Course Curriculum

SEMESTER-I

Three Year Diploma Course

UNIVERSITY POLYTECHNIC

DAS 101 : ENGLISH COMMUNICATION -I

Credits: 04 **Semester I**

Module No.	Contents	Teaching Hours
I	**Grammar and Usage:** Modals Voice Direct and Indirect Narration Question Tags Transformation of Sentences **Study of Text**: "Science and Human life" by J.B.S. Haldane (From the prescribed text)	12
II	**Writing skills**: Writing Paragraphs Picture Composition Letter Writing: Personal Letters **Study of Text:** "The Eyes Are Not Here" by Ruskin Bond (From the prescribed text) "The Rocking-Horse Winner" by D.H. Lawrence (From the prescribed text)	12
III	**Reading Skills:** Comprehension passages from the prescribed text. **Vocabulary**: Words often confused, Synonyms, Antonyms. **Study of Text:** "The Lament" by Anton P. Chekhov (From the prescribed text) "The Fly" by Katherine Mansfield (From the prescribed text) **Developing Oral Communication Skills** • Greeting, Starting a Conversation • Introducing Oneself • Introducing Others • Leave Taking • Thanks Giving, Wishing Well • Talking about Self • Talking about Likes and Dislikes	12

BOOKS PRESCRIBED:

- *An Anthology of English Short Stories*, Ed. R.P.Singh, Oxford University Press, New Delhi.

Current English Grammar & Usage with Composition by R.P. Sinha, Oxford University Press, New Delhi

BOOKS RECOMMENDED FOR STUDY:

- *Communicating Effectively in English, Book-I* by RevathiSrinivas, Abhishek Publications, Chandigarh.
- *High School English Grammar and Composition* by Wren & Martin, S. Chand & Company Ltd., Delhi.
- *Communication Techniques and Skills* by R.K.Chadha, DhanpatRai Publications, New Delhi.
- *Intermediate English Grammar* by Raymond, Murphy, Cambridge University Press, New Delhi.
- *Living English Structure* by W. Allen, Pearson Education, New Delhi.

DAS 102: APPLIED MATHEMATICS - I

Credits: 04 **Semester I**

Module No.	Contents	Teaching Hours (Approx.)
I	**Algebra**: Determinants and Matrices: expansion of determinants (upto III order) by expansion method, solution of equations(upto three unknowns) by Cramer's rule, Definition of matrix, addition, subtraction, multiplication of matrices (upto III order), transpose of matrix, minor and cofactor, Inverse of a matrix by adjoint method (upto II Order). Partial Fractions(Linear factors, repeated linear factors, non reducible quadratic factors excluding repeated factors), concept of A.P., G.P., permutation and combination (nPr, nCr) Binomial theorem(without proof) for positive integral index (expansion and general forms), Binomial theorem for any index (expansion without proof), first and second binomial approximation with application to engineering problems	12
II	**Trigonometry**: T – ratios of allied angles (without proof), sum , difference formulae and their applications(without proof), product formulae (transformation of product to sum, difference and vice – versa), T – ratios of multiple angles, sub multiple angles (2A, 3A, A/2), Properties and solution of the triangle, inverse trigonometrical functions (principal value only). Definition of complex numbers, real and imaginary parts of complex number, polar and cartesian form and their inter- conversion, conjugate, modulus and argument of a complex number, addition, subtraction, multiplication and division of a complex number. Demoivre's theorem, Euler's theorem of circular functions, hyperbolic functions	12
III	**Coordinate Geometry**: Equation of straight line in standard forms (without proof), intersection of two straight lines, angle between two lines, perpendicular distance formula (without proof). General equation of circle and its characteristics, to find the equation of the circle given: centre and radius or three points lying on it or coordinates of end points of a diameter Equation of conics(ellipse, parabola and hyperbola), simple problems related to engineering (standard forms only)	12

Reference Books/ Text Books / Cases:

* Gupta P.(2012), Comprehensive Mathematics XII, Laxmi Publications, Delhi
* Grewal B. S. Elementary Engineering Mathematics, Khanna Publishers, New Delhi

Sharma R.D., Applied Mathematics, Dhanpat Rai Publications, Delhi

DAS 103: APPLIED PHYSICS – I

Credits: 04 **Semester**

Module No.	Content	Teaching Hours
I	Physical quantities, fundamental and derived units, systems of units (CGS, MKS and SI units),Dimensions and dimensional formulae of physical quantities, Checking the correctness of physical relations and derivation of relations between various physical quantities, Error in measurement, types of errors, significant figures, Scalar and Vector quantities, representation of vectors, types of vectors, Addition, subtraction, multiplication of vectors, scalar and vector products, Force: Newton's laws of motion, linear momentum and its conservation laws, impulse, simple numerical problems, Friction, Types of friction and its application, equilibrium of forces, lami's theorem, Projectile, horizontal and oblique projections and equation of trajectory, Relation between linear and angular variables (velocity and acceleration),	12
II	Concept of Translatory and rotatory motion with examples, Definitions of Torque, angular momentum and their relationship, Law's of Conservation of angular momentum (qualitative) and its examples, Moment of inertia and its physical significance, rotational kinetic energy, inertia of rod, rod, disc, ring and sphere (Formulae only), Planetary motion: Newton's law of gravitation, Kepler's law of plentary motion (Qualitative), escape velocity, Work (definition), work done against friction on horizontal and inclined plane, Work done by a moving object on horizontal and inclined plane (incorporating frictional forces), Power (definition), Calculation of power in simple cases, Energy (definition), Kinetic energy and Potential energy with their derivations, Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another, Elasticity (definition), stress and strain, different types of modulus of elasticity (Formulae), Hooke's law with its applications, Pressure (Definition), atmospheric pressure. gauge pressure, absolute pressure,	12
III	Difference between heat and temperature, Principles of measurement of temperature and different scales of temperature and their relationship, Types of thermometers (Concept only), Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them (Concept and only formulae), Modes of transfer of heat (Conduction, convection and radiation with examples), Thermal conductivity: Co-efficient of thermal conductivity, Black body radiations Wave motion: Transverse and longitudinal wave motion with examples, Velocity of sound waves, frequency and wave length of a wave (relationship $v = \upsilon\lambda$)	12

Reference Books:

- Applied Physics Vol. I TTTI Publications, Tata McGraw Hill, New Delhi
- Concepts in Physics by HC Verma, Vol. I , Bharti Bhawan Ltd. New Delhi

- Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
- Applied Physics by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
- Engineering Physics by Vanchna Singh and Sheetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi

Text Books:

- Applied Physics Vol.I by T.R.Narula and Suman Chaudhary, North Publications, Jalandhar
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- Nutan Physics by Kumar & Mittal

DAS 104: APPLIED CHEMISTRY-I

Credits: 4 **Semester-I**

Module No.	Contents	Teaching Hours
I	**General Chemistry:** Symbols, formula of simple inorganic compounds, valency, chemical equations, Atomic weight, Equivalent weight, Molecular weight, Isotopes, Isobars, Surface tension, Viscosity, Specific gravity. **Structure of atom:** Fundamental particles viz. electron, proton, neutron. Rutherford and Bohr's model of atom, Bohr Burry Scheme, Aufbau principle and Hund's Rule, Electronic configuration of elements (up to atomic number 30), Quantum numbers.	12
II	**Periodic properties of elements:** Modern periodic law, Long form of periodic table and its merits and demerits. Atomic radii, ionic radii, Ionization potential, Electro negativity and Electron affinity. **Electrochemistry:** Electrolytes and non electrolytes, Faraday's Law of electrolysis, Arrhenius acid - base concept, pH (numericals of strong acid and strong base) & buffer solution (definition and types). Common ion effect and solubility product. Oxidation number, Oxidation and reduction including electronic concept. Dry cell.	12
III	**Chemical bonding:** Types of chemical bonding (ionic, covalent and co-ordinate bond). Hydrogen bonding, Hybridisation (sp3, sp2, sp). **Solutions:** Homogeneous and heterogeneous solutions. Normality, Molarity, Molality, Mole concept, colligative properties, osmotic pressure and its measurement by Berkley and Hartley method. **Radioactivity:** General idea of radioactivity, emission of alpha, beta, gamma rays and their properties. Fajan's group displacement law, half life, average life, nuclear fission and nuclear fusion.	12

DME 101: ENGINEERING MECHANICS

Credits: 4 **Semester-I**

Module No.	Contents	Teaching Hours
I	**1. Introduction** 1.1 Concept of mechanics and applied mechanics. Importance and necessity of applied mechanics giving suitable examples of bodies at rest and in motion. 1.2 Concept of rigid body, scalar quantity and vector quantity. **2. Force System & various laws of Mechanics** 2.1 Force systems: coplanar and non coplanar force systems, coplanar concurrent and non concurrent force systems. 2.2 Principle of transmissibility of forces. 2.3 Composition and resolution of coplanar forces. 2.4 Law of triangle, law of parallelogram and law of polygon of forces. 2.5 Free body diagram and its related problems, equilibrium and equilibrant forces. 2.6 Lami's theorem.	12
II	**3. Moment Couple and Torque** 3.1 Concept of moment, couple and torque. 3.2 Application of moment to simple mechanism. 3.3 Calculation of resultant of coplanar forces using moment of force method. 3.4 General condition of equilibrium of bodies under coplanar forces and moments. . **4. Introduction of Friction** 4.1 Concept of friction and types of friction. 4.2 Limiting friction and sliding friction 4.3 Laws of static friction and coefficient of friction. 4.4 Equilibrium of bodies lying on a rough horizontal plane under external forces. 4.5 Equilibrium of bodies lying on a rough inclined plane under external forces.	12
III	**5 Centre of Gravity & Moment of inertia** 5.1 Concept of gravity and gravitational force. 5.2.Concept of centroid and centre of gravity. 5.3.Concept of moment of inertia I Section & T section. **6. Laws of Motion** 6.1 Concept of momentum. 6.2 Newton's laws of motion, their application. 6.3 Derivation of force equation from second law of motion. 6.4 Numerical problems on second law of motion. 6.5 Newton's third law of motion and numerical problems based on it.	12

TEXT BOOKS

1. Bansal R.K., Engineering Mechanics, Laxmi Publication Pvt Ltd., Delhi.
2. Khurmi R.S., Engineering Mechanics, S. Chand & Co., Delhi.
3. Kapoor J.K., Applied Mechanics, Bharat Bharti Prakashan, Meerut.
4. Yadav K.S., Engineering Mechanics, Vayu Education of India.

REF BOOKS:

1. Kumar D.S., Engineering Mechanics, S.K. Kataria & Sons, Delhi

DME 152: ENGINEERING DRAWING – I

Credits: 02 **Semester I**

Module No.	Content
I	**Drawing Office Practice, Lines and Lettering (2 Sheets)** 1.1 Definition of drawing, classification of drawing 1.2 Drawing instruments such as mini drafter, drawing board, drawing sheet, drawing pins, pencils, eraser, sandpaper, sharpener, cello-tape etc. 1.3 Sizes and layout of standard drawing sheets and drawing boards 1.4 Different types of lines in engineering drawing as per BIS specifications **1.5** Definition and classification of letterings, free hand lettering (alphabets and numerals) in different standard series of 2.5, 3,5,7,10 and 15 mm heights. Single stroke vertical and inclined lettering at 75° (alphabets and numerals) lowercase and uppercase in the ratio of 7:4.
II	**Dimensioning (2 Sheets)** 2.1 Necessity of dimensioning, Types of dimensioning (chain, parallel and progressive dimensioning, size and location dimensioning) Methods of placing dimensioning (Aligned and unidirectional system), use of leader lines. General principles of dimensioning. 2.2 Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and gaps, radii, curves and arches.
III	**Scale (2 sheets)** 3.5 4.1 Scale – their need and importance, Definition of representative fraction (R.F), find RF of given scale 3.6 4.2 Construction of plain and diagonal scales
IV	**Principle of Projections (10 sheets)** 3.7 5.1 Principle of orthographic projection and introduction to first angle projection and third angle projection 3.8 Projection of points situated in different quadrants (1 Sheet) 3.9 Projection of lines, Lines inclined to one plane and parallel to the *3.10 Projection of Planes: Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and parallel to the other or vice versa (1st & 3rd quadrants) (1 Sheet)* *3.11 5.5 Drawing 3 orthographic views of given objects (6 sheets, at least one sheet in 3rd Angle Projection)* *3.12 5.6 Identification of surfaces on drawn orthographic views from isometric object drawn (1Sheet)*

RECOMMENDED BOOKS

1. *Engineering Drawing by KK Dhiman, Ishan Publications, Ambala, Haryana*
2. Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House, Anand, Gujrat
3. A Text Book of Engineering Drawing by Surjit Singh published by Dhanpat Rai and Co
3. Engineering Drawing by PS Gill published by SK Kataria and sons, Delhi
4. Engineering Drawing by RB Gupta published by Satya Prakashan, New Delhi

References:

1. Ghosh and Malik, "Manufacturing science" East West Pvt. Ltd.
2. Boothroyd, "Fundamental of Metal Cutting and Machine tools"
3. Sharma, P.C., "Manufacturing Technology (Manufacturing Processes)

DME 153: WORKSHOP PRACTICE

Credits: 02 **Semester I**

Module No.	Content	Teaching Hours
I	**Carpentry Shop – I** 1.1 Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification). 1.2 Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed. Job I Marking, sawing, planning and chiseling & their practice (size should be mentioned) 1.3 Introduction to various types of wooden joints, their relative advantages and uses. Job II Preparation of half lap joint Job III Preparation of Mortise and Tenon Joint 1.4 Demonstration of various methods of painting wooden items. Job IV Preparation of wooden surface before painting including primer coating Job V Painting Practice by brush/spray 1.5 Safety precautions in carpentry shop	08
II	**Fitting Shop** 2.1 Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. Such as Steel, Brass, Copper, Aluminium etc. Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc. 2.2 Description and demonstration of various types of work benches, holding devices and files. Precautions while filing. 2.3 Description and demonstration of simple operation of hack-	08

	sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade. Job I Marking of job, use of marking tools and measuring instruments. Job II Filing a dimensioned rectangular or square piece of an accuracy of ± 0.5mm Job III Filing practice (production of flat surfaces). Checking by straight edge. Job IV Making a cutout from a square piece of MS Flat using hand hacksaw. 2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count (all gauges including dial gauge).	
III	**Welding Shop – I** 3.1 (a) Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, electrode holder, electrodes and their specifications, welding screens and other welding related equipment, accessories and gloves. (b) Safety precautions during welding (c) Hazards of welding and its remedies 3.2 Electric arc welding, (a.c. and d.c.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthing of welding machine. Job I Practice of striking arc bending and tacking while using electric arc welding set. Job II Welding practice on electric arc welding for making uniform and straight weld beads 3.3 Various types of joints and end preparation. Job III Preparation of butt joint by electric arc welding. Job IV Preparation of lap joint by electric arc welding. Job V Preparation of corner joint by using electric arc welding. Job VI Preparation of Tee joint by electric arc welding.	08

DAS 151 : CHEMISTRY LAB

Semester-I

Credits: 02

LIST OF EXPERIMENTS

Module No.	Contents	Teaching Hours
I	1. Instructions for working in chemistry laboratory. 2. Instructions for handling of various apparatus/instruments used in laboratory. 3. Preparation of standard solution of oxalic acid or sodium hydroxide. 4. Analysis of the following acidic radicals* CO_3^{2-}, NO_2^-, S^{2-}, SO_4^{2-}, NO_3^-, CH_3COO^-, Cl^-, Br and I^- 5. Analysis of the following basic radicals* NH_4^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, As^{3+}, Sb^{3+}, Sn^{2+}, Al^{3+}, Fe^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Ni^{2+}, Co^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+} and Mg^{2+} 6. Identification of functional group -CHO, -OH (phenolic and alcoholic), -COOH in a given organic compound. 7. Determination of the solubility of a solid at room temperature. 8. Determination of acid value of oil. 9. Determination of viscosity of given liquid. 10. Determination of surface tension of the given liquid by using stalagmometer.	24

DME 151: ENGG MECHANICS LAB

Credits: 02 **Semester-I**

LIST OF PRACTICALS

Module No.	Contents	Teaching Hours
I	1. Verification of the polygon law of forces using greaves and apparatus. 2. To verify the forces in different members of jib crane. 3. To verify the reaction at the supports of a simply supported beam. 4. To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane. 5. To find the mechanical advantage, velocity ratio and efficiency of a screw jack. 6. To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel. 7. To find mechanical advantage, velocity ratio and efficiency of single purchase crab. 8. To find out center of gravity of regular lamina. 9. To find out center of gravity of irregular lamina. 10. To determine coefficient of friction between three pairs of given surface.	24