SAURASHTRA UNIVERSITY, RAJKOT

B.E. FIRST YEAR

[CE/EC/IT/BM/EEE]

101-COMMUNICATION SKILLS

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	-	50	2	-	25	75

- **Introduction :**
  Importance of language and communication skills in the engineering professions.
- **Spoken and conversational English :**
  Main features, Agreements, Disagreements, Likes, Dislikes and enquiries, debate and discussion.
- **Basic Sentence pattern in English :**
  Agreements between subject and verbs, proper use of pronouns, adjectives and adverbs, proper use of phrases and clauses, some basic rule of compositions.
- **Concept of Register :**
  Development of vocabulary, reference skills dictionary thesaurus (treasure), indexing contents, glossary, reading of selected texts and discussion, vocabulary building tasks.
- **Note taking note making :**
  Linkage, development of paragraphs cohesion coherence and style.

P.S. : Communication skills course should be a practice oriented-one, and it should include Oral & Written assignments based on general topics.

REFERENCE BOOKS :-

- **Grant Taylor** English Conversation Practice
- **G.H. Valiance** Good English.

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102-MATHEMATICS

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
3	-	100	3	-	-	100

- **Infinite Series :**

  Convergence of infinite series, comparison test, ratio test, root test for convergence and convergence of alternating series using above tests.

- **Matrices :-**

  Fundamental concepts operations associated matrices, Elementary transformation, Rank of a matrix, Normal form of a matrix, Linear equations, Consistency of a system of Linear equations and its solution, Charactersistic equations and its solution, Eigen Values and Eigen Veotars, Cayley-Hamilton Theorem.

- **Complex Numbers :**

  Real and imaginary parts, De Moivres theorems and its uses, Hyperbolic and inverse hyperbolic functions, real and imaginary parts of log of a complex number.

- **Successive Differentiations :**

  Leibnitz's rule and formation of differential equation and their nth derivative.

- **Expansions and Indeterminate Forms :**

  Expansions of function using Taylor's & Maclaurin's theorems and problems of approximation, Limits of indeterminate forms including uses of expansion.

- **Applications of Differentiation :**

Tangents and normals in parametric, cartensian and polar co-ordinates including padal equation in polar form, Subtangents and subnormals of standard curves, radius of curvature in Cartesian, polar and parametric co-ordinates, Radius of curvature at origin using Newton's and expansion method.

- **Reduction Formulae :**

  Reduction formulae for $\int \sin^n x\, dx$, $\int \cos^n x\, dx$, $\int \sin^n x$, $\int \cos^n x\, dx$, $\int \tan^n x\, dx$ and definite integrals based on above results, problems related to above results.

- **Applications of Integration :**

  Are volume of revolution, lnght of are, surface area of revolution and C.R. of area in cartesian, polar and parametric co-ordinates.

- **Laplace Transforms :**

  Definiton, Transforms of elementary functions, Properties of Laplace transforms. Inverse transforms. Transforms of drivatives and integrals, Multiplication by T^n. Division by t, Convolution theorem, Applications of differential equations. Unit step and impulse function, Periodic functions.

REFERENCE BOOKS :-

- B.S. Grewal Elementrary Engg. Mathematics
- G.V.Kumbhojksr Engg. Mathematics F.E> Sem. I, II & III
- C.Dasschaval Engg. Mathematics

SAURASHTRA UNIVERSITY, RAJKOT

B.E. FIRST YEAR

[CE/EC/IT/BM/EEE]

103-ENGINEERING GRAPHICS

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	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 fractino. 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 :**

  Imple 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- 2 : SOLID GEOMETRY

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

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

- **Introduction to projection of solids, section of solids and interenetration of solids:**

  Classification of solids, Projections of solids. Projection of right and regular solids with their axis inclined to both planes. Projection of sphere, Section of 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 :

  Paralal line development. Radial line development of sphere in same method and line method.

PART- 3 : 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.

- **Isometric views :**

  Conversion of pictorial views into orthographic views into Isomatric views.

- **Introduction to computer aided drafting :**

  Advantages of CAD, elements of CAD. Components of computer. Input and output devices, types of software. Basic functions, Drafting software.

PART- 4

Electric wiring diagrams for residential, public and industrial buildings, domestic appliances, standard electrical symbols, main and distributory boards. Simple earthing etc.

TERM WORK

PART I, II & III

Each candidate shall submit a set of the following sheets certified by the concerned staff member/s principal of the college that they have been executed in a satisfactory manner in the drawing halls of the college.

1. One sheet of Engineering curves.
2. One sheet of loci of points.
3. One sheet of projection points. Line and plane surfaces.
4. One sheet of orthographic view with section (two problems one in Ist angle and other 3rd angle system of projections)
5. One sheet of reading of orthographic view and missing lines/missing views.
6. One sheet on rojections of solids and sections of solids.
7. One sheet on development of surfaces and interpentration of surfaces.
8. One sheet on isometric projections/views.
9. Sketch book containing sketches of machine parts electrical, electronics, chemical and pipe drawing, lines dimensioning, scale.

REFERENCE BOOKS :-

- P. J. Shah — Engg. Drawing Vol. I & II
- N.D. Bhatt — Engg. Drawing
- N.D. Bhatt — Machine Drawing

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B.E. FIRST YEAR

[CE/EC/IT/BM/EEE]

104-MATERIAL SCIENCE

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work Cum Viva**	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	-	100	3	-	-	100

- **Introduction to material science :**

  Importance. Engineering requirements of materials, important properties of engineering material 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 differation, ordered and disordered structures, stacking sequences and faults.

- **Crystal imperfections :**

  Type, Frank - Reed source, Dislocations. Geometry and effect of dislocatinos.

- **Conducting materials :**

  Resistivity and conductivity. Good conductors, semiconductors, dielectric. Ferro electricity piezo electricity. Superconductivity.

- **Magnetic materials :**

  Magnetic properties, classification of magnetic materials, magnetostriction, ferromagnetism, soft adn hard magnetic materials.

- **Ceramic materials :**

  Ceramic phases, ceramic crystals, Machanical behaviour of ceramic. Various materials.

- **Metals :**

  Ferrous metals. types, ferrous metals alloys, composition, properties and uses of metals and alloys.
- **Glasses :**

  Pyroceramics, Toughened glass. Strengthening glass.
- **Organic materials :**

  Polymerisations ; Polymer structures; plastics ; Synthetic resings; Elastomers and rubbers; Protecive coatings.
- **Composites :**

  Material combinations; reinforced materials; High stifness 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.

REFERENCE BOOKS :

- Van Vlack — Element of material science
- Wolff — The structure and properties of material Vol. 1,2,3,4
- Zha & Zha — Material science and processes
- R. B. Gupta — Material science and processes
- Narula and Gupta — Material science and processes
- Patel & Upadhyay — Material science and processes

SAURASHTRA UNIVERSITY, RAJKOT
B.E. FIRST YEAR
[CE/EC/IT/BM/EEE]
105-PRINCIPLES OF ELECTRICAL ENGINEERING

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	-	100	3	-	-	100

- **Introduction :**
  Electric charge, current, voltage, MKS unit, S.I. Unit, Resistance, conductors, 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 conventions, KCL, KVL, series - parallel connections of resistances star - delta Transformation, source Transformation, superposition theorem, Thevenin's Norton's Theorem, Maximum Power Transfer Theorem.
- **Electromagnetism :**
  Magneticfield, flux distributions, force on a conductor in a magnetic field, relative, directions of current, flux & force, magnetic fux, electromagnetic induction, Faraday's laws, Fleming's rules.
- **Self and Mutual Inductances :**
  MMF, magnetic field intensity, permeability, reluctance, force between parallel conductors, B-H curve, laws governing magnetic circuits, comparision of magnetic circuits and electric circuits, fringing, magnetic hysterisis, core loses, hysterisis loss, eddy current, loss stacking factor loss, stacking factor.
- **Electric Fields and Capacitance :**
  Coloumb'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 a 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 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 of a quantity, Peak factor & form factor, vector representation of A.C. quantities.

- **A. C. Circuits :**

  Single phase series & parallel circuits using R,L & C, under steady state condition, P.F. & power equation, resonance in series & parallel circuits, Q factor.

- **Polyphase Circuits :**

  3-phase star-delta connected circuit, balance & unbalanced load, measurement of power by one wattmeter method, two wattmeter method for a balanced load, effect of P.F. on wattmeter reading.

- **Electrical Measurement :**

  Indicating instruments, PMMC, MI and Electrodynamic instruments, extention of range of A.C. instruments. Instrument transformers. Energymeter, Megger.

REFERENCE BOOKS :

- B. L. Theraja Electrical Techonology Vol - 1
- J. B. Gupta Basic Electrical Engg.
- S. K. Sahdev Fundamentals of Electrical & Electronics Engg.
- V. N. Mittal Basic Electrical Engg.

SAURASHTRA UNIVERSITY, RAJKOT
B.E. FIRST YEAR
[CE/EC/IT/BM/EEE]
106-FUNDAMENTALS OF ELECTRONICS

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work Cum Viva**	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	-	100	3	-	25	100

- **Diodes and their applications :**
  Conductors, semiconductors, dielectrics, PN Junction diode, P type and N type semiconductors, Formation of PN junctions, Varactor diodes, Zener diodes, Rectifier diodes, Schoottky 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, and 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 optocoupiers, various types, packages used in devices, plastic and ceramic packages, equivalent circuits of transistors and FETs, definition of 'h' parameter, model at low frequency.
- **Transistor Biasing Methods :**
  Difference methods of biasing the transistors into active region, their merits and demerits.
- **Passive Electronic Components :**
  Resistors, various types, carbon, film adn 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 oand their applications in Eletronics :**
  Transformers used in electronics circuits, audio and RF transformers, pulse transformers, ferrite cores ad their applications in transformers.
- **Specification writing :**
  Writing specifications for the various electronic passive components to be used in electronic circuits. e.g. Resistor value of by colour code, wattage, diode, forward voltaeg and forward current, diode reverse voltage and reverse current, PIV 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 — Integrated Electronics
- Malvino — Electronics Principles
- Mottorshed — Electronics Device & Circuits

SAURASHTRA UNIVERSITY, RAJKOT
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[CE/EC/IT/BM/EEE]
107-COMPUTER PROGRAMMING - 1 Revised

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work Cum Viva**	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	2	100	3	-	25	125

- **INTRODUCTION : (50 MARKS)**

  Definition of Computer, Hardware, Software & Firmware, Advantage of Computers, Limitation of Computers, Classification of Computer Systems.
- **COMPUTER BASIC :**

  Data Representation and Binary Arithmetic, Data Represent number systems (Decimal, Octal, Hexadecimal), Binary Operations, Compelment of Number, Binary Multication and division, Digital Coding and Octal coding.
- **HARDWARE ORGANIZATION OF COMPUTERS :**

  Overview of Computer systems, Looking inside of the computers, organizations of microprocessor based systems, factors affecting the speed of processors, memory classification, different types of CPU in personal compute, types on input devices and ouput devices, How to connect input and output devices to the computer, switch mode poer supply.
- **COMPUTER SOFTWARE :**

  What is software, system software, different operating systems, system supported programs, application software, multi programming and multi processor.
- **INTRODUCTION OF INTERNET & APPLICATIONS :**
- **INTRODUCTION TO PROGRAMMING : (50 Marks)**

  Problems solving techniqus, Study of Algorithm and Flow Charts, Pseudo code, Programming Languages and classifications.
- **C LANGUAGE PRELIMINARIES :**

  Overview of C, Data Types, Variables Operators and expressions, Input out put operators.
- **CONTROL STATEMENTS IN C :**

  Decision - making, Branching & Looping.
- **ARRAYS :**

  Introduction, One-dimensional array, Two-dimensional array, Initialization of arrays.
- **STRING PROCESSING**

Reference Books :

Sr. No.	Title	Author	Publisher
1.	Fundamentals of Computer 3rd	V.Rajaraman	PHI
2.	Computer Fundamentals	Peasl Software	Khanna
3.	Introduction to Computers	KHWandra	Akshat Pbl.
4.	Programming in C	Balaguru Swami	THM

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108-PRINCIPLES OF STRUCTURAL & MECHANICAL ENGINEERING

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
2	2	100	3	50	-	150

PART - 1

- **Introduction :**
  Mechanics, basic concept, scalars, vectors.
- **Force System :**
  Loading deformation, elastic limit, shear stress and strain, Hook's law, Poission's ratio. moments couples, resulatant 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 intertia :**
  Load, effort, mechanical advantage, velocity ratio, efficientcy, 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 :

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

SAURASHTRA UNIVERSITY, RAJKOT
B.E. FIRST YEAR
[CE/EC/IT/BM/EEE]
109-ELECTRONICS PRACTICE

Teaching Scheme		Examination Scheme				
Theory	**Practical**	**Theory**	**Paper**	**Practical/Oral**	**Term work** Cum Viva	**Total**
Hours	Hours	Marks	Hours	Marks	Marks	Marks
1	2	-	-	50	-	50

- **Identification of components :**
  Like Resistance, Capacitor, diode, transistor, (BJT & FET) & other semiconductors (e.g. SCR, LEED, LCD, etc.) & Ics (Analog & Digital)
- **Intruments Familiarisation :**
  To familiarise With Ammeter, Voltmeter, Wattmeter, Powerfactormeter, Frequency, meter, Multimeter, Energy meter etc. Digital Intruments.
- **Soldering Practice :**
  To earry out side light connection, to study heating devices like Gyser, Immersion, heater, Electric iron and the like ones.
- **Lighting accessories :**
  To study incandascent lamp, tubelight, CFL, switches of different types and other related items.
- **Earthing :**
  Types of earthing, to study pipe earthing, plate earthingm RF earthing.
- **C. R. O. operation and use for measurement and wave observation :**
  To see and measure different quantities like voltage, current, phase difference, frequency etc. and component testing.

<u>Jointing :-</u>

Study and demonstration of equipments of gas & electric are welding. Brazing. Tin smithy. fitting / Assembly practice, Drilling practice, Moulding & Casting process (Demonstration only)

REFERENCE BOOKS :-

- S. L. Uppal — Electrical Estimating. Costing & Wiring
- Hajara Chaudhary — Workshop Technology