

NOIDA INTERNATIONAL UNIVERSITY

PROGRAMME STRUCTURE

BACHELOR AND MASTER OF COMPUTER APPLICATION

FIRST SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme				Subject Total	Total Credit
			L	T	P	Sessional Exam			External Exam		
						CA	TA	Total			
1	BCA-101	Mathematics	3	1	0	20	20	40	60	100	4
2	BCA-102	Digital Design & Electronics	3	1	0	20	20	40	60	100	4
3	BCA-103	Computer Fundamentals & C Programming	3	1	0	20	20	40	60	100	4
4	BCA-104	System Analysis and Design	3	1	0	20	20	40	60	100	4
5	BCA-105	Industrial Communication	2	0	0	20	20	40	60	100	2
PRACTICALS											
6	BCA-151	C-Programming Lab	0	0	4	-	-	40	60	100	2
7	BCA-152	Digital Design & Electronics Lab	0	0	4	-	-	40	60	100	2
Total										700	22

SECOND SEMESTER

S.No.	Course Code	Subject	Period			Evaluation Scheme			Subject Total	Total Credits	
			L	T	P	CA	TA	Total			External Exam
1	BCA-201	Computer Organization and Architecture Allied	3	1	0	20	20	40	60	100	4
2	BCA-202	Discrete Mathematics Core	3	1	0	20	20	40	60	100	4
3	BCA-203	Introduction to Operating System	3	1	0	20	20	40	60	100	4
4	BCA-204	Object Oriented Programming using Java	3	1	0	20	20	40	60	100	4
5	BCA-205	Environmental Studies Humanities	2	0	0	20	20	40	60	100	2
PRACTICALS											
6	BCA-251	Java Programming Lab	0	0	4	-	-	40	60	100	2
7	BCA-252	Operating System Lab	0	0	4	-	-	40	60	100	2
Total									700	1000	22

THIRD SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme				Subject Total	Total Credits
			L	T	P	CA	TA	Total	External Exam		
1	BCA-301	Algorithms and Data Structure	3	1	0	20	20	40	60	100	4
2	BCA-302	Microprocessors and Assembly language	3	1	0	20	20	40	60	100	4
3	BCA-303	Data Base Management Systems	3	1	0	20	20	40	60	100	4
4	BCA-304	Hypertext Pre Processor	3	1	0	20	20	40	60	100	4
5	BCA-305	Graph Theory	2	1	0	20	20	40	60	100	3
PRACTICALS											
1	BCA-351	Data Structure Lab	0	0	4	-	-	40	60	100	2
2	BCA-352	DBMS Lab	0	0	4	-	-	40	60	100	2
Total										700	23



FOURTH SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme					Total Credits
			L	T	P	Sessional Exam			External Exam	Subject Total	
						CA	TA	Total			
1	BCA-401	Financial Accounting	3	1	0	20	20	40	60	100	4
2	BCA-402	Business Statistics	3	1	0	20	20	40	60	100	4
3	BCA-403	Software Engineering	3	1	0	20	20	40	60	100	4
4	BCA-404	Web Technology	3	1	0	20	20	40	60	100	4
5	BCA-405	Mobile Computing/Distributed System	3	1	0	20	20	40	60	100	4
PRACTICALS											
1	BCA-451	Software Engineering Lab	0	0	4	-	-	40	60	100	2
2	BCA-452	Web Programming Lab	0	0	4	-	-	40	60	100	2
Total										700	24



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FIFTH SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme				Subject Total	Total Credits
			L	T	P	Sessional Exam		External Exam			
			L	T	P	CA	TA	Total			
1	BCA-501	Data Communication and Networks	3	1	0	20	20	40	60	100	4
2	BCA-502	Computer Graphics	3	1	0	20	20	40	60	100	4
3	BCA-503	Cloud Computing/ Big Data	3	1	0	20	20	40	60	100	4
4	BCA-504	Advanced Industrial Communication	2	0	0	20	20	40	60	100	2
PRACTICALS											
1	BCA-551	Data Network Lab	0	0	4	-	-	40	60	100	2
2	BCA-552	Computer Graphics Lab	0	0	4	-	-	40	60	100	2
3	BCA-553	Mini Project	0	0	8	-	-	40	60	100	4
Total										700	22

SIXTH SEMESTER

S.No	Course Code	Subject	Period			Evaluation Scheme				Subject Total	Total Credit
			L	T	P	Sessional Exam		External Exam			
			CA	TA	Total						
1	BCA-601	.Net Framework	3	1	0	20	20	40	60	100	4
2	BCA-602	Cryptography & Network Security /Compiler Design	3	1	0	20	20	40	60	100	4
3	BCA-603	Entrepreneurship	3	1	0	20	20	40	60	100	4
4	BCA-604	Numerical Analysis	3	1	0	20	20	40	60	100	4
5	BCA-605	Advanced DBMS	2	0	0	20	20	40	60	100	2
PRACTICALS											
1	BCA-651	.Net Programming Lab	0	0	2	-	-	40	60	100	2
2	BCA-652	Cryptography & N/W Security	0	0	2	-	-	40	60	100	2
Total										700	22

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EIGHTH SEMESTER

1.	MCA-801	Software Testing	3	1	0	20	20	40	60	100	4
2.	MCA-802	Operation Research	3	1	0	20	20	40	60	100	4
3.	MCA-803	Digital Image Processing	3	1	0	20	20	40	60	100	4
4.	MCA-804	Unix and Shell Programming	3	1	0	20	20	40	60	100	4
5.	MCA-805	Management Information System	3	1	0	20	20	40	60	100	4
PRACTICALS											
6.	MCA-851	Digital Image Processing Lab	0	0	4	-	-	40	60	100	2
7.	MCA-852	Unix and Shell Programming Lab	0	0	4	-	-	40	60	100	2
Total										700	24

NINTH SEMESTER

1.	MCA-901	Software Reliability	3	1	0	20	20	40	60	100	4
2.	MCA-902	Neural Network	3	1	0	20	20	40	60	100	4
3.	MCA-903	Artificial Intelligence	3	1	0	20	20	40	60	100	4
4.	MCA-904	Distributed System	3	1	0	20	20	40	60	100	4
PRACTICALS											
5.	MCA-951	Distributed System Lab	0	0	4	-	-	40	60	100	2
6.	MCA-952	Mini Project	0	0	4	-	-	40	60	100	2
Total										600	20

TENTH SEMESTER

1.	MCA-1001	Major Project						200	400	600	20
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MATHEMATICS

MATHEMATICS

Code: BCA101

CONTACTS: 3L + 1 T

CREDITS: 4

Unit-I

DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants.
MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, Rank of Matrix Dependence of Vectors, Eigen Vectors of a Matrix, Cayley -Hamilton Theorem (without proof).

Unit-II

STATISTICS: Measures of Central Tendency, Preparing frequency distribution table, arithmetic mean, geometric mean, harmonic mean, median and mode. Measure of dispersion: Range, mean, deviation, standard deviation.

Unit-III

INTEGRATION: Integral as Limit of Sum, Riemann Sum, Fundamental Theorem of Calculus, Indefinite Integrals, Methods of Integration Substitution, By Parts, Partial Fractions, Integration of Algebraic and Transcendental Functions, Elementary concepts of Gamma and Beta Functions.

Unit-IV

VECTOR ALGEBRA: Definition of a vector in 2 and 3 Dimensions; Double and Triple Scalar and Vector Product and their Applications.

LIMITS & CONTINUITY: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity at a Point, Continuity Over an Interval, Intermediate Value Theorem.

Unit-V

DIFFERENTIATION: Derivative, Derivatives of Sum, Differences, Product & Quotients, Chain Rule, Derivatives of Composite Functions, Logarithmic Differentiation, Rolle's Theorem, Mean Value Theorem, Expansion of Functions (Maclaurin's & Taylor's), Indeterminate Forms, L' Hospitals Rule, Maxima & Minima.

References

- B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998..
- Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
- H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001. Shanti Narayan, "Differential Calculus", S.Chand & Company, 1998.

- Shanti Narayan, “Integral Calculus”, S. Chand & Company, 1999

DIGITAL DESIGN & ELECTRONICS

DIGITAL DESIGN & ELECTRONICS

Code: BCA102

CONTACTS: 3L + 1 T

CREDITS: 4

Unit-I

Number System: Binary, octal, Hexadecimal Number, their addition and subtraction, Base conversions, Number code: BCD codes, Grey, ASCII, EBCDIC.

Unit-II

Boolean Algebra: Laws and theorems of Boolean algebra. De Morgan's theorem, XOR and XNOR gates, Half and Full Adder and Subtractor circuits.

Unit-III

Fundamentals: Products, Sum of products and Product of sums, Form of Boolean expressions, Truth Tables and Karnaugh maps, pair reads octets and Karnaugh simplification. Multiplexers BCD to Decimal to BCD decoders and, decoders' characteristics of digital integrated digitals.

Unit-IV

Flip Flop: RS Flip Flop, Clocked, RS Flip Flop, Edge trigger D Flip Flop. Flip Flop Switching time, JK Flip Flop. JK Master Slave Flip Flop. Clock wave forms, Shift registers: Serial in and serial out, Parallel in and parallel out. Counters: Asynchronous counters Synchronous counters.

Unit-V

Memories for Digital: System: Semiconductor Memories, Memory organization and expansion, classification of memories on the basis of principles of operation, ROM and RAM memory.

References:

- Moris Mano, “Digital Logic and Computer Design”, PHI Publications, 2002
- R. P. Jain, “Modern Digital Electronics”, TMH, 3rd Edition, 2003.
- R.L. Tokheim, “Digital Electronics, Principles and Applications”, Tata McGraw Hill, 1999.
- W. Gothman, “Digital electronics”, PHI.
- S. Salivahanan & S. Arivyhgan. “Digital circuits and design”, Vikas Publication, 2001
- Malvino Leach, "Digital Principles and Application", TMH, 1999.
- V. Rajaraman : Computer Fundamentals (PHI)

COMPUTER FUNDAMENTS & C - PROGRAMMING

COMPUTER FUNDAMENTS & C – PROGRAMMING
CONTACTS: 3L + 1 T

Code: BCA103
CREDITS: 4

Unit-I

Fundamental: H/W and S/W part of computer system, Computer Block Diagram, online processing, time sharing system, real time system, batch system, multiprogramming, multiprocessing, SPOOLING, distributed data processing. Element of computer file, types of files, file processing activities, file design factors, access methods, pros and cons of file organization

Unit-II

MS office: Introduction to MS Office; Introduction to MSWord; Features & area of use. Working with MS Word.; Menus & Commands; Toolbars & Buttons; Shortcut Menus, Wizards & Templates; Creating a New Document; Different Page Views and layouts; Applying various Text Enhancements; Working with – Styles, Text Attributes; Paragraph and Page Formatting; Text Editing using various features ; Bullets, Numbering, Auto formatting, Printing & various print options

Unit-III

MS Excel: Introduction and area of use; Working with MS Excel.; concepts of Workbook & Worksheets; Using Wizards; Various Data Types; Using different features with Data, Cell and Texts; Inserting, Removing & Resizing of Columns & Rows; Working with Data & Ranges; Column Freezing, Labels, Hiding, Splitting etc.; Using different features with Data and Text; Use of Formulas, Calculations & Functions; Cell Formatting including Borders & Shading; Working with Different Chart Types; Printing of Workbook.

Unit-IV

Elements of C: C character set, identifiers and keywords, Data types: declaration and definition, storage classes in C, Type conversion, Types of error, ‘C’ macro, macro vs function.

Operators: Arithmetic, relational, logical, bitwise, unary, assignment and conditional operators and their hierarchy & associativity. Data input/output.

Control statements: Sequencing, Selection: if and switch statement; alternation, Repetition: for, while, and do-while loop; break, continue, goto.

Unit-V

Functions: Definition, prototypes, passing parameters, recursion.

Data Structures: arrays, structure, union, string.

Pointers: Declaration, operations on pointers, array of pointers, pointers to arrays.

String & file handling, Streams, String I/ O, File Operations, Formatted I/O, Character I/ O, Line I/O, Block I/O, File positioning, File handling.

References:

- Joe Habraken, Microsoft Office 2000, 8 in 1 by, Prentice Hall of India
- Deitel & Deitel: C How to Program (Prentice Hall), 1996.
- Yashwant Kanetker, Let us C, BPB Publications.
- R. B. Patel, Fundamental of Computers and Programming in C, Khanna Book Publishing Company PVT.LTD. Delhi, India, 1st edition, 2008, ISBN: 13: 978-81-906988-7-0, pp. 1-962.
- Gottfried, Programming with C, Tata McGraw Hill.
- Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language, 2nd Ed., Prentice Hall of India.

System Analysis and Design

System Analysis and Design

CONTACTS: 3L + 1 T

Code: BCA104

CREDITS: 4

Unit 1 :

Introduction to SAD Fundamentals of System, Important Terms related to Systems, Classification of Systems, Real Life Business Subsystems, Real Time Systems, Distributed Systems, Development of a successful System, Various Approaches for development of Information Systems Structured Analysis and Design Approach, Prototype, Joint Application Development.

Unit 2 :

Process of System Development Systems Development Life Cycle: Phases of SDLC, Project Identification and Selection, Project Initiation and planning, Analysis, Logical Design, Physical Design, Implementation, Maintenance, Product of SDLC Phases, Approaches to Development, Prototyping, Joint Application Design, Participatory Design, Case Study

Unit 3 :

Introduction to Documentation of Systems Concepts and process of Documentation: Types of Documentation, System Requirements Specification, System Design Specification, Test Design Document, User Manual, Different Standard for Documentation, Documentation and Quality of Software,

Unit 4:

Process of System Planning Fact finding Techniques: Interviews, Group Discussion, Site Visits, Presentations, Questionnaires, Issues involved in Feasibility Study, Technical Feasibility, Operational Feasibility, Economic Feasibility, Legal Feasibility, Cost Benefit Analysis, Preparing Schedule, Gathering Requirements of System, Joint Application Development, Prototyping

Unit 5 :

Modular and Structured Design Design Principles: Top Down Design, Bottom Up Design, Structure Charts, Modularity, Goals of Design, Coupling, Cohesion. Criteria for Report Design, Relevance, Accuracy, Clarity, Timeliness, Cost

INDUSTRIAL COMMUNICATION

INDUSTRIAL COMMUNICATION

CONTACTS: 2L + 0 T

Code: BCA105

CREDITS: 2

Unit-I

Communicative Grammar: Spotting the errors pertaining to nouns, pronouns, adjective and adverbs; Concord - grammatical concord, notional concord and the principle of proximity between subject and verb. Changing the voice: from Active to Passive and Passive to Active. Idioms and phrases; Words often confused; One-Word Substitutes; Formation of words (suffixes, prefixes and derivatives);

Unit-II

Oral Communication: Introduction to principal components of spoken English – Transcription, Word accent, Intonation, Weak forms in English. Developing listening and speaking skills through various activities, such as (a) role play activities, (b) Practicing short dialogues (c) Group discussion (d) Debates (e) Speeches (f) Listening to news bulletins (g) Viewing and reviewing T.V. programmes etc.

Unit-III

Written Communication: Developing reading and writing skills through such tasks/activities as developing outlines, key expressions, situations, slogan writing and theme building exercises, dialogue writing, interpreting pictures/cartoons.

Unit-IV

Book Review – Herein the students will be required to read and submit a review of a book (Literary or non-literary) of their own choice. This will be followed by a presentation of the same in the class.

Technical Writing:

- (a) Business Letters, Format of Business letters and Business letter writing
- (b) E-mail writing
- (c) Reports, Types of Reports and Format of Formal Reports
- (d) Press Report Writing

Unit-V

Proper use of Language: The Communication Skills, The effective Speech.

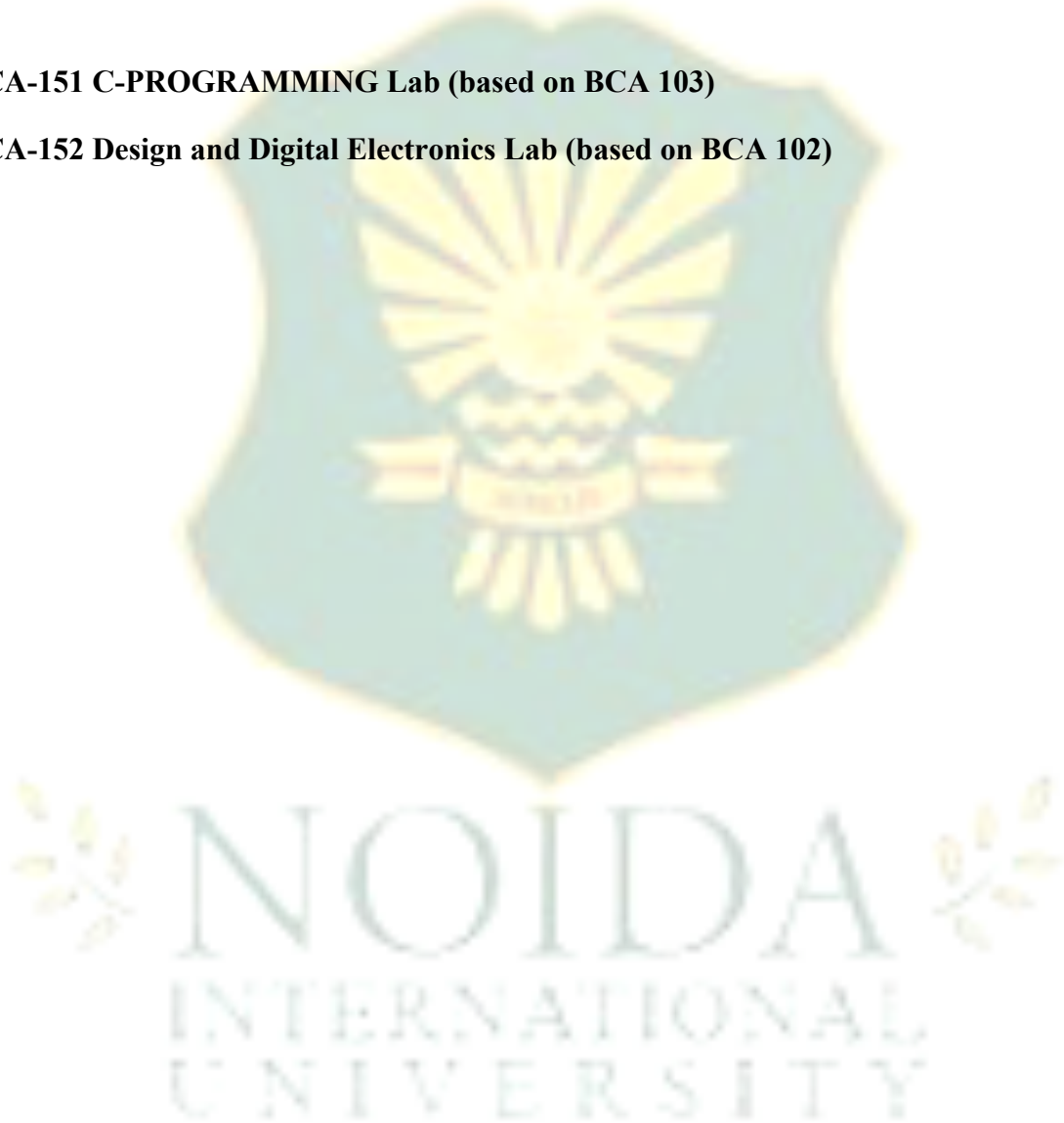
Effective self-presentation & facing interview: The interview process & preparing for it, the presentation skills.

References:

- Language in Use (Upper intermediate Level, Adrian Doff Christopher Jones, Cambridge University Press
- Common Errors in English, Abul Hashem, Ramesh Publishing House, new Delhi.
- Objective English, Tata Mc. Graw Hill Publishing Company Ltd., New Delhi.
- Spoken English for India, R.K. Bansal & J.B. Harrison, Orient Longman, Delhi.
- The sounds of English, Veena Kumar, Makaav Educational Software, New Delhi.
- English Phonetics & Phonology, P. Roach, Cambridge University Press, London
- Raman, Singh – Business communication – Oxford Press

BCA-151 C-PROGRAMMING Lab (based on BCA 103)

BCA-152 Design and Digital Electronics Lab (based on BCA 102)



COMPUTER ORGANIZATION AND ARCHITECTURE

COMPUTER ORGANIZATION AND ARCHITECTURE
CONTACTS: 3L + 1 T

Code: BCA201
CREDITS: 4

Unit-I

Basis Computer Architecture, Functional Organisation, Register Organisation, Arithmetic and Logic Unit, Central Processing unit, Instruction Formats.

Unit-II

Addressing Modes. Data Transfer and Manipulation, interrupts RISC/CISC architecture.

Unit-III

Register transfer and macro-operations, Register Transfer Languages (RTL). Arithmetic, Logic and Shift Macro-operations, Sequencing, Micro-program sequences.

Unit-IV

Memory & Storage: Processor Vs. Memory speed: Cache memory. Associative memory, Virtual memory and Memory management

Unit-V

Input/ Output organization: Peripheral devices, I/O Asynchronous Data Transfer: Strobe Control, Data Transfer Schemes (Programmed, Initiated, DW, Transfer), I/O Processor.

References:

- Moris Mano, “Computer System Architecture”, PHI Publications, 2002.
- R. P. Jain, “Modern Digital Electronics”, TMH, 3rd Edition, 2003.
- V. Rajaraman : Computer Fundamentals (PHI).

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DISCRETE MATHEMATICS

DISCRETE MATHEMATICS
CONTACTS: 3L + 1 T

Code: BCA202
CREDITS: 4

Unit-I

Graphs: Introduction to graphs, Graph terminology, Representing Graphs and Graph Isomorphism, Connectivity. Directed and undirected graphs and their matrix representations, reachability, Chains, Circuits, Eulers paths and cycles, Hamiltonian paths and cycles, Minima's Path Application, Trees, Binary trees, Binary search trees and traversals, Graph coloring.

Unit-II

Groups & Subgroups: Group axioms, permutation groups, subgroups, co-sets, normal subgroups, semi - groups, free semi – groups, applications.

Unit-III

Finite Fields: Definition, representation, structure, minimal polynomials, polynomial roots, Splitting Field, Integral Domain, Irreducible polynomial.

Formal Languages: Representation of special languages and grammars, finite state machines.

Unit-IV

Lattices & Boolean Algebra: Relation to partial ordering, lattices, Hasse Diagram, Axiomatic definition of Boolean algebra as algebraic structures with two operations basic results truth values and truth tables,

Unit-V

Algebra of propositional functions, Boolean algebra of truth values, Applications (Switching Circuit, Gate Circuit).

References:

- Kenneth G. Rosen: “Discrete Mathematics and Its Applications”, McGRAW-Hill International Edition, Mathematics Series.
- Babu Ram: “Discrete Mathematics and Its Applications”, Vinayaka Publications.
- C.L. Liu, “Discrete Mathematics and Its Applications”, McGRAW-Hill International Edition, Mathematics Series.
- Trembley, “Discrete Mathematics and Its Applications”, Tata McGRAW-Hill.
- Alan Doerr, Kenneth Levaseur, “Applied Discrete Structures for Computer Sciences”, Galgotia Publications Pvt. Ltd.

Introduction to Operating System

INTRODUCTION TO OPERATING SYSTEM
CONTACTS: 3L + 1 T

Code: BCA203
CREDITS: 4

Unit-I

Fundamentals of Operating system: Introduction to Operating System, its need and Operating System services, Early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems.

Process Management: Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

Unit-II

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms : FCFS, SJF, Round Robin & Queue Algorithms.

Deadlocks: Deadlock characterization, Methods for handling deadlocks, Banker's Algorithm.

Unit-III

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

Unit-IV

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Unit-V

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

References:

- Abraham Silberschatz, Peter B. Galvin, " Operating System Concepts", Addison-Wesley publishing. Co., 7th. Ed., 2004.
- Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
- Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
- William Stallings, "Operating Systems, "Internals and Design Principles", 4th Edition, PH, 2001.
- Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

Object Oriented Programming Using Java

OBJECT ORIENTED PROGRAMMING USING JAVA
CONTACTS: 3L + 1 T

Code: BCA204
CREDITS: 4

Unit I

8L

Object Modeling: Objects and classes, links and association, generalization and inheritance, aggregation, abstract class, multiple inheritance, meta data, candidate keys, constraints. **Dynamic Modeling:** Events and states, operations, nested state diagrams and concurrency, advanced dynamic modeling concepts, a sample dynamic model.

Unit II

8L

Functional Modeling: Data flow diagram, specifying operations, constraints, a sample functional model. **OMT (object modeling techniques) methodologies, examples and case studies to demonstrate methodologies, comparisons of methodologies, SA/SD, JSD.**

Unit III

8L

Java Programming: Introduction, Operator, Data types, Variables, Methods & Classes, Multithread Programming, I/O, Java Applet.

Unit IV

8L

Java Library: String Handling, Input/Output exploring Java.io, Networking, Exception Handling, Event Handling, Introduction to AWT, Working with window, Graphics, AWT Controls, Layout Manager and Menus, Images.

Unit V

8L

Software Development using Java:

Java Swing, Migrating from C++ to java, Application of java, JDBC.

Reference books:

1. Horstmann, Big Java, Wiley India
2. Herbert Schildt, "The Complete Reference: Java", TMH, 7th Edition.
3. Nino, "An Introduction to Programming and Object Oriented Design using Java, w/CD", Wiley India
4. James Rumbaugh et al, "Object Oriented Modeling and Design", PHI
5. Bjarne Stroustrup, "C++ Programming Language", Addison Wesley, 3rd Edition.

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ENVIRONMENTAL STUDIES

ENVIRONMENTAL STUDIES
CONTACTS: 3L + 1 T

Code: BCA205
CREDITS: 4

Unit 1 : Multidisciplinary nature of environmental studies

Definition, scope and importance, need for public awareness, Renewable and non-renewable resources , Natural resources and associated problems.

Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people.

Water resources : Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Unit 2 : Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Food chains, food webs and ecological pyramids.
- Introduction, types, characteristic features, structure and function of the following ecosystems:-

Forest ecosystem

Grassland ecosystem

Desert ecosystem

Unit 3 : Biodiversity and its conservation

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographically classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical,
- India as a mega-diversity nation
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 4 : Environmental Pollution Definition

- Cause, effects and control measures of :-
 - a. Air pollution
 - b. Water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.

- Disaster management : floods, earthquake, cyclone and landslides.

Unit 5 : Social Issues and the Environment (7 lectures)

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- Environmental ethics : Issues and possible solutions.
- Wasteland reclamation.
- 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.

REFERENCES

- a) Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- b) Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad –380 013, India, Email:mapin@icenet.net (R)
- c) Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- d) Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
- e) Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- f) De A.K., Environmental Chemistry, Wiley Eastern Ltd.

BCA-251 C++ PROGRAMMING Lab (based on BCA 204)

BCA-252 Operating System Lab (Based on BCA 203)

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Algorithm and Data Structure

ALGORITHM AND DATA STRUCTURE
CONTACTS: 3L + 1 T

Code: BCA405
CREDITS: 4

Unit-I

Arrays: Representation of single and multidimensional arrays; sparse arrays - lower and upper triangular matrices and Tri-diagonal matrices.

Unit-II

Stacks and Queues: Introduction and primitive operations on stack; Stack application, Infix, postfix, prefix expressions; Evaluation of postfix expression; Conversion from infix to postfix, Introduction and primitive operation on queues.

Unit-III

Lists: Introduction to linked lists; Sequential and linked lists, operations such as traversal, insertion, deletion, searching, Two way lists and Use of headers.

Trees: Introduction and terminology; Traversal of binary trees; Recursive algorithms for tree operations such as traversal, insertion, deletion; threaded trees, binary search trees, trees in search algorithm. B- tree. B+ tree and applications.

Unit-IV

Sorting Techniques: Insertion sort, selection sort, merge sort, heap sort.

Searching Techniques: Linear search, binary search and hashing.

Unit-V

File structure: physical storage devices and their characteristics, constituents of a file viz. fields, records, fixed and variable length records, primary and secondary keys; file operations, basic file system operations, file organizations: serial sequential, index sequential, direct , inverted, hashing function and collision handling methods.

Reference:

- E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd,
- 2003
- R. S. Salaria, "Data Structure & Algorithms", Khanna Book Publishing Co. (P) Ltd., 2002.
- P. S. Deshpande and O.G. Kakde, "C & Data Structure", Wiley Dreamtech, 1stEdition, 2003.
- Y. Langsam et. al., "Data Structures using C and C++", PHI, 1999.
- Schaum's outline series, "Data Structure", TMH, 2002

Microprocessor & Assembly Programming

MICROPROCESSOR & ASSEMBLY PROGRAMMING
CONTACTS: 3L + 1 T

Code: BCA302
CREDITS: 4

Unit-I

Fundamental Micro-processor: overview of intel pro-pentium Motorola 68000 series, power PC, DEC-Alphacip; CISC architecture.

Unit-II

Basic microprocessor architecture and interface: Internal architecture, external system bus architecture, memory and Input/output interface.

Unit-III

Programming mode: General-purpose registers; pointer and index registers; flag; segment registers, program invisible registers; memory addressing and addressing modes.

Unit-IV

Memory interfacing; memory address decoding; cache memory and cache controllers. Basic I/O interface; I/O mapped I/O memory mapped I/O; basic input/output and handshaking input/output port address decoding; 8255 programmable peripheral interface; 8279 programmable keyboard and display interface; 8254 programmable timer; 8251 programmable/communication interface;

Unit-V

interrupts-interrupt vector, vector tables, hardware and software Interrupts, 8259 programmable Interrupts controller; real-time clock; direct memory access, 8237/ 8257 DMA controller; video controllers; shared bus operation.

Reference:

- Morris Mano, Computer System Architecture, 3rd Edition, Prentice-Hall of India Private Limited, 1999.
- Gill, Nasib Singh and Dixit J.B., “Digital Design and Computer Organisation”, University
- William Stallings, Computer Organization and Architecture, 4th Edition, Prentice Hall of India Private Limited, 2001
- Mathur A.P “Introduction microprocessor”, Tata McGraw Hill
- Leventhal, L.A, “Introduction microprocessor”, Prentice Hall of India.
- Naresh Grover, —“Microprocessor comprehensive studies Architecture, Programming and Interfacing” Dhanpat Rai, 2003.

Data Base Management System

MOBILE COMPUTING
CONTACTS: 3L + 1 T

Code: BCA303
CREDITS: 4

Unit-I

Introduction: Characteristics of database approach, data models, DBMS architecture and data independence.

Unit-II

E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, roles and structural constraints, weak entities, enhanced E-R and object modeling, Sub Classes:, Super classes, inheritance, specialization and generalization,

Relational Data Model: Relational model concepts, relational constraints, relational algebra, relational calculus.

Unit-III

SQL: Introduction, Features of SQL, Components – DDL, DML, DCL, Data types in SQL; Commands: Create, Insert, Select, Delete, Update, Alter, Rename; Aggregate functions, Character/String functions, Numeric functions, Joins, Declarative constraint, Transaction control command, Views: Create, Drop, Advantage & disadvantage of view, Uses of view.

Unit-IV

Normalization: Introduction, Needs of Normalization, Normal form up to BCNF normal form.

Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of transaction

Unit-V

Concurrency Control: Introduction to Lock Management, Lock Conversions, Dealing with Dead Locks, Concurrency without Locking, Recovery Techniques, Database Security

Reference:

- Raghurama Krishnan : Data base Management Systems, Johannes Gehrke, TMH.
- Siberschatz, Korth : Data base System Concepts, McGraw Hill, latest edition.
- C.J. Date : Introduction to Database Systems, Pearson, Education.
- Elmasri Navathe : Data base Management System, Pearson Education.
- Connoley : Data base Systems, Pearson Education.

Hypertext Pre Processor

HYPERTEXT PRE PROCESSOR

CONTACTS: 3L + 1 T

Code: BCA304

CREDITS: 4

Unit-I

Introduction to PHP Evaluation of Php: Basic Syntax Defining variable and constant Php, Data types, Operator and Expression, Handling Html Form With Php, Capturing Form.

Unit-II

Data Dealing with Multi-value filed: Generating File uploaded form, Redirecting a form after submission, Decisions and loop Making, Decisions Doing Repetitive task with looping, Mixing Decisions and looping with Html.

Unit-III

Function: What is a function, Define a function Call by value and Call by reference, Recursive function.

String: Creating and accessing String, Searching & Replacing String, Formatting String, String Related Library function.

Unit-IV

Array: Anatomy of an Array, Creating index based and Associative array, Accessing array, Element Looping with Index based array, Looping with associative array, using each() and foreach(), Some useful Library function.

Unit-V

Working with file and Directories: Understanding file & directory, Opening and closing a file, Copying ,renaming and deleting a file, Working with directories, Building a text editor, File Uploading & Downloading, Generating Images with PHP.

Graph Theory

GRAPH THEORY

CONTACTS: 3L + 0 T

Code: BCA305

CREDITS: 3

Unit -I Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, Euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

Unit- II Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all

spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

Unit -III Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

Unit -IV Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.

References

1. Deo, N, Graph theory with applications to Engineering and Computer Science, PHI
2. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH
3. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
4. Harary, F, Graph Theory, Narosa.
5. Bondy and Murthy: Graph theory and application. Addison Wesley.
6. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH
7. Geir Agnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education

BCA-351 Data Structure Lab (Based on Theory)

BCA-352 DBMS Lab (Based on Theory)

NOIDA
INTERNATIONAL
UNIVERSITY

Financial Accounting

FINANCIAL ACCOUNTING
CONTACTS: 3L + 1 T

Code: BCA401
CREDITS: 4

Unit-I

Conceptual Framework of Accounting: Nature and Scope of Accounting information, Identifying and Recording accounting transaction using traditional and accounting equations approach, Generally accepted accounting principles,

Unit-II

Accounting Standards- In India, Bases of accounting- Cash and accrued. Capital and Revenue item.

Unit-III

Fundamentals of Computerized Accounting System: Concept of grouping the accounting heads, schemes of assigning the codes to accounting heads, maintaining the hierarchy of Ledger accounts for preparing control accounts.

Unit-IV

Applications of computers in accounts:

- (a) Accounting procedures used, in practice, for recording Cash, Bank and Journal Transactions using appropriate voucher;
- (b) Preparation of Ledger counts, Cash Book, Journal Book and Bank Book;
- (c) Preparation of Trial Balance, Profit and Loss Accounts and Balance Sheet.
- (d) Accounting for petty cash transactions and preparation of petty cash register.
- (e) Lease and Loan accounting;

Unit-V

Accounting system: for preparing and maintaining Payrolls; Inventory Accounting and Control; Budget and Budgetary Control;

- (i) Accounting System for Orders booking, Processing (forwarding and acceptance) and invoicing for a trading Organization;
- (j) Accounting for Decision making control : Marginal costing and standard costing.

Reference:

- T.S Grewal, “Book Keeping”
- Prasanna Chandra, “Financial Accounting”

BUSINESS STATISTICS

BUSINESS STATISTICS
CONTACTS: 3L + 1 T

Code: BCA402
CREDITS: 4

UNIT-I Population, Sample and Data Condensation Definition and scope of statistics, concept of population and sample with Illustration, Raw data, attributes and variables, classification, frequency distribution, Cumulative frequency distribution.

UNIT-II Measures of Central Tendency Concept of central Tendency, requirements of good measures of central tendency, Arithmetic mean, Median, Mode, Harmonic Mean, Geometric mean for grouped and ungrouped data.

UNIT-III Measures of Dispersion: Concept of dispersion, Absolute and relative measure of dispersion, range variance, Standard deviation, Coefficient of variation.

UNIT-IV Sample space, Events and Set Theory Experiments and random experiments, Ideas of deterministic and non-deterministic experiments; Definition of sample space, discrete sample space, events; Types of events, Union and intersections of two or more events, mutually exclusive events, Complementary event, Exhaustive event; Simple examples

UNIT-V Statistical Quality Control Introduction, control limits, specification limits, tolerance limits, process and product control; Control charts for X and R; Control charts for number of defective {n-p chart} ,control charts for number of defects {c - chart}

Referential Books:

1. S.C.Gupta - Fundamentals of statistics - Sultan Chand & Sons , Delhi.
2. Montgomery D.C. – Statistical Quality Control - John Welly and Sons
3. Goon, Gupta And Dasgupta - Fundamentals of Statistics - The world press private ltd. Kolkata.
4. Hogg R.V. and Craig R.G. – Introduction to mathematical statistics Ed 4 {1989} – Macmillan

Software Engineering

SOFTWARE ENGINEERING
CONTACTS: 3L + 1 T

Code: BCA403
CREDITS: 4

Unit-I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements Analysis & Specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

Unit-II

Software Project Management Concepts: The Management spectrum, The People The Problem, The Process.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

Unit-III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design.

Software Implementation: Relationship between design and implementation, Implementation issues and programming support environment, Coding the procedural design.

Unit-IV

Software Testing: Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing. Debugging Activities.

Unit-V

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering.

Reference:

- Pressman: Software Engineering, TMH.
- Gill, Nasib Singh : Software Engineering, Khanna Book Publishing Co. (P) Ltd. N. Delhi.
- Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
- Chhillar Rajender Singh : Software Engineering : Testing, Faults, Metrics, Excel Books.
- Ghezzi, Carlo : Fundamentals of Software Engineering, PHI.
- Fairely, R.E. : Software Engineering Concepts, McGraw-Hill.
- Lewis, T.G.: Software Engineering, McGraw-Hill.

Web Technology

WEB TECHNOLOGY
CONTACTS: 3L + 1 T

Code: BCA404
CREDITS: 4

Unit-I

Introduction to Internet Basic : The Basic of the Internet, Concepts of Domain, IP Addressing, Resolving Domain Names, Overview of TCP/IP and its Services, WWW, web projects, web applications, Web Team, planning & process development.

Unit-II

Designing Pages with HTML: Introduction to HTML, Essential Tags, Deprecated Tags, Tags and Attributes, Text Styles and Text Arrangements, Text, Effects, Exposure to Various Tags, Color and Background of Web Pages, Lists and their Types, Attributes of Image Tag.

Unit-III

Link: Hypertext, Hyperlink and Hypermedia, Links, Anchors and URLs, Links to External Documents, Different Section of a Page and Graphics, Footnote and e-Mailing, Creating Table, Frame, Form and Style Sheet.

Unit-IV

DHTML: Dynamic HTML, Document Object Model, Features of DHTML, CSSP (Cascading Style Sheet Positioning) and JSSS (JavaScript assisted Style Sheet), Layers of Netscape, The ID Attribute, DHTML Events.

Unit-V

Web Page: Web Page Basics, Web Terminologies, Phases of Planning and Building Web Sites, The FTP, HTTP and WPP, Features, Web Page Views, Adding Pictures, Backgrounds, Links.

Scripting language: Java script and VB script JDBC database.

Reference:

- Dick Oliver : Tech Yourself HTML 4 in 24 Hours, Techmedia.
- David Plotkin :How to Do Everything with Microsoft Office FrontPage 2003, TMH
- Craig Zacker : 10 minutes Guide to HTML Style Sheets, PHI.
- V.K. Jain : "O" – Level Information Technology, BPB Publications.
- Harley Hahn : The Internet - Complete Reference, TMH.
- Steven Holzner: HTML Black Book, Dreamtech Press.
- Evan Bayross: HTML, Java Script, DHTML, PERL, CGI, BPB

MOBILE COMPUTING

MOBILE COMPUTING
CONTACTS: 3L + 1 T

Code: BCA405
CREDITS: 4

Unit-I: Introduction, issues in mobile computing, overview of wireless telephony: cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Unit-II: Wireless Networking, Wireless LAN Overview: MAC issues, IEEE 802.11, Bluetooth, Wireless multiple access protocols, TCP over wireless, Wireless applications, data broadcasting, Mobile IP, WAP: Architecture, protocol stack, application environment, applications.

Unit-III: Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, File system, Disconnected operations.

Unit-IV: Mobile Agents computing, security and fault tolerance, transaction processing in mobile computing environment.

Unit-V: Adhoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad-Hoc on demand distance vector routing (AODV), Temporary ordered routing algorithm (TORA), QoS in Ad Hoc Networks, applications.

References:

- J. Schiller, Mobile Communications, Addison Wesley.
- Charles Perkins, Mobile IP, Addison Wesley.
- Charles Perkins, Ad hoc Networks, Addison Wesley.

Upadhyaya, "Mobile Computing", Springer

BCA-451 Software Engineering Lab (Based on Theory)
BCA-452 Web Technology Lab (Based on Theory)

Computer Networks

Computer Networks
CONTACTS: 3L + 1 T

Code: BCA501
CREDITS: 4

Unit-I

Data communications concepts: Digital and analog , parallel and serial, synchronous and asynchronous, simplex, half duplex, duplex, multiplexing, Transmission media: Wired (physical): Twisted pair, Coaxial cable, Optical Fiber.

Communication switching techniques: Circuit switching, message switching, packet switching.

Unit-II

Introduction to Computer Network : Network Topologies, Types of Network, OSI and TCP/IP Models: Layers and their functions, comparison of models.

Data Link Layer Fundamentals: Framing, Basics of Error Detection, Forward Error Correction, Cyclic Redundancy Check codes for Error Detection.

Unit-III

Media Access Protocols : The advantages of Multiple-Access Sharing of Channel Resource, ALOHA, Carrier Sense Multiple Access (CSMA), CSMA with Collision Detection (CSMA/CD), Token Ring, Token Bus, Asynchronous Transfer Mode (ATM).

Unit-IV

Network Layer: Host to Host Delivery: IP Addressing and Routing, Gateway, N/W Layer Protocols: ARP, IPV4, ICMP, IPV6.

Transport Layer: Process-to-Process Delivery: UDP, TCP Congestion Control & Quality of Service.

Unit-V

Application Layer: Client Server Model, Domain Name System (DNS), E-mail (SMTP), File Transfer (FTP) and Model TCP/IP.

Reference:

- A.S. Tanenbaum : Computer Networks (4th ed.), Prentice-Hall of India.
- W. Tomasi : Introduction to Data Communications and Networking, Pearson, Education.
- P.C. Gupta : Data Communications and Computer Networks, Prentice-Hall of India.
- Behrouz Forouzan and S.C., Fegan : Data Communications and Networking, McGraw Hill.

- L.L. Peterson and B.S. Davie : Computer Networks : A system Approach, Morgan Kaufmann.
- William Stallings : Data and Computer Communications, Pearson Education.

Computer Graphics

Computer Graphics

Code: BCA502

CONTACTS: 3L + 1 T

CREDITS: 4

Unit-I

Graphics Primitives: Introduction to computer graphics, Basics of Graphics systems, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems.

Unit-II

Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms.

Filled area primitives: Scan line polygon fill algorithm, boundary fill and flood-fill algorithms.

Unit-III

2-D Geometrical Transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, .

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland –Hodgeman polygon clipping algorithm..

Unit-IV

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces, polygon-rendering methods..

Unit-V

3-D Geometric Transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

Reference:

- Donald Hearn and M. Pauline Baker : Computer Graphics, PHI Publications.
- Plastock : Theory & Problem of Computer Graphics, Schaum Series.
- Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison-Wesley.
- Newman : Principles of Interactive Computer Graphics, McGraw Hill.

Cloud Computing Syllabus

Cloud Computing Syllabus
CONTACTS: 3L + 1 T

Code: BCA503
CREDITS: 4

Unit 1: Overview of Cloud Computing

Introduction to cloud, features of cloud(benefits and disadvantages), architecture of cloud computing, types of service delivery in cloud ,their providers and examples of software for each type(Iaas, Paas, Saas), cloud deployment models: Public ,private and hybrid cloud.

Unit 2: Cloud Computing Concepts:

Virtualization: introduction to virtualization, characteristics of virtualization, how is virtualization achieved, what is hypervisor, types of hypervisor(type 1 and type 2),Multitenancy and its advantages and disadvantages, migration in cloud.

Unit 3: Distributed systems

Introduction to distributed systems, How are distributed systems managed, Introduction to mapreduce framework, importance of mapreduce , understanding how it works with an example. Introduction to Hadoop, What is hadoop, why hadoop ,HDFS ,Traditional file system vs HDFS, Big data: what is big data, features of big data, study sample dataset for big data, techniques and tools for handling big data, Hive

Unit 4: Saas

What is Saas, Agile programming, Introduction to OOP, Introduction to Ruby, simple programming using Ruby, Ruby on Rails.

Unit 5: Cloud security

Security risks in cloud, types of threat in cloud, ways of handling the threats, covert channel attacks in cloud, detection mechanisms for the threats, ways of making cloud secure.

Advanced Industrial Communication

Advanced Industrial Communication
CONTACTS: 2 L + 0 T

Code: BCA504
CREDITS: 2

Unit 1 : The Process of Communication

Introduction: What is Communication?, The Process of Communication, Barriers to Communication, Different Types of Communication , Written vs. Oral Communication, Different Types of Face-to-Face Interactions, Characteristics and Conventions of Conversation, Conversational Problems of Second/Foreign Language Users, Difference between Conversation and Other Speech Events

Unit 2 : Telephone Techniques

Warm Up, Speaking and Listening: Commonly Used Phrases in Telephone Conversations, Reading: Conference Calls, Vocabulary, Writing and Listening: Leaving a Message, Grammar and Usage: The Perfect Tenses, Pronunciation: Contracted Forms

Unit 3 : Job Applications and Interviews

Warm up, Reading, Vocabulary: Apply for a Job, Curriculum Vitae, Language Focus: Some Useful Words, Study Skills: Preparing for an Interview, Listening, Speaking, Writing

Unit 4 : Group Discussions

Reading, Writing Skills, Listening: How to be Successful in a Group Discussion, Study Skills, Language Focus, Vocabulary, Speaking, Grammar: Connectives, Pronunciation

Unit 5 : Managing Organisational Structure

Warm Up: Ability to Influence and Lead, Reading: The Role of a Manager, Vocabulary: Leadership, Speaking and Listening, Language Focus: Degree of Probability, Grammar: Modals, Writing: Reports, Pronunciation

BCA-551 Data Network Lab (Based on Theory)

BCA-552 Computer Graphics Lab (Based on Theory)

BCA-553 Mini Project (Any Language)

.Net PROGRAMMING

.Net PROGRAMMING

Code: BCA601

CONTACTS: 3L + 1 T

CREDITS: 4

UNIT - I

C# Fundamentals: Basic classes, declarations, conditionals, loops, arrays, strings, enumerations, structures, and Encapsulation, inheritance, polymorphism, Structured exception handling. Understanding interface types

UNIT - II

Delegates, Events, and Lambdas: basics of each -- very important for event driven (GUI), Understanding the garbage collector, creating and working with .NET assemblies.

UNIT - III

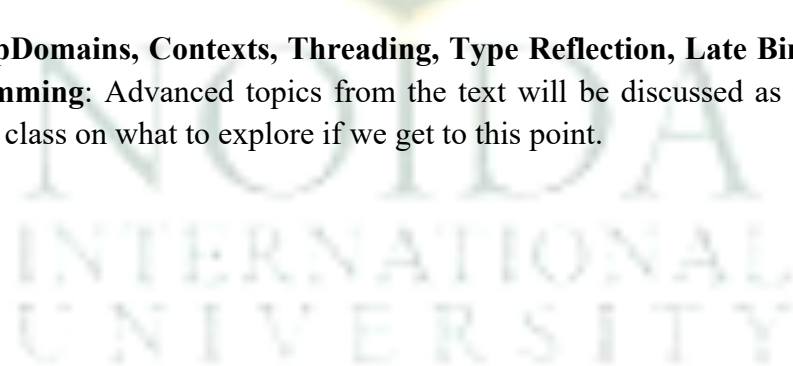
Windows Forms and WPF: Basic windows programming: forms, component class, control class, control events, menus, status bars, tool bars, interacting with the registry. Indexers, Operator Overloading, Custom Type Conversion, Extension Methods, Anonymous Types, Pointer Types

UNIT - IV

Input, Output, and Serialization: System.IO, Directory and File Types, StreamReaders and StreamWriters, working with binary data, configuring objects for serialization, Working with and creating custom generic types.

UNIT - IV

Processes, AppDomains, Contexts, Threading, Type Reflection, Late Binding, Attribute-based programming: Advanced topics from the text will be discussed as time permits. We can decide as a class on what to explore if we get to this point.



CRYPTOGRAPHY AND NETWORK SECURITY

CRYPTOGRAPHY AND NETWORK SECURITY
CONTACTS: 3L + 1 T

Code: BCA602
CREDITS: 4

UNIT I

Security trends, Attacks and services, Classical crypto systems, Different types of ciphers Ceaser, Transposition and Hill Cipher, sequences Group, Ring and Field, Congruences Chinese Remainder theorem, Modular exponentiation, Fermat and Euler's theorem

UNIT II

Simple DES, Differential cryptanalysis, DES – Modes of operation – Triple DES –AES – RC4 – RSA – Attacks – Primality test, factoring.

UNIT III

Discrete Logarithms, Computing discrete logs, Diffie-Hellman key exchange, ElGamal Public key, cryptosystems: Hash functions, Secure Hash, Birthday attacks -MD5 – Digital signatures – RSA –Elgamel DSA

UNIT IV

Authentication applications, Kerberos, X.509, PKI, Electronic Mail security, PGP, S/MIME IP security, Web Security, SSL, TLS, SET

UNIT V

System security, Intruders, Malicious software, viruses, Firewalls, Security Standards

Text Book:

1. William Stallings, "Cryptography and Network Security: Principles and Practice", Prentice Hall, New Jersey.

Reference Books:

1. Johannes A. Buchmann, "Introduction to cryptography", Springer- Verlag.
2. Atul Kahate, "Cryptography and Network Security", TMH
3. Mahtab Alam, "Information Security and Cryptography, BOOKSHELF.

ENTERPRENEURSHIP & DEVELOPMENT

ENTERPRENEURSHIP & DEVELOPMENT

Code: BCA603

CONTACTS: 3L + 1 T

CREDITS: 4

UNIT I:

Entrepreneur- Concept on percent - Functions and clarifications of entrepreneurs - Characteristics of entrepreneur - Nature and importance of ,entrepreneur - Entrepreneur vs. professional manager - Women entrepreneurs.

UNIT II:

Concept of Entrepreneurship - Entrepreneurship and environment-Policies governing entrepreneurs, entrepreneurial development programmes - Institutions for - entrepreneurship development, entrepreneurship. Entrepreneurship -Entrepreneurship development in other countries.

UNIT III:

Institutions for Entrepreneurial Development - Role of constancy organisations - Role of financial institutions -Bank finance to entrepreneurs Entrepreneurship development: Role of development financial institutions.

UNIT IV:

Concept of project and classification of project identification project formulation - project report - project design - project appraisal - profitability appraisal - project planning - social cost benefit analysis - financial analysis and project financing.

UNIT V:

Financial analysis - Ratio analysis - Investment process; Break even analysis - Profitability analysis social cost - Benefit analysis - Budget and planning process, applicability of the factories Act.

Suggested References:

1. Vasanta Desai: Dynamics of entrepreneurial development and management;
2. Vasanta Desai: Entrepreneurial development;
3. Peter F. Drucker: Innovation and development;
4. M.V. Deshpande: Entrepreneurship of small scale industries;
5. Balakrishnan, G. Financing of small scale industries.

NUMERICAL ANALYSIS

NUMERICAL ANALYSIS
CONTACTS: 3L + 1 T

Code: BCA604
CREDITS: 4

Unit-I

8L

Introduction: Number System and their conversion, Computer Arithmetic, Machine Computation, Errors and their Computation, General error formula, Error in a series approximation.

Solution of Algebraic and Transcendental Equation:

Bisection Method, Iteration method, Method of false position, Newton-Raphson method, Methods of finding complex roots, Muller's method, Rate of convergence of Bisection methods, Polynomial Equations.

Unit-II

8L

Interpolation: Finite Differences, Difference tables Polynomial Interpolation: Newton's forward and backward formula Central Difference Formulae: Gauss forward and backward formula, Stirling's, Bessel's, Everett's formula.

Unit-III

Interpolation with unequal intervals: Langrange's Interpolation, Newton Divided difference formula, Inverse Interpolation

8L

Numerical Integration and Differentiation: Introduction, Numerical differentiation Numerical Integration: Trapezoidal rule, Simpson's 1/3 and 3/8 rule, Boole's rule, Waddle's rule.

Unit-IV

Solution of differential Equations: Picard's Method, Euler's Method, Taylor's Method, Runge-Kutta Methods, Predictor Corrector Methods, Automatic Error Monitoring and Stability of solution.

Unit-V

8L

Statistical Computation: Frequency distribution, Relative Frequency, Graphs of Frequency Distribution (Line frequency and Histograms), Types of Frequency Curves (Symmetrical Uni-modal Curves, Moderately Asymmetrical Frequency Curves), Control Charts, Acceptance Sampling.

References:

1. Yang, "Applied Numerical Methods using MATLAB", Wiley India
2. Pradip Niyogi, "Numerical Analysis and Algorithms", TMH, 1st Edition.
3. Gerald & Whealey, "Applied Numerical Analyses", AW
4. Grewal B S, "Numerical methods in Engineering and Science", Khanna Publishers, Delhi.
5. Numerical Method Principles, analysis and algorithms ,Srimamta Pal (Oxford Higher ed)
6. Rajaraman V, "Computer Oriented Numerical Methods", PHI, 3rd edition.

BCA-605 ADVANCE DATABASE MANAGEMENT SYSTEM

Advance Database Management System
CONTACTS: 3L + 1 T

Code: BCA 605
CREDITS: 4

Unit I

Data base system vs. file system, data models, , relational model, database languages, DDL, DML, database access for applications programs, data base users and administrator, transaction management, history of data base systems, data base design and ER diagrams, attributes and entity sets, relationships and relationship sets, additional features of ER model, concept design with the ER model, and conceptual design for large enterprises, Codds Rules.

Unit II

Data Base Design: Functional Dependency and Decomposition - Functional Dependency - Decomposition. Normalization - Introduction - Normalization - Normal Forms 1NF, 2NF, 3NF - BCNF - 4NF - 5NF.

Unit III

Examples of basic SQL queries, nested queries, correlated nested queries set, comparison operators, aggregative operators, NULL values, comparison using null values, logical connectivity, AND, OR and NOTR, impact on SQL constructs, outer joins, disallowing NULL values, complex integrity constraints in SQL triggers and active data bases.

Unit IV

Data Base Recovery Systems: Introduction - Recovery Concepts - Types of Failures - Types of Recovery - Recovery Techniques - Buffer Management. Data Base Security: Goals - Firewalls - Data Encryption

Unit V

ACID properties, transactions and schedules, concurrent execution of transaction, lock based concurrency control, performance locking, and transaction support in SQL, crash recovery, concurrency control, Serializability and recoverability, lock management, lock conversions, dealing with dead locks, specialized locking techniques, concurrency without locking, crash recovery:

References:

1. Elmasri Navathe, Data Base Management System, Pearson Education, 2008.
2. S.K. Singh, "Database Systems Concepts, Design and Applications", Pearson Education Pte. Ltd., New Delhi: 2006.
3. C. J. Date, Introduction to Database Systems, Pearson Education, 2009.
4. Silberschatz, Korth, Database System Concepts, McGraw hill, 5th edition, 2005.
5. Rob, Coronel & Thomson, Database Systems Design: Implementation and Management, 2009.

OOPS USING UML

Oops Using UML
CONTACTS: 3L + 1 T
UNIT I

Code:MCA-701
CREDITS: 4

INTRODUCTION • An overview - Object basics - Object state and properties, Behavior, Methods, Messages. • Object Oriented system development life cycle. • Benefits of OO Methodology, Overview of Prominent OO Methodologies. Introduction to UML, Important views & diagram to be modeled for system by UML, Factional view(models): • Use case diagram, Requirement Capture with Use case, Building blocks of Use Case diagram - actors, use case guidelines for use case models, Relationships between use cases - extend, include, generalize, Activity diagram a. Elements of Activity Diagram - Action state, Activity state, Object node, Control and Object flow, Guidelines for Creating Activity Diagrams.

UNIT II

Static structural view (Models)Classes, values and attributes, operations and methods, responsibilities for classes, abstract classes, access specification(visibility of attributes and operations). Relationships among classes: Associations, Dependencies., Inheritance - Generalizations, Aggregation. Adornments on Association: association names, association classes, qualified association, n-ary associations, ternary and reflexive association. Dependency relationships among classes, notations Notes in class diagram, Extension mechanisms, Metadata, Refinements, Derived , data, constraint, stereotypes, Package & interface notation. Object diagram notations and modeling, relations among objects (links).

UNIT III

Class Modeling and Design Approaches: Three approaches for identifying classes - using Noun phrases, Abstraction, Use Case Diagram. Comparison of approaches. Using combination of approaches. Flexibility guidelines for class diagram: Cohesion, Coupling, Forms of coupling (identity, representational, subclass, inheritance), class Generalization, class specialization versus aggregation. Behavioral (Dynamic structural view): • State diagram, State Diagram Notations, events (signal events, change events, Time events). b. State Diagram states (composite states, parallel states, History states).

UNIT IV

Interaction diagrams: Sequence diagram - Sequence diagram notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, Activations in sequence diagram. Collaboration diagram - Collaboration diagram notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, activations in sequence diagram.

UNIT V

Approaches for developing dynamic systems: Top - down approach for dynamic systems. Bottom - up approach for dynamic systems. Flexibility Guidelines for Behavioral Design - guidelines for allocating and designing behaviors that lead to more flexible design. Architectural view: a. Logical architecture: dependency, class visibility, sub systems. b. Hardware architecture: deployment diagram notations, nodes, object migration between node c. Process architecture: what are process and threads and their notations in UML, object synchronization, invocation schemes for threads (UML notations for different types of invocations). d. Implementation architecture: component diagram notations and examples.

References: 1. Designing Flexible Object Oriented systems with UML - Charles Ritcher

2. Object Oriented Analysis & Design, Satisfier. Jackson, Burd Thomson

3. Object oriented Modeling and Design with UML - James Rumbaugh. Micheal Blaha (second edition)

4. The Unified Modeling Language User Guide - Grady Booch, James Rumbaugh, Ivar Jacobson.

5. Object Oriented Modeling and Design - James Rumbaugh

6. Teach Yourself UML in 24 Hours - Joseph Schmuilers

7. Object-Oriented Analysis and Design: using UML Mike O'Docherty Wiley Publication

ADVANCED OPERATING SYSTEM

Advanced Operating System

CONTACTS: 3L + 1 T

Code: MCA 702

CREDITS: 4

Unit I: Introduction to operating system

Operating system and function, Evolution of operating system, Batch, Interactive, multiprogramming, Time Sharing and Real Time System, multiprocessor system, Distributed system, System protection. Operating System structure, Operating System Services, System Program and calls.

Unit II: Process Management

Process concept, State model, and process scheduling, job and process synchronization, structure of process management, Threads inter process Communication and Synchronization: Principle of Concurrency, Producer Consumer Problem, Critical Section problem, Semaphores, Hardware Synchronization, Critical Regions, Conditional critical region, Monitor, Inter Process Communication. CPU Scheduling: Job scheduling functions, Process scheduling, Scheduling Algorithms, Non Preemptive and preemptive. Strategies, Algorithm Evaluation, Multiprocessor Scheduling. Deadlock: System Deadlock Model, Deadlock Characterization, Methods for handling deadlock, Prevention strategies, voidance and Detection, Recovery from deadlock combined approach.

Unit III: Memory Management

Single Contiguous Allocation: H/W support, S/W support, Advantages and disadvantages, Fragmentation, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Swapping, Overlays

Unit IV: Device management

Principles of I/O hardware, Device controller, Device Drivers, Memory mapped I/O, Direct Access Memory, Interrupts, Interrupt Handlers, Application I/O interface, I/O Scheduling, Buffering, Caching, Spooling, Disk organization, Disk space management, Disk allocation Method, Disk Scheduling, Disk storage.

Unit V: File System and Protection and security

File Concept, File Organization and Access Mechanism, File Directories, Basic file system, File Sharing, Allocation method, Free space management. Policy Mechanism, Authentication, Internal excess Authorization.

Text & References:

Operating System by Galvin,
Operating System by Taneun Bomb
Operating System by William Stalling

Data Warehousing & Data Mining

Data Warehousing and Data Mining

CONTACTS: 3L + 1 T

Code: MCA-703

CREDITS: 4

Unit I

Data Warehousing: Overview, Definition, Data Warehousing Components, 8 Building a Data Warehouse, Warehouse Database, Mapping the Data Warehouse to a Multiprocessor Architecture, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

Unit II

Data Warehouse Process and Technology: Warehousing Strategy, Warehouse 8 /management and Support Processes, Warehouse Planning and Implementation, Hardware and Operating Systems for Data Warehousing, Client/Server Computing Model & Data Warehousing. Parallel Processors & Cluster Systems, Distributed DBMS implementations, Warehousing Software, Warehouse Schema Design, Data Extraction, Cleanup & Transformation Tools, Warehouse Metadata

Unit III

Data Mining: Overview, Motivation, Definition & Functionalities, Data 8 Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and

Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Discretization and Concept hierarchy generation, Decision Tree.

Unit IV

Classification: Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases, Statistical-Based Algorithms, Distance-Based Algorithms, Decision Tree-Based Algorithms. Clustering: Introduction, Similarity and Distance Measures, Hierarchical and Partitional Algorithms. Hierarchical Clustering- CURE and Chameleon. Density Based Methods- DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method – Statistical Approach, Association rules: Introduction, Large Itemsets, Basic Algorithms, Parallel and Distributed Algorithms, Neural Network approach.

Unit V

Data Visualization and Overall Perspective: Aggregation, Historical & information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse. Warehousing applications and Recent Trends: Types of Warehousing Applications, Web Mining, Spatial Mining and Temporal Mining.

Reference

Textbooks: 1. Alex Berson, Stephen J. Smith “Data Warehousing, Data-Mining & OLAP”, TMH

2. Mark Humphries, Michael W. Hawkins, Michelle C. Dy, “Data Warehousing: Architecture and Implementation”, Pearson

3. Margaret H. Dunham, S. Sridhar, “Data Mining: Introductory and Advanced Topics” Pearson Education 4. Arun K. Pujari, “Data Mining Techniques” Universities Press 5. Pieter Adriaans, Dolf Zantinge, “Data-Mining”, Pearson Education

THEORY OF COMPUTATION

Theory of Computation

CONTACTS: 3L + 1 T

Unit – I

Code: MCA 704

CREDITS: 4

Introduction; Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill-Nerode Theorem

Unit – II

Regular expression (RE) , Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen’s Theorem, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages . Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

Unit – III

Context free grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation , Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

Unit – IV

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, Two stack PDA

Unit – V

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church’s Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to Undesirability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory

References : 1. Hopcroft, Ullman, “Introduction to Automata Theory, Languages and Computation”, Pearson Education .

2. K.L.P. Mishra and N.Chandrasekaran, “Theory of Computer Science : Automata, Languages and Computation”, PHI Learning Private Limited, Delhi India.

3.Peter Linz, "An Introduction to Formal Language and Automata", Narosa Publishing house.

4. Y.N.Singh “Mathematical Foundation of Computer Science”, New Age International.

5. Papadimitrou, C. and Lewis, C.L., “Elements of the Theory of Computation”, PHI Learning Private Limited, Delhi India.

6. K.Krithivasan and R.Rama; Introduction to Formal Languages, Automata Theory and Computation; Pearson Education.

Compiler Design

Compiler Design

CONTACTS: 3L + 1 T

Code: MCA-705

CREDITS: 4

Unit – I

Introduction to Compiler, Phases and passes, Bootstrapping, Finite state machines and regular expressions and their applications to lexical analysis, Optimization of DFA-Based Pattern Matchers implementation of lexical analyzers, lexical-analyzer generator, LEX-compiler, Formal grammars and their application to syntax analysis, BNF notation, ambiguity, YACC. The syntactic specification of programming languages: Context free grammars, derivation and parse trees, capabilities of CFG.

Unit – II

Basic Parsing Techniques: Parsers, Shift reduce parsing, operator precedence parsing, top down parsing, predictive parsers Automatic Construction of efficient Parsers: LR parsers, the canonical Collection of LR(0) items, constructing SLR parsing tables, constructing Canonical LR parsing tables, Constructing LALR parsing tables, using ambiguous grammars, an automatic parser generator, implementation of LR parsing tables.

Unit – III

Syntax-directed Translation: Syntax-directed Translation schemes, Implementation of Syntax directed Translators, Intermediate code, postfix notation, Parse trees & syntax trees, three address code, quadruple & triples, translation of assignment statements, Boolean expressions, statements that alter the flow of control, postfix translation, translation with a top down parser. More about translation: Array references in arithmetic expressions, procedures call, declarations and case statements.

Unit – IV

Symbol Tables: Data structure for symbols tables, representing scope information. Run-Time Administration: Implementation of simple stack allocation scheme, storage allocation in block structured language. Error Detection & Recovery: Lexical Phase errors, syntactic phase errors semantic errors.

Unit – V

Code Generation: Design Issues, the Target Language. Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Code Generator. Code optimization: Machine-Independent Optimizations, Loop optimization, DAG representation of basic blocks, value numbers and algebraic laws, Global Data-Flow analysis

References: 1. Aho, Sethi & Ullman, "Compilers: Principles, Techniques and Tools", Pearson Education

2. V Raghvan, “ Principles of Compiler Design”, TMH
3. Kenneth Loudon,” Compiler Construction”, Cengage Learning.
- 4.. Charles Fischer and Ricard LeBlanc,” Crafting a Compiler with C”, Pearson Education

SOFTWARE TESTING

SOFTWARE TESTING

CODE: MCA-801

CONTACTS: 3L + 1 T

CREDITS: 4

Unit-I

Introduction: Introduction to software, Basics of Software Testing, fault, errors and failures, Testing objectives, Causes of software errors, test case, test plan.

Software testing principles, software testing process, software quality and features.

Unit-II

Testing and Debugging , Validation and Verification , Types of Testing : Unit testing , integration testing, system testing , acceptance testing , regression testing , installation testing.

White box testing: Dynamic Testing, Structural testing , White Box Testing , pros and cons of white box testing, unit/code functional testing.

Unit-III

Black box testing: Black box testing, pros and cons of black box testing, Requirement based testing, Boundary Value Analysis, Model based testing and model checking. Difference between White box and Black box testing. Difference between Functional testing and Structural testing.

Unit-IV

Integration, System and Acceptance testing: Integration Testing , Types of integration testing : Top down and Bottom up integration, Bi- directional integration, system integration. Functional v/s Non functional testing .

Alpha and Beta Testing : Alpha testing , Beta testing , Scalability testing , Reliability testing, Stress testing.

Unit-V

Acceptance Testing: Acceptance testing, acceptance criteria, test cases, selection and execution.

Regression Testing : Regression Testing, test process, selection of regression tests, tools for regression testing.

Reference:

- Dileep Kumar Gupta and Umesh Singh: Paradigms Of Software Testing, Dhanpat Rai & Co. Publications.
- Newman: Principles of Software Testing, McGraw Hill.

OPERATION RESEARCH

OPERATION RESEARCH
CONTACTS: 3L + 1 T

Code: MCA 802
CREDITS: 4

Unit 1. Linear Programming-Simplex Method, Graphical Method, Duality Method, Assignment Problem, Transportation Problem.

Unit 2. Integer Programming-Cutting Plane, Branch & Bound

Unit 3. Network Optimisation Models- The shortest path problem, Minimum Spanning Tree Algorithm, Maximal Flow Algorithms, PERT/ CPM.

Unit 4. Game Theory-Two person Zero Sum game, saddle point determination, algebraic method, graphical method etc.

Unit 5. Inventory Control- Determination of EOQ, Components, Deterministic Continuous & Deterministic Periodic Review Models, Stochastic Continuous & Stochastic Periodic Review Model.

Books:

1. Operation Research, Kanti Swaroop
2. Operation Research, V.K. Kapoor
3. Operation Research, Paneer Selvam, PHI
4. Operations Research, Hillier & Lieberman, TMH



DIGITAL IMAGE PROCESSING

DIGITAL IMAGE PROCESSING
CONTACTS: 3L + 1 T

Code: MCA 803
CREDITS: 4

UNIT-I

Introduction and Fundamentals Motivation and Perspective, Applications, Components of Image Processing System, Element of Visual Perception, A Simple Image Model, Sampling and Quantization. Image Enhancement in Frequency Domain Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

UNIT-II

Image Enhancement in Spatial Domain Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing - Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-III

Image Restoration A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-IV

Morphological Image Processing Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT-V

Registration Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth Segmentation Introduction, Region Extraction, Pixel-Based Approach, Multi-level Thresholding, Local Thresholding, Region-based Approach, Edge and Line Detection: Edge Detection, Edge Operators, Pattern Fitting Approach, Edge Linking and Edge Following, Edge Elements Extraction by Thresholding, Edge Detector Performance, Line Detection, Corner Detection.

References: 1. Digital Image Processing 2nd Edition, Rafael C. Gonzalvez and Richard E. Woods. Published by: Pearson Education.
2. Digital Image Processing and Computer Vision, R.J. Schalkoff. Published by: John Wiley and Sons, NY.
3. Fundamentals of Digital Image Processing, A.K. Jain. Published by Prentice Hall, Upper Saddle River, NJ.

UNIX AND SHELL PROGRAMMING

UNIX AND SHELL PROGRAMMING
CONTACTS: 3L + 1 T

Code: MCA 804
CREDITS: 4

Unit 1 Overview of The UNIX Operating System, General Purpose Utilities.

Unit 2 File system & Handling ordinary Files. Shell commands & simple programming. (Bourne Shell)

Unit 3 Vi editor advanced Vi Editor. Basic & More File attributes, Concept of I-Node.

Simple filters. grep command.

Unit 4 Overview of process. Overview of sed & awk.

Unit 5 Overview of TCP/IP networking- basic concept of 4 layers, network class, basic concepts of the applications, subnet.

Books:

- 1.UNIX: Concepts & Applications, Sumitava Das, TMH
- 2.Your UNIX –The Ultimate Guide, Sumitava Das, TMH
- 3.Design of UNIX Operating System,Maurice Bach, PHI
- 4.Learning the UNIX operating Systems,Peek,SPD/O'REILLY
- 5.Mastering UNIX/LINUX/Solaris Shell Scripting, Randal k. Michael, Wiley Dreamtech

MANAGEMENT INFORMATION SYSTEMS

MANAGEMENT INFORMATION SYSTEMS

Code: MCA 805

CONTACTS: 3L + 1 T

CREDITS: 4

Unit 1: Foundation of Information Systems: Introduction to information system in business, fundamentals of information systems, Solving business problems with information systems, Types of information systems, Effectiveness and efficiency criteria in information system.

Unit 2: An overview of Management Information Systems: Definition of a management information system, MIS versus Data processing, MIS & Decision Support Systems, MIS & Information Resources Management, End user computing, Concept of an MIS, Structure of a Management information system.

Unit 3: Concepts of planning & control: Concept of organizational planning, The Planning Process, Computational support for planning, Characteristics of control process, The nature of control in an organization.

Unit 4: Business applications of information technology: Internet & electronic commerce, Intranet, Extranet & Enterprise Solutions, Information System for Business Operations, Information System for Managerial Decision Support, Information System for Strategic Advantage.

Unit 5: Managing Information Technology: Enterprise & global management, Security & Ethical challenges, Planning & Implementing changes. Advanced Concepts in Information Systems: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, and Procurement Management.

Text Books

1. O Brian, “Management Information System”, TMH
2. Gordon B. Davis & Margrethe H. Olson, “Management Information System”, TMH.

References

1. O Brian, “Introduction to Information System”, MCGRAW HILL.
2. Murdick, “Information System for Modern Management”, PHI.
3. Jawadekar, “ Management Information System”, TMH.
4. Jain Sarika, “Information System”, PPM
5. Davis, “Information System”, Palgrave Macmillan

SOFTWARE RELIABILITY

SOFTWARE RELIABILITY
CONTACTS: 3L + 1 T

Code: MCA 901
CREDITS: 4

UNIT I

INTRODUCTION Need and Concepts of Software Reliability, Failure and Faults – Prevention, Removal, Tolerance, Forecast, Dependability Concept – Failure Behavior, Characteristics, Maintenance Policy, Reliability and Availability Modeling, Reliability Evaluation

UNIT II

SOFTWARE RELIABILITY MODELS Introduction - Historical Perspective and Implementation, classification, limitations and issues, Exponential Failure Models – Jelinski-moranda model, Poisson, Musa, Exponential models, Weibull Model, Musa-okumoto Model, Bayseian Model – Littlewood veral Model, Phase Based Model

UNIT III

PREDICTION ANALYSIS Model Disagreement and Inaccuracy – Short & Long Term Prediction, Model Accuracy, Analyzing Predictive Accuracy – Outcomes, PLR, U & Y Plot, Errors and Inaccuracy, Recalibration – Detecting Bias, Techniques, Power of Recalibration, Limitations in Present Techniques, Improvements.

UNIT IV

THE OPERATIONAL PROFILE Concepts and Development Procedures – Customer Type, User Type, System Mode, Functional and Operational Profile, Test Selection - Selecting Operations, Regression Test, Special Issues – Indirect Input Variables, Updating, Distributed system,

UNIT V

TESTING FOR RELIABILITY MEASUREMENT Software Testing – Types, White and Black Box, Operational Profiles – Difficulties, Estimating Reliability, Time/Structure based software reliability – Assumptions, Testing methods, Limits, Starvation , Coverage, Filtering, Microscopic Model of Software Risk.

REFERENCES

1. Patric D. T.O connor, “Practical Reliability Engineering”, 4th Edition, John Wesley & sons, 2003.
2. John D. Musa, “Software Reliability Engineering”, Tata McGraw Hill, 1999.
3. Michael Lyu, “Handbook of Software Reliability Engineering”, IEEE Computer Society Press, ISBN: 0-07-039400-8, 1996.

NEURAL NETWORK

**NEURAL NETWORK
CONTACTS: 3L + 1 T**

**Code: MCA 902
CREDITS: 4**

UNIT I

INTRODUCTION - what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks

UNIT II

SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment

UNIT III

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection,

BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning,

UNIT IV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantifier, contexmel Maps

UNIT V

NEURO DYNAMICS – Dynamical systems, stability of equilibrium states, attractors, neuro dynamical models, manipulation of attractors’ as a recurrent network paradigm

TEXT BOOK:

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

REFERENCE BOOKS:

1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003
3. Neural networks James A Freeman David M S kapura Pearson Education 2004

ARTIFICIAL INTELLIGENCE

ARTIFICIAL INTELLIGENCE

Code: MCA 903

CONTACTS: 3L + 1 T

CREDITS: 4

Unit 1:

Overview of Artificial intelligence- Problems of AI, AI technique, Tic – Tac – Toe problem. Problems, Problem Space & search.

Unit 2:

Heuristic Search Techniques, Knowledge representation issues. Representing knowledge using rules.

Unit 3:

Symbolic reasoning under uncertainty. Statistical reasoning, Weak slot & filler structures. Strong slot & filler structures.

Unit 4:

Game planning –Minimax search procedure, adding alpha beta cut-off's, iterative deepening, Planning. Natural language processing, Understanding.

Unit 5:

Expert systems- expert system shells, knowledge acquisition, Basic knowledge of programming language like Prolog & Lisp.

Books:

- 1.Artificial Intelligence, Ritch & Knight, TMH
- 2.Introduction to Artificial Intelligence & Expert Systems, Patterson, PHI
- 3.Logic & Prolog Programming, Saroj Kaushik, New Age International
- 4.Expert Systems, Giarranto, VIKAS

DISTRIBUTED SYSTEM

DISTRIBUTED SYSTEM

CONTACTS: 3L + 1 T

Code: MCA 904

CREDITS: 4

Unit 1. Fundamentals

Evolution of Distributed Computing Systems, System models, issues in design of Distributed-computing environment, web based distributed model, computer networks related to distributed systems and web based protocols

Unit 2. Message Passing

Inter process Communication, Desirable Features of Good Message-Passing Systems, Issues in IPC by Message, Synchronization, Buffering, Multi datagram Messages, Encoding and Decoding of Message Data, Process Addressing, Failure Handling, Group Communication

Unit 3. Distributed Shared Memory

Design and Implementation Issues of DSM, Granularity, Structure of shared memory space, Consistency Models, replacement Strategy, Thrashing, Other Approaches to DSM, Advantages of DSM

Unit 4. Synchronization

Clock Synchronization, Event Ordering, Mutual Exclusion, Election Algorithms.

Unit 5. Distributed File Systems

Desirable Features of a good Distributed File Systems, File Models, File-Accessing Models, File-sharing Semantics, File-caching schemes, File Replication, Fault Tolerance, Design Principles, Sun's network file system, Andrews file system, comparison of NFS and AFS

Reference Books:

1. Distributed OS by Pradeep K. Sinha (PHI)
2. Tanenbaum S. : Distributed Operating Systems, Pearson Education
3. Tanenbaum S. Maarten V.S.: Distributed Systems Principles and Paradigms. (Pearson Education)
4. George Coulouris, Jean Dollimore, Tim Kindberg: Distributed Systems concepts and design

Practical

1. **Distributed System Lab**
2. **Mini Project**

MCA 951

MCA 952

Tenth Semester

Industrial Project

MCA 1001





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