### First Semester

<table>
<thead>
<tr>
<th>CODE</th>
<th>Course</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Credits</th>
<th>Exam Duration (Hrs)</th>
<th>Relative weightage %</th>
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<tr>
<td>PY1101</td>
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<td>2</td>
<td>5</td>
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<td>CWS: 10 MTE: 30 PRE: 20 ETE: 40</td>
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**Total credits** 25

### Second Semester

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<th>CODE</th>
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<td>CWS: 20 MTE: 40 PRE: 40</td>
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VALUES: Meaning of value education, Three Gunas, Nature and kinds of value, Understanding Harmony at various Levels: understanding in the human being as co-existence of Self ('I') and Body, in the Self ('I'), understanding myself, harmony with the Body, family, Society, Nature, in existence; Ethics and Business: Values and attitudes for professional accountants, Legal frameworks, regulations and standards for business, Nature of ethics and its relevance; Rules-based and framework approaches to ethics; Personal development and lifelong learning; Personal qualities; Ethical principles; Concepts of independence, skepticism, accountability and social responsibility; Ethical Conflict: Relationship between ethics, governance, the law and social responsibility, Unethical behaviour, Ethical dilemmas and conflicts of interest; Organisational Governance: The role and key objectives of organisational governance in relation to ethics and the law; development of organisational governance internationally; the role of directors in relation to organisational governance; the role of the board, Types of board structures and organisational governance issues, Policies and procedures for ‘best practice’ companies, Rules and principles based approaches to governance

Books:

References:
1. C.V Baxi, Organisational Governance, Excel Books, 2009
Computer fundamentals: The von Neumann architecture, flowcharts and algorithms, operating system fundamentals (Linux), programs, assembly language, high level programming languages; Number System: binary, decimal, octal, hexadecimal; C Programming: data types, variables, operators, expressions, statements, control structures, functions, recursion, arrays and pointers, records (structures), files, input/output, standard library functions and elementary data structures.

Laboratory experiments will include assignments on branching, looping, functions, recursions, arrays, pointers, structures and a mini project.

TEXT BOOKS:

REFERENCES:
Mechanics of Rigid Bodies: Introduction to basic principles and concepts, Force systems, resultant of concurrent and non-concurrent coplanar force systems; Equilibrium of concurrent and non-concurrent coplanar force systems. Centroid and moment of inertia of simple and composite areas, Kinetics: Application of D ‘Alembert’s work energy and impulse-momentum principles; Mechanics of Deformable Bodies: Mechanical properties of materials, normal stress and strain, Hooke’s law, modulus of elasticity, tension test on ductile and brittle materials, factor of safety, allowable stress, Poisson’s ratio, shear stress and shear strain, modulus of rigidity, relation between modulus of elasticity, modulus of rigidity and bulk modulus; Stresses and deformations in tapering bars, stepped bars, thermal stresses, statically indeterminate problems, stresses on inclined planes, stresses in thin cylindrical pressure vessels.

Text Books:


References:

Chemical Fuels: Classification; Calorific value and its determination; Analysis of solid fuel; Liquid Fuel: Distillation of petroleum, Petroleum cracking, Reforming of petrol, Octane number and Cetane value, Synthetic petrol, Combustion based numerical; Water Technology: Hardness of water; Units of hardness; Ion exchange water softening technique; Boiler feed water: scale & sludge, priming and foaming; Polymers & Composites: Molecular weight determination; Glass transition temperature; Methods of polymerization; Mechanism of polymerization reactions; Compounding of plastics; Vulcanization; Conducting polymers; Synthesis, properties and applications of some polymers; Composition and characteristic properties of composites; Nano Chemistry: Synthesis, properties and applications of selected nanomaterials; Corrosion and its control: Theories and Mechanism of Corrosion; Types of corrosion; Factors affecting corrosion, Protection against corrosion, Paints and Coatings: Antifouling Coating, Fire retardant paints and Case studies.

Text Books:

Reference Books:

List of experiments of Engineering Chemistry Laboratory:
1. To determine the viscosity of a given lubricating oil at various temperatures using Redwood Viscometer No. 1 or No. 2.
2. To determine flash point and fire point of the given lubricating oil using Pensky Marten’s apparatus.
3. To determine cloud and pour point of a given sample of lubricating oil using cloud and pour point apparatus.
4. To determine the moisture, volatile and ash contents in a given sample of coal by proximate analyses.
5. To determine the calorific value of fuel by bomb’s calorimeter.
6. To find out the chemical oxygen demand (COD) of a water sample using K2Cr2O7.
7. To deionize the given water sample using ion exchange process.
8. To determine the total, permanent and temporary hardness of given water sample by complexometric titration using EDTA solution.
9. To prepare urea formaldehyde resin.
10. To prepare phenol formaldehyde resin (Bakelite)
11. Preparation of Magnetic Composites for the Adsorption of Water Contaminants
12. Observe the corrosion of iron and investigate conditions related to corrosion.
13. Estimation of Fe(II) in Mohr's salt solution using standard KMnO4 solution via Redox titration
14. To determine the strength of given HCl solution using a standard NaOH solution by performing a conductometric titration
15. To determine the strength of given HCl solution using a standard NaOH solution by performing a pH-metric titration.
PN Junction: Formation of depletion region, Effect of forward and reverse bias on depletion region, I-V characteristics and equivalent circuits of ideal and practical diode, Diode equation, Application of Diodes: Series and parallel combination of diodes circuits, Half Wave and Full Wave rectifiers, Capacitor filter, clipper, clamper circuits, Zener Diode; I-V Characteristics, Zener Regulators, LEDs, BJT: Construction, schematic diagram and characteristic of CE, CB Configuration, CC configuration w.r.t. CE, Relation between α and β, transistor biasing, Q-point, load line, fixed bias, self-bias, bias stabilization, Transistor as amplifiers, frequency response, Operational Amplifiers: Ideal characteristics of an op amp., inverting and non-inverting, amplifiers, linear circuit applications as voltage follower, integrator, differentiator, summing amplifier, subtractor, Digital Electronics: Number systems, Boolean algebra, DeMorgan’s Theorem, logic gates; Truth tables, SOP, POS form, K-map for minimization of Boolean expressions, Implementation of Boolean expressions with logic gates; Combinational circuits: Half and full adders, Half and full subtractors, S-R flip-flops, Communication Systems: Elements of communication systems, examples of communication systems, Analog and optical communications.

Reference Books:

Text Books:
Effective Pronunciation: Understanding English sounds and their symbols, phonemic transcriptions, characteristics of language; Effective Communication Skills (LSRW - Listening, Speaking, Reading and Writing): Definition, process, types, barriers, non-verbal communication, kinesics & paralanguage, difference between general and technical communication, difference between hearing and listening; Common errors in professional English: Prepositions, articles, non-finite verbs, syntactic errors & words often confused (nouns, verbs, adjectives & adverbs), sentence pattern, question tags, synonyms, antonyms, one word substitutions; Compositional Skills: Reading comprehension, paragraph writing: different orders of paragraph writing, précis writing, formal letter writing, job application & resume writing, email etiquettes, technical writing, writing a movie review in English; Classroom Activity: Group Discussion; Mock Interview; Understanding nuances of delivery for making presentations and impromptu public speaking; Literary texts for Case Studies.

Reference Books:
Basic components of the environment: Internal structure of Earth, Spheres of Atmosphere, Scope of environmental studies; Environmental concerns: urbanization, industrialization, agricultural revolution and their impact on environment; Structure and functions of the ecosystem: Ecology, Ecological succession, Chemical cycles, Energy flow; Environmental pollution and control: Air pollution, Water pollution, Soil pollution, Noise pollution; Biodiversity and its conservation: Genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity, Threats to biodiversity, Conservation of biodiversity; Natural resources: Forest, water, mineral, land and food resources of India; Sustainable energy and development: Conventional Energy Sources, Non-Conventional Energy Sources, Energy audit; Solid waste and hazardous waste management: Sources, characteristics and control measures of urban and industrial wastes, Agricultural revolution, Environment Impact Assessment, Evolution and history.

TEXT BOOK:


REFERENCES:

ES1103  Engineering Thermodynamics  [2 1 0 3]


Text Book:


Reference Books:

MA 1101  Engineering Mathematics I  [3 1 0 4]


Text Books:

References:

MA 1201  Engineering Mathematics II  [3 1 0 4]


Text Books:

References:
**ME1101**

**ENGINEERING GRAPHICS**

**Principle of Orthographic Projections:** Points, straight lines parallel to one ref. plane (HP/VP) and inclined to other ref. plane, Straight lines inclined to both HP and VP, Straight lines inclined to both HP & VP and parallel to PP, Straight lines with traces, Practical problems on straight lines; **Computer Aided Drafting practice; Projections of Plane surfaces:** Perpendicular one ref. plane (HP/VP) and inclined to other ref. plane, Inclined to both HP & VP, Inclined to both HP & VP and perpendicular to PP; **Projections of Solids (right regular) by change of position method:** Axis parallel to one ref. plane (HP/VP) and inclined to other ref. plane, Resting on one of the ref. plane, axis inclined to both HP & VP, Suspended freely, axis inclined to both HP & VP, Axis inclined to both HP & VP parallel to PP; **Projections of solids by Auxiliary plane method:** Axis inclined to both HP and VP; **Sections of solids (right regular):** Using Horizontal and vertical section planes, Using section plane perpendicular to one ref. plane and inclined to the other ref. plane, Given the regular true shapes of various solids and find the inclination of section plane; **Development of surfaces:** Parallel line development, Radial line development, Triangulation development. **Isometric projections:** Plane surfaces and simple solids (prisms & cylinders), Frustum and combination of solids, Simple machine elements.

**Text Book:**


**Reference Books:**

ME1130  Basic Workshop Practice

Introduction to Basic workshop experiments, tools, machines and applications of processes;

**Lathe operations:** Facing, turning, taper turning and knurling on MS cylindrical work piece;

**Foundry shop:** Study of types of moulding process and various tools use for foundry process, preparation of a green sand mould and demonstration of casting; **Welding:** Study of types of welding and applications of welding, perform different types of welding joints on MS plate with arc welding process; **Carpentry:** Cut and prepare T halving joint; **Fitting:** cut and prepare mild steel square part and make all the edges at 90 degree, cut a 10x10 mm notch on the mild steel piece and make all the edges of notch at 90 degree; **Soldering:** prepare funnel using soldering operation; **Plumbing:** cut a PVC pipe and prepare thread on it.

**Text Book:**

**Reference Books:**

Lab course: Newton's rings, Diffraction grating, dispersive power, ultrasonic interferometer, Series and parallel resonance, Zener diode, Transistor characteristics, Band gap energy, Rectifier and filter circuits, Hall effect, He-Ne laser, Planck's Constant,

TEXT BOOK
3. C. L. Arora; Practical Physics; S. Chand & Co. Pvt. Ltd., 2013

REFERENCE BOOK
2. S. L. Gupta & V. Kumar; Practical physics; Pragati Prakashan, 2013.