FIRST YEAR ENGINEERING COMMON TO ALL BRANCHES

SCHEME OF INSTRUCTION AND EXAMINATION
(RC 2016-17)

SEMESTER - I

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P#	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 1.1	Engineering Mathematics - I	4	--	--	3	100	25	--	--	--	**125**
FE 1.2	Applied Science (Physics / Chemistry)	3	--	2	3	100	25	25	--	--	**150**
FE 1.3	Engineering Mechanics	3	--	2	3	100	25	25	--	--	**150**
FE 1.4	Fundamentals of Electrical Engineering	3	--	2	3	100	25	--	--	--	**125**
FE 1.5	Fundamentals of Computer Engineering	3	--	2	3	100	25	--	--	--	**125**
FE 1.6	Technical English	3	--	--	3	100	25	--	--	--	**125**
FE 1.7	Workshop Practice – I*	--	--	4	--	--	--	50	--	--	**50**
TOTAL		**19**	**--**	**12**	**--**	**600**	**150**	**100**	**--**	**--**	**850**

* Term Work in Workshop Practice – I is a separate Head of Passing.

A candidate is considered to have successfully fulfilled the requirement of a semester, provided he/ she submits to the department a certified journal reporting the experiments conducted during the semester.

LEGEND

Abbreviation	Description
L	Lecture
T	Tutorial
P	Practical
Th	Theory
S	Sessional
TW	Term Work
O	Oral

FIRST YEAR ENGINEERING COMMON TO ALL BRANCHES

SCHEME OF INSTRUCTION AND EXAMINATION
(RC 2016-17)

SEMESTER - II

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P#	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 2.1	Engineering Mathematics - II	4	--	--	3	100	25	--	--	--	**125**
FE 2.2	Applied Science Physics / Chemistry)	3	--	2	3	100	25	25	--	--	**150**
FE 2.3	Programming Languages	3	--	2	3	100	25	--	--	--	**125**
FE 2.4	Fundamentals of Electronics and Telecommunication Engineering	3	--	2	3	100	25	--	--	--	**125**
FE 2.5	Environmental Sciences and Social Sciences	3	--	--	3	100	25	--	--	--	**125**
FE 2.6	Engineering Graphics	2	--	4	4	100	25	25	--	--	**150**
FE 2.7	Workshop Practice - II*	--	--	4	--	--	--	50	--	--	**50**
TOTAL		**18**	**--**	**14**	**--**	**600**	**150**	**100**	**--**	**--**	**850**

* Term Work in Workshop Practice – II is a separate Head of Passing.

A candidate is considered to have successfully fulfilled the requirement of a semester, provided he/ she submits to the department a certified journal reporting the experiments conducted during the semester.

FE 1.1 ENGINEERING MATHEMATICS-I

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
					Th Duration (Hrs)	Marks					
		L	T	P		Th	S	TW	P	O	Total
FE 1.1	Engineering Mathematics-I	4	--	--	3	100	25	--	--	--	**125**

Course Objectives: To enhance their knowledge of Mathematics specifically in the field of function of more than one variable and their analytic properties, expansion of function as a power series, complex functions and its analytic properties.

Course Outcomes: After successful completion of this course the student will

1. Have knowledge of an infinite series.
2. Evaluate integrals using Beta and Gamma functions.
3. Express a function in the form of a power series.
4. Understand various operations on complex numbers & analytic properties of functions of complex variables.
5. Have knowledge of indeterminate forms.
6. Understand partial differentiation & its applications.
7. Solve first order partial differential equations.

UNIT - 1 (16 Hours)

Beta and Gamma Functions: Various forms and properties, relation between Beta and Gamma functions, Legendre's duplication formula, Error function.

Infinite Sequence and Infinite Series: Convergence and Divergence of sequences and series, tests for Convergence and Divergence of infinite series such as Integral test, Comparison test, D'Alembert's ratio test, Cauchy's root test and Leibnitz test for Alternating series, Power series and Radius of Convergence.

UNIT - 2 (16 Hours)

Complex Variables: Complex numbers and their properties, Modulus and Argument of a Complex number, Polar and Exponential form of Complex number, Geometric interpretation of Complex numbers, De Moivre's theorem and its applications, Exponential, Trigonometric, Hyperbolic and Logarithmic functions, Inverse Trigonometric and Hyperbolic functions, Continuity, Differentiability and Analytic functions. Cauchy-Riemann equations, Harmonic functions.

UNIT - 3 (16 Hours)

Differential Calculus: Leibnitz theorem, Taylor's theorem (without proof), Taylor's and Maclaurin's series expansion. Indeterminate forms, Partial Differentiation, Total Differentiation.

UNIT - 4 (16 Hours)

Partial Differential Equations and Extreme Values of Functions: Formation of first order Partial Differential Equations, Methods to solve first order Partial Differential Equations, Euler's theorem on Homogenous functions, Extreme values of functions of two and three variables, Lagrange's method of Undetermined Multipliers.

Recommended Readings:

1. G.V. Kumbhojkar; Applied Mathematics-I for F.E. Semester-1; C Jamnadas & Company.
2. Erwin Kreysig; Advanced Engineering Mathematics; Wiley International Edition.
3. Ch. V. Ramana Murthy and N. C. Srinivas; Applied Mathematics; S. Chand Publishing.
4. Dr. B. S. Grewal; Higher Engineering Mathematics; Khanna Publishers.
5. Srimanta Pal, Subodh C. Bhunia; Engineering Mathematics; Oxford University Press.
6. Thomas/Finney; Calculus and Analytic Geometry; Addison Wesley.

FE 1.2/2.2 APPLIED SCIENCE (PHYSICS)

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
					Th Duration (Hrs)	Marks					
		L	T	P		Th	S	TW	P	O	Total
FE 1.2/2.2	Applied Science (Physics)	3	--	2	3	100	25	25	--	--	**150**

Course Objectives:

1. To familiarize the students with the concept of applied science like interference, semiconductors, ultrasonics, Electron Ballistics and the various topics of modern Physics.
2. The knowledge gained will be useful in learning the various concepts from different branches of Engineering. It gives the basic ideas of all the topics.

Course Outcomes:

The student after undergoing this course will be able to:

1. Gain the knowledge of the application of certain concepts like Ultrasonics, X-rays, Superconductivity and Lasers in the different fields in daily life.
2. Gain the skill of using various apparatus like Cathode ray Oscilloscope and CRT tube.

UNIT - 1 (12 Hours)

Interference of Light:

Interference based on division of amplitude, Phase change at reflection, Geometric and optical path, Interference due to reflected and transmitted light in thin parallel film, Interference in wedge shaped film, Newton's rings for reflected and transmitted light, Determination of radius of curvature of plano convex lens, Wavelength of light used and R. I. of liquid using Newton's ring expt.

Semiconductors: Mobility, Drift velocity, Conductivity of charge carriers, Generation and recombination of charges, Diffusion, Continuity equation, Hall effect.

UNIT - 2 (12 Hours)

Magnetic Materials: Introduction, Origin of magnetization, Classification of magnetic materials, Magnetic hysteresis, Soft and hard magnetic materials, Ferrites, Applications of magnetic materials.

Ultrasonics: Production of ultrasonic waves, Magnetostriction, Piezoelectric oscillator, detection of ultrasonic waves, Properties, Cavitation, Application of ultrasonics in various fields, Measurement of wavelength, Velocity by acoustic diffraction grating.

Electron Ballistics: Thomson's method to determine the specific charge of an electron(qualitative),Electrostatic and magnetic focusing, CRO and applications.

UNIT - 3 (12Hours)

LASERS: Interaction of radiation with matter from quantum mechanical point of view, Absorption, Stimulated and spontaneous emission of radiation, Active medium, Metastable state, Population inversion, Non equilibrium state, Pumping, Condition for light amplification, Einstein's theory of stimulated emission, Operating principle of a laser, Pumping schemes, Optical resonator, Properties of laser, He-Ne laser, Ruby laser, Applications.

Fiber Optics: Total internal reflection, Propagation of light in optical fiber, Structure of an optical fiber and fiber cable, Acceptance angle and cone, Numerical aperture, Types of optical fibers, Modes of propagation, Single and multimode fibers, Frequency or v - number of a fiber, Applications- fiber optic communication and fiberscope, Losses of optical fibres- attenuation (Qualitative study).

UNIT - 4 (12 Hours)

X-rays: Origin of X rays, Continuous and characteristic x-ray spectra, Mosleys law, X-ray diffraction and Bragg's spectrometer.

Compton Effect: Wave nature of particle, de Broglie hypothesis, Davisson Germer expt, Velocity of De Broglie waves, Group and phase velocity.

Super Conductors: Meissner effect, Isotope effect, type-I and type –II superconductors, BCS theory (qualitative analysis only), High temperature superconductors, Properties and applications.

Recommended Readings:

1. M. N. Avadhanulu & P. G. Kshirsagar; A text book of engineering Physics; S. Chand & company Pvt. Ltd. Revised edition 2015.
2. A. S. Vasudeva; Modern Engineering Physics; S. Chand & Company Pvt. Ltd. Revised Edition.
3. Uma Mukherji; Engineering Physics; Narosa Publications.
4. R. K. Gaur & S. L. Gupta; Engineering Physics; Dhanpat Rai Publications Pvt. Ltd. Reprint 2013.
5. K. Rajagopal**;** Engineering Physics**;** PHI Learning Pvt. Ltd. Third Printing 2009.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments. Term Work marks to be awarded based on the assessment of the experiments conducted.)

1. Newton's rings
2. Air-wedge
3. Zener diode characteristics
4. Voltage regulator
5. Rectifiers
6. Use of CRO
7. Thermister characteristics
8. Hall effect
9. e/m by Thomsons method
10. Velocity of ultrasonic wave
11. Energy gap of a semiconductor
12. Planck's constant by Photocell
13. He/Ne laser/ diode laser

FE 1.2/2.2 APPLIED SCIENCE (CHEMISTRY)

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
					Th Duration (Hrs)	Marks					
		L	T	P		Th	S	TW	P	O	Total
FE 1.2/2.2	Applied Science (Chemistry)	3	--	2	3	100	25	25	--	--	**150**

Course Objectives:

1. To deal with industrial technologies and applications related to chemistry, which would help to meet the basic need of an individual, society & environment.

Course Outcomes:

The students will acquire knowledge to:

1. Understand the basic concept of electrochemical system involving different types of energy systems and components involved therein. This knowledge will help students to understand/develop present technologies like batteries and fuel cells.
2. Understand the classification and grading of Hydrocarbon fuels and non-conventional energy systems like solar and Biogas.
3. Differentiate various types of corrosion and gain knowledge on control measures associated with corrosion.
4. Understand the concept of Green Chemistry and its importance towards environment friendly chemical processes.
5. Identify polymeric materials, methods and properties associated with these materials.
6. Understand the principles of some commonly used analyticaltools in the field of chemistry.
7. Understand the Impurities involved in Water, methods for large scale treatment of river and saline water including treatment of sewage water.
8. Understand the classification, constitution, properties and application of composite materials.

UNIT - 1 (12 Hours)

Electrochemical Energy Systems:

Single electrode potential: concept, sign convention, Determination of standard electrode potential, Nernst equation and related numerical.

Electrochemical cells: Galvanic and Concentration cells- Construction, Representation, Determination of EMF, Role of Electrochemical series and numerical.

Electrodes: Reference Electrodes –Calomel and Silver/Silver chloride electrodes; Ion Selective electrodes, glass electrode; Construction, representation, pH determination using the electrodes.

Batteries: Basic concepts, Characteristics, classification. Construction, working and applications of Zn-Air Battery and Li-ion polymer battery.

Fuel Cells: Basic construction and working with reference to Hydrogen–Oxygen Fuel cell with KOH as electrolyte.

Fuels:

Definition, Classification with reference to combustible fuels; Important terms-Calorific value, GCV, NCV.

Crude oil- Mining and purification, grading of Gasoline and Diesel. Blending of gasoline with ethanol.

Non-Conventional Sources of Energy: Solar and Biogas- working principles and constructions involved therein.

UNIT - 2 (12 Hours)

Corrosion:

Definition and Mechanism of corrosion- Direct chemical corrosion &Electrochemical corrosion. Types of Corrosion: Galvanic corrosion, differential aeration corrosion(with reference to waterline and Pitting corrosion), Inter-granular and stress corrosion. Factors Influencing corrosion: Nature of metal and Environment; Corrosion Control Measures: Proper design, Purity and alloying, Cathodic protection, Modifying environment, Metal cladding, Inorganic coatings(phosphate and anodized) and Protective Metal coatings e.g. (Hot metal coatings(Galvanization & Tinning), Electroless (PCB preparation) and Electroplating (Chromium Plating).

Green Chemistry:

Objectives and significance of Green Chemistry; Basic components of green chemistry: Alternative feedstocks (adipic acid preparation), reagents (methylation by use of DMC),reaction conditions(Use of aqueous solvent) and final products(Synthesis of acetyl acetate esters); Concept of atom Economy. Industrial application of Green Chemistry(with reference to Products from natural materials, Green Solvents and Green fuels).

UNIT - 3 (12 Hours)

Polymers:
Definition, Classification-based on source of availability, structure, number of monomers and their arrangement, type of polymerization and response to heat, Basic concepts- monomers, Degree of polymerization, Functionality. Methods of Polymerization- Bulk, Suspension, Emulsion and solution. Structure-Property relationships in Polymers- chemical, Electrical(conducting polymer e.g. polyacetylene), optical, Mechanical and Crystallinity in Polymers (Tg and Tm).Degradation of Polymers-Oxidation, weathering, Environmental stress cracking and thermal. Compounding of polymers to yield plastics: ingredients involved. Elastomers: Processing of natural rubber, comparison between natural and synthetic rubber.

Instrumental Techniques: covering Principles, working and applications of UV-visible, Gas Chromatography and Differential Scanning Calorimeter (DSC).

UNIT - 4 (12 Hours)

Water Technology:
Impurities in water, water analysis-Determination of pH, Turbidity, Dissolved solids, Hardness, Alkalinity, BOD and COD including numericals. Specifications for drinking water; BIS and WHO standards. Municipal treatment for large scale production of potable water.
Large scale production of potable water using saline water- Flash Evaporation, Electro dialysis and reverse Osmosis method. Sewage treatment.

Composites:
Definition, constituents of composites, Types of composites-Fibre, particulate and layered. Applications of composites.

Recommended Readings:

1. Shashi Chawla; A Text Book of Engineering Chemistry; Dhanpat Rai Publishing Co.; 2011.
2. S. S. Dara; Engineering Chemistry; Chand & Co.; 2011.
3. Jain and Jain; Engineering Chemistry; Dhanpat Rai Publishing Co.; 2013.
4. M.G. Fontana; Corrosion Engineering; McGraw Hill Publication.
5. M.M. Uppal; Engineering Chemistry; Khanna Publication.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments. Term Work marks to be awarded based on the assessment of the experiments conducted.)

1. Introduction to the Chemistry laboratory session: Discussion on basic aspects like calculation of normality & Molarity, preparations of solutions, Acquaintance with glassware and other laboratory facilities
2. Determination of Standard Electrode potential and verification of Nernst Equation
3. Study of corrosion activity of Aluminum metal in Acid and Base Solution
4. Study of deposition of Ni metal on Aluminium by Electroless plating
5. Determination of Viscosity by using Ostwald Viscometer
6. Elemental analysis using Colorimeter
7. Determination of pH, Turbidity and Dissolved solid content of water
8. Determination of Hardness of a given water sample
9. Determination of Alkalinity of a given water sample
10. Determination of Dissolved oxygen content in water
11. Determination of COD of a water sample
12. Determination of molecular weight of polymer using Ostwald viscometer
13. Analysis of an ore using titrimetric method of analysis
14. Separation of miscible liquids using Fractional distillation method
15. Titrimetric analysis involving use of Conductometer
16. Synthesis of Polymer

Recommended Readings for practicals:

1. Vogels text book of quantitative chemical analysis; 6th edition.
2. Sunita Rattan; Experiments in applied chemistry; S.K. Kataria & Sons.

FE 1.3 ENGINEERING MECHANICS

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 1.3	Engineering Mechanics	3	--	2	3	100	25	25	--	--	**150**

Course Objectives:

1. To apply principles of statics and dynamics to a rigid body.
2. To impart knowledge of different types of simple lifting Machines.

Course Outcomes:

The student after undergoing this course will be able to:

1. Find resultant and understand the concept of equilibrium of coplanar concurrent and non-concurrent force systems
2. Understand the concept of centroid, area moment of inertia and mass moment of Inertia
3. Understand the basic principles of Engineering Mechanics and applications to beams and trusses
4. Understand the principle of virtual work, application of Work Energy principle, Impulse Momentum equation, and principle to rigid bodies.
5. Study the working principle of some simple lifting machines

UNIT-1 **(12 Hours)**

Basic Concepts: Concept of a rigid body, Laws of motion, Force systems, Principle of Transmissibility of forces, concurrent and non-concurrent Forces, Resultant of a forces, Composition and resolution of forces, moment of a force, Principle of moments, Equilibrium of forces, Lami's theorem, Free body diagrams, Applications. Types of beams, determinate and indeterminate beams, Types of loads, Types of supports and support reactions of determinate beams.

Graphic Statics: Concept of vector and space diagram, Bow's notation, force polygon and funicular polygon.

UNIT-2 (12 Hours)

Centroid and Moment of Inertia: First moment of an area and Centroid, Locating the centroid of built – up sections. Second moment of area , radius of gyration, Parallel Axes Theorem, Perpendicular axes Theorem, polar moment of inertia, Finding moment of inertia of built up sections. Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their Axis.

Virtual Work Method: Principle and concept of virtual work. Application to determinate beams

UNIT-3 (12 Hours)

Trusses: Introduction, Simple Truss and Solution of Simple truss by Method of Joints and Method of Sections.

Friction: Theory of friction, Types of friction, Static and kinetic friction, angle of friction, Limiting Friction, Laws of friction, Coefficient of friction, Angle of repose, Applications involving rigid body on a horizontal or an inclined plane, ladder and wedge friction.

UNIT-4 (12 Hours)

Simple Lifting Machines: Mechanical advantage, velocity ratio, efficiency of machine, law of machine. Study of simple machines:- Simple wheel and axle, differential wheel and axle, single and double purchase crab and worm and worm wheel.

Kinetics of Rigid Body: Work Energy principle, Impulse Momentum equation, D'Alembert's Principle and related applications.

Recommended readings:

1. S. S. Bhavikatti and K. G. Rajshekarappa; Engineering Mechanics; New Age International Publication.
2. F. P. Beer and Johnson; Vector Mechanics for Engineers: Statics and Dynamics; Tata McGraw Hill Publication.
3. R. C. Hibbeler; Engineering Mechanics: Statics and dynamics; Prentice Hill Publication.
4. I. H. Shames andG. K. RaoMohana; Engineering Mechanics: Statics and dynamics; Pearson Education Publication.
5. A. K. Tayal; Engineering Mechanics; Umesh Publications.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments. The Term Work Marks to be awarded based on the assessment of experiments conducted)

1. To determine support reactions of simply supported beam.
2. To verify parallelogram law of forces.
3. To verify polygon law of forces for concurrent system.
4. To determine coefficient of friction and angle of friction using inclined plane.
5. To verify the principle of moments.
6. To determine law of machine for simple wheel and axle.
7. To determine law of machine for differential wheel and axle.
8. To determination law of machine for single purchase crab.
9. To determine law of machine for double purchase crab.
10. To determine law of machine for worm and worm wheel.

FE 1.4 FUNDAMENTALS OF ELECTRICAL ENGINEERING

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 1.4	Fundamentals of Electrical Engineering	3	--	2	3	100	25	--	--	--	**125**

Course Objectives:

1. To develop an understanding of important concepts of Electricity & Magnetism.
2. To be able to analyze AC & DC circuits
3. To understand concept of DC and AC power, Reactive power and power factor
4. To develop conceptual understanding of three phase AC circuits.
5. To understand basics of Transformer.

Course Outcomes:

On completion of this course, the students will have a thorough understanding of various electrical and magnetism concepts. They will have an ability to work on DC and AC circuits. They will have knowledge of Transformers.

UNIT - 1 (12 Hours)

Introduction to Generation of Electrical Energy: Different sources of generation of electrical energy - conventional sources of energy- Thermal, hydro & nuclear. Non conventional sources - solar & wind. Single line representation of a power system indicating generation, transmission & distribution of electrical power.

Magnetism: Concept of magnetic field. Definitions of terms related to magnetic field- flux density, permeability, reluctance, m.m.f, Ampere law, Faraday's laws , Lenz's Law . Fleming's rules - their significance & application. Electromagnetic induction, induced emf and its types, magnetic circuits, analogy between electric circuit & magnetic circuit. Energy stored in magnetic circuit.

UNIT - 2 (12 Hours)

Electrical Circuits & Analysis of DC circuits: Introduction to Electric circuit, circuit elements- passive & active – their definition from circuit & energy view point, ohm's law, Kirchhoff's laws- KCL & KVL, series & parallel connection, star & delta transformation . Basic principles of voltage divider & current divider. Concept of voltage & current sources. Analysis of D.C. circuits involving independent sources: Loop analysis/mesh analysis & nodal analysis. Superposition Theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, Millman's Theorem.

UNIT - 3 (12 Hours)

A.C. Fundamentals, AC Circuit Analysis: Generation of sinusoidal voltage - frequency, time period, average value, r.m.s. value, maximum value , form factor, peak factor, phase, concept of phasor diagram, phase angle. Active, reactive & apparent power. Power factor. Analysis of R, L, C, series and parallel circuits, phasor diagram.

UNIT - 4 (12 Hours)

Three phase A.C Circuits : Representation of three phase system, concept of phase sequence & its significance. Balanced & unbalanced three phase supply system. Relationship between line and phase quantities for star & delta connections. Three phase power. Three phase power measurement.
Introduction to Single Phase Transformer: Working principle, construction, equivalent circuit, phasor diagram, voltage regulation, losses in transformer and their measurements using O.C. & S.C. test & efficiency.

Recommended Readings:

1. Vincent Del Tero; Principles of Electrical Engineeringby; PHI Publication.
2. Joseph Administer; Electrical Circuits; Schaum Series Publication.
3. Hayt, Kemmerly, Durbin ;Engineering Circuit Analysis; Tata McGraw Hill Publication.
4. G. D. Rai; Non conventional Energy Sources; Khanna Publications.
5. J B Gupta; Electrical power; Khanna Publication.
6. Rajendra Prasad; Fundamentals of Electrical Engineering; PHI Publication.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments.)

1. Ohm's law and its application
2. Verification of Kirchhoff's laws
3. Verification of Thevenin's theorem
4. Verification of Norton's theorem
5. Verification of Superposition theorem
6. Verification of Maximum power transfer theorem
7. Study of single phase domestic wiring system

8. Brightness control of 2 bulbs using series and parallel connection
9. Measurement of power in single phase circuit
10. Open circuit and short circuit test on single phase transformer
11. Load test on single phase transformer.

FE 1.5 FUNDAMENTALS OF COMPUTER ENGINEERING

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
					Th Duration (Hrs)	Marks					
		L	T	P		Th	S	TW	P	O	Total
FE 1.5	Fundamentals of Computer Engineering	3	--	2	3	100	25	--	--	--	**125**

Course Objectives:

The subject aims to provide the student with:

1. An understanding of basic concepts of computer science and engineering.
2. An introduction to the fundamentals of hardware, software and programming.
3. An introduction to mathematical software.
4. An understanding of cyber laws and computer security.

Course Outcomes:

The student after undergoing this course will be able to:

1. Demonstrate the use of mathematical software and solve simple mathematical problems.
2. Explain the needs of hardware and software required for a computation task.
3. State typical provisions of cyber law that govern the proper usage of Internet and computing resources.
4. Explain the working of important application software and their use to perform any engineering activity.
5. Demonstrate the use of Operating system commands and shell script.

UNIT -1 (12 hours)

Overview, Introduction to computers: Generation of Computers. Software and hardware, Types of Computers, Computer Networks and Internet. Data and program representation. Working of CPU, Making computers faster and better now and in the future. Storage systems characteristics, types of storage systems, Magnetic disk systems, Optical disk systems and Flash Memory systems. Keyboards, Pointing devices, Scanners, Readers and Digital cameras, Audio input, Display devices, Printers, Audio output.

UNIT- 2 (12 hours)

Introduction to System software and Application software, the operating system (OS). OS for Desktop PCs, servers, handheld PCs, Smartphone and larger computers. Linux and Windows Operating system commands and shell scripts. Concepts of Word processing, Spreadsheet, Database, Presentation graphics and multimedia. Introduction to Assemblers, Interpreters, Compilers and Debuggers.

UNIT-3 (12 hours)

Basic Concepts of Technology and Law, Understanding the Technology of Internet, Scope of Cyber Laws, Cyber Jurisprudence, Encryption, Science of Cryptography, Symmetric and Asymmetric Cryptography. Electronic Banking: Banking and Bookkeeping, Legal Recognition of Digital Signature. The Cyber Crime, Tampering with Computer Source Document, Hacking with Computer System.

UNIT-4 (12 hours)

MATLAB and Its family, Menus and toolbars, Types of windows and types of files, MATLAB Help system, Basic calculations in MATLAB, Vectors and arrays, Multi-dimensional arrays, Element by element operations, Polynomial operations using arrays, X-Y Plotting functions, Subplots, 3-D Plots and Contour plots.

Recommended Readings:

1. Deborah Morley and Charles S. Parker; Fundamentals of Computers; Cengage Learning, India edition; 2009.
2. Alexis Leon and Mathews Leon; Fundamentals of Information Technology; Vikas Publication, Chennai.
3. Francis Scheid; Theory and Problems of Introduction to Computer Science Schaum's Outline Series; Tata McGraw Hill publication.
4. Information Technology: Tools and Application, Ed. UPTEC Computer Consultancy Limited, Elsevier Publication, 2004.
5. Rudra Pratap ;Getting started with MATLAB: A quick introduction for scientists and engineers; Oxford University press; 2003.
6. W. L. Palm III ; Introduction to MATLAB 7 for Engineers; McGraw Hill ;2005.
7. Rajeshree R Khande and Manisha Maddel ; Internet Programming & Industrial Law; Vision Publications, Pune.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments.)

1) Five programs using MATLAB (Programs will be on Basic Calculation, Calling Data file and Sending results to Data file, Control structure, Plots and Subplots, creating and using built in functions)
2) Five programs using linux shell scripting. (Using any scripting language like PERL or PYTHON)
3) Five experiments involving packages for Word Processing, Spread Sheet, Presentation, Graphics and Database.

FE 1.6 TECHNICAL ENGLISH

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Instruction						
		L	T	P	Th. Duration (Hrs)	Marks					
						TH	S	TW	P	O	Total
FE 1.6	Technical English	3	--	--	3	100	25	--	--	--	**125**

Course Objective:

1. To ensure understanding of the basics of communication through English, aspects of verbal & non-verbal communication.
2. To speak a neutral & correct form of English.
3. To appreciate the nuances of language & develop skills required for the competitive world.
4. To enhance their soft skills.
5. To develop skills in technical writing like project/training reports, and effective presentation.
6. To develop writing skills in English grammatically correct and smooth flowing.

Course Outcomes:

The student after undergoing this course will be able to:

1. To read, write and speak effectively in English.
2. To participate in debate, paper presentation, quiz etc. at state and national level.
3. To participate effectively in a job interview, group discussion needed for the job market.
4. Write reports and assignments in fairly understandable manner.

UNIT - 1 **(12 Hours)**

Communication: Relevance and importance of communication, Characteristics of effective communication, Communication basics, Benefits of communicating effectively. Communication cycle; barriers Types of communication Verbal Non-verbal: oculesics, proxemics, vocalic, haptics, Body language, gestures. Liasioning. Cross cultural communication- factors to be taken into consideration while communicating to members of other cultures. Communication in the social media- reach, responsibility and ethics.

UNIT - 2 (12 Hours)

Job Interviews: techniques interview preparations, conducting interviews, types. Group Discussions: Qualities of a GD member, do and don'ts of a GD. Listening Skills: Concepts of listening, barriers to listening, types of listening. Oral Presentations: Debates, One minute speaks and topics among groups in class. Soft Skills: Concepts and relevance of soft skills, practicing soft skills. Specific Soft skills: 1) Inter Personal skills. 2) Leadership, 3) Decision making 4) Emotional intelligence. Ergonomics: Definitions, Purpose, ergonomics at workplace, Safety measures.

UNIT - 3 (12 Hours)

Technical communication: Concept and introduction, Preparing resume and cover letter Drafting notice agenda, minutes of the meeting, drafting memorandum, formal letters, report writing. Concepts and methodology for writing thesis or assignment: Defining the problem, limiting it, consulting course material, preparing bibliography, foot notes. Use of quotations tables and figures, Assignments on allotted topics.

UNIT - 4 (12 Hours)

Grammar: Active passive voice, tenses, prepositions, Degrees of comparison- positive, comparative, superlative. Question tag: Affirmative negative sentences, sentence constructions using 'No Sooner'; 'So that'. Comprehension, question based on passage and vocabulary questions. Vocabulary: phrasal verbs, idioms, antonyms, synonyms, sentence errors.

Prose Pieces: ChetanBhagat's Talk on "sparks" delivered in symbiosis Pune and an extract from Kalam's "My Journey"- 'Three great heroes resolve a problem'.

Recommended Readings:

1. Meenakshi Raman; Technical communication; 2nd ed.; Oxford University Press.
2. Meenakshi Raman, Prakash Singh; Business communication; 2nd ed.; Oxford University Press.
3. R. C. Sharma, Krishna Mohan; Business Correspondence& Report Writing; 3rd ed.; Tata McGraw – Hill Publishing Company Limited , New Delhi.
4. Krishna Mohan, Meenakshi Raman; Effective English Communication; Tata McGraw – Hill Pvt. Ltd, New Delhi.
5. K. Alex; Soft Skills; S. Chand Publication.

FE 1.7 WORKSHOP PRACTICE - I

Subject Code	Nomenclature of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 1.7	Workshop Practice - I	--	--	4	--	--	--	50	--	--	**50**

Course Objectives:

1. Understand the basic workshop skills from raw material stage to finished product.
2. Develop the skills required for fitting, forging, welding and carpentry jobs.
3. Understand the use of tools, machines and effort required to complete the job.

Course Outcomes:

After the successful completion of the course, the students will be able to:

1. Achieve the skills required to complete fitting, forging, welding and carpentry jobs.
2. Understand the concepts of forming and joining methods.

(I) Fitting

i) Demonstration of various tools and equipments used in Fitting shop.

ii) Practical: At least one job covering simple fitting practice.

(II) Forging

i) Demonstration of various tools and equipments used in Forging shop.

ii) Practical: At least two different jobs covering forging practice.

(III) Welding

i) Demonstration of various welding machines, tools and equipments used by a Welder.

ii) Practical: At least one job on electric arc welding.

(IV) Carpentry

i) Demonstration of wood cutting machines, various tools & equipments used by a Carpenter.

ii) Practical: At least two jobs as follows:-

1) Wooden Joint ----------one job

2) Wood Turning ----------one job

Practicals mentioned above are to be conducted in the workshop and the jobs are to be submitted for assessment at the end of the course. The Term Work marks are to be awarded based on the assessment of the jobs completed.

A candidate is considered to have successfully fulfilled the requirement of a semester, provided he/she submits to the workshop jobs completed in all trades during the semester.

FE 2.1 ENGINEERING MATHEMATICS-II

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 2.1	Engineering Mathematics-II	4	--	--	3	100	25	--	--	--	**125**

Course Objectives:

Primary objective of this subject is to familiarize students with multiple integrals, vector calculus, solve ordinary differential equations.

Course Outcomes:

After successful completion of this course the student will

1. Evaluate double & triple integrals & learn its various Engineering applications.
2. Understand analytic properties of vector valued functions & the associated results used in engineering.
3. Solve first order differential equation & higher order linear differential equations.

UNIT - 1 (16 Hours)

Differentiation under the Integral Sign: Integral with its limit as constant and as a function of the parameter.

Curve Tracing and Rectification of Plane Curves: Tracing of Plane Curves in two dimensions, Polar and Parametric forms of Plane Curves such as Cardiod, Asteroid, Cycloid, Leminiscate etc., Rectification of Plane Curves in Polar, Cartesian and Parametric form, Vector Differentiation, Curves in space, Tangent, Normal and Binormal vectors, Torsion and Curvature, Serret- Frenet formulas.

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UNIT - 2 (16 Hours)

Multiple Integrals: Double Integration in Polar and Cartesian co-ordinates, change of order in Double Integration, application of Double Integration to computation of Centre of Gravity; Triple Integration in Cartesian , Spherical and Cylindrical co-ordinate systems, Geometrical interpretation of Triple Integration and applications to surface area and volume.

UNIT - 3 (16 Hours)

Vector Calculus: Scalar and Vector fields, Directional Derivatives, Divergence and Curl of Vector fields, Gradient of a Scalar field, Line Integrals and their applications, Greens theorem in a Plane, Surface and Volume Integrals, Divergence theorem and Stroke's theorem(both without proof) and their applications.

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UNIT - 4 (16 Hours)

Ordinary Differential Equations: First order and first degree Ordinary Differential Equations, Method of separation of variables, Homogeneous and Non- Homogeneous differential equations, Equations reducible to Homogeneous form, Linear Differential Equations, Bernoulli's Differential Equation, Exact and Non- Exact Differential Equations; Higher order Differential Equation with constant coefficients and with right hand side of the form e^{ax}, sin ax, cos ax, e^{ax} f(x), x^n f(x) etc., Linear equations with variable coefficients such as Cauchy's Equation and Lagrange's Equation, D- operator and Inverse D- operators, method of Variation of Parameters.

Recommended Readings:

1. G. Shanker Rao; Engineering Mathematics Volume I; I.K. International Publishing House.
2. A textbook of Vector Calculus; Shanti Narayan; S. Chand Publishing.
3. Ch. V. Ramana Murthy and N. C. Srinivas; Applied Mathematics; S. Chand Publishing.
4. Dr. B. S. Grewal; Higher Engineering Mathematics; Khanna Publishers.
5. Erwin Kreysig; Advanced Engineering Mathematics; Wiley International Edition.
6. Thomas/Finney; Calculus and Analytic Geometry; Addison Wesley.

FE 2.3 PROGRAMMING LANGUAGES

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
					Th Duration (Hrs)	Marks					
		L	T	P		Th	S	TW	P	O	Total
FE 2.3	Programming Languages	3	--	2	3	100	25	--	--	--	**125**

Course Objectives:

The subject aims to provide the student with:

1. An understanding of basic concepts of computer programming and developer tools.
2. An introduction to the syntax and semantics of the "C" language as well as data types offered by the language.
3. An introduction to write programs using standard language infrastructure regardless of the hardware or software platform.

Course Outcomes:

The student after undergoing this course will be able to:

1. Demonstrate the use of algorithms and flowcharts to plan the solution of a computing problem.
2. Explain the use of formatted and unformatted input and output statements in "C".
3. State typical usage of sequence control statements of "C'.
4. Enlist the fundamental data types and data structures of "C".
5. Explain the usage of arrays and pointers in "C".
6. Differentiate between a structure and a union.
7. Explain the commands of File Management in "C".

UNIT - 1 (12 Hours)

Programming Basics: Notions of algorithms, flowcharts and programming, iteration and recursion. Imperative style of programming, Functional style of programming, correctness and efficiency issues. Features of block-structured languages, Functions and procedures, Parameter passing, Top-down style and stepwise-refinement with concrete examples Fundamental algorithms: Exchanging values of two variables, counting, summation of a set of numbers , generation of prime numbers , reversal ,series.

UNIT - 2 (12 Hours)

Overview of Programming language C, constants variables and data types, operators and expressions, data input output, decision making and looping: If, If-else, while, do-while, for, switch. Function declarations and prototypes, pass by value, and pass by reference. User defined function in C, iterative function and recursive functions.

UNIT - 3 (12 Hours)

Arrays: One dimension array, array initialization, Searching, Insertion, deletion of an element from an array; finding the largest/smallest element in an array, two dimension array, addition/multiplication of two matrices, transpose of a square matrix; passing array to function , character array and string. Pointers: Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, arrays and pointers, pointer arrays.

UNIT - 4 (12 Hours)

Structure & Unions: Defining a structure, declaring structure variables, Accessing structure members, structure initialization, copying & comparing structure variables, operation on individual members, Array of structures, structure & functions, Unions, Size of Structure.

Files management in C: Defining & opening a file, closing a file, I/O operations on files, Error handling during I/O files, Random Access to files. Introduction to Dynamic Memory Allocation

Recommended Readings:

1. Herbert Schildt ; C: The Complete Reference, 4th Edition; Tata McGraw Hill; 2000.
2. Stephen Prata ; C Primer Plus 5th Edition; SAMS Publishing; 2005.
3. Brian W. Kernighan and Dennis M. Ritchi; C Programming Language 2nd Edition; Pearson Education; 2006.
4. Samuel P. Harbison and Guy L. Steele; C: A Reference Manual , 5th Edition; Prentice Hall; 2003.
5. Yashwant Kanetkar; Let Us C; BPB Publications, 9th Edition; 2008.
6. King K.N; C Programming: A Modern Approach, 2nd Edition; W. W. Norton and Company; 2008.
7. Dromey R.J ; How to Solve it by Computer, Prentice Hall India Series; 2000.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments.)

1. Program to find area and circumference of circle.
2. Program to convert temperature from degree centigrade to Fahrenheit.
3. Program to calculate sum of 5 subjects & find percentage.
4. Program to show swap of two no's without using third variable.
5. Program to print a table of any number.
6. Program to find greatest in 3 numbers.
7. Program to show the use of conditional operator.
8. Program to find whether given no is even or odd.
9. Program to shift inputed data by two bits to the left.
10. Program to use switch statement. Display Monday to Sunday.
11. Program to display first 10 natural no & their sum.
12. Program to print Fibonacci series up to 100.
13. Program to find factorial of a number.
14. Program to find whether given no is a prime no or not.
15. Program to display series and find sum of 1+3+5+……..+n.
16. Program to use bitwise AND operator between the two integers.
17. Program to add two number using pointer.
18. Program to show sum of 10 elements of array & show the average.
19. Program to find sum of two matrices.
20. Program to find multiplication of two matrices.
21. Program to find transpose of a matrix.
22. Program to find the maximum number in array using pointer.
23. Program to reverse a number using pointer.
24. Program to show input and output of a string.
25. Program to find square of a number using functions.
26. Program to show call by value.
27. Program to show call by reference.
28. Program to find factorial of a number using recursion.
29. Program to find whether a string is palindrome or not.

FE 2.4: FUNDAMENTALS OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	O	P	Total
FE 2.4	Fundamentals of Electronics and Telecommunication Engineering	3	--	2	3	100	25	--	--	--	125

Course Objectives:

The subject aims to provide the student with:

1. An understanding of discrete semiconductor devices and their applications.
2. An introduction to operational amplifier and its basic configurations.
3. An introduction to Boolean algebra and logic gates.
4. An introduction to SCR, transducers, PLC, and basic communication system.
5. The basic understanding of PCB fabrication process.

Course Outcomes:

The student after undergoing this course will be able to:

1. Demonstrate the use of diode and Zener diode in simple circuits and compare their performance.
2. Explain the working of a BJT, JFET and MOSFET and compare basic BJT configurations.
3. State typical parameters of an op-amp, and design basic amplifier circuits using op-amps.
4. Enlist the fundamental logic gates, Boolean laws and justify the use of NAND and NOR gates as Universal gates.
5. Explain the working of SCR, simple transducers and PLC.
6. Differentiate between PLC, microprocessor and microcontroller.
7. Distinguish between AM and FM communication system.
8. Explain the PCB fabrication process.

UNIT - 1 (12 Hours)

Diodes and Circuits: Structure of Atom, classifications of solid materials on the basis of conductivity, atomic bonds, energy band theory, semiconductors, p-n junction basics, p-n junction diode, Zener diode, breakdown mechanism in diodes, light emitting diode.

Diode Applications: Half-wave, Full-wave and Bridge Rectifiers; PIV; DC and r.m.s voltages, Derivation of Ripple Factor. Voltage Regulation using Zener diodes.

UNIT - 2 (12 Hours)

Bipolar Junction Transistor (BJT): Transistor Construction; Transistor Operation; Common-Base Configuration; Transistor Amplifying Action; Common-Emitter Configuration; Common-Collector Configuration; Limits of Operation.

DC Biasing: Operating Point; Fixed-Bias Circuit; Emitter-Stabilized Bias Circuit; Voltage-Divider Biasing.

Field Effect Transistors: Construction and Characteristics of JFETs; Transfer Characteristics; Depletion-Type MOSFET; Enhancement- Type MOSFET; CMOS.

UNIT - 3 (12 Hours)

OP-AMP (741): Pin diagram, ideal op-amp, practical op-amp, equivalent circuit of op-amp, open loop configuration of op-amp, closed loop configuration of op-amp (basic concept of voltage gain and bandwidth - inverting and non inverting amplifiers).

Digital Electronics: Introduction, Positive and negative logic, logic operations and operators, logic gates, universal gates, Boolean algebra.

Power Semiconductor Device: SCR basic symbol, construction and operation.

UNIT - 4 (12 Hours)

Transducer: Basic concept of Thermistor, LVDT, strain gauge, LDR,
Block diagram of programmable logic controller (PLC). PCB fabrication procedure
Definitions and difference between, microprocessor and microcontroller.

Communication Systems: Block Diagram of basic communication system, Need for modulation, basic concepts of amplitude modulation and frequency modulation.

Recommended Reading:

1. Boylestad and L. Nashelsky; Electronic Devices and Circuits; PHI.
2. A. Mottershead; Electronic Devices and Circuits; PHI.
3. Ramakant A. Gayakwad; Op-Amps and Linear Integrated Circuits; PHI.
4. George Kennedy; Electronic Communication Systems; Tata McGraw Hill.
5. David Bates and Albert Malvino; Electronic Principles; McGraw-Hill Higher Education.
6. N.N.Bhargava; Basic Electronics and Linear Circuits; Tata McGraw-Hill.
7. Vijay Baru, Rajendra Kaduskar, Sunil Gaikwad; Basic Electronics Engineering; Dreamtech Textbooks.
8. Walter C. Bosshart; Printed Circuit Boards; Tata Mcgraw Hill.

List of Experiments:

(At least 8 experiments should be conducted from the list of experiments.)

1. P-N Junction Diode Characteristics
2. Half-wave, Full-wave and Bridge Rectifiers
3. Zener diode characteristics and Zener diode as a voltage regulator
4. Transistor Common - Emitter Configuration Characteristics
5. FET Characteristics
6. Inverting configuration of OPAMP using 741 IC
7. Non-Inverting configuration of OPAMP using 741 IC
8. Verification of truth-tables of basic logic gates
9. Verification of De' Morgan's laws
10. NAND and NOR as Universal gates
11. Silicon-Controlled Rectifier (SCR) Characteristics
12. Transducer Characteristics
13. PCB fabrication
14. AM System
15. FM System

FE 2.5 ENVIRONMENTAL SCIENCES AND SOCIAL SCIENCES

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 2.5	Environmental Sciences and Social Sciences	3	--	--	3	100	25	--	--	--	**125**

Course Objectives:

1. To study the concept of various environmental aspects on scientific basis in the functional area of Engineering and technology.
2. To study and critically assess the approaches to pollution control, environmental and resource management, sustainable development, cleaner technologies, Environmental Legislation based on an understanding of the fundamental, environmental, social and economic dimensions.
3. To know the various types of probable disaster and its mitigation measures.
4. To have the knowledge of ethics and emotional intelligence.

Course Outcomes:

The student after undergoing this course will be able to:

1. Understand the Present, past and future status of the Environment.
2. Demonstrate the knowledge of core concepts and components in Environmental Science.
3. Explain environment management by equitable handling of natural resources, pollution control technologies, biodiversity and ecosystem protection.
4. Identify environmental issues and problems arising due to human activities at local, national and global level and acquire knowledge of mitigation measures and explain the importance of Environmental Legislation and its implementation.
5. Get acquainted for preparedness towards natural disaster.
6. Released the importance of ethics for engineers, emotional intelligence etc.

SECTION I: ENVIRONMENTAL SCIENCES

UNIT-1 (12 Hours)

The Environment: Definition, Objectives, Principles, Importance, ethics and Scope of Environmental education, Need for public awareness. Role of an individual in conservation of natural resources.

Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems.

Forest Resources: Use and over-exploitation, deforestation, Timber extraction, mining, dams and their effects on forests and tribal people.

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

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

Food Resources: World food problem, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy Resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

UNIT-2 (12 Hours)

Environmental Pollution: Definition, Causes, effects and control measures of- Air Pollution, Water Pollution, Marine Pollution and Noise Pollution, Fire works - crackers effects and control measures.

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Social Issues and the Environment from Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, Rain water harvesting, Watershed management.

Disaster Management: Planning, Disaster Preparedness, Response and Recovery. Guidelines of national disaster management division. Rehabilitation policy: Objectives and guidelines.

SECTION II: SOCIAL SCIENCES

UNIT-3 (12 Hours)

Personality : Freudian & humanistic Theory, Personality Development, Notion of successful personality, Emotional Intelligence.

Motivation: Theories of motivation.

Stress Management: cause & effect. Coping mechanisms. Prayer, Meditation, Yoga.

Professional work ethic for the engineer.

Team: Leadership ,Team culture. Team Attitudes, Interpersonal skills.

Engineer's Responsibility: individual & social level.

Positivity: Attitudes, lifestyle, living.

UNIT-4 (12 Hours)

Education: Nature. Scope, Limitations.

Concept of Culture: Identity, Conflict, Changes in culture, Acculturation, Enculturation, Cultural diffusion, Globalisation.

Social Issues : Women empowerment, Religious Tolerance.

Business Etiquettes: Policies, Implications.

Civil Society Groups: An emergent social phenomenon.

Recommended readings:

1. S. Deswal, A. Deswal; A Basic Course in Environmental Studies; Dhanpat Rai & Co Publication.
2. N.K. Uberoi; Environmental Studies, Excel Books Publications New Delhi, first edition; 2005.
3. D. K. Asthana and Meera Asthana; A Text Book Of Environmental Studies; S. Chand Publications New Delhi, 1st Edition; 2006.
4. Mrinalini Pandey; Disaster Management; Wiley Publication.
5. T. G. Miller; Environmental Science; Wadsworth Publication.
6. C. N. Shankar Rao; Principles of Sociology with an introduction to social thoughts; S. Chand and Co. Publication.
7. Robert A. Baron; Psychology; Pearson Pvt. Ltd.

NOTE: Section I and Section II to be answered on separate answer book

FE 2.6 ENGINEERING GRAPHICS

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 2.6	Engineering Graphics	2	--	4	4	100	25	25	--	--	**150**

Course Objectives:

1. Understand and appreciate the importance of Engineering Graphics in Engineering.
2. Develop the ability to visualize and communicate three-dimensional shapes.
3. Increase ability to communicate with people with engineering background.
4. Understand the basic principles of Technical/ Engineering Drawing.
5. Know how to create drawings which follow the engineering graphics conventions/standards.

Course Outcomes:

After the successful completion of the course, the students will be able to:

1. Enhance the imagination skills required in converting idea into drawing.
2. Understand projection systems in engineering drawing.
3. Analyze solids and their cut sections along with development of surfaces.
4. Understand Orthographic and Isometric projection of parts.

UNIT-1 (8 hours)

Introduction to engineering graphics, different types of lines used in engineering graphics, curves involving conic sections, cycloid and involute curves.

Projections of points, straight lines- when line is parallel to both the planes, parallel to one and perpendicular to other, line inclined to both the principal planes.

UNIT-2 (8 hours)

Projections of Planes: Circle, square, triangle, rectangle, pentagon, hexagon and combination of these.

Projections of Solids: Cube, tetrahedron, cylinder, cone, pyramid, prism.

UNIT-3 (8 hours)

Sections of Solids.

Developments of lateral surfaces of the objects like cube, tetrahedron, cylinder, cone, pyramid and prism.

UNIT-4 (8 hours)

Orthographic projection (using 1st angle projection only) of machine parts and castings etc.
Isometric projection.

Recommended Readings:

1. N. D. Bhatt; Engineering Drawing; Charotar Publishing House Pvt. Ltd.; 2015.
2. K. R. Gopalkrishna; Engineering Drawing; Subash Publishing House; 2012.
3. K. R. Mohan; Engineering Graphics; Dhanpat Rai Publishing Co.; 2015.
4. P. J. Shah; Engineering Drawing; Vol. 1 & 2 – Praveen Shah Publishers; 2003.
5. P. S. Gill; Engineering Drawing; S. K. Kataria & Sons; 2013.

List of Practicals:

During practicals, drawing sheets on following topics (one each) should be completed and submitted within given deadline. (The Term Work marks to be awarded based on the assessment of sheets completed)

1. Ellipse, parabola and hyperbola
2. Cycloid, involute
3. Projection of points
4. Projection of lines
5. Projection of planes
6. Projection of solids
7. Sections of solids
8. Development of surfaces
9. Orthographic projection
10. Isometric projection

FE 2.7 WORKSHOP PRACTICE - II

Subject Code	Name of the Subject	Scheme of Instruction Hrs/Week			Scheme of Examination						
		L	T	P	Th Duration (Hrs)	Marks					
						Th	S	TW	P	O	Total
FE 2.7	Workshop Practice - II	--	--	4	--	--	--	50	--	--	**50**

Course Objectives:

1. Understand the basic workshop skills from raw material stage to finished product.
2. Develop the skills required for turning, plumbing, pattern making and foundry jobs.
3. Understand the use of tools, machines and effort required to complete the job.

Course Outcomes:

After the successful completion of the course, the students will be able to:

1. Achieve the skills required to complete turning, plumbing, pattern making and foundry jobs.
2. Understand the concepts of machining, joining and forming processes.

(I) Turning/Machining

i) Demonstration of lathes, drilling machines, grinding machines, milling machines and shapers, tools & equipments.

ii) Practical: At least one job on lathe covering operations such as facing, centre drilling, plain turning, step turning, taper turning, chamfering.

(II) Plumbing

i) Demonstration of various tools and equipments used by a Plumber.

ii) Demonstration of various plumbing fittings.

iii) Practical: At least one job on G.I. pipe or P.V.C. pipe fitting by threading.

(III) Pattern Making

i) Study of various pattern materials, pattern allowances and demonstration of pattern making tools.

ii) Practical: At least one simple pattern of wood.

(IV) Foundry

i) Demonstration of various tools, equipments, and furnaces used in Foundry shop.

ii) Practical: Preparation of at least four different types of sand moulds.

Practicals mentioned above are to be conducted in the workshop and the jobs are to be submitted for assessment at the end of the course. The Term Work marks are to be awarded based on the assessment of the jobs completed.

A candidate is considered to have successfully fulfilled the requirement of a semester, provided he/she submits to the workshop jobs completed in all trades during the semester.
