

**FACULTY OF
ENGINEERING & TECHNOLOGY**

**SAURASHTRA UNIVERSITY,
RAJKOT.**

**SYLLABUS
OF
B.E. FIRST YEAR**

COMPUTER ENGINEERING

ELECTRO. & COMM. ENGINEERING

INFORMATION TECHNOLOGY

BIO-MEDICAL ENGINEERING

**C.U. SHAH COLLEGE OF
ENGINEERING & TECHNOLOGY
WADHWAN CITY**

SAURASHTRA UNIVERSITY, RAJKOT
B.E. FIRST YEAR [CE/EC/IT/EEE]

Code No	Subject	Teaching Scheme		Examination Scheme			
		Lect.	Pra.	Theory	Paper Hrs.	T.W. & Viva/Pra	Total
101	Communication skills	2	-	50	2	25	75
102	Mathematics	3	-	100	3	-	100
103	Engineering Graphics	2	2	100	3	50	150
104	Material Science	2	-	100	3	-	100
105	Principles of Electrical Engineering	2	2	100	3	25	125
106	Fundamentals of Electronics	2	2	100	3	25	125
107	Computer Programming - I	2	2	100	3	25	125
108	Principles of Structural and Mech. Engg.	2	2	100	3	50	150
109	Electronics Practice	1	2	-	-	50	50
	TOTAL	18	12	750	-	250	1000

SAURASHTRA UNIVERSITY, RAJKOT.
FIRST YEAR (CE/EC/IT/EEE)
103 - ENGINEERING GRAPHICS

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	2	100	3	50	-	150

PART - I PLANE GEOMETRY AND MACHINE PARTS :

• **Introduction to engineering graphics :**

Principles of projection lines and dimensioning, B.I.S. code of practice (Sp 46) Scale, Representative fraction. Plane scale, diagonal scale, Vernier scale and scale of chords.

• **Engineering curves :**

Classification of engineering curves, Construction of conics, cycloidal curves., involute and spiral.

• **Loci of points :**

Simple mechanism like slider crank mechanism, four bar chain mechanism etc.

• **Fastening and connecting methods :**

Screw threads, bolts, nuts, studs, locking devices, simple riveted and welded joints, pipe fitting couplings, cotterjoints, pin joints, Electrical, Electronics, Chemical and pipe drawing, Basic notation and symbols for simple flow diagram.

PART - II SOLID GEOMETRY :-

• **Introduction to projection of point, line and plane :**

Projection of line inclined to both planes and simple cases, True length of straight line and its inclination with reference planes (traces are not included) Projections of perpendicular and oblique planes.

• **Introduction to projections of solids, section of solids and interpenetration of solids:**

Classification of solids, Projections of solids. Projections of right and regular solids with their axis inclined to both planes. Projection of sphere, Section of pyramid, cone, prism and cylinder. Method of determining line of intersection and curve of intersection.

• **Intersection of prism-prism. Cone-cylinder, cylinder-cone, cylinder-prism, Development of surfaces :**

Parallel line development, Radial line development of sphere by zone method and line method.

PART - III ORTHOGRAPHIC PROJECTIONS :-

• **Orthographic projection :**

Conversion of pictorial views into orthographic views. Type of sections, (full, half, offset, broken, removed, revolved) Sectional views, orthographic reading. Missing views and missing line problems.

FIRST YEAR (CE/EC/IT/EEE)

104 - MATERIAL SCIENCE

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	-	100	3	-	-	100

- **Introduction to material science :**
Importance. Engineering requirements of materials, important properties of engineering material, types.
- **Crystal geometry :**
Atoms and atomic coordination, atomic structure, bonds in solids, crystal structure, space lattice, unit cell, crystal systems, atomic packing, co-ordination numbers, Crystal structures for metallic elements, crystal directions and planes, miller indices, interplaner spacing. Bragg's law, X-ray diffraction, ordered and disordered structures, stacking sequences and faults.
- **Crystal imperfections :**
Type, Frank-Reed source, Dislocations. Geometry and effect of dislocations.
- **Conducting materials :**
Resistivity and conductivity. Good conductors, semiconductors, dielectrics. Ferro electricity piezo electricity, Superconductivity.
- **Magnetic materials :**
Magnetic properties, classification of magnetic materials, magnetostriction, ferromagnetism, soft and hard magnetic materials.
- **Ceramic materials :**
Ceramic phases, ceramic crystals, Mechanical behaviour of ceramics. Various materials.
- **Metals :**
Ferrous metals, types, ferrous metal alloys, composition, properties and uses of metals and alloys.
- **Glasses :**
Pyroceramics, Toughened glass. Strengthening glass.
- **Organic materials :**
Polymerisations; Polymer structures; plastics; Synthetic resins; Elastomers and rubbers; Protective coatings.
- **Composites :**
Material combinations; reinforced materials; High stiffness composites.
- **Performance of material in service :**
Service requirements; Fracture and fatigue high temperature failures; erosion. IS specifications of materials be referred to wherever relevant.
- **Corrosion :**
Types, Factors, Mechanism and control.
- **Miscellaneous Engineering materials :**
Introduction to HDPE, LDPE, thermocol, foam, resins, teflon, PUF, glass wool, fibre glass, acrylic, silicon chips, superconducting materials, optical fibers, freon, magnetic tapes, solar cells, neoprene, polyester fibers, high tensile steel etc, general and specific applications.

SAURASHTRA UNIVERSITY, RAJKOT.
FIRST YEAR (EC/CE/IT)
105 - PRINCIPLES OF ELECTRICAL ENGINEERING

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	2	100	3	-	25	125

- **Introduction :**

Electric charge, current, voltage, MKS Unit, S.I. Unit, Resistance, conductor, Semiconductor, Semiconductors, Insulators, Temperature co-efficient of resistance, Effect of temperature on resistance.

- **Work, Energy and Power :**

- **Kirchoff's Laws & Network Theorems**

Network terminology, Kirchoff's laws, sign convention, KCL, KVL, series-parallel connection of resistances, star-delta transformation, source transformation, superposition theorem, Thevenin's theorem, Norton's theorem, maximum Power transfer theorem.

- **Electromagnetism :**

Magnetic field, flux distribution, force on a conductor in a magnetic field, relative direction of current, flux & force, magnetic flux, electromagnetic induction, Faraday's laws, Fleming's rules.

- **Magnetic Circuits :**

MMF, magnetic field intensity, permeability, reluctance, force between parallel conductors, B-H curve, laws governing magnetic circuits, comparison of magnetic circuits and electric circuits, fringing, magnetic hysteresis, core losses, hysteresis loss, eddy current, stacking factor loss, stacking factor.

- **Self and Mutual Inductance :**

Self inductance, inductance of a coil effect of self inductance, mutual inductance, coupling coefficient.

- **Electric Fields and Capacitance :**

Coulomb's law of electrostatics, electric flux, flux density, electric potential, relation between field intensity and voltage gradient, capacitance, relation between voltage, capacitance and charge, relative permittivity, energy stored in a charged capacitor, capacitance of parallel plate capacitor, dielectric strength, capacitors in series, voltage distribution between series connected capacitors, capacitors in parallel.

- **D.C. Transients:**

Introduction, growth of current in an inductive circuit, time constant of R-L circuit, energy relation in R-L circuit, rise and decay of a capacitor voltage, time constant of R-C circuit, discharge of a capacitor.

- **A.C. Fundamentals :**

Introduction, Generation of alternating voltage, different forms of sinusoidal equation R.M.S. & average values of sinusoidal & other simple wave forms, true rms value of a quantity, Peak factor & form factor, vector representation of A.C. quantities.

SAURASHTRA UNIVERSITY, RAJKOT.
FIRST YEAR (EC/CE/IT)
106 - FUNDAMENTALS OF ELECTRONICS

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	2	100	3	-	25	125

- **Diodes and their applications :**

Conductors, semiconductors, dielectrics, PN Junction diode, P type and N type semiconductors, Formation of PN junction, Varactor diodes, Zener diodes, Rectifier diodes, Schottky barrier diodes (metal-semiconductor junction), Light Emmissive Diodes (LEDs), PIN diodes, Tunnel diodes, Rectifier diodes, LCDs, Laser diodes, solar cells.

- **Rectifiers :**

PN Junction as rectifier, HW rectifier, FW rectifier, using Bridge & CT transformer, filter, ripples, load regulation, simple zener regulator.

- **Active devices and circuits :**

Bipolar transistor, its working and characteristics, PNP and NPN transistors, Junction Field Effect Transistor, Unijunction transistor, 'P' channel and 'N' channel MOSFETs, Phototransistor and optocouplers, various types, packages used in devices, plastic and ceramic packages, equivalent circuits of transistors and FETs, definition of 'h' parameter, model at low frequencies.

- **Transistor Biasing Methods :**

Different methods of biasing the transistors into active region, their merits and demerits.

- **Measurement of basic Electrical Quantities :**

Use of Multimeter and C.R.O. for measuring current, voltage and frequency.

- **Passive Electronic Components :**

Resistors, various types, carbon, film and wire wound resistors, L.D.R., thermistors, sensistors. Capacitors : Various types, paper, ceramic, tantalum and electrolytic capacitors, inductors, their properties.

- **Printed circuit boards and integrated circuits :**

Use of printed circuit board and bread board, integrated circuits and their substrates, Integrated circuits using semiconductor substrates. Integrated circuits technology.

- **Transformers and their applications in Electronics :**

Transformers used in electronics circuits, audio and RF transformers, pulse transformers ferrite cores and their applications in transformers.

- **Specification writing :**

Writing specifications for the various electronics passive components to be used in electronic circuits. E.g. Resistor value by colour code, wattage, diode, forward, voltage and forward voltage and forward current, diode reverse voltage and reverse current, P.I.V. of diode, Working voltage of capacitor,

capacity of a capacitor, centre tapped transformer, step-up/step-down transformers and similar other components/devices related terms.

REFERENCE BOOKS :

- Millman and Halkias
 - Malvino
 - Mottorshed
- Integrated Electronics
Electronics Principles
Electronics Device & circuits

SAURASHTRA UNIVERSITY, RAJKOT.
FIRST YEAR (EC/CE/IT)
107 - COMPUTER PROGRAMMING - 1

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	2	100	3	-	25	125

- **Introduction of computers :**

Definition of computer, hardware, software and firmware, advantage of computers, limitation of computers, classification of computer systems.

- **Computer Basics :**

Data representation and binary arithmetic, data represent number systems (Decimal, Binary, Octal, Hexadecimal), binary operations, complement of number, binary multiplication and division, digital coding and octal coding.

- **Hardware organization of computer :**

Overview of computer systems, looking inside of the computers, organizations of microprocessor based computer systems, factors affecting the speed of processors, memory classification, different types of CPU in personal computers, types of input devices and output devices, how to connect input and output devices to the computer, switch mode power supply.

- **Computer Software :**

What is software, system software, different operating systems, system supported programs, application software, multiprogramming and multiprocessor.

- **Introduction of internet and applications :**

- **Introduction to programming :**

Problem solving techniques, study of algorithm and flowcharts, pseudo code, programming languages and classifications.

- **C Language preliminaries :**

Overview of C, data types, variables operators and expressions, input output operators.

- **Control statements in C :**

Decision making, branching and looping.

- **Arrays :**

Introduction, one dimensional array, two dimensional array, initialization of array.

- **String processing :**

REFERENCE BOOKS :

Sr No	Title	Author	Publisher
1.	Fundamental of computer	V. Rajaraman	PHI
2.	Computer fundamental	Peasl Software	Khanna
3.	Introduction to computer	K.H.Wandra	Akshat publ.
4.	Programming in C	Balaguruswami	TMH

SAURASHTRA UNIVERSITY, RAJKOT.
FIRST YEAR (EC/CE/IT)
108 - PRINCIPLES OF STRUCTURAL &
MECHANICAL ENGINEERING

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
2	2	100	3	50	-	150

PART - I

• **Introduction :**

Mechanics, basic concept, scalars, vectors.

• **Force System :**

Loading deformation, elastic limit, shear stress and strain, Hook's law, Poission's ratio, moments couples, resultant, equilibriumdeterminacy.

• **Simple structures :**

Introduction, plane truss, method of joints, section, graphical, type to beam, beam-supports, reactions, loading. Friction introduction, type, application & mechanism.

• **Moment of inertia :**

Introduction, reactangular & polar moment of inertia, radius of gyration.

• **Lifting machines :**

Load, effort, mechanical advantage, velocity ratio, efficiency, friction loss, load of machine, maximum efficiency, wheel and differential axle, pulley, screw jack.

• **Dynamics of particle :**

Introduction, impulse, momentum, conservation of energy, laws of motion, D'Alembert's principle.

REFERENCE BOOKS :

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|-----------------------|---------------------------------|
| • H.J.Shah & Junarkar | Engineering Mechanics |
| • Beer & Johnson | Engineering Mechanics (Statics) |
| • P.J.Shah | Engineering Mechanics (Statics) |
| • R.S.Khurmi | Engineering Mechanics |

PART - II

• **Basic concept :**

Units of mechanical Quantities used used in Engineering.

• **Laws of Thermodynamics :**

First law of thermodynamics, second law of thermodynamics.

Energy forms : different forms of energy & general energy equation.

- **Internal Combustion engines :**

Two-stroke & four-stroke engines, performance of I.C. engines.

- **Refrigeration & Air-conditioning* :**

Basic principle, vapour compression refrigeration system & performance. Method of Air conditioning.

- **Power plant* :**

Thermal, gas & hydro power plant.

- **Lathe Machines* :**

Introduction, types of machine and operations.

- **Link Mechanism Gears* :**

Introduction types of links, types of gears and functions.

- **Mechanical Measurements* :**

Liquid & Gas Measure,ment, General & Instruments descriptive treatment and introduction is to be prescribed.

REFERENCE BOOKS :-

- | | |
|---------------------------------|---------------------------------|
| • P.L.Ballaney | Thermal Engineering |
| • N.C.Pandya & C.S.Shah | Heat Engines |
| • R.C.Patel & C.J.Karamchandani | Elements of Heat Engines Vol. 1 |
| • P.L.Ballaney | Theory of Machines |
| • D.S.Kumar | Mechanical Measurements |
| • Hajara Chaudhary | Workshop Technology Vol. 1 |

LIST OF EXERCISES TO BE PERFORMED BY THE STUDENTS

1. Identification of components.
2. Symbols used in Electrical / Electronics.
3. Use of multimeter.
4. Tube light connection.
5. Connections of house hold electrical appliances Such as Fan, Gyser etc.
6. Staircase Wiring.
7. Godown Wiring.
8. Study of different types of cables and connections.
9. Study of incandascent lamp, Neon lamp, Mercury lamp, CFL lamp.
10. Different types of lighting assessories.
11. Earthing practice.
12. Measurement using C.R.O.
13. One job on Tinsmithy.
14. One simple job on fitting.
15. One job of drilling and threding.