNaClfrom1NNaCl&from2NNaCl etc., preparingworkingstandardfromstockstandard, bodyfluiddilutions, reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc., saturated and supersaturated solutions. Technique for preparation of standard solutions.: glucose, urea, etc. Significanceofvolumetricflaskinpreparing.

       standard solutions. Volumetric flasks of different sizes, preparation of standard solutions of deliquescent compounds (CaCl2, potassium carbonate, sodium hydroxide etc.). Preparation of standards using conventional and SI unit's acids, bases, salts and indicators.
9. Acids andBases
    a. Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowry–Bronstedtheoryofacidsandbases.Classificationofacids andbases.
    b. Differences between bases and alkali, acidity and basicity, monoprotonic and polyprotonic acids and bases. Concepts of acid base reaction, hydrogen ion

concentration, ionization of water,bufferandpHvalue of solution.

c. Preparationofbuffersolutionsusingp Hmeter. Salts: definition, classification, waterof crystallization, definitionanddifferenttypes, deliquescentandhygroscopicsalts.

Theory

10. Acid- base indicators: (Theory and Practical)

a. Definition, concept, mechanismofdissociationofanindica tor, color changeofan indicator in acidic and basic conditions, use of standard buffer solution and indicatorsforpHdeterminations, preparationanditsapplication, listofcommonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators.

Practical

a. Titrationofasimpleacidandabase (preparationofstandardsolutionof oxalic acid and using this solution finding out the normality of a sodium hydroxide solution. AcidtobetitratedusingthisbaseCalculation ofnormalityofanacidorabaseafter titration, measurement of hydrogen ion concentration.

11. Qualitycontrol

a. Accuracy, precision. Specificity, sensitivity, limitsoferrorallowableinlaboratory, percentage error.
b. Normal values and Interpretations.

12. SpecialInvestigations

a. Serumelectrophoresis,immunoglobulins,drugs:digitoxin,theophylline,regulation of acid base status, Henderson Hassel Bach equations, buffers of the fluid, pH regulation,disturbanceinacidbasebalance,aniongap,metabolicacidosis,metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of bloodgasesandpH,basicprinciplesandestimationofelectrolytes,waterbalance, sodium regulation, bicarbonate buffers, nutrition, nutritional support with special emphasis on parental nutrition, calorific value, nitrogen balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins.

Practical

1. Analysis of normal urine.
2. Composition of urine.
3. Procedure for routine screening.

4. Urinary screening for inborn errors of metabolism.
5. Common renal disease.
6. Urinary calculus.
7. Urine examination for detection of abnormal constituents.
8. Interpretation and diagnosis through charts.
9. Liver function tests.
10. Lipid profile.
11. Renal function test.
12. Cardiac markers.
13. Blood gas and electrolytes.
14. Estimationofbloodsugar, bloodureaandelectrolytes.
15. Demonstrationofstrips, demonstrationofglucometer.

COURSE LEARNING OBJECTIVE

CLO 1. Discuss the fundamental biochemistry knowledge related to specimen collection and laboratory apparatus.(1,2,3&4)

CLO 2. Through this course the students are exposed to importance of biological macromolecules.(5&6)

CLO 3. They study the influence and role of structure in reactivity of biomolecules including acid and bases and their indicators,(9&10)

CLO 4. At the end of the course, the students have a thorough understanding on the role of biomolecules and their functions and about the quality control and various special investigations.(11&12)

CLO 5. The students will know about the atomic structure and dilutions of variouys solutions.(7&8)

Text books

- Practical Clinical Biochemistry by Harold Varley
- Text book of biochemistry by P. B. Godker
- Principal of Biochemistry by u. Satyanarayana
- Principal of Biochemistry by M. A. Siddiqi

Reference books

- Instrumental Analysis by Chatwal Anand
- Text book of Medical Biochemistry by Chaterjee, Shinde
- Principal of Biochemistry by Lehninger

Online links for study & reference materials.

- http://www.freebookcentre.net/Chemistry/BioChemistry-Books
- https://www.slideshare.net/

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-201

Course Name -Pathology

Course Credit: 04

Total Credit Hours: 130 hours

COURSE OBJECTIVE:

- To familiarize students with the basic disease patterns including definition, etiology, morphological changes in different organ system diseases in addition to their fate and complication.
- To provide students with essential knowledge for gross and microscopic changes in different diseases for understanding and interpreting pathological reports.

COURSE DESCRIPTION:

- Discuss the principals of general pathology (cell injury, inflammation, tissue repair, homodynamic, cellular dysplasia , neoplasia… etc.) and explain different disease processes occurring in cardiovascular system, renal and endocrinal organs; their causes (etiology), and how the disease develops in response to the etiologic agents (pathogenesis) together with infectious diseases in all body organs.
- Describe and discuss characteristic gross and microscopic pictures of different pathologic lesions within those organ systems and the associated functional disturbances.
- Determine the fate and complications of different disease processes

COURSE CONTENT:

1. Histopathology
    a. Introduction to histopathology.
    b. Receiving of specimen in the laboratory.
    c. Grossing techniques.
    d. Mounting techniques: variousmountants.
    e. Maintenance of records and filing of the slides.
    f. Use & care of microscope.
    g. Various fixatives, mode of action, preparation and indication.
    h. Section cutting.
    i. Tissue processing for routine paraffin sections.
    j. Decalcification of tissues.
    k. Staining of tissues: H & EStaining.
    l. Bio-medical waste management.

2. Clinical Pathology
    a. Introduction to clinical pathology.
    b. Collection, transport,preservation,andprocessingofvariousclinicalspecimens.

c. Urine Examination: collection and preservation of urine, physical, chemical, microscopicexamination.
d. Examination of body fluids.
e. Examination of cerebro spinal fluid (CSF).
f. Sputum examination.
g. Examination offaeces.

3. Hematology
   a. Introduction to hematology.
   b. Normal constituents of blood, their structure and function.
   c. Collection of blood samples.
   d. Anticoagulants used in hematology.
   e. Instrumentsandglasswareusedinhaematology, preparationanduseofglassware.
   f. Laboratory safetyguidelines.
   g. SI units and conventional units in hospitallaboratory.
   h. Hb, PCV.
   i. ESR.
   j. Normal hemostasis.
   k. Bleeding time, clotting time, prothrombin time, activated partial thromboplastin time.

4. Blood Bank
   a. Introduction.
   b. Blood grouping and Rhtypes.
   c. Cross matching.

Practical

1. Urine Examination: physical, chemical, microscopic.
2. Blood grouping Retyping.
3. Hb estimation, packed cell volume (PCV), erythrocytese dimentationrate. (ESR).
4. Bleeding time, clottingtime.
5. Histopathology: section cutting and H &Estaining.

COURSE LEARNING OUTCOME:

CLO1. Interpret gross and microscopic pictures aiming at reaching the correct diagnosis. (UNIT1)

CLO2. Predict the diagnosis of different diseases based on the underlying gross and microscopic pictures (UNIT2)

CLO3. Employ the different diagnostic pathological tools (UNIT3)

CLO4. Interpret a pathology report in an accurate manner. (UNIT4)

CLO5. Respond appropriately according to the seriousness of pathologic diagnosis in acceptable manner. (UNIT4)

TEXTBOOKS:

- harsh_ Mohan text book of pathology 6th edition.
- Robbins and cot ran pathologic basis of disease, 9th edition

REFRENCE BOOKS:

Guyton and hall text book of medical physiology 13th edition

WEB LINKS:

Http/www.pathologystudent .com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-202

Course Name -Microbiology

Course credit: 4

Total hours: 130

COURSE OBJECTIVE:

- To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites;
- To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice;
- Tounderstandthepathogenesisofthediseasescausedbytheorganismsinthehumanbody with particular reference to the eye infections
- To understand basic principles of diagnostic ocular microbiology.

COURSE DESCRIPTION:

This course covers the basic biological biochemical and pathogenic characteristics of pathogenic organisms

COURSE CONTENT:

1. Morphology
    a. Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.
2. Growth and nutrition
    a. Nutrition, growthandmultiplicationsofbacteria, useofculturemediaindiagnostic bacteriology.
3. Culture media
    a. Useofculturemediaindiagnosticbacteriology, antimicrobialsensitivitytest.
4. Sterilization and Disinfection
    a. Principlesanduseofequipmentofsterilization namely hot air oven, autoclave and serum inspissate, pasteurization, antiseptic and disinfectants.
5. Immunology
    a. Immunity, vaccines, types of vaccine and immunization schedule, principles and interpretationofcommonserologicaltestsnamelyWidal, VDRL, ASLO, CRP, RF&ELISA.
    b. RapidtestsforHIVand HBsAg (excludingtechnicaldetails).
6. Systematic Bacteriology
    a. Morphology, cultivation, diseasescaused, laboratory diagnosis including specimencollectionofthefollowingbacteria (excluding classification, antigenic structure and pathogenicity),
    b. Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, *E. coli*, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas Spirochetes
7. Parasitology
    a. Morphology, life cycle, laboratory diagnosis of following parasites: *E. histolytica*, Plasmodium, tape worms, Intestinal nematodes.

8. Mycology
    a. Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi
9. Virology
    a. General properties of viruses, diseases caused lab diagnosis and prevention of followingviruses, Herpes, Hepatitis, HIV,RabiesandPoliomyelitis.
10. Hospitalinfection
    a. Causative agents, transmission methods, investigation, prevention and control of hospitalinfection.
11. Principles and practice Biomedical wastemanagement

COURSE LEARNING OBJECTIVE:

CLO1: To prepare the students to gain essential knowledge about the characteristics of bacteria, viruses, fungi and parasites ;(1,2&3)
CLO2: To acquire knowledge of the principles of sterilization and disinfection in hospital and ophthalmic practice ;(4&5)
CLO3: To understand the pathogenesis of the diseases caused by the organisms in human body and about the systemic microbiology, mycology, virology. (6,7,8&9)
CLO4: To understand about the hospital infections. (10)
CLO5: To understand basic principles and practice of biomedical waste management. (11)

Text Book

- Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi - 199
- Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers, New Delhi

REFERENCE BOOKS

- Microbiology
- Anathanarayana & Panikar Medical Microbiology
- Roberty Cruckshank - Medical Microbiology - The Practice of Medical Microbiology
- Chatterjee - Parasitology - Interpretation to Clinical medicine.
- Rippon - Medical Mycology
- Emmons - Medical mycology

WEB LINKS:

- Http/www.pathologystudent .com

Practical

1. Compound microscope.
2. Demonstrationofsterilizationequipment's: hotairoven, autoclave, bacterialfilters.
3. Demonstrationofcommonlyusedculturemedia, nutrient broth, nutrient agar, blood agar, chocolateagar, MacConkeymedium,LJmedia,Robertsoncookedmeat media,Potassium tellurite mediawithgrowth, MacConkeymediumwithLF&NLF, NAwith staph.
4. Anaerobic culturemethods.
5. Antibiotic susceptibilitytest.
6. Demonstration of common serological tests: Widal, VDRL, ELISA.
7. Gram's staining.
8. Acid fast staining.
9. Stool exam for helminthic ova &cysts.
10. Visittohospitalfordemonstrationofworkdonebyinfectioncontrolteamandbiomedical waste management department.

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-203

Course Name -Applied Pathology & Microbiology related to Dialysis Therapy Technology

Course credit: 4

Total hours: 130

COURSE OBJECTIVE:

- To familiarize students with the basic disease patterns including definition, etiology, morphological changes in Urinary system disorders in addition to their fate and complication.
- To provide students with essential knowledge for gross and microscopic changes in different diseases of renal system for understanding and interpreting pathological reports.

COURSE DESCRIPTION:

- Describe and discuss characteristic gross and microscopic pictures of different pathologic lesions within the urinary systems and the associated functional disturbances.
- Determine the fate and complications of different disease processes

COURSE CONTENT:

Pathology

1. Congenital abnormalities of urinary system.
2. Classification of renal diseases.
3. Glomerular diseases: causes, types &pathology.
4. Tubulo-interstitial diseases.
5. Renal vascular disorders.
6. End stage renal diseases: causes &pathology.
7. Pathology of kidney in hypertension, diabetes mellitus, pregnancy.
8. Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes.
9. Pathology of urinary tract infections
10. Pyelonephritis &tuberculosis pyelonephritis

Microbiology

1. Hepato tropicvirusesindetail: modeoftransfusion,universalprecautionsvaccinations.
2. Humanimmuno deficiencyvirus (HIV), modeoftrans-fusion, universal precautions.
3. Opportunistic infections.
4. Microbiology of urinary tract infections.
5. Microbiologyofvascaraccess infection (femoral, jugular,subclavian catheters).
6. Sampling methodologies for culture &sensitivity.

COURSE LEARNING OBJECTIVE:

CLO1: To prepare the students to gain essential knowledge about the Congenital abnormalities of urinary system and classification of renal diseases. (1&2)

CLO2: To acquire Knowledge about Pathology of kidney in hypertension, diabetes mellitus and pregnancy. (7)

CLO3: To understand the pathogenesis of the diseases caused by the organisms in human body and Glomerular diseases: causes, types, Tubule-interstitial diseases, and renal vascular diseases. (3,4&5)

CLO4: Tounderstand about the Pathology of peritoneum, peritonitis, bacterial, tubular &sclerosing peritonitis, dialysis induced changes and Pathology of urinary tract infections. (8&9)**CLO5:** Tounderstand about the Pathology of Pyelonephritis &tuberculous pyelonephritis (10)

TEXTBOOKS:

- Harsh_ Mohan text book of pathology 6th edition.
- Robbins and cot ran pathologic basis of disease, 9th edition

REFRENCE BOOKS:

Guyton and hall text book of medical physiology 13th edition

WEB LINKS:

Http/www.pathologystudent .com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

\

Course code-RDT-204

Course Name -General pharmacology

Course credit hours: 2

Total hours: 60

COURSE OBJECTIVE:

To know the structural activity relationship of different classof drugs.

COURSE DESCRIPTION:

This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

COURSE CONTENT:

1. Concepts of the interactions of chemical agents with living tissues, effect of drugs on the body, drugs and alteration of disease processes, toxicity effects. New drugs testing and development prior to use for patientcare.

2. Druguseinrenaldisease, drugs in special populations (theneonateandinfant, the pregnantand elderly), pharmacokinetics, druginteractions, Definitions, routesofdrugadministration,

Course Learning Outcomes:

CLO1: Define pharmacology & its branches. (1)

CLO2: Describes Autonomic Nervous system and affecting drugs.(2)

CLO3: Able to know Drugs uses in treatment of renal diseases. (2)

CLO4: Define pharmacodynamics& principles of individualization of drug therapy. (2)

TEXT BOOKS:

1. Essential of Medical Pharmacology- K. D. Tripathi

Reference Book

Pharmacology in Rehabilitations- Ciccone

Online links for study & reference materials.

- http://www.freebookcentre.net/Chemistry/BioChemistry-Books

https://www.slideshare.net/

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-205

Course Name -Pharmacology related to Dialysis Therapy Technology

Course credit hours: 2
Total hours: 50

COURSE OBJECTIVE:

To know the structural activity relationship of different classof drugs related to dialysis therapy.

COURSE DESCRIPTION:

This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment of dialysis therapy. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body. The student will be aware of the contribution of drugs in the outcome of treatment.

COURSE CONTENT:

1. IV fluid therapy with special emphasis in renal diseases.
2. Diuretics: classification,actions,dosage,sideeffects&contraindications.
3. Anti-hypertensives: classification, actions,dosage,sideeffects&contraindications,special referenceduringdialysis, vasopressors,drug sued inhypotension.
4. Drugs & dialysis: dose & duration of administration ofdrugs.
5. Dialyzable drugs: phenobarbitone, lithium, methanolic.
6. Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeuticvalue.
7. Erythropoietin indetail.
8. Heparin,lowmolecularweightheparinandheparin-inducedthrombocytopenia
9. Procaine sulphate as antidote andindication.
10. Alternativeanticoagulants.
11. Formalin,citrate,sodiumhypochlorite,hydrogenperoxide: roleasdisinfectants&adverse effects of residual particles applicable toformalin.
12. Hem dialysis concentrates:composition&dilution (acetate&bicarbonates).
13. Peritonealdialysisfluidinparticularhypertonicsolutions: composition.
14. Potassium exchangers in withspecialemphasisonmodeofadministration.

Course learning Outcomes:

CLO1: Define Diuretics: classification, actions, dosage, sideeffects&contraindications And IV fluid therapy with special emphasis in renal diseases. (1&2)
CLO2: Describe Antihypertensives: classification, actions, dosage, side effects &contraindications, specialreference during dialysis,vasopressors,drugsusedin hypotension. (3)

CLO3: Able to know Drugs uses in treatment of dialysis. (4)

CLO4: Define Dialyzable drugs: phenobarbitone, lithium, methanolic. (5)
CLO5: Describe the Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value and also Erythropoietin in detail. (6&7)
CLO6: Explain about the Heparin, low molecular weight heparin-induced thrombocytopenia (8)
CLO7: Explain about the Procaine sulphate as antidote and indication and Alternative anticoagulants.(9&10)
CLO8: Explainsodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin. (11)

CLO9: To describe about the Hem dialysis concentrates and peritoneal dialysis (12&13) concentrates

CLO10: Describe Potassium exchangers in with special emphasis on mode of administration. (14)

TEXT BOOKS:

1. Essential of Medical Pharmacology- K. D. Tripathi

Reference Book

Pharmacology in Rehabilitations- Ciccone

Online links for study & reference materials.

- http://www.freebookcentre.net/Chemistry/BioChemistry-Books

  https://www.slideshare.net/

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-206

Course Name-Concepts of renal disease, dialysis & Nutrition

Course credit-02
Total Contact Hr-60

COURSE OBJECTIVE:

- To make the students aware of effective care in renal disease.
- To sharpen the student's communication skill.
- To create responsible professional competent to understand how to follow medical protocols fordialysis in an acute care environment.
- To provide complete knowledge about assisting dialysis with proper medical terms and in handling emergencies, taking care of medical and diagnostic supplies.

COURSE DESCRIPTION:

This course is designed to help student gaining knowledge and understanding of complexities of medical terminologies related to renal dialysis, and sharpening cognitive to handle emergencies and patient break downs during complex dialysisprocedures.

COURSE CONTENT:

Basic Concepts of Renal Diseases

1. Acute renal failure.
2. Nephrotic syndrome – primary &secondary.
3. Nephritic syndrome.
4. UTI (urinary tract infections.)
5. Asymptomatic urinary abnormalities.
6. Chronic renal failure.
7. Renal stone diseases.
8. Obstructive uropathies.
9. Congenital & inherited renal diseases.
10. Tumors of kidney.
11. Pregnancy associated renal diseases.
12. Renal vascular disorders & hypertension associated renal diseases.

Basic Concepts of Dialysis Therapy Technology

1. Definition.
2. Indications of dialysis.
3. Types of dialysis.
4. Principles of dialysis.
5. Hemodialysis apparatus - types of dialyzer &membranes.
6. Types of vascular access for hemodialysis.
7. Introduction to haemodialysismachine.
8. Priming of dialysisapparatus.
9. Dialyzer reuse.
10. Common complications of hemodialysis.
11. Monitoring of patients during dialysis.

Basic Concepts of Nutrition

1. Introduction to science ofnutrition.
    a. Definition.
    b. Food pattern and its relation to health.

c. Factors influencing food habits.

d. Superstitions, culture, religion, income, composition of family, age, occupation, special groupetc.
e. Food selection, storage and preservation.

2. Prevention of food adulteration.
3. Classification of nutrients.
    a. Macronutrients and micronutrients.
    b. Types, sources, requirements and deficiency of proteins.
    c. Sources, requirements and deficiency ofcarbohydrates.
    d. Types,sources,requirementsanddeficiency of fats.
    e. Sources, requirement and storage of drinking water.
    f. Types, sources, requirements and deficiency of minerals.
    g. Types, sources, requirements and deficiency of vitamins.

4. Planning of diets.
    a. Need for planning of diets.
    b. Concepts of balanced diet.
    c. Food groups and balanced diet.
    d. Influence of age, sex, occupation &physiological state.
    e. Recommended dietary intake.
    f. Steps in planning balanced diet.
    g. Concepts of balanced diet for dialysis patients.
    h. Recommended dietary intake for dialysis patients.
    i. Planning diet for dialysis patients.
    j. Steps in planning balanced diet for dialysis patients.

Course Learning Outcomes (CLOs)

CLO1: Demonstrate relative knowledge and understanding of medical terminologies
CLO2: Skill to assess, analyse and evaluate the information gathered during the treatment.
CLO3: Demonstrate the ability to plan, organize and repeat different diagnosis related to treatment.and maintain its proper record and report
CLO4: Understand professional and ethical responsibilities in patient care`.

Text Books-

Pollak VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance.

References Book:

B.C. Bhagavan (2017) Text Book of Renal Dialysis, Clement Publications.

Online links for study & references materials:

www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-207

Course Name -Applied Dialysis Therapy Technology – Part I

Course credit-04
Total Contact Hr-130

COURSE OBJECTIVE:

The course is designed to mold students to administer hemodialysis treatments for patients with renal failure, under the governance of a nurse or physician.

COURSE DESCRIPTION:

The students will be able to learn about the indications, history, types and theory of hemodialysis.

COURSE CONTENT:

1. Indications of dialysis.
2. History & types of dialysis.
3. Theoryofhemodialysis: diffusion, osmosis,ultra-filtration& solvent drag.
4. Hemodialysis apparatus: types ofdialyzer&membrane, dialysate.
    a. Dialysis Membrane:
        - Structure,
        - Characteristics [molecular weight cut off; Ultrafiltrationcoefficient (Kuf); Mass transfer coefficient (KoA)and efficiency; Lowandhighflux; Clearance(K)]
        - Biocompatibility
        - Newer membranes.
        - High performance membranes.
5. Physiology of peritoneal dialysis.
6. Dialysis machines:
    a. Latest Haemodialysismachine:
        - Conventional and Portable Machines
        - Wearable artificial Kidney
        - The Bioartificial Kidney
        - Home dialysis machines and patient training
    b. Mechanism of functioning &management:
        - Haemodialysismachine.
        - Peritoneal dialysis machine.
7. Biochemical investigations required for renal dialysis.
8. Adequacy of dialysis:
    a. Hemodialysis.
    b. Peritoneal dialysis.
    c. Peritoneal equilibration test (PET).
9. Anti-coagulation.
10. Withdrawled dialysis criteria:
    a. Acute dialysis.
    b. Chronic dialysis.
11. Dialyzer reuse.
12. Water treatment system.

Course Learning Outcomes (CLOs)

CLO1: Demonstrate relative knowledge and understanding of indication of dialysis and types of dialysis. (1&2)

CLO2: Skill to acquire knowledge on education theories and related practical skills. (3,4&5)
CLO3:Demonstrate knowledge of dialysis therapies including: - the mechanisms of fluid delivery, machine mechanics and membrane physiology. (6)
CLO4: Understandthe Biochemical investigations required for renal dialysis. (7)
CLO5: To explain about the Adequacy of dialysis and about anticoagulation (8&9)
CLO6: To explain about the Withdrawal of dialysis criteria and dialyzerreuse.
(10&11) **CLO7**: To explain about the water treatment system. (12)

Text Books-

Pollak VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance.

References Book:
B.C. Bhagavan (2017) Text Book of Renal Dialysis, Clement Publications.

Online links For study & references materials:
www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

BSc.DT Directed Clinical Education – part II (studentship)

Studentswillgainadditionalskillsin clinicalprocedures, interactionwithpatientsandprofessional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technologyskills.

THIRD YEAR

Course code-RDT-301

Course Name -Applied Dialysis Therapy Technology – Part II

Course credit-04
Total Contact Hr-150

COURSE OBJECTIVE:
The course is designed to mold students to administer hemodialysis treatments for patients with renal failure, under the governance of a nurse or physician.

COURSE DESCRIPTION:
The students will be able to learn about the indications, history, typesand theory of hemodialysis.

COURSE CONTENT:

1: Dialysis in special situations:

- Patients with congestive cardiac failure.
- Advanced liver disease.
- Patients positive for HIV, HBsAg &HCV.
- Failed transplant.
- Poisoning cases.
- Pregnancy.
- Dialysis in infants &children.

2:Special dialysis procedures:

- Continuous therapies in hemodialysis.
- Different modalities of peritoneal dialysis.
- Hemodiafiltration.
- Hemoperfusion.
- SLED.
- MARS.

3: Plasmapheresis

4: Special problems in dialysis patients:

a. Psychology &rehabilitation.
b. Diabetes
c. Hypertension.
d. Infections.
e. Bone diseases.
f. Aluminum toxicity.

5: Renal anemia management: chronic dialysis.

Course Learning Outcomes (CLOs)

CLO1: Demonstrate relative knowledge and understanding of dialysis in special situations. (1)
CLO2: Skill to acquire knowledge on special dialysis procedures. (2)

CLO3:Demonstrate knowledge of dialysis therapies including: - the mechanisms of fluid delivery, machine mechanics and membrane physiology. (3)
CLO4: Understand the specialinvestigations required for renal dialysispatients. (4)
CLO5: To explain about the renal anemia management in chronic dialysis patient (5)

Text Books-

Pollak VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance. .

References Book:
B.C. Bhagavan (2017) Text Book of Renal Dialysis, Clement Publications.

Online links for study & references materials:
www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

Course code-RDT-302

Course Name -Applied Dialysis Therapy Technology – Part III

Course credit-04
Total Contact Hr-150

COURSE OBJECTIVE:

The **course** is designed to mold students to administer hemodialysis treatments for patients with renal failure, under the governance of a nurse or physician.

COURSE DESCRIPTION:

The students will be able tolearn about the indications, history, types and theory of hemodialysis.

COURSE CONTENT:

1. Vascular access for hemodialysis &associated complications.
2. Peritoneal access devices: types of catheters, insertion techniques & associated complications.
3. Complications of dialysis:
    a. Hemodialysis: acute & long-term complications.
    b. Peritoneal dialysis: mechanical &metabolic complications.
4. Peritonitis & exit site infection.
5. Recent advances and research in hemodialysis.
    a. Nocturnal dialysis.
    b. Online dialysis.
    c. Daily dialysis.
6. Telemedicine in dialysis practice.
7. Introductiontokidneytransplantationimmunology, procedure andImmunosuppressive medications.
8. Live donor and cadaver transplantation; paired exchange transplantation and ABO incompatible transplantation; transplant in sensitized recipients.

Practical

1. Setting up dialysis machine for dialysis.
2. A Vcannulation.
3. A V fistula/A V graft cannulation
4. Initiation of dialysis through central venous catheters like internal jugular, femoral &subclavian vein.
5. Packing & sterilization of dialysis trays.
6. Closing of dialysis.
7. Preparation of concentrates depending on the situations.
8. Reuse of dialysisapparatus.
9. Isolated ultrafiltration.
10. Performance of peritoneal dialysis exchange manually.
11. Settingupofautomatedperitonealdialysisequipment.

12. first assistant in minor procedures.
13. Skin suturing.
14. Redemonstrations.
15. Introductiontotissuetypinglaboratoryandwitnessmetrologyfor1) HLA tying methods, tissue cross-match (X-match), panel reactive antibodies (PRA) and Detection of donor specific antibodies (DSA).

Course Learning Outcomes (CLOs)

CLO1: Demonstrate relative knowledge and understanding of indication of dialysis and types of dialysis. (1&2)

CLO2: Skill to acquire knowledge on education theories and related practical skills. (3,4&5)

CLO3: Demonstrate knowledge of dialysis therapies including: - the mechanisms of fluid delivery, machine mechanics and membrane physiology. (6)

CLO4: Understand the Biochemical investigations required for renal dialysis. (7)

CLO5: To explain about the Adequacy of dialysis and about anticoagulation (8&9)

CLO6: To explain about the Withdrawal of dialysis criteria and dialyser reuse. (10&11)

CLO7: To explain about the first assistant in minor procedures (12)

CLO8: To demonstrate about skin suturing andCPR (13&14)

CLO9: To demonstrate about TISSUE Typing laborory and to explain the various methods used in detection of donor specific antibodies (15)

Text Books-

Pollak VE, Lorch JA. Effective computerized patient record improves patient well-being and financial performance. .

References Book:

B.C. Bhagavan (2017) Text Book of Renal Dialysis, Clement Publications.

Online links for study & references materials:

www.slideshare.com
www.wikipedia.com

Assessmentmethod (Continue Internal Assessment=25%,final Examination=75%)

Assessment-1	Assignment	5
Assessment-2	Attendance	5
Assessment-3	Extra-curricular activities	5
Assessment-4	Internals	10
Total Internal Assessment-	Total	25

BSc.DTT Directed Clinical Education – part III (studentship)

Students will gain additional skills in clinical procedures, interaction with patients and professional personnel. Students apply knowledge from previous clinical learning experience under the supervision of a nephrologist or senior Dialysis Therapy Technologist. Students are tested on intermediate clinical dialysis therapy technologyskills.

INTERNSHIP

Theinternshipwillspan 6 months. This will include4hoursofpracticeaday,totalingto 720 hours for ONEsemester.
As a part of this, thestudentswillchoosearelevantsubjectandprepareanin-depthprojectreport ofnotlessthan1000wordswhichwillbe handed over tothesupervisorortrainer.Thereportcan include objective, scope of the project and an in-depth report.

Theinternshiptimeperiodprovidesthestudentstheopportunitytocontinuetodevelopconfidence and increased skill in simulation and treatment delivery. Students will demonstrate competence in beginning and intermediate procedures. Students will observe the advanced and specialized treatment procedures. The student will complete the clinical training by practicing all the skills learned in classroom and clinical instruction. The students are expected to work for minimum 8 hoursperdayandthismaybemoredependingontheneedandthehealthcaresetting.

Job Description for all levels

Level 4: Diploma in Dialysis Therapy Technology

1. JOBTITLE - DIALYSISASSISTANT
2. JOBPURPOSE - Performing dialysis, Monitoring patients, Machine maintenance &ICUdialysis
3. ACCOUNTABLITY - Head of Department/ Chief Dialysis Therapy Technologist / Dialysis Therapy Technologist
4. QUALIFICATION - Diploma in Dialysis TherapyTechnology

CLINICAL CARE RESPONSIBILITIES:

- Sets up, operates, and cleans the haemodialysismachine.
- Performing hemodialysis in dialysis unit and ICU. Connects patients to the hemodialysis machines, with aseptic precautions performs cannulation (simple arteriovenous fistula (AVF)and arteriovenous grafts (AVG)), handles AV shunts, jugular, subclavianandfemoral catheters.
- Planningimplementationofthedialysisprescriptionandexecutionofhemodialysistherapy.
- Documentation of patient data on charts as per unit policies.
- Managing various intra-dialytic complications, notifies shift supervisor of any unusual change in the patient's condition and performing related duties as assigned under the supervision of dialysis Technologist, physicianornephrologist.

CLINICAL OUTCOMES RESPONSIBILITIES:

- Patienteducation, psychosocialanddietcounselingofdialysispatients.
- Maintaining and monitoring, dialysis adequacy, clinical quality practices and infection control within the dialysis unit as per unit policies.

EQUIPMENT & REUSE PRACTICE RESPONSIBILITIES:

- Supervise the proper functioning, preventive maintenance, conduct minor repairs of the dialysis machines and reverse osmosis water systems.
- Settingupandmonitoringthedialysissystemandmachinesasperunitprotocols.
- Maintenance of infection control practices by regular dialysis machine and equipment disinfection as per unit protocols.
- Ensure mandatory compliance of guideline-based reuse practices of dialysis disposables when applicable.

Level 5: BSc Dialysis Therapy Technology /BSc.DTT

1. JOBTITLE - DIALYSIS THERAPYTECHNOLOGIST
2. JOBPURPOSE - Performing dialysis, monitoring patients, machine maintenance, ICU dialysis
3. ACCOUNTABLETO - HOD/ Chief Dialysis Therapy Technologist
4. QUALIFICATION - B.Sc. Dialysis Therapy Technologist (3 years+ one-year internship)

CLINICAL CARE RESPONSIBILITIES:

- Planning implementation of the dialysis prescription, execution of regular hemodialysis therapy.

- Assumes the role of a shift supervisor and assists with the supervision of hemodialysis assistants and auxiliary personnel. Assists the hemodialysis assistant in the use of new or modified techniques, dialysis equipment.

- Performing unusual, difficult and complex dialysis modalities such as slow continuous therapies (CRRT), SLED (slow low efficiency dialysis), Hemoperfusion, Plasmapheresis, Isolated ultrafiltration, peritoneal dialysis, andMARSinthe dialysisandICU.
- Managing under the supervision various intra-dialytic complications or referring to the dialysis physician or nephrologist.
- Documentsandmaintainsdialysispatient records (e.g., patientdailylog, treatment recordsand charts, dialysismachinemaintenance, service records, laboratory equipment and-blood chemistry data, andotherauxiliary dialysisequipment, watertreatmentmaintenancerecords etc.).
- Assists in thetrainingofcaregivers/familymembersofoutpatientsintheoperationofthe hemodialysismachinestofacilitatehomehemodialysisorperitonealdialysis.
- Performingbothacute, andchronic peritonealdialysis. AidingpatientselectingforCAPD, CCPD and NIPD based on their convenience and economic status. Educating and training patients on peritoneal dialysis procedures and sterile techniques. Maintaining data and recordsforanalysisandimprovepatientoutcomes. CounselingPDpatients onpsychosocialneeds, educatingonnutritionalneedsincoordinationwithdietitiansandtransplantneedsin consultation with nephrologist.
- Preparation of daily and weekly reports.
- Maintainingdataandrecordsforanalysisandimprovepatientoutcomes.Undersupervision ofthetreatingnephrologistisresponsibletocoordinatethecareofpotentialrenaltransplant patientsand donorbyfacilitating testing, maintaining documentsand communicatingwithtransplant coordinators, surgicaloranesthesia teamsundernephrologistsupervision.

CLINICAL OUTCOMES RESPONSIBILITIES:

- Patient education, psychosocialanddietcounselingofdialysispatients.
- Maintaining and monitoring, dialysis adequacy, clinical quality practices and infection control within the dialysis unit as per unit policies.

EQUIPMENT & REUSE PRACTICE RESPONSIBILITIES:

- Supervise the proper functioning, preventive maintenance, conduct minor repairs of the dialysis machines and reverse osmosis water systems.
- Settingupandmonitoringthedialysissystemandmachinesasperunitprotocols.
- Maintenance of infection control practices by regular dialysis machine and equipment disinfection as per unit protocols.
- Ensure mandatory compliance of guideline-based reuse practices of dialysis disposables when applicable.

Level 6-8: M.Sc. Dialysis Therapy Technology /MSc.DTT

1. JOBTITLE - Assistant Professor
2. JOBPURPOSE - TeachingandResearchinrenalsciences (Dialysis Therapy Technology)
3. ACCOUNTABLETO- Head of Department
4. QUALIFICATION - M.Sc. RenalSciencesandDialysisTechnologyTechnology

CLINICAL CARE RESPONSIBILITIES:

- Supervisestheactivitiessachemdialysisassistants, technologistsandauxiliarypersonnel on all shifts, including planning and scheduling.
- Providingexpertsupportwithintheunitinthehandlingofallhemodialysisandperitoneal dialysisrelatedandpatient relatedisuse, e.g., dialysis complications, dietary consultations, psychologicalcareandvascularaccessissuesincoordinationwiththenephrologists.
- Monitoring the dialysis patients for intradialytic complications.
- Guiding and teaching the students about pediatric dialysis.
- Guidingthestaffandstudentsondialysisunit policies, infectioncontrolandquality control standards as per unit polices.
- Qualitymaintenanceandoverallsupervisionofspecialproceduresperformedbytheunit e.g., CRRT, ICU dialysis, pediatric dialysis, plasmapheresis, hemoperfusion, SCUF, and MARS.
- Supervising the conduct of regular ongoing patient education nutritional counseling programs in the dialysis unit.
- Overall care of patient outcomes, addresses patient satisfaction scores and patient safety issues.

CLINICAL OUTCOMES RESPONSIBILITIES:

- Patienteducation, psychosocialanddietcounselingofdialysispatients.
- Maintaining and monitoring, dialysis adequacy, clinical quality practices and infection control within the dialysis unit as per unit policies.
- Supervising data documentation, data collection, data validation and outcomes evaluation within the unit.
- Preparationofquarterlyandannualreports

EQUIPMENT & REUSE PRACTICE RESPONSIBILITIES:

- Supervise the proper functioning, preventive maintenance, conduct minor repairs of the dialysis machines and reverse osmosis water systems.
- Settingupandmonitoringthedialysissystemandmachinesasperunitprotocols.
- Assist in implementing new or modified techniques; recommending the purchase of new equipmentorthemodificationofpresent equipment; andmaintaining adequatesuppliesfor the performance of hemodialysis on the particularshiftassigned
- Maintenance of infection control practices by regular dialysis machine and equipment disinfection as per unit protocols.
- Ensure mandatory compliance of guideline-based reuse practices of dialysis disposables when applicable to ensure quality clinical care.

ADMINISTRATIVE RESPONSIBILITIES:

- Evaluates the quality of hemodialysis services performed.
- Performs human resource related duties (e.g., employee evaluation, need for additional manpower, recommending promotions, compensation increases, conductongoingemployeetraining and staff grievance redressals).
- Ensures that hemodialysis equipment is in proper operating condition.
- Evaluates the quality and quantity of suppliesandequipment.

TEACHING RESPONSIBILITIES:

- Teaching of undergraduate (BSc & MSc dialysis) students and coordinating all academic

programs, e.g. clinical and theoretical teaching, conducting assessments and examinations for the diploma, B.Sc. candidates and interns.

RESEARCH RESPONSIBILITIES:

- Encouraging, conducting and mentoring research.
- Enforcing ethical research standards

Level 9-10: PhD Dialysis Therapy Technology

1. JOBTITLE - Professor or Head of Department

2. JOBPURPOSE -Clinical Care, TeachingandResearchinrenalsciences, dialysistherapy technology
3. ACCOUNTABLETO - Head of Department/ Medical Superintendent/CEO
4. QUALIFICATION -PhD, RenalSciencesandDialysisTherapyTechnology

EQUIPMENT & REUSE PRACTICES:

- Supervise the implementation of all the policies, protocols and procedures within the dialysis unit.
- Ensure proper functioning, preventive maintenance, conduct minor repairs of the dialysis machines and reverse osmosis water systems.
- Maintenanceofinfectioncontrolandqualitycontrolpractices as perunitprotocols.
- Ensure mandatory compliance of guideline-based reuse practices of dialysis disposables when applicable.

CLINICAL & ADMINISTRATIVE RESPONSIBILITIES:

- Supervisestheactivitiesofallcategoriesofhemodialysisstaffandauxiliarypersonnelonall shifts, including planning, andschedulingasper unitpolicies
- Confers with nephrologists, physicians, nurses to schedule patients, determine individual patienttreatmenttimeandestablishpatienttriagefordialysisdependingoncomorbidityand severity of disease.
- Supervisesthemaintenanceofallpatientrecords, laboratory parameters.
- Evaluates the quality of hemodialysis services performed.
- Overallcare ofpatient outcomes, patientsatisfactionscoresandpatientsafetyissues.
- Performs human resource related duties (e.g., recommending promotions, compensation increases, conductongoingemployeetrainingandstaffgrievance redressals).
- Evaluates the quality and quantity of suppliesand equipment.
- Ensures that hemodialysis equipment is in proper operatingcondition.
- Formulatingadialysisunitpolicyandproceduresmanualtoensurequalityclinicalcareand quality administrative governance of the unit.
- Implements departmental policies and procedures and recommends changes as necessary. Coordinatesactivitiesofthehemodialysisunitwiththeotherdepartments/facilitiesofthe organization.
- Keep abreast of current trends in hemodialysis techniques and management to ensure ongoingorganizationalchangeandlearningtoimprovepatientcareandoutcomes.

TEACHING RESPONSIBILITIES:

- Teaching of undergraduate (BSc & MSc dialysis) students and coordinating all academic programs, e.g. clinicalandtheoreticalteaching, conductingassessmentsandexaminationsforth diploma, B.Sc. MSc candidates andinternswithdocumentationasneeded.
- Planning and implement ongoing staff educational and skills training programs with continual assessments and monitoring outcomes thereby ensuring on going organizational learninginconsultationwiththeheadofdepartmentandnephrologystaff.

RESEARCH RESPONSIBILITIES:

- Encouraging, conducting and mentoring research.
- Encouragingresearchmethodologytrainingamongthestudentsandfaculty.
- Enforcing ethical research standards.

NOIDA INTERNATIONAL UNIVERSITY
SCHOOL OF HEALTH SCIENCES

The Public Health Landscape in India:

Despite significant achievements over the years, Public Health challenges continue to stretch the existing resources, both in India and in the world. The countries, across the globe, strive towards achieving the Millennium Development Goals, yet the agenda remains unfinished. With the commencement of Sustainable Development Goals (SDG) era, a renewed thrust is required to maintain and improve upon the progress achieved so far.

While old threats continue to challenge health systems, new issues and challenges have appeared, thereby overburdening the health systems. Countries have developed an increased ownership towards the need to create a healthier population. Across the world, governments and voluntary organizations have worked towards strengthening the health systems through multiple approaches. Creation of a dedicated Public Health Cadre has been identified as one of the important pre-requisites in this direction. Public Health professionals help in bridging the gap between the clinical and managerial aspects of the program implementation and provide techno-managerial inputs. Public Health Programs demand a special emphasis on the study of disease epidemiology, various determinants of health & emerging challenges in health, public policy making and program management.

The determinants of health reside both within and beyond the formal health sector. Public health, as defined by Winslow is both an 'art' and a 'science'. Every discipline has its unique perspective of the world. We believe these perspectives from individual disciplines enrich public health. This course will be an attempt to prepare competent cadre of professionals who have a basic understanding of the various aspects of public health and are able to successfully apply this knowledge towards meeting public health challenges in Indian context.

Establishment of the Taskforce on Public Health in India:

The Joint Working Group UK- India embarked on the Master of Public Health (MPH) curriculum under the direction of Joint Secretary (Medical Education and Training) and held its first meeting on Sep 03, 2014 at New Delhi and the second meeting in January 2015 in London, UK. Subsequent to further joint meetings, led by the two co-chairs, it was decided to form a Taskforce on Public Health Education (PHE) in India under the Sub-group on Health Education and Training with expert members from the two countries.

The curriculum guideline that follows herewith, is a result of detailed deliberations, both remote and in person, between public health (PH) experts of both countries. As prescribed in the Terms of Reference for the Taskforce, the following essential elements, among others, have been addressed and included:

a) Level of course/ semester(s) for MPH
b) Minimum duration of course work
c) Evaluation criteria
d) Expected skills and competencies to be developed in the PH Postgraduate **Overall**

Program/Course Objectives in terms of Skills, Competencies and Learning Outcomes:

The course will help candidate to **develop skills in the following areas:**

- Analytical and assessment skills for collecting and interpreting information

- Policy planning and development skills to address public health challenges
- Communication skills for advocacy, dissemination and evaluation of public health data and information
- Financial planning and management skills for running public health programs in the country
- Leadership skills

At the end of the 2-years program, the PH Post-graduates are expected to demonstrate the **following Broad Values in the context of Public Health**:

1. Apply contemporary ideas to influence program organization and management, problem solving and critical thinking in public health domain
2. Undertake operational research in institutional and field settings
3. Work in socially, culturally and economically diverse populations by being attentive to needs of vulnerable and disadvantaged groups and be well versed with existing health systems
4. Demonstrate qualities of leadership and mentorship
5. Be an effective member of a multidisciplinary health team
6. Demonstrate ethics and accountability at all levels (professional, personal and social)
7. Practice professional excellence, scientific attitude and scholarship
8. Demonstrate social accountability and responsibility
9. Be open to lifelong learning

Specific to the course content, successful candidates are expected to demonstrate thefollowing competencies in a Public Health setting:

1. **Apply the course learning to the public health system and its challenges:**
    a. Demonstrate adequate knowledge and skills to a wide range of public health topics
    b. Critically conduct the situational analysis and develop action plan for identified public health issues
    c. Develop workforce for taking public health related responsibilities in defined geographical areas
    d. Develop an understanding of the epidemiological transitions of programs specific to each State within the country in order to prioritize public health challenges for policy making

2. **Develop, implement and evaluate key public health policies:**
    a. Develop a capacity to apply conceptual framework to understand policy processes in health care
    b. Understand roles of supply and demand in policy making in health care
    c. Develop an understanding to facilitate inter-sectoral coordination and public- private partnership
    d. Critically analyse resource allocation for competing public health interests across programs
    e. Formulate context appropriate policies and design programs to address public health challenges, effectively

3. **Develop and demonstrate competency in managing health systems at different levels:**
    a. Identify immediate and long term health program goals at national, State and district levels
    b. Prioritize health issues in population
    c. Describe various managerial information systems and their application
    d. Describe program management plans in health
    e. Understand and apply core management principles for human resources in health
    f. Understand and apply program budgeting and economic evaluation
    g. Understand and apply quality assurance and improvement techniques in health care

4. **Develop competency in research:**
    a. Understand and apply ethical principles in research, evaluation and dissemination
    b. Develop competence to critically evaluate existing information and identify gaps
    c. Formulate and test research hypotheses in real world scenario
    d. Translate research knowledge for evidence based policy making

Eligibility Criteria for the Masters in Public Health Program:

Since public health is interconnected and influenced by our surrounding, global institutions have wide eligibility criteria for undertaking the Masters in Public Health (MPH) programs. In the Indian context, we see a very important role for candidates from multiple professional backgrounds within MPH programs. Thereby, the eligibility Criteria for MPH program in India may include both science as well as non-science graduates.

The following are suggested eligibility criteria for the MPH Program in India:

Graduates in

- Medicine / AYUSH / Dentistry / Veterinary Sciences / Allied and Health Sciences / Life Sciences
- Statistics / Biostatistics / Demography / Population Studies / Nutrition / Sociology / Psychology / Anthropology / Social Work

Although highly recommended, candidates need not be restricted to the above disciplines and graduates from selected backgrounds other than these, may be taken by the Universities, when considering the overall aptitude and eligibility of a certain candidate.

Demonstrated work experience in a healthcare-related field is highly desirable.

Duration of the course: This course is designed to be a two years' full time program including internship and dissertation.

Course outline

COURSE FORMAT

During the MPH classes, there will be instructor/speaker presentation, class discussion, andgroup work and/or class activities addressing the designated topic. Students are encouraged to share any additional journal or newspaper articles related to course topics with the class.

Please email or bring them to class so they can be shared. Course points will be earned based on the following:

1. Group/Class Participation & Attendance: Students are expected to attend every class, read all class assignments, participate in class and working group discussions/activities, complete written assignments, and complete in-class exams. Please inform, submit and sign documents from the instructor in case of any unexpected absences prior to class. Attendance are taken seriously and will be taken regularly. Use the BIOMETRIC REGULARLY FOR YOUR ATTENDANCE IN THE MORNING from 9.30 a.m. to 4.30p.m daily. On NO OCCATION SHOULD ANY STUDENT LEAVE THE PREMISSES. Most weeks, students will be divided into groups to discuss the topic of the week or engage in a class activity. Individuals will be placed in different groups each time. Discussions/activities will address readings, case studies, article highlights and specified issues. In most instances, the group will provide a verbal and written report back to the rest of the class. All discussion should be respectful and reflect understanding of individuals' beliefs and experiences.

2. Assignments: This includes individual or groups assignments to given by yourteachers and submitted throughout the semester. There also projects involve with the assignments, attendance, posters, labs will be graded.

3. Research Paper: Research papers will focus on a specific health issue and an at risk population. All papers will include a discussion of the identified health issue, justification of the targeted population (for example epidemiological data), and identification of both positive and negative social, cultural, and/or behavioral factors e.t.c that contribute to the specific health pattern or outcome. Topics must be pre-approved by the instructor. Topic proposal in the form of a paragraph (300 words).

Your paper should include the following sections:-

□ Title Page (Title, Your name, Date, Course Name & Number, Instructor Name)

□ Introduction

- This section should include a brief description of the overall purpose of the paper and provide an overview of the health issue.

□ Health Issue (Review and synthesize of pertinent literature)

- Discuss the specific health problem/issue.
- Discuss the relationship between the biological pathway and the major factors influencing the disease process and/or health outcome.
- Do not select a health issue that has a strong genetic determinant as you will have little opportunity to discuss behavioural factors.

□ Objectives & Method

- Targeted Population, Discuss the specific population on which you are focusing.
- Provide a demographic description of the population.
- Discuss any relevant factors of the population.

□ Result

- Integration of the Health Issue and Target Population related to your topic

- Explain how the risk and/or protective factors for the specific population contributingto the control and/or occurrence of the health condition.
- Identify positive and negative factors related to the topic that you have chose

□ Discussion of conclusions and recommendations

- Summarize the literature and your conclusions about the relationship between thepopulation and the specific health pattern
- Make recommendations regarding what could be done to prevent and reduce thehealth problem in this population and how lessons learned in this population could beapplied to other populations or the nation.

□ References Cited - use the Vancouver style. Citing references should be cited in the body

of the text. (http://www.apastyle.org/learn/tutorials/basics-tutorial.aspx/).

Do not use Wikipedia as a cited reference. Focus on peer-reviewed research articles. Other

information: The papers should not be longer than 10 double spaced pages, not Including

references or title page. Margins should be one inch and font should be

New Times Roman 12-point font. If you have limited experience writing a scientific research paper, review articles in professional public health journals to understand the concise style typical of research manuscripts. Avoid using first person and unreferenced pronouns, e.g. "it", "that" or "this" not followed by a noun. Other "pitfalls" will be reviewed. Department of Public Health- SON, will offer students a 1-2 hour workshop for PubMed/Ovid Searching, google scholar and RefMan. Attendance at this workshop is optional. This workshop will help students meet the reference criteria of the research paper.

The MPH course will comprise of 15 Core modules and several elective modules which may be offered by Universities depending on their capacity and capability. **Four** elective streams comprising five modules each have been suggested in this document in addition to **15 Core** modules. A candidate will need to pass 15 Core (compulsory) modules, and five (5) elective modules of the chosen stream to successfully complete the program.

A. Core modules (compulsory for all four streams)

i. Social &Behavioural Aspects of Public Health
ii. Epidemiology
iii. Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases
iv. Biostatistics
v. Population sciences
vi. Women, Child health & Gender issues
vii. Health System & Policies in Public Health
viii. Ethics in Public Health
ix. Health Economics & Health care Financing
x. Occupation & Industrial health
xi. Environmental Health & Sustainable Development
xii. Nutrition & Food Safety in Public Health
xiii. Health Communication & Behavioural change Communication

xiv. Research methodology
xv. Health Programme Management
xvi. Global health

B. Elective streams •Epidemiology

i. Advanced Biostatistics
ii. Advanced Epidemiology
iii. Survey design and methods
iv. Infectious disease epidemiology
v. NCD epidemiology

Note: *Modules (i) to (v) compulsory for Epidemiology Stream*

•**Health Management**

i. Strategic management in public health
ii. Organization Behavior and Design
iii. Human Resource Development
iv. Quality Assurance and Total Quality
v. Management Information and Evaluation System
vi. *Social entrepreneurship, NGO Management & Marketing

Note: *Modules (i) to (v) compulsory for Health Management Stream*

•**Industrial and Occupational Health**

i. Principles and Relevance of Industrial and
ii. Occupational Health
iii. Occupational health disorders and diseases
iv. Industrial Hygiene
v. Ergonomics
vi. Industrial Psychology
vii. Occupational Services at workplace
viii. Legislations related to occupational health and safety
ix. Semester-IV

Note: *Modules (i) to (v) compulsory for Industrial and Occupational Health*

•**Clinical Trials Specialization (III & IV Semester)**

i. Epidemiology and principles of clinical research
ii. Drug discovery and Development
iii. Ethics in clinical trials
iv. Drug safety research and pharmacovigilance
v. Statistics and Data Management for clinical research
vi. Designing of clinical trials
vii. Regulatory affairs in clinical
viii. Management of clinical trials
ix. Semester – IV

Note: *Modules (i) to (v) compulsory for Clinical Trials Specialization +A Stream*

Note: Institutes may also choose to offer elective modules in other thematic areas such as *Advanced Health Economics and Financing, Advanced HealthInformatics, RMNCH+A, Advanced Environmentaland Health Programme, Policy and Planning, Global health security and International Policies,Advanced Health Promotions, Human Resources for Health* etc. Each elective stream MUST contain coursework for at least **10 credits or 350 hours**.

C. Dissertation

Semester Distribution of Master's Program

Suggested calendar of activities
(*1 month ~ 120 teaching hours @ 6 hours per day* 5 days a week*)
(1 credit = 35 teaching hours) Breaks to be calculated as applicable

Semesters	Months	In/out Campus	Approximate division of Teaching/practical Hours
Semester 1	6 months	In campus classes	~500
Semester 2	6 months	In campus classes	~500
Semester 3	4 months	In campus classes	~350
	2 month	**Internship**	~80
Semester 4	2 months	In campus classes	~150
	4 months	**Research, submission and defence of dissertation**	350

Holidays and breaks may be planned as applicable to each individual institution/regional calendar. The suggested organization of modules is as follows:

SEMESTER 1 MODULES
Social and Behavioural Aspects of Public Health
Epidemiology
Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases
Biostatistics
Population Sciences
Women & Child Health and Gender Issues
Health System & Policies in Public Health
SEMESTER 2 MODULES
Ethics and Regulatory issues on Human Research in Public Health
Health Economics & Health Care Financing and application to global health
Occupational and Industrial Health
Health Communication & Behaviour Change Communication
Research Methodology

Health Program Management [Disaster Management]
Global Health
Environmental Health and Sustainable Development
Nutrition and Food Safety in Public Health
SEMESTER 3 MODULES
Strategic management in public health
Organization Behavior and Design
Human Resource Development
Quality Assurance and Total Quality
Management Information and Evaluation System
*Social entrepreneurship, NGO Management & Marketing
Internship with health care organization – Thesis writing and presentation
SEMESTER 4 MODULES
Elective Stream modules (5)

COURSE CREDITS and TEACHING HOURS

S No.	COURSE		Credits		TeachingHours
A	**COREMODULES**				
MPH101	Social &Behavioural Aspects of Public Health		3		**50**
MPH102	Epidemiology		6		**90**
MPH103	Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases		6		**90**
MPH104	Biostatistics		5		**75**
MPH105	Population sciences		4		**60**
MPH106	Women, Child health & Gender issues		2		
MPH107	Health System & Policies in Public Health		6		**90**
MPH108	Ethics in Public Health		2		**40**
MPH109	Health Economics & Health care Financing		4		**60**
MPH110	Occupation & Industrial health		1		**20**
MPH111	Environmental Health & Sustainable Development		4		**60**
MPH112	Nutrition & Food Safety in Public Health		4		**60**
MPH113	Health Communication & Behavioural change Communication		4		**60**
MPH114	Research methodology		6		**90**
MPH115	Health Programme Management		4		**60**
MPH116	Global health		1		**20**

	TOTAL FOR CORE MODULES		62		925

S No.	COURSE		Credits		TeachingHours
A	**SEMESTER 1 CORE MODULES**				
(MPH101)	Social and Behavioural Aspects of Public Health		3		50
(MPH102)	Epidemiology		6		90
(MPH103)	Epidemiology & Management of Communicable Diseases and Non-Communicable Diseases		6		90
(MPH104)	Biostatistics		5		75
(MPH105)	Population Sciences		4		60
(MPH106)	Women & Child Health and Gender Issues		2		40
(MPH107)	Health System & Policies in Public Health		6		90
	TOTAL FOR CORE MODULE		32		495
B	**SEMESTER 2 CORE MODULES**				
(MPH201)	Ethics and Regulatory issues on Human Research in Public Health		2		40
(MPH202)	Health Economics & Health Care Financing and application to global health		4		60
(MPH203)	Occupational and Industrial Health		1		20
(MPH204)	Environmental Health and Sustainable Development		4		60
(MPH205)	Nutrition and Food Safety in Public Health		4		60
(MPH206)	Health Communication & Behaviour Change Communication		4		60
(MPH207)	Research Methodology		6		90
(MPH208)	Health Program Management [Disaster Management]		4		60
(MPH209)	Global Health		1		20
	TOTAL FOR CORE MODULE		30		470
C	**SEMESTER 3** **Based on Specializations in any one area**				
C1	**Health Management**				
MPH301	Strategic management in public health		4		60
MPH302	Organization Behavior and Design		4		60

MPH303	Human Resource Development		4		60
MPH304	Quality Assurance and Total Quality		4		60
MPH305	Management Information and Evaluation System		4		60
MPH306	Social entrepreneurship, NGO Management &Marketing		4		60
SEMESTER 4 CORE MODULES					
MPH 400	Hospital Management		3		50
MPH 401	Internship with health care organization – Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		24		360
C2	**Industrial and Occupational Health**				
MPH307	Principles and Relevance of Industrial and Occupational Health		4		60
MPH308	Social entrepreneurship, NGO Management &Marketing		4		60
MPH 309	Industrial Hygiene		4		60
MPH 310	Ergonomics		4		60
MPH 311	Industrial Psychology		4		60
MPH 312	Occupational Services at workplace		4		60
MPH 313	Legislations related to occupational health and safety		4		60
MPH 400	Hospital Management		3		50
MPH 402	Internship- Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		28		420
C3	**Clinical Trials Specialization (III & IV Semester)**				
MPH 314	Epidemiology and principles of clinical research		4		60
MPH 315	Drug discovery and Development		4		60
MPH 316	Ethics in clinical trials		2		20
MPH 317	Drug safety research and pharmacovigilance		4		60
MPH 318	Statistics and Data Management for clinical research		4		60
MPH 319	Designing of clinical trials		4		60
MPH 320	Regulatory affairs in clinical		4		60
MPH 321	Management of clinical trials		4		60
MPH 400	Hospital Management		3		50
MPH 403	Internship with industry, Thesis writing and presentation		24		
	TOTAL FOR CORE MODULES		30		440

	IT applications in Public Health				
	Epidemiology & Biostatistics				

NB: 1Credit= 15hrs of class room teaching and doubled in case of field visit/practical/ project

Importance of Professionalism, values and communication: During orientation week, the course is expected to provide the candidate an overview of professionalism, importance of professional values and communication including;

- Professional values- Integrity, objectivity, professional competence and confidentiality.
- Core values- Accountability, Altruism, Compassion/ caring, excellence, integrity, professional duties, social responsibility
- Personal values- ethical or moral values
- Attitude and behaviour- professional behaviour, treating people equally
- Code of conduct, professional accountability and responsibility, misconduct
- Cultural issues in the healthcare environment
- Differences between the various healthcare professions and importance of team efforts
- Entry level health care practitioner, direct access, autonomy in profession, practitioner of medical practice and evidence based practice

General evaluation:

Each semester will have theory exam and practical examination at the end of the semester and in addition the fourth semester will also be evaluated on the basis of the Dissertation.

MPH 1ST SEMESTER

COURSE CODE: MPH 101
COURSE TITLE: SOCIAL AND BEHAVIOURAL ASPECTS OF PUBLIC HEALTH
COURSE CREDIT: 3
TOTAL HOURS: 50

COURSE OBJECTIVE

Aim: To familiarize students with views on key concepts that forms a basis for the social and behavioral aspects of public health: culture, race/ethnicity, gender, poverty/disparities, factors related to behavior change, community, organizational climate, family. To familiarize students with the policies that are involve, and investigative tool. To help develop empathy for Health promotion & disease prevention toward populations with whom one will work in the field of public health. To promote interest in further study of the social and behavioral determinants of health

COURSE CONTENT

UNIT 1: Introduction and Determinants of Health
UNIT 2: Introduction to social and behavior aspects of health UNIT
3: Contribution of social aspect of health to the community UNIT
4: Individual health behavior
UNIT 5: Impact of social interactions on health
UNIT 6: Evidence-based approaches in the development and evaluation of social and behavioural science interventions
UNIT 7: Behavioral and social science models
UNIT 8: Stakeholders in Public Health including NGO's and Social Support Networks
UNIT 9: Theories, research, and practice models at varying social ecological levels, including the intraindividual, inter-individual
UNIT 10: Communications theory, community or organizational mobilization, political economy and culture theory
UNIT 11: Chronic disease interventions

COURSE LEARNING OUTCOME [CLOs]

CLO1: Explain the determinants of health: Value of the social and behavioral sciences for understanding and solving public health problems. UNIT 1
CLO2: Concept of socio aspects of health, the behaviors that affect health, Disease pathogenesis, diagnosis, diagnostic techniques and management of communicable and non – communicable diseases which are of high burden to the society. UNIT 2
CLO3: Explain the social aspect of health in the community, explore selected behavioral and social science models including the Precede-Proceed Model (PPM) and the Behavior-Determinant-Intervention Logic model (BDI) to develop a systematic process for developing evidence-based public health interventions. UNIT 3 CLO4: Understand individual health behaviors and evaluate the importance and association of social and economic inequalities and other factors (e.g. psychological stress, coping, social class, gender, race/ethnicity, culture, social capital, social relationships) on health-related behavior and disease patterns. UNIT 4
CLO5: Impact of social interactions on health Discuss how communications theory, community or organizational mobilization, political economy and culture theory might be applied to selected contemporary public health issues. UNIT 5& 6
CLO6: Evaluate a public health intervention using a systematic, evidence-based approach. Evidence-based approaches in the development and evaluation of social and behavioral science interventions UNIT 7
CLO7: Analyze the causes of social and behavioral factors that affect health of individuals and populations. Behavioral and social science models UNIT 8
CLO8: Stakeholders in Public Health including NGO's and Social Support Networks UNIT 9
CLO9: Theories, research, and practice models at varying social ecological levels, including the intraindividual, inter-individual. UNIT 10

CLO10: Communications theory, community or organizational mobilization, political economy and culture theory Chronic disease interventions. UNIT 11

BOOKS

1. Park K. Park's textbook of preventive and social medicine. Preventive Medicine in Obstet, Paediatrics and Geriatrics. 2005.

2. Edberg M. Essential readings in health behavior: Theory and practice. Jones & Bartlett Publishers; 2010 Oct 22.

3. Bhalwar R, Singh M, Jayaram J, Vaz LS, Bhatti VK, Agrawal S, Datta A. Text book of public health and community medicine. History. 2009;1:2.

4. Coreil J, editor. Social and behavioral foundations of public health. Sage; 2010.

5. Edberg MC. Essentials of health behavior: Social and behavioral theory in public health. Jones & Bartlett Publishers; 2007.

REFERENCES

1. Pan-Ngum W, Poomchaichote T, Cuman G, Cheah PK, Waithira N, Mukaka M, Naemiratch B, Kulpijit N,
Chanviriyavuth R, Asarath SA, Ruangkajorn S. Social, ethical and behavioural aspects of COVID-19. Wellcome open research. 2020;5.

2. Shen B, Guan T, Ma J, Yang L, Liu Y. Social Network Research Hotspots and Trends in Public Health: A Bibliometric and Visual Analysis. Public Health in Practice. 2021 Jun 24:100155.

3. Vanderslott S, Van Ryneveld M, Marchant M, Lees S, Nolna SK, Marsh V. How can community engagement in health research be strengthened for infectious disease outbreaks in Sub-Saharan Africa? A scoping review of the literature. BMC public health. 2021 Dec;21(1):1-6.

4. Wang Y, Zhao L, Gao L, Pan A, Xue H. Health policy and public health implications of obesity in China. The Lancet Diabetes & Endocrinology. 2021 Jun 4.

5. Towne SD, Liu X, Li R, Smith ML, Maddock JE, Tan A, Hayek S, Zelber-Sagi S, Jiang X, Ruan H, Yuan Z. Social and Structural Determinants of Health Inequities: Socioeconomic, Transportation-Related, and ProvincialLevel Indicators of Cost-Related Forgone Hospital

Care in China. International Journal of Environmental Research and Public Health. 2021 Jan;18(11):6113.

WEBLINK

http://library.umac.mo/ebooks/b28354990.pd

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 102
COURSE TITLE:
EPIDEMIOLOGY
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

Aim: To provide an introduction to the basic concepts and methods of Epidemiology and to highlight Interrelationship between epidemiology and medicine to understand evidence based medicine

COURSE CONTENT

UNIT 1

- Fundamentals Of Epidemiology

UNIT 2

- Epidemiologic Study Design And Analysis

UNIT 3

- Methodological Challenges In Epidemiologic Research

UNIT 4

- Epidemiological Inferences In epidemics and Outbreak Investigations UNIT 5
- Critical Analysis of Published Epidemiological Studies

UNIT 6

- Disease Surveillance Clinical/ Field trial methodology

COURSE LEARNING OUTCOME [CLOs]

CLO1
Explain the Basic Concepts / Basics of Epidemiology.
Measuring the occurrence of diseases: -Evaluate the measures of Morbidity (Incidence, Prevalence), Measures of Mortality (Mortality Rates).
Measures of Prognosis, Case Fatality rate, Five Year Survival. Observed Survival (Life Table). Discuss critically with examples the Median Survival Time, Relative Survival Time .
Explain with relevant examples the following Measurement of Risk, Relative Risk, Odds Ratio, Attributable Risk UNIT 1
CLO 2: Epidemiological study design and Analysis. Explain with illustration the various study Design: Cross sectional, cohort, case control and intervention studies UNIT 2
CLO3: Assessing the methodological challenges in epidemiology research, strengths and limitations of different study designs association and Causation.
Describe critically Causality, random errors, Bias, Interaction and Confounding factors in epidemiological research. Methods for assessment of Effect Modification. Strategies to allow / adjust for confounding in design and analysis
Design, application, strength and weakness of studies
Concepts of Validity and Reliability (Causation and Casual interference) UNIT 3
CLO4: Epidemiological Inferences in epidemics and Outbreak Investigations
Preventive Strategies: Concepts of Screening
Disease Surveillance. Outbreak
investigation.
Benefits and limitations of different forms of epidemiological evidence in formulating policy decisions. UNIT 4
CLO5: Critical Analysis of Published Epidemiological Studies

Interpretations of published epidemiological UNIT 5

CLO6: Discuss critically Disease Surveillance Clinical/ Field trial methodology UNIT 6

BOOKS:

1. Leon Gordis (2019), Epidemiology, 6th Edition, Elsevier Publication.
2. R Beaglehole (2007), Basic Epidemiology, WHO.
3. Principles of Epidemiology in Public Health Practice (2012), 3rd Edition, CDC.
4. Rothman, Greenland and Lash (2008). Modern Epidemiology. (3rd Ed.) Lippincott Williams & Wilkins

REFERENCES

1. Park's - Textbook of Preventive and Social Medicine.
2. Jugal Kishore. Textbook of National Health Programmes: National Policies & Legislation related to Health.
3. CDC - Global Health protection – NCD Training Modules.
4. WHO – NCD steps questionnaire
(http://www.who.int/ncds/surveillance/steps/instrument/en/)
5. NPCDCS - National Health Programmes in India- (https://www.nhp.gov.in/nationalprogramme-for-prevention-and-control-of-c_pg)
6. GBD 2015 Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet, 2016; 388(10053):1659-1724
7. WHO – Global Action Plan for the Prevention and control of NCD 2013- 2020
8. WHO – Package of Essential NCD interventions for primary health care in low resource settings.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 103

COURSE TITLE: EPIDEMIOLOGY & MANAGEMENT OF COMMUNICABLE AND NON COMMUNICABLE DISEASES

COURSE CREDIT: 6

TOTAL HOURS: 90

COURSE OBJECTIVE

AIM: To provide students with an understanding of the scope of the public health issues with regard to communicable disease and non- communicable diseases in India and also provide them with the overview with the national health programs that have been designed to address these issues

COURSE CONTENT

UNIT 1

Classification of various communicable and non-communicable diseases and also appreciate the modes of evolution of disease stages.

UNIT 2

Burden of Communicable and non-communicable diseases

UNIT 3

Policies and programs used in the control of important communicable and non-communicable diseases, Issues involved in their implementation and evaluation;

UNIT 4

Appreciate the issues involved in managing and evaluating various National health programs.

COURSE LEARNING OUTCOME [CLOs]

CLO 1: Understand and explain the classification of diseases UNIT 1

CLO 2: Discuss the global Burden of diseases and Disease cycle / transmission UNIT 2

CLO 3: Describe, geographical trends, causes, approach to surveillance, prevention and control of Communicable diseases and Non-communicable diseases UNIT 3

CLO 4: Explain critically the National Health programs UNIT 4

Books:

1. Leon Gordis (2019), Epidemiology, 6_{th} Edition, Elsevier Publication.
2. R Beaglehole (2007), Basic Epidemiology, WHO.
3. Principles of Epidemiology in Public Health Practice (2012), 3_{rd} Edition, CDC.
4. Rothman, Greenland and Lash (2008). Modern Epidemiology. (3rd Ed.) Lippincott Williams & Wilkins

Reference

1. Park's - Textbook of Preventive and Social Medicine.
2. Jugal Kishore. Textbook of National Health Programmes: National Policies & Legislation related to Health.
3. CDC - Global Health protection – NCD Training Modules.
4. WHO – NCD steps questionnaire (http://www.who.int/ncds/surveillance/steps/instrument/en/)
5. NPCDCS - National Health Programmes in India- (https://www.nhp.gov.in/national-programme-forprevention-and-control-of-c_pg)
6. GBD 2015 Risk Factors Collaborators. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. Lancet, 2016; 388(10053):1659-1724
7. WHO – Global Action Plan for the Prevention and control of NCD 2013- 2020
8. WHO – Package of Essential NCD interventions for primary health care in low resource settings.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE- MPH 104
COURSE NAME- BIOSTATISTICS
COURSE CREDIT- 5
TOTAL CONTACT HOUR - 75 HOUR

COURSE OBJECTIVE:

Demonstrate an understanding of

1. fundamental principles and practices in health promotion, education, and behavior
2. organization, principles, and practices in health administration
3. principles and practices in epidemiology, and tools for translating epidemiological findings into public health action
4. public health statistical applications

a) environmental health from the perspective of the earth as a complex, dynamic system.

COURSE DESCRIPTION : To introduce the basic statistical methods used in public health research. As part of this introduction, students will learn to make practical use of statistical computer packages.

COURSE CONTENT :

Unit 1• Organization of data - Primary and Secondary

Unit 2• Sources of data – Nature and functions of primary and secondary data.

Unit 3• Difference between scores and other non-score data.

Unit 4 • Properties of measurement - Measuring and interpretation of score/ other data methods of scaling Nominal, Ordinal, Ratio and Interval scale.

Unit 5• Developing indices - Nature and function of an • Index. Building composite scale simple and weighted scale – Developing weighted scores by statistical methods – Data Reduction techniques.

Unit 6• Measuring Reliability and validity of scales and such scales.

Unit 7 • Statistical Methods and Application through SPSS processing.

Unit 8• Data Organization – Raw data files and files.

Unit 9• Transformation and Manipulation of SPSS file.

Unit 10• Statistical Procedures.

★ Descriptive Statistics ☐Univariate Statistics ☐Bi variate Statistics.

★ Multivariate Statistics.

COURSE LEARNING OBJECTIVE: At the end of the course students will able to :

- CLO 1: Demonstrate an understanding of fundamental principles and practices in health promotion, education, and behavior; UNIT 1

- CLO 2: Demonstrate the ability to interpret the results of a statistical analysis, and to communicate such interpretations in an easily comprehensible manner. UNIT 2,3&4
- CLO 3: Demonstrate the ability to evaluate a given health related problem, and to identify the most appropriate statistical technique (e.g., t-test, contingency table, correlation) for analysis. UNIT 5
- CLO 4: Display a mastery of a variety of traditional and newly developed statistical techniques, including multi-variable methods for continuous and categorical data analysis. UNIT 6
- CLO 5: Demonstrate the ability to apply analytic epidemiologic methods used to investigate health conditions. UNIT 7
- CLO 6: Demonstrate the ability to structure available data in an easily useable form, using a variety of data management software tools. UNIT 8 & 9
- CLO 7: Gain exposure to a wide variety of public health topics, and demonstrate a basic understanding of the philosophy of public health practice.

  Demonstrate the ability to interpret the results of a statistical analysis, and to explain those results in understandable terms to public health practitioners. UNIT 10

Text book:

- ★ Nikpeyma, N., Abed_Saeedi, Z., Azargashb, E., &Alavi_Majd, H. (2014). Problems of clinical nurse performance appraisal system: A qualitative study. Asian Nursing Research, 8(1), 15-22.
- ★ Kumar, R. (2005). Research Methodologies: a step-by-step guide for beginners. 2nd.
- ★ Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. Journal of clinical nursing, 16(2), 234-243.
- ★ Fathalla, M. F. A Practical Guide for Health Researchers World Health Organization Regional Office for the Eastern Mediterranean: Cairo, 2004. Available at: wwwwhoint/emro/2004/92902136
- ★ Clough, P., &Nutbrown, C. (2012). A student's guide to methodology. Sage.
- ★ Cronbach, L. J. (1971). Test validation. In R. L. Thorndike (Ed.). Educational
- ★ Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3, 77–101.

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 105
COURSE TITLE: POPULATION SCIENCES
COURSE CREDIT: 3
TOTAL HOURS: 50

COURSE OBJECTIVE

Aimed at providing students with an understanding of community demographics, socio-economic status, types and distribution of diseases and disorders in a community, and a community perspective of the factors determining utilization of health

COURSE CONTENT

- UNIT 1:Concepts Of Population And Development
- UNIT 2 :Sources Of Data
- UNIT 3: Mortality, Morbidity And Fertility
- UNIT 4:Model Life Tables and Indirect Methods of Estimating Vital statistics.
- UNIT 5Migration, Population Growth, Ageing, Problems, Projections

COURSE LEARNING OUTCOME [CLOs]

- CLO1 Explain the concepts of Population and Development o
  Meaning, Nature and scope of demography,
  Population growth, structure, characteristics and distribution; Components of population change,
  Demographic Transition UNIT 1
- CLO 2 Describe the sources of data :Census, surveys and
  - registries - objectives and components UNIT 2
- CLO3 Critically expanciate on fertility – Concept and definitions of basic terms like Fecundity, Sub-fecundity, fertility, conception, pregnancy, abortion, still-birth, live-birth, menarche, menstrual cycle, menopause, family size, sources of fertility data and their limitations. Measures of Fertility factors effecting fertility UNIT 3
- CLO 4 Discuss mortality - Basic concepts, importance, sources of mortality data and errors in death statistic and measurement of errors; Mortality measures: Crude death rates, specific death rates by age, sex, causes of death, marital status and other characteristics; standardized rates; Life tables: Meaning, assumptions, type, functions and uses of life tables, construction of life tables from census data, mortality comparisons; multiple decrement life tables and cause specific life tables. UNIT 4
- CLO 5 Explain critically Migration, and the impact on the population. Understand the Ageing Population, causes of the trend, and contribution to the population. Describe Population growth and projections including the causes, prevention and impact on the globe. UNIT 5

REFERENCES BOOKS

1. Andrew Scharlach and Amanda Lehning (2016). Creating aging-friendly communities. Oxford University Press
2. Brocklehurst's Textbook of Geriatric Medicine and Gerontology, 7th Edition (2010).
3. RonniChernoff'sGeriatric Nutrition (2010). The Health Professional's Handbook4th Edition
4. O.P. Sharma (2012). A Textbook of Geriatrics & Gerontology, 3rd edition.
5. Ministry of health and family welfare. New Delhi: Director General of Health Services, MOHFW, Government of India; 2011. National Program for Health Care of the Elderly (NPHCE): Operational Guidelines 2011.

6. Central Statistics Office. New Delhi: Central Statistics Office Ministry of Statistics and Programme Implementation, Government of India; 2011. Situation Analysis of the Elderly in India.
7. Central Statistics Office. New Delhi (2006) . National Sample Survey Organization, Ministry of Statistics and Programme Implementation, Government of India.
8. Morbidity, Health Care and the Condition of the Aged. NSSO (64th round) Jan-June 2004.
9. Colleen Keller&Julie Fleury. Health Promotion for the Elderly (2012). SAGE Publications, Inc
10. National Programme for the Health Care of the Elderly (NPHCE): An approach towards active and healthy ageing. Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. 2011.
11. National Programme for Health Care of the Elderly. India current affairs (2011). A leading resource of online information of India.
12. Olshansky, S.J.& B.A. Carnes. 2009. "The future of human longevity." Pp. 731-745 in International Handbook of Population Aging: Springer.
13. Jagger, C. 2006. "Can we live longer, healthier lives?" Pp. 7-22 in Longer Life and Healthy Aging, edited by Y. Zeng. New York: Springer.
14. Moen. 2013. New Directions in the Sociology of Aging. National Academy of Sciences.
15. Hermalin, A.I. et al. 2007. "Future characteristics of the elderly in developing countries and their implications for policy." Asian Population Studies 3(1):5-36.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 106
COURSE TITLE: WOMEN & CHILD HEALTH AND GENDER ISSUES
COURSE CREDIT: 2
TOTAL HOURS: 40

COURSE OBJECTIVE

Aim: To impart an understanding of the scope of women and child health and toenable students to find and interpret relevant information on women and child health

COURSE CONTENT

UNIT 1 Women's Health – Concepts, Definition And Measures
UNIT 2 Customs, Norms, Attitudes And Practices In India UNIT 3 Adolescent Sexual Health And Family Planning
UNIT 4 RTI's , STI And HIV/AIDS
UNIT 5 Millennium Development Goals And Government
UNIT 6 Programs In Reproductive Health

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Women's Health – concepts, definition and measures. Customs, norms, attitudes and practices pertaining to various aspects of women's health including menstruation, puberty, childbirth and menopause; sexual and reproductive rights; infertilityUNIT 1
- CLO 2 Adolescent Sexual Health & Contraception
- Role and involvement of men in RH.
- Methods of Family Planning
- Health Benefits of Family Planning
- Contraceptive Behavior, Measurement & Service Delivery
- Quality of Family Planning Care
- Gender, autonomy, empowerment and status of women, domestic violence in India
- Maternal morbidity and mortality.
- Abortion, Family Planning UNIT 2
- CLO 3 RTIs & STIs and HIV/AIDS UNIT 3
- CLO 4 Millennium Development Goals And Government UNIT 4
- CLO 5Response of Govt. to Issues of Millennium UNIT 5
- CLO 6Development Goals in the context of women and child health. UNIT 6

BOOKS &REFERENCES

1. Krieger, Nancy, "Genders, sexes, and health: what are the connections – and why does it matter?" *International Journal of Epidemiology* 32 (2003): 652-657.

2. Krieger, Nancy and Elizabeth Fee, "Man-Made Medicine and Women's Health: The Biopolitics of Sex/Gender and Race/Ethnicity," *International Journal of Health Services* 24(2) (1994): 265-283.

3. Connell, Raewyn, "Gender, health and theory: Conceptualizing the issue, in local and world perspective," *Social Science & Medicine* 74 (2012): 1675-1683.

4. Denton, Margaret, Steven Prus, and Vivienne Walters, "Gender differences in health: a Canadian study of the psychosocial, structural, and behavioural determinants of health," *Social Science & Medicine* 58 (2004): 2585-2600.

5. Courtenay, Will, "Constructions of masculinity and their influence on men's well-being: a theory of gender and health," *Social Science & Medicine* 50 (2000): 1385-1401.

6. Bowleg, Lisa, "The Problem With the Phrase *Women and Minorities*: Intersectionality – an Important Theoretical Framework for Public Health," *American Journal of Public Health* 102(7) (2012): 1267-1273.

7. Samuels-Dennis, Joan et. al., "Intersectionality Model of Trauma and Post-Traumatic Stress Disorder," in *Health Inequities in Canada: Intersectional Frameworks and Practices*, ed. OlenaHankivsky, UBC Press: 2011, 274-288.
8. M. Pilar Sánchez-LópezRosaLimiñana-Gras,The Psychology of Gender and Health, 1st edition 3rd January 2017,Academic Press
9. Jasmine Gideon, "Handbook on Gender and Health" Publication Date: 2016 ISBN: 978 1 78471 085 9
10. Annandale Kuhlmann Annandale Kuhlmann,The Palgrave Handbook of Gender and Healthcare,2 New edition 2012, Palgrave MacMillan
11. Purohit, Brijesh C, "Inequity in Indian Health Care", 1st edition 2017 Hardcover ISBN 978-981-10-5043- 5, Springer Singapore
12. K.S. James Arvind Pandey, Dhananjay W. BansodLekhaSubaiya, "Population, Gender and Health in India: Methods, Processes and Policies",Academic Foundation (2010)
13. Manoranjan Pal, PremanandaBharati, Bholanath Ghosh, and T.S. Vasulu, "Gender and Discrimination Health, Nutritional Status, and Role of Women in India", Published: 10 November 2011,Oxford University Press 2017
14. KeertyNakray ,"Gender-based Violence and Public Health: International perspectives on budgets and policies" 1 edition (16 June 2017), Routledge
15. Chloe E. Bird, " Gender and Health: The Effects of Constrained Choices and Social Policies" edition (January 28, 2008) , Cambridge University Press;
16. Judith Lorber and Lisa Jean Moore, Gender and the Social Construction of Illness (Gender Lens) 2 edition (August 15, 2002), AltaMira Press
17. Steele, Linda and Leanne Dowse, "Gender, Disability Rights and Violence Against Medical Bodies," *Australian Feminist Studies* 31(88) (2016): 187-202.
18. Fish, Rebecca and Chris Hatton, "Gendered experiences of physical restraint on locked wards for women," *Disability & Society* 32(6) (2017): 790-809.
19. Day et al. Integrating and evaluating sex and gender in health research. Health Research Policy and Systems. 2016, 4(1):75.
20. Tanenbaum et al. Why sex and gender matter in implementation research. BMC Medical Research Methodologies. 2016,16(1):145

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 107
COURSE TITLE: HEALTH SYSTEM & POLICIES IN PUBLIC HEALTH
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

Aim: To introduce students the different types of services and different levels in health care delivery.

COURSE CONTENT

- UNIT 1 Policy Making Process, With Historical, Ethical, Legal and Political Realities
- UNIT 2 Standard Frameworks For Policy Analysis
- UNIT 3 Basic Model And Function Of Health Service
- UNIT 4 Indigenous Systems Of Medicine
- UNIT 5 International Health
- UNIT 6 Persistent and Widespread Issues In Providing Health Services

COURSE LEARNING OUTCOME [CLOs]

At the end of the subject students should be able to understand and explain the below

CLO 1 Policy:

- Understanding, need and goals for various policies related to public health - Health policy, population policy, nutritional policy, research policy, women policy, child policy etc.
- Policy environment
- Methods to assess the needs of for the policy development / assessment process.
- Standard Frameworks for policy analysis, applying these to the assessment of current policies.
- Factors influencing the policy: external factors (interest groups as one example), politics and the like. UNIT 1

CLO 2 Health care system:

- Primary Health Care institutions (sub-centers, primary health centers, community health centers, district hospitals),
- Teaching hospitals, specialist hospitals, and health insurance schemes like Employees State Insurance and Central Government Health Scheme, defense health services, Railway health services.
- Private Health care system: Private hospitals, Polyclinics, Nursing homes and dispensaries, one-doctor practices; Major voluntary health agencies;
- Planning at Central, State, District, Block and Village levels like Union Ministry of Health and Family Welfare, Directorate General of Health Services, Central Council of Health, State Ministry of Health, State Health Directorate, District Health Organization etc
- Private health sector entities like private hospitals, polyclinics, nursing homes and dispensaries, one-doctor practices; Major voluntary health agencies; UNIT 2&3

CLO 3 Indigenous systems like Ayurveda, Homeopathy and Unani.

- Guided visits to one institution in each of the following category viz. PHC, CHC, Taluk Hospital, General Hospital, sub-centre and Anganwadi are undertaken to help the learning process
- Health Care Delivery Structure:
  - Central : State, District, Block and Village levels like Union Ministry of Health and Family Welfare, Directorate General of Health Services, Central
  - State level : Ministry of Health, State Health Directorate, District Health Organization etc
  - In-sectoral co-ordination UNIT 3 &4

CLO 4 International Health: Health care systems in developing countries and developing countries UNIT 5
CLO 5 Explain the Persistent and Widespread Issues In Providing Health Services UNIT 6

BOOKS &REFERENCES

1. IAPSM's Textbook of Community Medicine Paperback – Mar 2019, A. M Kadri (Author) 2.
Lee, Kenneth and Mills, Anne "Policy making and planning in health Sector" 1987, OUP.
3. Priorities in Health, World Bank Publications, 2006
4. An Introduction to Social Policy, Peter Dwyer & Sandra Shaw 9eds), SAGE, 15-Mar-2013

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

MPH 2ND SEMESTER

COURSE CODE: MPH 201
COURSE TITLE: ETHICS ANDREGULATORY ISSUES ON HUMAN RESEARCH IN PUBLIC HEALTH
COURSE CREDIT: 2
TOTAL HOURS: 40

COURSE OBJECTIVE

Aim: To understand ethical issues involved in epidemiology and public health practice and research

COURSE CONTENT

- UNIT 1 History of Ethics in Health Research
- UNIT 2 Theories and Principles and Guidelines of Research
- UNIT 3 Ethics Principles for Ethical Decision Making
- UNIT 4 OHRP and FWA Approvals and Institutionalizing Ethics

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 History of Ethics in Health Research UNIT 1
- CLO 2 Theories and Principles and Guidelines of Research UNIT 2
- CLO 3 Ethics Principles for Ethical Decision Making UNIT 3
- CLO 4 OHRP and FWA Approvals and Institutionalizing Ethics UNIT 4

REFERENCES&BOOKS

- Introduction to public health laws and Ethics.
- Healthy City Planning: From Neighborhood to National Health Equity (Planning, History and Environment Series) by Jason Corburn
- The Health Practitioner's Guide to Climate Change: Diagnosis and Cure (Earthscan: Climate) by Jenny Griffiths, Mala Rao, et al.
- Risk Communication: A Handbook for Communicating Environmental, Safety, and Health Risks by Regina E. Lundgren and Andrea H. McMakin

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**

Internal Assessment Exam	**25**

COURSE STRUCTURE

COURSE CODE: MPH-202

COURSE NAME: HEALTH ECONOMICS AND HEALTH CARE FINANCING

COURSE CREDIT: 04 COURSE HOURS: 60

1. **COURSE OBJECTIVES:**

   The student should be able to describe the basics of Health Economic and Health Care financing, sector reforms, Fundamentals of Budgeting and Financial Management, Cost- Benefit Analysis: Theory & its Techniques, Health Care Financing- Case Studies related to health care financing, Medical Insurance and Public Private Partnerships.

2. **Course description:**

   This course involves the introduction of Health Economic and Health Care financing, budgeting and financial management, medical insurance, and its benefits.

3. **Course Content:**

UNIT-1. Introduction to Health Economic and Health Care financing

- Introduction
- Definition
- Scope of health economics
- Demand, supply, and market
- Economic objectives of health care
- Concepts of economics efficiency and hospital economics
- Resource generation for hospital

UNIT-2. Basics Of Health Economics and Financing

- Introduction
- Health economics
- Microeconomics
- Macroeconomics
- Health economics evaluation- Scope
- Health economics evaluation- Indian Perspective

UNIT-3. Sector Reforms

- Introduction
- Definition
- Goals of Health sector reforms
- Historical Perspective: Health sector reforms
- Health sector reforms in India:

- Public Sector
- Private sector

- Health sector reforms: International examples
- Impact evaluation of health sector reforms

UNIT-4 Fundamentals of Budgeting and Financial Management

- Introduction
- Definition
- Purpose of Budgeting
- Prerequisites of budgeting
- Characteristics of budgeting
- Importance and principles of budgeting
- Types and classification of budgeting
- Budgeting process
- Advantages and disadvantages of budgeting

UNIT-5 Cost-Benefit Analysis (CBA) : Theory & Techniques

- Introduction
- Definition
- History of cost benefit analysis
- Principles of cost benefit analysis
- Key indicators and Challenges of cost benefits analysis
- Tools to improve CBA

UNIT-6 Health Care Financing – Case Studies

- Definition
- Purposes of Health Care Financing
- Challenges of Health Care Financing
- Sources of Health Care Financing in India
- Role of the Private sector in health care delivery system
- Public Private Partnership: Public Policy Response
- Human Resources for Health
- Initiative by Government of India
- Other Models of financing
- Challenges of Health Care Financing

UNIT-7. Medical Insurance and Public Private Partnerships

- Definition Medical Insurance and Public Private Partnership
- Goals of Public Private Partnerships
- Objectives, concept, and core principles of Public Private Partnerships

- Basic dimensions of Public Private Partnerships
- Approaches and Common models of Public Private Partnerships
- Importance, challenges, and opportunities of Public Private Partnerships

Course learning outcomes:

CLO-1.

Students should be able to know about Scope, Demand, supply, and market risk of health Economic. Able differentiate the objectives of health care, Concepts of economics efficiency and Resource generation for hospital. UNIT 1

CLO-2

Should be able to differentiate in Microeconomics and Macroeconomics,

Scope of Health economics evaluation and health economics evaluation- Indian Perspective. UNIT 2

CLO-3.

After the completion of this unit students should know the Goals of Health sector reforms, Historical Perspective, Health sector reforms in India in regards with Public & Private sector, Impact evaluation of health sector reforms. UNIT 3

CLO-4.

Should be able to acquire knowledge regarding Fundamentals of Budgeting and Financial Management, Purpose, Prerequisites & Characteristics of budgeting. Formulation of budget and Budgeting process. Advantages and disadvantages of budgeting **CLO-5.**

Should be able to know in depth about Cost-Benefit Analysis (CBA): Theory & Techniques. Key indicators and Challenges of cost benefits analysis. Tools to improve CBA. UNIT 4

CLO-6.

Students will be able to knowPurposes, Challenges, Sources and of Health Care Financing. Public Private Partnership: Public Policy Response. Initiative by Government of India and important Models of financing.UNIT 6

CLO-7.

Students should be able to acquire knowledge regarding Medical Insurance and Public Private Partnerships in details. Approaches and Common models of Public Private Partnerships UNIT 7

Textbooks:

1. Creese A., Parker D., cost analysis in primary health care. WHO UNICEF, Agakan foundation 1994.
2. Pindyck, Robert S and Rubinfield, Daniel I., Micro economics 5th edition
3. Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. (2015). Methods for the economic evaluation of health care programmes. Oxford university press.

4. Donaldson, C., & Gerard, K. (1993). Economics of health care financing. Basingstoke: Macmillan.

Reference books:

1. Green, A. (1992). An introduction to health planning in developing countries. Oxford University Press (OUP).
2. Thomas E. Getzen. (1997). Health economics: fundamentals and flow of funds. John Wiley & Sons.
3. Dror, D. M., Preker, A. S., &Jakab, M. (2002). The role of communities in combating social exclusion. Social reinsurance: A new approach to sustainable community health financing,

Online link for study and reference materials

a) www.slideshare.net
b) https://www.ncbi.nlm.nih.gov/pmc/
c) Google scholar
d) www.researchlink.org

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 203
COURSE NAME: INDUSTRIAL AND OCCUPATIONAL HEALTH
COURSE CREDIT:1
TOTAL HOURS: 20

COURSE OBJECTIVES:

The purpose of this course is to make the students aware about the responsibility of occupational health services to keep all employees informed about hazards in the workplace. The measures taken to protect employee health should be thoroughly explained so that workers understand the necessity of complying with unpleasant restrictions as the wearing of protective clothing and face masks. First aid facilities should be organized and employees instructed about first aid procedures in case of accidental injuries or other emergencies.

COURSE DESCRIPTION:

OH specialists aim to enhance a worker's health status, increase the productivity of a workforce, and improve business performance and the economy. They have specific training and experience to understand the link between health and work. This enables them to support both workers and employers. OH focuses on three main objectives:

- Maintenance and promotion of workers' health and working capacity
- Improvement of working environments to ensure that they are conducive to health and safety.
- The development of work organisations/cultures in ways which support health and safety at work, promote positive social interactions and improve productivity.

COURSE CONTENT:

UNIT 1- Introduction to Occupational Health
UNIT 2- Introduction to work environment
UNIT 3- Occupation epidemiology
UNIT 4- Occupational Health Policy & Administration
UNIT 5- Occupational Safety & injury prevention UNIT
6- Ergonomic /Human factor
UNIT 7- Occupation Health care delivery
UNIT 8- Practice of Occupation Health

COURSE LEARNING OUTCOME:

CLO 1- To understand the importance of occupational health and safety of workers at workplace. To provide them safe environment so that they can contribute effectively in the economic growth. UNIT 1

CLO 2- To have the students' proper orientation to healthy work environment. To understand the proper uses of PPE kits and its importance. UNIT 2

CLO 3- To know about the incidences of work related accidents and how it effects the performance of workers and along with the growth of an organization. UNIT 3

CLO 4- Have a brief understanding of the policies and guidelines laid down by the policy makers and the organization for the betterment of the individual.UNIT 4

CLO 5- To know about the injuries occurred at workplace and the steps taken to safeguard the health of the workers. UNIT 5

CLO6- To have a brief knowledge about the good ergonomics and the considerations to be taken in order to avoid injuries due to bad posture. UNIT 6

CLO 7- To know the role of the occupational health care services and their functions. UNIT 7

CLO 8- Healthy occupational practices and the need to know the importance of induction program to its workers. UNIT 8

BOOKS

1. Martins R, Duarte J, Branco JC, Teixeira T, Vasconcelos S, Fernandes M, Bustos D, Niquice F. Book of Abstracts of the 4th Symposium on Occupational Safety and Health.
2. Slote L. Handbook of occupational safety and health.
3. Islam MN. Occupational Health Hazard of Female Beedi Workers in Rural West Bengal: A Case Study.
4. Saikh LM, Chaudhury SK. OCCUPATIONAL HEALTH STATUS OF SMALL SCALE INDUSTRY WORKERS: A CASE STUDY OF BERHAMPORE MUNICIPALITY, WEST BENGAL, INDIA.
5. VANAJAKSHI DE, NM A. Occupational health status among women workers: a study in food industry. Journal of Contemporary Issues in Business and Government. 2021 Apr 8;27(3):1251-6.
6. Mukhopadhyay K. Occupational Hazards in the context of SARS-CoV-2. Occupational Hazards. 2021 May;5(1).
7. Hirsh R. The Developing World Outreach Initiative: Expansion of Occupational Hygiene through Volunteerism and Networking. InImproving Global Worker Health and Safety Through Collaborative Capacity Building Initiatives (pp. 61-85). CRC Press.

REFERENCES

1. Fundamental principles of occupational health and safety Second edition by Benjamin O. ALLI, INTERNATIONAL LABOUR OFFICE • GENEVA
2. Detels R, Beaglehole R, Lansang MA, Gulliford M. Oxford textbook of public health. Oxford University Press; 2011.
3. Burke RJ, Clarke S, Cooper CL, editors. Occupational health and safety. Gower Publishing, Ltd.; 2011.
4. Baker MG. Occupational Health Surveillance as a Tool for COVID-19 Prevention.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**

Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 204
COURSE TITLE: ENVIRONMENTAL HEALTH AND SUSTAINABLE DEVELOPMENT
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: The course provides the comprehensive knowledge in issues related to environment affecting health and means of sustainable development.

COURSE CONTENT

- UNIT 1 Public Health Ecology
- UNIT 2 Air And Noise Pollution Control
- UNIT 3 Water Pollution, Solid Waste Management And Hazardous Waste
- UNIT 4 Sustainable Development And The Environment
- UNIT 5 Waste Minimization & Cleaner Production

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Air and Noise Pollution Control: Definition of air pollution pollutants and their sources – effects on human health, vegetation and climate of air pollution – air pollution control legislation – noise pollution – sources and effects – control measures. UNIT 1 & 2
- CLO 2 Water Pollution: Definition, sources, classification of water pollutants – organic waste, oxygen demanding waste, disease causing wastes, synthetic organic UNIT 3
- CLO 3 Compounds. Sewage and agricultural run – off, inorganic pollutants suspended solids and sediments, radioactive materials, BOD, COD, Waste water treatment- primary secondary, tertiary.UNIT 3
- CLO 4 Solid waste management – classification, origin, methods of solid waste treatment and disposal compositing, sanitary land filling, thermal process (incineration, Pyrolysis) Recycling and reuse. UNIT 3
- CLO 5 Hazardous waste – sources, identification and management of hazardous waste – treatment and disposal UNIT 3
- CLO 6 Development and The Environment: Climate change - ozone depletion global warming, greenhouse effect. UNIT 4
- CLO 7 From unsustainable to sustainable development – urban problems related to energy – water conservation, rainwater harvesting, watershed management – resettlement and rehabilitation of people – its problems and concerns. UNIT 5

BOOKS

1. Thind PS, Sareen A, Singh DD, Singh S, John S. Compromising situation of India's bio-medical waste incineration units during pandemic outbreak of COVID-19: Associated environmentalhealth impacts and mitigation measures. Environmental Pollution. 2021 May 1;276:116621.

2. **https://www.researchgate.net/publication/347439215_SMART_PUBLIC_HEALTH_PLANNING_FOR_SMART_CITY_A_SYSTEMATIC_REVIEW**

3. Chandrappa R, Das DB. Environmental Health Planning. InEnvironmental Health-Theory and Practice 2021 (pp. 69-98). Springer, Cham.

4. Thakur JS, Paika R. Smart Health and Wellness Promoting Villages: A Case Study from India. Smart Villages.:321.

REFERENCES

1. Occupational Safety and Health: Fundamental Principles and Philosophies by Charles D. Reese
2. Industrial and Occupational health (pb 2017) by Haldar 3. Industrial Relations and Labour Legislation by Sharma R.C.
4. Industrial Safety, Health and Environment Management Systems by R. K. Jain and Sunil S. Rao

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 205
COURSE TITLE: NUTRITION AND FOOD SAFETY IN PUBLIC HEALTH
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: This module covers the basics of human and community nutrition. Issuesrelated to food safety are also covered.

COURSE CONTENT

- UNIT 1. Principles Of Nutrition
- UNIT 2. Disease Specific Nutrition
- UNIT 3.Community Nutrition And Nutritional Assessment
- UNIT 4.Policy And Programmes For Nutrition Related Issues
- UNIT 5.Food Safety

COURSE LEARNING OUTCOME [CLOs]

- CLO 1 Basics of Nutrition: Importance of pattern and balanced diet for preschooler school going children, adolescents, pregnant & lactating mothers, old age, athletes, space nutrition UNIT 1
- CLO 2 Disease specific Nutrition: Diet modifications during various diseased condition diabetes, obesity, heart diseases, civil and kidney, TB, HIV UNIT 2
- CLO 3 Community Nutrition: Deficiency disorders and dietary management – PCM, anemia, goiter and vitamin & mineral deficiency. Prevalence of under nutrition and malnutrition in India – Assessment of nutritional status anthropometric measurements – clinical examination delay survey – malnutrition infection and infestation effect of malnutrition in infancies, pregnant & nursing mothers – Nutrition organization programmes – UNIT 3
- CLO 4 National , international & voluntary organizations – undertaken to combat malnutrition UNIT 4
- CLO 5 Policy and programmes for nutrition related Issues Food Safety: General principles importance of food borne illness – prevention of contamination, food toxicants, food additives, aduthathur and food standers – Importance of safe drinking water – purification methods. UNIT 5

REFERENCES

1. World Health Organization. To improve nutrition, food safety and food security, throughout the life-course, and in support of public health and sustainable development.
2. Losasso C, Cibin V, Cappa V, Roccato A, Vanzo A, Andrighetto I, Ricci A. Food safety and nutrition: Improving consumer behaviour. Food Control. 2012 Aug 1;26(2):252-8.
3. Walls H, Baker P, Chirwa E, Hawkins B. Food security, food safety & healthy nutrition: are they compatible?. Global Food Security. 2019 Jun 1;21:69-71.
4. Dietary Guidelines for Indians-A Manual, National Institute of Nutrition, Indian Council of Medical Research (ICMR Centenary Year Celebrations)
5. Shills, E.M., Olson, A.J and Shike, Lea and Febiger, Modem Nutrition in health and disease.
6. Frances, J. Zeman (1983), Nutrition and Dietetics.
7. Srilakshmi, B (2003), Dietetics, New age International Pvt. Ltd.

8. Srilakshmi, B (2003), Nutrition science, New age International Pvt. Ltd.

9. Summerfied (Liane, M), Nutrition, Exercise and Behaviour: An integrated approach to weight management.

10. Vidya. C. Bhaskar Rao. D. A Text Book of Nutrition Discovery Publishing House, New Delhi.

11. Beaton, GH. & M. C. Henry, E. W (1996) Nutrition: A Comprehensive Treatise. Vol III Academic Press, New York.

12. Bandilla R. K. (1992) food problems in India. Ashish publishing House.

13. Water Low J. C (1992) Protein in Energy Malnutrition Edward Arnold, London. 23

14. Vinodini Reddy., Pralhad Raj., Gowrinathsastry, J find Kashinath, K.C. (1993), Nutrition Trends in India, NIN, Hyderabad.

15. Park and park (2018), Text book of preventive and social medicine, Banarsidas published by Jabalpur.

16. Jellifee, D.D and Pathes (1989), Assessment of Nutritional status of community, WHO, Geneva.

BOOKS

- Manoranjan Pal, PremanandaBharati, Bholanath Ghosh, and T.S. Vasulu, "Gender and Discrimination Health, Nutritional Status, and Role of Women in India", Published: 10 November 2011,Oxford.

- Industrial Safety, Health and Environment Management Systems by R. K. Jain and Sunil S. Rao University Press 2017

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**

Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 206
COURSE TITLE: HEALTH COMMUNICATION AND BEHAVIOR CHANGE
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVES:

The purpose of this model is to introduce different models of communication for use in health promotion activities and also in community based health activities.

COURSE DESCRIPTION:

- Behavior Change Communication (BCC) is a communication strategy which encourages individual/community to change their behavior.
- It is a strategy that triggers people/society/communities to adopt healthy, beneficial and positive behavioral practices.
- BCC is an effective communication approach which helps to promote changes in knowledge, attitudes, norms, beliefs and behaviors

COURSE CONTENT:

UNIT1.
Communication Process, Function and Types

- Barriers to communication
- Mass Communication
- Communication Skills
- Community Participation
- Concepts and Types

UNIT2.
Information, Education and Communication

- IEC in Health and Family Welfare
- IEC structure in districts
- Innovative strategies and evaluation

UNIT3.
Behavioral Change Communication

- Best practices and strategic approaches
- BCC framework, implementation strategy

UNIT4.
Target Audience Segmentation

- Different approaches to target audience

UNIT5.
Physician – Patient Communication

- Why and how of physician – patient relationship
- Data for IEC Planning

- Relationship Management

COURSE LEARNING OUTCOMES:

CLO1: Describe concept of communication and its type, function and implementation.
CLO2: Knowledge of IEC in health, family welfare and district structure.
CLO3: knowledge of basic concept of behavioral change communication and its implementation**.**
CLO4: To describe target audience and segmentation**.**
CLO5: Basic concept of physician patient communication and its application and management.

TEXT BOOKS:

- Schiavo, R. (2013). *Health communication: From theory to practice*. John Wiley & Sons.
- Brashers, D. E. (2001). Communication and uncertainty management. *Journal of communication*, *51*(3), 477-497.

REFERENCE BOOKS

- Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of communication*, *56*(suppl_1), S1-S17.
- Noar, S. M., Grant Harrington, N., Van Stee, S. K., & Shemanski Aldrich, R. (2011). Tailored health communication to change lifestyle behaviors. *American Journal of Lifestyle Medicine*, *5*(2), 112-122.

ASSESSMENT GRADING

Internal exam 40%; Final exam 60%

Assessment	**Grades[40%]**
Assignment	**10**
Class test	**10**
Quiz	**10**
Question & Answer Session	**10**

COURSE TITLE: RESEARCH METHODOLOGY
COURSE CREDIT: 6
TOTAL HOURS: 90

COURSE OBJECTIVE

The students will be able understand various steps research Able to Design and develop research proposals

COURSE CONTENT

Unit 1: Quantitative and Qualitative
Unit 2: Data Management: Packages for Analysis –
Unit 3: Quantitative and Qualitative
Unit 4: Health Care Organizations: Public Health System and Its Boundaries Unit 5: Comparative Health Systems

COURSE LEARNING OUTCOME [CLO]

CLO 1: Basics of Research - Definitions and designs

- Uses of Research in public health
- Formulation of research problems
- Developing hypothesis
- Writing research questions
- Sampling: How much sample and how to choose, principles of sampling and terminology UNIT 1

CLO 2: Design and development of Interview schedule, questionnaire construction, pre-testing (reliability and validity)

Research ethics (protection of human subjects).

Data collection – Filed work, mapping and listing operations, selecting of respondents and MIS for major research projects

Data management - editing, entry and preparing data sets for analysis

Data analysis using spss/epi. Info/stata UNIT 2

CLO 3: Qualitative research

Development of conceptual framework.

Qualitative methods: FGDs, indepth interviews, biographies, participatory methods, participant observation etc.. UNIT 3

CLO 4: Data collection, recording, Public Health System and Its Boundaries UNIT 4

CLO 5: Comparative Health Systems, Data analysis (manual and computer based using QSR) UNIT 5

REFERENCES& BOOKS

1. Research Methods In Health:- Investigating health and health services Second edition Ann Bowling
2. Nikpeyma, N., Abed_Saeedi, Z., Azargashb, E., &Alavi_Majd, H. (2014). Problems of clinical nurse performance appraisal system: A qualitative study. *Asian Nursing Research*, *8*(1), 15-22.
3. Kumar, R. (2005). Research Methodologies: a step-by-step guide for beginners. 2nd. 4. Rattray, J., & Jones, M. C. (2007). Essential elements of questionnaire design and development. *Journal of clinical nursing*, *16*(2), 234-243.
5. Fathalla, M. F. A Practical Guide for Health Researchers World Health Organization Regional Office for the Eastern Mediterranean: Cairo, 2004. *Available at:*

wwwwhoint/emro/2004/9290213639.
6. Clough, P., &Nutbrown, C. (2012). *A student's guide to methodology*. Sage.
7. Cronbach, L. J. (1971). Test validation. In R. L. Thorndike (Ed.). *Educational* 8. Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 208

COURSE TITLE: HEALTH PROGRAM MANAGEMENT [DISASTER MANAGEMENT]

COURSE CREDIT: 4

TOTAL HOURS: 60

COURSE OBJECTIVE

Aim: The overall aim of the Module is to train the students in project management with special focus on formulation, implementation, supervision and evaluation.

COURSE CONTENT

- UNIT 1: Principles Of Planning, Management,
- UNIT 2: PIME, HMIS
- UNIT 3: Management Of Health Services
- UNIT 4: Disaster Management With Focus On Nutrition, And Livelihood Assistance

COURSE LEARNING OUTCOME [CLOs]

- CLO 1: Principles of Management and results based management
  - Project management cycle
  - Situational analysis - SWOT
  - Strategy formulation (formulation of alternatives and selection of a strategy) UNIT 1
- CLO 2: Planning tools: Log frame, PERT, CPM
  - Quality assurance in project management
  - Activity based implementation plan
  - Human aspects of project management like motivating people, team building, improving personal influence and effectiveness.
  - Gender issues in Project Management.
  - Monitoring UNIT 2
- CLO 3: Disaster management
  - Disaster definition and managementUNIT 3
- CLO 4: Management Information System (MIS)
  - Evaluating the projects
  - Developing action plans for project implementation UNIT 4

REFERENCES

1. EUROPEAN COMMISSION - JOINT RELEX SERVICE FOR THE MANAGEMENT OF COMMUNITY AID TO NON-MEMBER COUNTRIES (SCR), Resources, relations with the other institutions, evaluation, and information, Evaluation, Version 1.0, May 1999 – Project Cycle Management – Training handbook.
2. Centers for Disease Control and Prevention, 1999. *Framework for Program Evaluation in Public Health*. Atlanta, Georgia: Centers for Disease Control and Prevention.
3. Project Management for Healthcare. David Shirley. April 25, 2011 by CRC Press ISBN 9781439819531
4. Cook, T.D. and Campbell, D.T, 1979. *Quasi-Experimentation: Design and analysis issues for field settings.* Boston, MA: Houghton Mifflin Company.
5. Healthy City Planning: From Neighbourhood to National Health Equity (Planning, History and Environment Series) by Jason Corburn

LINKS

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE TITLE: GLOBAL HEALTH
COURSE CODE: MPH209
COURSE CREDIT: 1
GLOBAL PUBLIC HEALTH
COURSE HOURS: 20

COURSE OBJECTIVE

This unit aims to introduce terms and concepts that underpin global public health discourses, policies and practices, and to provide an overview of key public health issues, challenges and responses at local, national and global levels

COURSE CONTENT

UNIT I: Basic concepts in global health
01. Defining and measuring global health
02. Global health definitions, case studies
03. Historical origin and evolution
57
04. Health systems and global health

UNIT II: Understanding the key global health challenges
01. Current global health status
02. Global burden of disease
03. Global health priorities for twenty-first century
04. Global health at the human–animal–ecosystem interface

UNIT III: Cross-cutting themes in global health and emerging trends
01. Environment, climate, and migration
02. Nutrition, Food, water, and sanitation
03. Health disparities
04. Women's health
05. Emerging, remerging infectious diseases
06. NCD and injuries
07. Maternal and child health
08. Childhood immunization
09. Adolescent health
10. Neglected tropical diseases
11. Antimicrobial resistance

IV: Global health diplomacy
01. Overview of global health diplomacy

02. Global health actors and activities {International and national health agencies, activities & other actors}
03. Global health financing
04. Global health policy and governance
05. Drivers of policy for global health diplomacy
06. Globalization, trade, work, and health

07. Foreign policy and health

UNIT V: Global health security
01. Global health security: Gender and Health
02. Pandemics and health security responses
03. Health in complex humanitarian emergencies
04. Humanitarian response and humanitarian dilemmas05. Global health equity
06. Values in global health
07. Towards a social justice approach to global health

UNIT VI: Research, development, innovation, and technology for global health
01. The environment, sustainable development, and health
02. Universal health coverage in the context of aging
03. Sustaining good health with equity at low cost
04. Science and technology for global health
05. Scaling up effective models in global health delivery

COURSE LEARNING OUTCOME [CLO]

CLOI: Student should understand the basic concepts in global health, defining and measuring global health. Global health definitions, case studies. Historical origin and evolution, Health systems and global health UNIT 1

CLO2: Understanding the key global health challenges, Current global health status, Global burden of disease. Global health priorities for twenty-first century. Global health at the human–animal– ecosystem interface UNIT 2

CLO3: Cross-cutting themes in global health and emerging trends. Environment, climate, and migration. Nutrition, Food, water, and sanitation. Health disparities. Women's health. Emerging, remerging infectious diseases. Describe NCD and injuries. Explain Maternal and child health. Describe Childhood immunization. Explain Adolescent healt. Neglected tropical diseases
11. Antimicrobial resistance. Global health diplomacy and management UNIT 3

CLO4: Critically explain Global health actors and activities {International and national health agencies, activities & other actors}. Global health financing. Global health policy and governance. Drivers of policy for global health diplomacy. Globalization, trade, work, and health . Foreign policy and health UNIT 4

CLO5: Define Global health security. Global health security: Gender and Health. Pandemics and health security responses. Health in complex humanitarian emergencies. Humanitarian response and humanitarian dilemmas05. Global health equity. Values in global health. Towards a social justice approach to global health UNIT 5

CLO6: Research, development, innovation, and technology for global health. The environment, sustainable development, and health. Universal health coverage in the context of aging. Sustaining good health with equity at low cost. Science and technology for global health. Scaling up effective models in global health delivery UNIT 6

REFERENCE

1. Amatya A, Basel P. Why study global health? Kathmandu Univ Med J (2014) 12:87–

8.10.3126/kumj.v12i2.13650 [PubMed] [Cross Ref]
2. Koplan JP, Bond TC, Merson MH, Reddy KS, Rodriguez MH, Sewankambo NK, et al. Towards a common definition of global health. Lancet (2009) 373:1993– 5.10.1016/S0140-6736(09)60332-9[PubMed] [Cross Ref]
3. Pati S, Sharma K, Zodpey S, Chauhan K, Dobe M. Health promotion education in India: present landscape and future vistas. Glob J Health Sci (2012) 4:159– 67.10.5539/gjhs.v4n4p159 [PMC free article][PubMed] [Cross Ref]
4. Rowson M, Smith A, Hughes R, Johnson O, Maini A, Martin S, et al. The evolution of global health teaching in undergraduate medical curricula. Global Health (2012) 8:35.10.1186/1744-8603-8-35 [PMC free article] [PubMed] [Cross Ref]
60
5. Bateman C, Baker T, Hoornenborg E, Ericsson U. Bringing global issues to medical teaching. Lancet(2001) 358:1539–42.10.1016/S0140-6736(01)06586-2 [PubMed] [Cross Ref]
6. Macfarlane SB, Jacobs M, Kaaya EE. In the name of global health: trends in academic institutions. J Public Health Policy (2008) 29:383– 401.10.1057/jphp.2008.25 [PubMed] [Cross Ref]
7. Bozorgmehr K, Saint VA, Tinnemann P. The 'global health' education framework: a conceptual guide for monitoring, evaluation and practice. Global Health (2011) 7:8.10.1186/1744-8603-7-8 [PMC free article] [PubMed] [Cross Ref]
8. Crump JA, Sugarman J. Working Group on Ethics Guidelines for Global Health Training (WEIGHT). Ethics and best practice guidelines for training experiences in global health. Am J Trop Med Hyg (2010) 83:1178–82.10.4269/ajtmh.2010.10-0527 [PMC free article] [PubMed] [Cross Ref]
9. Pati, S., Sinha, R., Panda, M., Pati, S., Sharma, A., &Zodpey, S. (2017). Global Health teaching in india: a Curricular landscape. *Frontiers in public health*, *5*, 259.

ASSESSMENT METHOD:

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

MPH 3RD SEMESTER

COURSE CODE: MPH 301
COURSE TITLE: STRATEGIC MANAGEMENT
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

The aim of this course is to help students to understand and gain knowledge in the use of effective tool and strategies to ensure that the healthcare organization delivers the best results. In improving business planning, guiding employees to think in a new and better way about the success of the organization and ensures that the future goals are accomplished.

COURSE CONTENT

UNIT 1: Introduction, history, concept and characteristics about strategic management

UNIT 2: Vision, Mission, Strategy framework for institutional approach to public health

UNIT 3: Public-Private Partnership as a Strategic Public Health Management -. Case studies in Strategic Management

UNIT 4: TQM as a public health management strategy - Healthy Plan it –

UNIT 5: Public Health Planning - Utilization of Health Services - (Public/Private facilities, Urban/Rural) UNIT 6:

Human Resource challenges and issues in Public Health Management

UNIT 7: Models in Healthcare Delivery – Delegation

UNIT 8: Change Management Problem solving tools

UNIT 9: Country/Region Strategy planning from public health perspective – Field Visits.

COURSE LEARNING OUTCOMES (CLOs)

After completion of this course successfully, the students will be able to

CLO1: Explain the vision, mission and strategic framework of institutional approach towards public health UNIT 1
CLO2: Explain and apply the PPP as a strategic public health management UNIT 2
CLO3: Understand and explain TQM as a public health management strategy UNIT 3
CLO4: Illustrate and explain Healthy Plan it -Public Health Planning UNIT 4
CLO5: Evaluate Utilisation of Health Services - (Public/Private facilities, Urban/Rural) UNIT 5
CLO6: Describe Human Resource challenges and issues in Public Health Management UNIT 6
CLO7: Explain the Models in Healthcare Delivery- Delegation UNIT 7
CLO8: Understand and explain Change Management Problem solving tool UNIT 8
CLO9: Discuss the Country/Region Strategy planning from public health perspective UNIT 9

BOOKS

1. Ansoff, H. I. Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion. New York: McGraw-Hill, 1965.
2. Ansoff, H. Igor. "Critique of Henry Mintzberg's 'The Design School: Reconsidering the Basic Premises of Strategic Management'." Strategic Management Journal 12, no. 6 (1991): 449-61.
3. Chandler, A. D. Strategy and Structure: Chapters in the History of the American Industrial Enterprise. Cambridge, MA: MIT Press, 1962.

REFERENCES

4. Review." Journal of Management Studies 28, no. 4 (1991): 353-74. Bracker, Jeffrey. "The Historical Development of the Strategic Management
5. Graetz, F. "Strategic Thinking versus Strategic Planning: Towards Understanding the Complementarities." Management Decision 40, no. 5 (2002): 456-62.
6. Hill, C.W.L. and G. R. Jones. Strategic Management: An Integrated Approach. Independence, KY: South-Western, 2007.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 302

COURSE TITLE: ORGANISATION BEHAVIOUR AND DESIGN

COURSE CREDIT: 4

TOTAL HOURS: 60

COURSE OBJECTIVES

- To help the students to develop cognizance of the importance of human behaviour.
- To enable students to describe how people behave under different conditions and understand why people behave as they do.
- To provide the students to analyse specific strategic human resources demands for future action.
- To enable students to synthesize related information and evaluate options for the most logical and optimal solution such that they would be able to predict and control human behaviour and improve results.

COURSE DESCRIPTION

The main objective of Organizational Behavior course is to help the students to acquire and develop skill to take rational decisions in the process of O.B. People have always been regarded as important in managing organizations. Human aspects are critical in each functional aspects of management and equally so for the effective utilization of resources. In view of this, organizational behavior has assumed great importance. This course is designed primarily for students who are being exposed to Organizational Behavior for the first time. MPH 302- Organisational Behaviour Student must have basic understanding of General Management. This course covers the explanations about the human behavior in the organizational context. It details the impact of individual, group and organizational factors on human behavior. The course also focuses on understanding the behavior of the employees working in the organization. It highlights the significance of Challenges and Opportunities of OB, perception, attribution, learning, organizational change, organizational culture, motivation, leadership and conflict management. Students are encouraged to share any additional journal or newspaper articles related to course topics with the class. Please email or bring them to class so they can be shared.

COURSE CONTENT

UNIT 1

Health services Org-Systems - The changing health care system - Ecology of Healthcare -Organizations –

UNIT 2

Manager and Managerial Activity. Learning: Classical Conditioning - Social Learning - Operational Conditioning - Schedules of reinforcement.

UNIT 3

Motivation: Define Motivation - Myths about Motivation - Theories of motivation.

UNIT 4

Leadership: Understand what leadership is and what is not - Key features of leadership perspective - Challenges in healthcare organizations. Distinction between leadership and management.

UNIT 5

Groups and teams: Stages of team development- Team effectiveness - Understanding and improving team performance - A model of team effectiveness.

UNIT 6

Work Design: Psychological Approach - Technical Approach - Approaches to work design - Changes in design of health care work - Dividing work into jobs

UNIT 7

Power and Politics: Power, influence and politics – Definition - Sources of Power - Abuse of Power in Organizations -Power strategies and tactics- Transactional Analysis (TA).

UNIT 8

Organizational design: Various types of organizational design - Organizational Structure -Organizational Culture.

UNIT 9

Organizational performance: Efficiency and effectiveness

COURSE LEARNING OUTCOMES (CLOs)

On completion of this course, the students will be able to

CLO1: Demonstrate the applicability of the concept of organizational behaviour to understand the behaviour of people in the organization in the health care. UNIT 1

CLO2: Demonstrate the applicability of analysing the complexities associated with management of individual behaviour in the organization. UNIT 2

CLO3: Analyse the complexities associated with management of the group behaviour and motivation in the organization. UNIT 3

CLO4: Demonstrate leadership skills in the organizational behaviour and integrate understanding the motivation (why) behind behaviour of people in the organization UNIT 4

CLO5: Explain the stages of team development- Team effectiveness - Understanding and improving team performance. UNIT 5

CLO6: Psychological Approach - Technical Approach - Approaches to work design - Changes in design of health care work - Dividing work into jobs. UNIT 6

CLO7**:** ExplainPower, influence and politics – Definition - Sources of Power - Abuse of Power in Organizations - Power strategies and tactics- TransactionalAnalysis(TA). UNIT 7

CLO8: Describe the various types of organizational design - Organizational Structure and Culture. UNIT 8

CLO9: Evaluate the Organizational performance: Efficiency and effectiveness UNIT 9

Books

1. Organizational Behavior – by Stephen Robins – Prentice Hall Publications
2. Organizational Behavior – by K. Ashwathappa – Himalaya Publishing
3. Organizational Behavior – by L. M. Prasad – Sultan Chand Publications
4. Organizational Behavior – by Suja Nair – Sultan Chand Publications

References

- Cunningham TR, Geller ES. Organizational behavior management in health care:applications for large-scale improvements in patient safety.
- Davis R, Campbell R, Hildon Z, Hobbs L, Michie S. Theories of behaviour andbehaviour change across the social and behavioural sciences: a scoping review. Healthpsychology review. 2015 Aug 7;9(3):323-44.
- Johnson J, editor. Health organizations: Theory, behavior, and development. Jones &Bartlett Learning; 2009 Oct 6.
- Kawonga M, Blaauw D, Fonn S. The influence of health system organizational structureand culture on integration of health services: the example of HIV service monitoring inSouth Africa. Health policy and planning. 2016 May 19;31(9):1270-80.

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 303
COURSE TITLE: HUMAN RESOURCE DEVELOPMENT IN PUBLIC HEALTH
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

To introduce the students to the systems theory to make them understand the development of human resources in an organization. Students will be able to correlate an organization to a system and will be able to understand how to achieve organisational goals, work culture,employee motivation, team integration and all that's required to make the human resource department achieve their goals.

COURSE DESCRIPTION

Organizations are made up of people: their knowledge, skills, attitudes and interconnections. In order to survive and thrive, organizations need to facilitate the growth of all of these as part of a HRD strategy. Human Resource Development (HRD) is a key activity that systematically leads to the growth and development of people in organisations, and makes organisations more effective. The process of identifying needs and designing and delivering HRD interventions that are part of the course are crucial skills for all managers. The course will focus on the role of HRD in designing and implementing appropriate strategies in line with the business goals of their organization. The course will include topics related to design, development, implementation and evaluation of HRD programmes. In addition to HRD Process, it would cover a number of HRD interventions like coaching, mentoring, and counselling. The course will also address the competency mapping framework of HRD, role of HRD in career planning and development,

COURSE CONTENT

UNIT 1
Preparatory: Introduction and Organization Designand Human Resource Development: Emergent of HRD, Critical HRD roles, challenges for HRD. Essential principles of systems Theory.

UNIT 2
Foundational: Evolutionary Psychology Model of Individual Human Behaviour - Systems model and evolving understanding of collectives and organisations. HRD Process Model: identification of HRD needs and Design and development of HRD programmes

UNIT 3:
Core Learning: The HRM processes cycle from job (role) analysis, recruitment, training, career development, performance evaluation and enhancement, compensation, communication, decisions, workplace issues, organisational culture, leadership.

UNIT 4:
Applicatory: Strategic HRM, Contemporary issues, Tools relevant to systems practice in organisational HRM context.Employee counselling for HRD: Overview of counselling programmess, employee assistance programme, stress management, employee wellness and health promotion

UNIT 5Competency framework of HRD: why competency mapping? Understanding the competency mapping framework, steps in competency mapping

COURSE LEARNING OUTCOME

CLO1:To have an understanding of the basic concepts, functions and processes of human resource management. To be aware of the role, functions and functioning of human resource department of the organizations UNIT 1

CLO2: Explain the evolutionary psychology model of individual human behaviour and HRD Process Model - systems model, evolving understanding of collectives and organisations. HRD Process Model: UNIT 2

CLO3: To understand issues, design and formulate various HRM processes such as Recruitment, Selection, Training, Development, Performance appraisals, employee safety and reward Systems, Compensation Plans, policy analysis and Ethical Behaviour. UNIT 3

CLO4: Develop ways in which human resources management might diagnose a business situation, strategy and then facilitate the internal change through various tools relevant to system practice necessary to accomplish the strategy in terms of counselling, stress management, wellness programs and so on relevant to accelerate the goals of the organisation. UNIT 4

CLO5: Evaluate the developing role of human resources in areas not limited to competency and steps in competency mapping. UNIT 5

Text Book

1. Dessler, G.&VarkkeyB.(2011) Human Resource Management, 12th Ed, Pearson Educatio
2. Aswathappa K. (2005) Human Resource and Personnel Management,4th Ed,Tata Mc Graw Hill Publishing Co. Ltd
3. A Textbook of Human Resource ManagementR S Dwivedi

Suggested Readings

- Durai, P. (2010), Human Resource Management, Pearson Education
- Snell/ Bohlander, Human resource Management, Cengage Learning
- David Lepak\ Mary Gowan, Human Resource Management: managing Employees for the Competitive advantage

Web Resources

- http://aise.swlearning.com
- www.pearsonhighered.com/lepak
- www.hgsi.com

4. www.slideshare.net
5. https://www.ncbi.nlm.nih.gov/pmc/

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades

Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 304

COURSE NAME: QUALITY ASSURANCE AND TOTAL QUALITY COURSE

CREDIT: 4

TOTAL HOURS: 6O

COURSE OBJECTIVES-

- TO develop products and focuses on the prevention of defects.
- TO improve development and testing processes to prevent defects from arising during the product development lifecycle.

COURSE DESCRIPTION-

The course provides basic concepts of quality in health care and approaches and skills to implement sustainable quality assurance program in the health system. The course, various quality improvement approaches (QC, QA, CQI, TQM), role of standards and norms, use of quality improve tools, methods of quality assessment and approaches to operationalise and implement quality Assurance program. Concepts of organization for quality improvement, including Quality Teams (QT) and Quality Control Circles (QCC) are explained.

COURSE CONTENT:

UNIT 1: Introduction to quality**:** Definition, concept, History – UNIT

2: TQM framework - Benefits,Awareness and Obstacles

UNIT 3: Quality Vision, Mission and Policy Statements

UNIT 4: Customer Focus, Customer Perception of Quality,

UNIT 5: Translating needs into requirements,

UNIT 6: Principles and Philosophies of Quality Management: Overview of the contributions of Walter Shewhart, Deming &Juran and others

UNIT 7: Concepts of quality circle: Japanese 5S Principles and 8D Methodologies

UNIT 8: Dimensions of Quality and Quality assurance: A Model Defining Quality

UNIT 9: Measuring Quality: Six-Sigma

UNIT 10: Quality assessment: Concept and tools

UNIT 11: Improving Quality: Institutionalizing QA

Course learning Outcomes:

CLO1: To ensure that a product is manufactured, or a service is provided, to meet the specifications which ensure public needs are met. UNIT 1

CLO2: To ensure all associated employees work toward the common goals of improving product or service quality, as well as improving the procedures that are in place for production.UNIT 2

CLO3: To foster student success in academic and professional leadership UNIT 3

CLO4: To answer customer questions, resolve support issues, improve credibility and nurture relationships UNIT 4

CLO5: To agree on the phrasing of one sentence in the original text, this effect is multiplied in the translation process. UNIT 5

CLO6: To improve quality of products or services your institution provides UNIT 6

CLO7: To improve quality, productivity and the total performance of the organization and also to enrich the quality of work life UNIT 7

CLO8: To verifying or determining whether services meet or exceed public expectations UNIT 8

CLO9: To identify and reduce errors and increase the efficiency of processes UNIT 9

CLO10: To clear, specific statements of what learners will be able to perform at the conclusion of instructional activities. UNIT 10

CLO11: To measure each component and achieve improvements. UNIT 11

TEXT BOOKS

1. **A Textbook of Quality AssurancebyPAPatilDr.AtulChoapade**
2. **Mukhopadhyay M. Total quality management in education. SAGE Publications Pvt. Limited; 2020 May 4.**
3. **Ross JE. Total quality management: Text, cases, and readings. Routledge; 2017 Oct 6.**
4. **Arcelay A, Sánchez E, Hernández L, Inclán G, Bacigalupe M, Letona J, González RM, Martínez□Conde AE. Self□assessment of all the health centres of a public health service through the European Model of Total Quality Management. International Journal of Health Care Quality Assurance. 1999 Apr 1.**
5. **Sidin AI. Is Total Quality Management/Continous Quality Improvement or Quality Assurance Applicable in Health Services?. International Journal of Health and Medical Sciences. 2016;2(1):712.**

REFERENCES

1. Agarwal A, Aeran H, Uniyal S, Nautiyal A. Quality assurance in dentistry: a need in Indian scenario. Int J Oral Health Dentistry. 2015 Dec;1(4):172-6.
2. Kumar MR. *Total quality management as the basis for organizational transformation of Indian Railways: a study in action research* (Doctoral dissertation, Southern Cross University).
3. McLaughlin CP, Kaluzny AD. Total quality management in health: making it work. Health Care Management Review. 1990 Jan 1;15(3):7-14.
4. Barendsz AW. Food safety and total quality management. Food control. 1998 Apr 1;9(2-3):163-70.
5. Dall'Agnol M, di Loreto C, Pirani WM, Utagawa ML, Pereira SM, Sakai YI, Feres CL, Shih LW, Yamamoto LS, Rodrigues RO, Shirata NK. 100% rapid rescreening for quality assurance in a quality control program in a public health cytologic laboratory. Actacytologica. 2005 Nov 1;49(6):639-43.

Total Quality Management: An Integrated Approach by Dr. Kiran, Bsp

Online link for study and reference materials

e) www.slideshare.net

f) https://www.ncbi.nlm.nih.gov/pmc/

g) Google scholar

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH 305
COURSE TITLE: MANAGEMENT INFORMATION AND EVALUATION SYSTEM
COURSE CREDIT: 4
TOTAL HOURS: 60

COURSE OBJECTIVE

- To describe the role of information technology and decision support systems in business and record the current issues with those of the firm to solve business problems.
- To introduce the fundamental principles of computer-based information systems analysis and design and develop an understanding of the principles and techniques used.
- To enable students, understand the various knowledge representation methods and different expert system structures as strategic weapons to counter the threats to business and make business more competitive.
- enable the students to use information to assess the impact of the Internet and Internet technology on electronic commerce and electronic business and understand the specific threats and vulnerabilities of computer systems.
- To provide the theoretical models used in database management systems to answer business questions.

COURSE CONTENT

UNIT 1
Information System in Health care: Perspectives on information systems UNIT 2
The basic concepts - Steps and approaches in developing HMIS: Reviewing the existing system. UNIT 3
Defining data needs - data flow: Designing the data collection and reporting tools UNIT 4
Procedures for data processing: Monitoring and evaluating the system
UNIT 5
Dimensions of information systems: Contemporary Approaches to Information Systems
UNIT 6
Learning to Use Information Systems – New Opportunities with Technology – HMIS in Various National Health Programs

COURSE LEARNING OUTCOME

Upon completing the course, students will be able to:
CLO1: Define an information system from both a technical and business perspective and distinguishbetween computer literacy and information systems literacy.Apply a framework and process for aligning and organization's information system objectives with organisations strategy.UNIT 1

CLO2: Defend the strategic value of information resources for an organization. What are the steps and approach in developing and HMIS? Explain the existing HMIS of any state. UNIT 2

CLO3: Participate in an organization's information systems and technology decision-making processes. Understand. Defining data needs - data flow: Designing the data collection and reporting tools UNIT 3

CLO4: Identify ways information systems & technology may improve an organization's performance, including improving organizational processes, decision-making, collaboration, and personal productivity.

Procedures for data processing: Monitoring and evaluating the system UNIT 4

CLO5: Dimensions of information systems: Contemporary Approaches to Information Systems Define what a manager should be able to expect from an IT department in an organization.

Build a business case for IT, addressing key IT acquisition decisions such as make/buy; outsource/insource; project management. UNIT 5

CLO6: Learning to Use Information Systems – New Opportunities with Technology – HMIS in Various National Health Programs. Apply a framework for evaluating information-related ethical dilemmas commonly faced by managers. UNIT 6

REFERENCES

Chaulagai CN, Moyo CM, Pendame RB. Health management information system in Malawi: Issues and innovations. InProceedings of the RHINO Workshop 2001 Mar 14 (pp. 14-16).

Ngoma C. *Cultivation Strategies in the Implementation of Health Management Information System in Zanzibar: An Action Research Study* (Master's thesis).

Ngoma C. *Cultivation Strategies in the Implementation of Health Management Information System in Zanzibar: An Action Research Study* (Master's thesis).

BOOKS

Muraleedharan VR, Dash U, Gilson L. Tamil Nadu 1980s–2005: a success story in India. 'Good health at low cost'25 years on. 2009:159.

Trikha S, Arora B, Sharma M, Thakur P. Implementing e-Upchaar: Hospital Management Information System for public health facilities in Haryana. Electronic Physician. 2020 Apr 1;12(2).

Links https://www.slideshare.net/Sujatamohapatra/health-management-information-evaluation-systemhttps://www.measureevaluation.org/resources/publications/ms-13-74/at_download/documenthttps://hmis.nhp.gov.in/#!/aboutus

ASSESSMENT METHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

COURSE CODE: MPH-306

COUSE NAME: SOCIAL ENTREPRENEURSHIP, NGO MANAGEMENT AND MARKETING IN PUBLIC HEALTH

COURSE CREDIT HOURS: 04

TOTAL CONTACT HOUR: 60

COURSE OBJECTIVES

The student should be able to describe the introduction of Entrepreneurship, difference between Commercial and SocialEntrepreneurship. Explain the Frameworks for Social Entrepreneurship, Management of Social Enterprises, Culture, Leadership and Strategy. Case studies in Social Entrepreneurship. Demonstrate the NGO management and Concepts of marketing and Social marketing in Public Health.

COURSE DESCRIPTION

This course involves the introduction of Entrepreneurship, Social Entrepreneurship, NGO management and marketing in Public Health

COURSE CONTENT:

UNIT-1. Introduction to Entrepreneurship

- Introduction
- Development of the Concept of Entrepreneurship
- Current Scenario of Entrepreneurship in India
- Characteristic Features Of Entrepreneur
- Traits of Successful Entrepreneurs
- Functions of an Entrepreneur
- Types of Entrepreneur

UNIT-2. Commercial and Social

- Introduction
- Differentiation between “commercial entrepreneurs” and “social entrepreneurs”
- “PCDO” analytical framework
- Modern Approach to Creating Social Value
- How Does Social Entrepreneurship Work?

UNIT-3. Frameworks for Social Entrepreneurship

- Characteristics of Social Enterprises
- Promotion of Social Innovation
- Behaviour of Successful Social Entrepreneurship
- Social Entrepreneurship Framework
- Applying the Framework

UNIT-4. Managing for Social Enterprises

- Introduction
- Business Model for Social Enterprise
- Learning for Social Enterprise Framework
- Strength of the management structures in social enterprises?
- Define good Leadership & Management
- Core Leadership and Management Skills
- Qualities of a Great Leader for Social Entrepreneurs •How can we improve leadership and management capability?
- Manage a team in a social enterprise

UNIT 5. Culture, Leadership and Strategy

- Introduction and definition
- Conceptual Bases for Organizational Cultural Analysis
- The Culture of Social Enterprise in Businesses
- The Culture of Social Enterprise in CSOs
- Final Reflections
- Leadership in Social Enterprise
- Venture Start-Up
- Social Venture Institutionalization
- Conglomerate Leadership
- Strategy
- Mission, Values, and Value Proposition

UNIT-6. Case studies in Social Entrepreneurship

- Introduction
- Advantages of Social & Rural Enterprises
- Case Study on Social Entrepreneurship

UNIT-7. NGO management - guidelines & regulations and

- What is a Non-Governmental Organization (NGO)?
- Registration of NGOs
- Types of NGOs
- Setting up an NGO's By-Laws
- An NGO Approach to Solving Community Problems
- Financial Management for NGOs
- Solving Organization Problems in NGOs

UNIT-8. Concepts of marketing- role of Marketing in Health care

- Marketing Concepts
- Role of Marketing in Health care

UNIT-9. Social Marketing – process and case studies

- Defining Social Marketing
- The Marketing Mix
- Consumer Orientation And The Importance Of Research
- Steps in the Social Marketing Process

- Case Examples Of Social Marketing Applications

4. Course learning outcomes:

CLO-1. The student should be able to implement the role of entrepreneurship. They will be able to develop of the Concept of Entrepreneurship, Characteristic and Traits of Successful Entrepreneurs. Explain the Functions and types of an Entrepreneur. UNIT 1

CLO-2. Ability to differentiate between "commercial entrepreneurs" and "social entrepreneurs", "PCDO" analytical framework and Modern Approach to Creating Social Value UNIT 2

CLO-3. Ability to describe thecharacteristics of Social Enterprises, Promotion of Social Innovation and Behaviour of Successful Social Entrepreneurship. Implementation of Social Entrepreneurship Framework and applying the Framework. UNIT 3

CLO-4. Students will be able to develop the business Model for Social enterprise, Strength of the management structures in social enterprises.
Core Leadership and Management Skills and Qualities of a Great Leader for Social Entrepreneurs, Manage a team in a social enterprise. UNIT 4

CLO-5. Students can Conceptualize the bases for Organizational Cultural Analysis and the Culture of Social Enterprise in Businesses and CSOs UNIT 5

CLO-6. Students will be able to demonstrate Non-Governmental Organization (NGO), Types of NGOs, NGO Approach to Solving Community Problems and Financial Management for NGOs UNIT 6

CLO-7. Marketing Concepts and Role of Marketing in Health care. UNIT 7

CLO-8. Ability to define Social Marketing , The Marketing Mix, Steps in the Social Marketing Process with Case Examples Of Social Marketing Applications UNIT 8 & 9

Text books:

a) Enterprising Nonprofits: A Toolkit for Social Entrepreneurs- J Gregory Dees

b) Social enterprise An introduction **Reference books:**

a) Social marketing in Public Health
b) Igniting the power of community

Online link for study and reference materials

a) www.slideshare.net
b) https://www.ncbi.nlm.nih.gov/pmc/
c) Google scholar

d) www.researchlink.org

Internal exam 25%; Final exam 75%

Assessment	**Grades**
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

HOSPITAL MANAGEMENT

COURSE TITLE: HOSPITAL MANAGEMENT [MPH 400]

COURSE CREDIT: 3

COURSE HOURS: 50

INTRODUCTION:

In the developing countries, the situation becomes even more intimidating as the hospitals have lesser space, equipment, hospital staff and are frequently overwhelmed and overcrowded. A more sensitive delivery of care in a more therapeutic environment can benefit patients and have a positive bottom- line impact on healthcare institutions.

Poor Quality of Hospital Services has been a major problem for public and private sector hospitals in most developing countries especially in India. One of the main contributors of the poor quality of hospital services, apparent to patients and staff alike, is the inefficiency of hospitals' management and its operations (long delays over minor treatments and cost of care). According to reports there were documents that there are large variations in the utilization of hospital services and that at present there are no quality control mechanisms in place within hospital sector, as a result, the public hospitals are generally perceived to be of low quality compared to developed countries.

LEARNING GOAL

The goal of the course is to enhance the students' knowledge regarding management and other issues faced by hospital managers and to develop their skills to address the managerial and administrative issues of Public and Private sector hospitals at all levels.

LEARNING OBJECTIVES

By the end of the course the participants will be able to:

1. Describe the management of hospitals in public and private sectors.
2. Describe the functional departments of a hospital.
3. Apply the management functions such as planning, organizing, staffing and controlling in hospitals.
4. List out the problems that are being faced by hospitals in implementing effectively these management functions.
5. Describe the expected role of hospital in the community.

6. Apply the principles and practice of Hospital Management.
7. Construct budgets, financial costing and cost effectiveness of the hospital services.
8. List the requirements for efficient management of hospital services and utilities like xrays, laboratory and indoor facilities.
9. Establish the concept of total quality management in health services.
10. Describe the dynamics of a Hospital as an Organization and the Corporate nature of a Hospital.
11. Address efficiency issues in the management of a hospital through its resources.
12. Explore possible options for Cost Containment and profitability.

COURSE CONTENTS

The contents of the course are as follows:

1. UNIT 1Hospital System and its Role, Components of a Hospital System & Role of Hospitals in PHC
2. UNIT 2Vision, Mission, Goals and Values of a Hospital
3. UNIT 3Role and Functions of Hospital Managers
4. UNIT 4Hospital Services Management Nursing Management
   - Change Management
   - Infrastructure Management
5. UNIT 5Inventory Management
6. UNIT 6Drugs Management in Hospitals-I and II
7. UNIT 7Human Resource Management
8. UNIT 8Financial Management
   - Accounting rules and practices in a public & Private Hospital
   - Financial Management
   - Hospital Financing for Sustainability
   - Cost Containment, cost effectiveness and profitability
   - Costing and Cost implications of Hospital Services
9. UNIT 9RAP Tool
   - Introduction to Rapid Appraisal Tool for assessment of Emergency of a Hospital Data
   - Collection in Hospitals using RAP Tool
10. UNIT 10Preparing a Hospital Budget
11. UNIT 11Hospital Waste Management and infection control
    - Hospital Environment & Hospital Waste Management
    - Hospital Environment-related issues: lighting, ventilation, Cleanliness and tidiness, horticulture and greenery, Clean, regular and safe water supply, standards of personal hygiene,

Control measures for hospital associated infections

12. UNIT 12Accident & Emergency /Trauma Management Services

13. UNIT 13Human Resource Management

- Human Resource Development: current status and future challenges

14. UNIT 14Infrastructure Management

- Hospital Planning and Design
- TQM and Medical Audit of the Hospital.
- Total Quality Management: key concepts and Introduction to some basic tools of TQM Hospital
- Purchasing Process
- Hospital Purchase, Tendering and Processing

15. UNIT 15SHospital Ethical Concerns

COURSE LEARNING OUTCOMES [CLO]

CLO1. ExplainHospital System and its Role, Components of a Hospital System & Role of Hospitals in PHC UNIT 1

CLO2. Discuss the vision, Mission, Goals and Values of a Hospital UNIT 2

CLO3. Role and Functions of Hospital Managers UNIT 3

CLO4. Define Hospital Services Management Nursing

- Management
- Change Management
- Infrastructure Management UNIT 4

CLO5. Discuss Inventory Management UNIT 5

CLO6. Drugs Management in Hospitals-I and II UNIT 6

CLO7. Explain the concept, functions ofHuman Resource Management, Human Resource Development: current status and future challenges UNIT 7

CLO8. Discuss the use, importance ofFinancial Management Accounting

- rules and practices in a public & Private Hospital Financial
- Management
- Hospital Financing for Sustainability
- Cost Containment, cost effectiveness and profitability
- Costing and Cost implications of Hospital Services UNIT 8

CLO9. RAP Tool importance, and case studies

- Introduction to Rapid Appraisal Tool for assessment of Emergency of a Hospital
- Data Collection in Hospitals using RAP Tool UNIT 9

CLO10. Describe the Preparing a Hospital Budget UNIT 10

CLO11. Hospital Waste Management and infection control, definitions, importance, causes and control

- Hospital Environment & Hospital Waste Management
- Hospital Environment-related issues: lighting, ventilation, Cleanliness and tidiness, horticulture and greenery, Clean, regular and safe water supply, standards of personal hygiene, Control measures for hospital associated infections UNIT 11

CLO12. DiscussAccident & Emergency /Trauma Management Services UNIT 12

CLO13. Elaborate and discussInfrastructure Management

- Hospital Planning and Design
- TQM and Medical Audit of the Hospital.
- Total Quality Management: key concepts and Introduction to some basic tools of TQM Hospital
- Purchasing Process
- Hospital Purchase, Tendering and Processing UNIT 13 & 14

CLO14: Infrastructural management with respect to hospital planning TQM, CONCEPT TOOLS, purchasing process and tendering UNIT 15

CLO15. Expanciate on theHospital Ethical Concerns UNIT 16

TEACHING METHODOLOGY

A combination of various teaching methods such as lectures, individual and group exercises, group presentations, Field visits to Private and Public Hospitals will be used.

RECOMMENDED READINGS

1. Barnum H, Kutzin J. Public hospitals in developing countries: resource use, cost, financing.Baltimore, MD: JohnsHopkinsUniversity Press; 1993.
2. Blanchet KD, Switlik MM. The handbook of hospital admitting management. USA: Aspen Publications; 1985.
3. Goel SL, Kumar R. Management of hospitals. New Dehli, India: Deep and Deep Publications; 2002.
4. King M, Lapsley I, Mitchell F, Moyes J. Activity based costing in hospitals: a case study investigation. London, UK: Chartered Institute of Management Accountants; 1994.
5. McMahon R, Barton E, Piot M, Gelina N, Rose F. On being in charge. Geneva: World Health Organization; 1992.
6. PrekerAS, Harding A (eds.). Innovations in health service delivery: the corporatization of public hospitals, vol. 1. WashingtonDC: World Bank; 2002.

7. Shepard DS, Hodgkin D, Anthony Y. Analysis of hospital costs in developing countries: a manual for managers. Waltham, MA: Institute for Health Policy, BrandeisUniversity; 1997.
8. Willan JA. Hospital management in the tropics and subtropics. London, UK: Macmillan Education Ltd, 1990.
9. World Health Organization. The hospital in rural and urban districts: report of a WHO study group on the functions of hospitals at the first referral level. World Health Organ Tech Rep Ser. 1992;819:1-74.

ASSESSMENT MENTHOD

Internal exam 25%; Final exam 75%

Assessment	Grades
Internal Exam	**10**
Assignment	**5**
Extra Curricular activity	**5**
Attendance	**5**
Internal Assessment Exam	**25**

A. NTERNSHIP:

Two months' internship will be undertaken by all the candidates with an aim to integrate learning and practice in an active public health organization. This can be undertaken at governmental or non-governmental public health organisations or program management units. The internship should include the candidate's role and support in assessing, monitoring, or conducting surveillance of health problems/services in a population; research on population-based health problems; developing and/or implementing policies and intervention strategies to meet public health needs**.** Overall it should contribute to the organization, and should help in understanding public health management and coordination and gaining personal confidence and leadership experience. Although finding a suitable internship opportunity lie with the candidate him/herself, mentors will facilitate the process. After the completion of 2 months of internship, candidates will be expected to submit a brief summary of public health program/challenge dealt with and solution proposed/implemented by the candidate at the end of second semester.

Candidates should submit their project plan and preliminary time scale with their chosen topic for dissertation at the end of the internship to their mentor/tutor to seek appropriate approvals before embarking on the full investigation and project. **The internship is worth two (2) credits**.

B. DISSERTATION

At the end of the fourth semester, candidates will submit their **dissertation**on previously chosen and approved topic for assessment. **This will be a 10 credit course**. The dissertation will be evaluated by an internal examiner (60% weightage) and an external examiner (40% weightage) including a viva-voce.

LIST OF ABBREVIATIONS

AEFI	Adverse Event Following Immunization
AIDS	Acquired Immuno-Deficiency Syndrome
BCC	Behaviour Change Communication CBA
	Cost Benefit Analysis
CEA	Cost Effective Analysis
CD	Communicable diseases
CPCB	Central Pollution Control Board
CRS	Civil Registration System DLHS
	District Level Health Survey
GSI	Gender and Social Inclusion
HMIS	Health Management Information System
IDSP	Infectious Disease Surveillance Program
IEC	Information Education and Communication
IPC	Inter Personal Communication
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MCTS	Mother and Child Tracking System
MDG	Millennium Development Goals
MNCH	Maternal, New-born and Child Health

MPH	Master's in Public Health
NCD	Non Communicable Diseases
NFHS	National Family Health Survey
NHP	National Health Policy
OR	Operational Research
PHE	Public Health Education
PPP	Public Private Partnership
RMNCH+A	Reproductive, Maternal, Newborn, Child, and Adolescent health
SBCC	Social Behaviour Change Communication
SDG	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
SRS	Sample Registration Survey
STI	Sexually Transmitted Infections
SWOT	Strength, Weakness, Opportunities and Threats
TB	Tuberculosis
SAFE	Safety, Acceptability, Feasibility and Effectiveness (SAFE)

Evaluation and Grading

Requirement	Description	% Final grade
Assignments/Articles	Blended Learning assignments, visits, projects, discussions, group and individual assignments, written assignment.	
PowerPoints/Charts	Ppts for individuals & group	
Attendance	Course wise & general	
Internal Exams	October/November	
Final Exams	December/January	

Students Expectations, Roles and Responsibilities

Communication Expectations: It is highly important for MPH students to be able to have enough access to use computers during course related tasks only as identified by the instructor or teacher. If the use of such devices becomes distracting to the instructor or others, students may be asked to discontinue using the device. The expectation is any use of technology either on a school or personal device will be conducted in a professional and appropriate manner. It is the duty of students to take care of their devices properly.

Students' Health and Counselling

There are sometimes when student experience stress during the academics periods from individual, academic, interpersonal issues e.t.c.. This may interfere with the health of the student and could be ill or have a health condition. If you find yourself in such situation that may interfere with your academics, you could seek the help of your teacher or counsellor. Come quickly as soon as you realise you have a health issue. Do not wait until there is a crisis before you call for help. We are here to help with everything that concerns your academic success.

MUKESH KUMAR PARASHAR

Digitally signed by MUKESH KUMAR PARASHAR
Date: 2023.04.16 16:48:46 +05'30'