

SYLLABUS
I Semester
Common to all branches of UG Engineering & Technology

1FY2-01: Engineering Mathematics-I

Credit: 4

Max. Marks: 200 (IA:40, ETE:160)

3L+1T+0P

End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	Calculus: Improper integrals (Beta and Gamma functions) and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions.	8
2	Sequences and Series: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.	6
3	Fourier Series: Periodic functions, Fourier series, Euler's formula, Change of intervals, Half range sine and cosine series, Parseval's theorem.	6
4	Multivariable Calculus (Differentiation): Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence.	10
5	Multivariable Calculus (Integration): Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Centre of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.	10
TOTAL		40



I & II Semester
Common to all branches of UG Engineering & Technology

1FY2-02/ 2FY2-02: Engineering Physics

Credit: 4
3L+1T+0P

Max. Marks: 200 (IA:40, ETE:160)
End Term Exam: 3 Hours

SN	CONTENTS	Hours
1	Wave Optics: Newton's Rings, Michelson's Interferometer, Fraunhofer Diffraction from a Single Slit. Diffraction grating: Construction, theory and spectrum, Resolving power and Rayleigh criterion for limit of resolution, Resolving power of diffraction grating, X-Ray diffraction and Bragg's Law.	9
2	Quantum Mechanics: Introduction to quantum Mechanics, Wave-particle duality, Matter waves, Wave function and basic postulates, Time dependent and time independent Schrodinger's Wave Equation, Physical interpretation of wave function and its properties, Applications of the Schrodinger's Equation: Particle in one dimensional and three dimensional boxes.	6
3	Coherence and Optical Fibers: Spatial and temporal coherence: Coherence length; Coherence time and 'Q' factor for light, Visibility as a measure of Coherence and spectral purity, Optical fiber as optical wave guide, Numerical aperture; Maximum angle of acceptance and applications of optical fiber.	4
4	Laser: Einstein's Theory of laser action; Einstein's coefficients; Properties of Laser beam, Amplification of light by population inversion, Components of laser, Construction and working of He-Ne and semiconductor lasers, Applications of Lasers in Science, engineering and medicine.	6
5	Material Science & Semiconductor Physics: Bonding in solids: covalent and metallic bonding, Energy bands in solids: Classification of solids as Insulators, Semiconductors and Conductors, Intrinsic and extrinsic semiconductors, Fermi dirac distribution function and Fermi energy, Conductivity in semiconductors, Hall Effect: Theory, Hall Coefficient and applications.	7
6	Introduction to Electromagnetism: Divergence and curl of electrostatic field, Laplace's and Poisson's equations for electrostatic potential, Bio-Savart law, Divergence and curl of static magnetic field, Faraday's law, Displacement current and magnetic field arising from time dependent electric field, Maxwell's equations, Flow of energy and Poynting vector.	8
TOTAL		40

I & II Semester



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1FY1-04/ 2FY1-04: Communication Skills

Credit: 2
2L+0T+0P

Max. Marks: 100 (IA:20, ETE:80)
End Term Exam: 2 Hours

SN	CONTENTS	Hours
1	Communication: Meaning, Importance and Cycle of Communication. Media and Types of Communication. Verbal and Non-Verbal Communication. Barriers to communication. Formal and Informal Channels of Communication (Corporate Communication). Divisions of Human Communication and Methods to improve Interpersonal Communication. Qualities of good communication.	5
2	Grammar: Passive Voice. Reported Speech. Conditional Sentences. Modal Verbs. Linking Words (Conjunctions)	5
3	Composition: Job Application and Curriculum-Vitae Writing. Business Letter Writing. Paragraph Writing. Report Writing.	5
4	Short Stories: “Luncheon” by Somerset Maugham. “How Much Land Does a Man Need?” by Count Leo Tolstoy. “The Night Train at Deoli” by Ruskin Bond.	5
5	Poems: “No Men are Foreign” by James Kirkup. “If” by Rudyard Kipling. “Where the Mind is without Fear” by Rabindranath Tagore.	5
TOTAL		25



I & II Semester
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1FY3-07/ 2FY3-07: Basic Mechanical Engineering

Credit: 2
2L+0T+0P

Max. Marks: 100 (IA:20, ETE:80)
End Term Exam: 2 Hours

SN	CONTENTS	Hours
1	Fundamentals: Introduction to mechanical engineering, concepts of thermal engineering, mechanical machine design, industrial engineering and manufacturing technology. Steam Boilers classification and types of steam boilers and steam turbines. Introduction and Classification of power plants.	
2	Pumps and IC Engines: Applications and working of Reciprocating and Centrifugal pumps. Introduction, Classification of IC Engines, Main Components of IC Engines, Working of IC Engines and its components.	
3	Refrigeration and Air Conditioning: Introduction, classification and types of refrigeration systems and air-conditioning. Applications of refrigeration and Air-conditioning.	
4	Transmission of Power: Introduction and types of Belt and Rope Drives, Gears.	
5	Primary Manufacturing Processes: Metal Casting Process: Introduction to Casting Process, Patterns, Molding, Furnaces. Metal Forming Processes: Introduction to Forging, Rolling, Extrusion, Drawing. Metal Joining Processes: Introduction to various types of Welding, Gas Cutting, Brazing, and Soldering.	
6	Engineering Materials and Heat Treatment of Steel: Introduction to various engineering materials and their properties.	



I & II Semester
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1FY3-08/ 2FY3-08: Basic Electrical Engineering

Credit: 2
2L+0T+0P

Max. Marks: 100 (IA:20, ETE:80)
End Term Exam: 2 Hours

SN	CONTENTS	Hours
1	DC Circuits: Electrical circuit elements (R, L and C), voltage and current sources, Kirchhoff current and voltage laws, Series-Parallel circuits, Node voltage method, Mesh current method, Superposition, Thevenin's, Norton's and Maximum power transfer theorems.	5
2	AC Circuits: Representation of sinusoidal waveforms, peak and r.m.s values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC and RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.	4
3	Transformers: Ideal and practical transformer, EMF equation, equivalent circuit, losses in transformers, regulation and efficiency.	4
4	Electrical Machines: Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Starting and speed control of induction motor, single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators.	7
5	Power Converters: Semiconductor PN junction diode and transistor (BJT). Characteristics of SCR, power transistor and IGBT. Basic circuits of single phase rectifier with R load, Single phase Inverter, DC-DC converter.	4
6	Electrical Installations: Layout of LT switchgear: Switch fuse unit (SFU), MCB, ELCB, MCCB, Type of earthing. Power measurement, elementary calculations for energy consumption.	4
TOTAL		28



I & II Semester
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1FY2-20/ 2FY2-20: Engineering Physics Lab

Credit: 1
OL+OT+2P

Max. Marks: 50 (IA:30, ETE:20)

1. To determine the wave length of monochromatic light with the help of Michelson's interferometer.
2. To determine the wave length of sodium light by Newton's Ring.
3. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer.
4. Determination of band gap using a P-N junction diode.
5. To determine the height of given object with the help of sextant.
6. To determine the dispersive power of material of a prism with the help of spectrometer.
7. To study the charge and discharge of a condenser and hence determine the same constant (both current and voltage graphs are to be plotted).
8. To determine the coherence length and coherence time of laser using He – Ne laser.
9. To measure the numerical aperture of an optical fibre.
10. To study the Hall Effect and determine the Hall Voltage and Hall coefficients.



I & II Semester
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1FY2-22/ 2FY2-22: Language Lab

Credit: 1
OL+0T+2P

Max. Marks: 50 (IA:30, ETE:20)

1. Phonetic Symbols and Transcriptions.
2. Extempore.
3. Group Discussion.
4. Dialogue Writing.
5. Listening comprehension.



I & II Semester

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1FY3-25/ 2FY3-25: Manufacturing Practices Workshop

Credit: 1.5

Max. Marks: 75 (IA:45, ETE:30)

OL+OT+3P

Carpentry Shop

1. T – Lap joint
2. Bridle joint

Foundry Shop

3. Mould of any pattern
4. Casting of any simple pattern

Welding Shop

5. Lap joint by gas welding
6. Butt joint by arc welding
7. Lap joint by arc welding
8. Demonstration of brazing, soldering & gas cutting

Machine Shop Practice

9. Job on lathe with one step turning and chamfering operations

Fitting and Sheet Metal Shop

10. Finishing of two sides of a square piece by filing
11. Making mechanical joint and soldering of joint on sheet metal
12. To cut a square notch using hacksaw and to drill a hole and tapping



I & II Semester
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1FY3-26/ 2FY3-26: Basic Electrical Engineering Lab

Credit: 1
OL+0T+2P

Max. Marks: 50 (IA:30, ETE:20)

1. Basic safety precautions. Introduction and use of measuring instruments – voltmeter, ammeter, multi-meter, oscilloscope. Real-life resistors, capacitors and inductors.
2. Transformers: Observation of the no-load current waveform on an oscilloscope. Loading of a transformer: measurement of primary and secondary voltages and currents, and power.
3. Three-phase transformers: Star and Delta connections. Voltage and Current relationships (line-line voltage, phase-to-neutral voltage, line and phase currents). Phase-shifts between the primary and secondary side.
4. Demonstration of cut-out sections of machines: dc machine (commutator-brush arrangement), induction machine (squirrel cage rotor), synchronous machine (field winding - slip ring arrangement) and single-phase induction machine.
5. Torque Speed Characteristic of separately excited dc motor.
6. Demonstration of (a) dc-dc converters (b) dc-ac converters – PWM waveform (c) the use of dc-ac converter for speed control of an induction motor and (d) Components of LT switchgear.



I & II Semester
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1FY3-29/ 2FY3-29: Computer Aided Machine Drawing

Credit: 1.5
OL+OT+3P

Max. Marks: 75 (IA:45, ETE:30)

Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning.

Conversion of pictorial views into orthographic views: (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems covering Principles of Orthographic Projections.

Sectional views of mechanical components: (1 drawing sheet) Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions-spokes, web rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials.

Fasteners and other mechanical components: (Free hand sketch) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, type of rivets, types of riveted joints etc. Bearing: Ball, roller, needle, foot step bearing. Coupling: Protected type, flange, and pin type flexible coupling. Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.

Overview of Computer Graphics: (2 drawing sheets) Covering theory of CAD software such as: The menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), Command Line (Where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.: Isometric Views of Lines, Planes, Simple and compound Solids.

