SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY
STRUCTURE OF F.E(ALL BRANCHES) W.E.F 2012-13

Semester-I

Sr.No	Subject	Teaching Scheme			Examination Scheme			
		Lectures	Tutorials	Practical	Paper		Term work marks	Total
					Theory marks	Online marks		
1	Engineering Mathematics-I	3	1		100		25	125
2	Engineering Physics(Group A)/ Engineering Chemistry (Group B) $	4			100			100
3	Basic Mechanical Engineering	3			100			100
4	Basic Electrical Engineering	3			100			100
5	Applied Mechanics	4			100			100
6	Communication Skill - I	1	2*				50	50
7	Lab I/Lab II : Engineering Physics(Group A)/ Engineering Chemistry (Group B) $			2			25	25
8	Lab III : Basic Mechanical Engineering			2			25	25
9	Lab IV : Basic Electrical Enginering			2			25	25
10	Lab V : Applied Mechanics			2			25	25
11	Lab VI: Workshop Practice			2			25	25
		18	2	10	500		200	700
		Total Hours:30			Total Marks:700			

Semester-II

Sr.No	Subject	Teaching Scheme			Examination Scheme			
		Lectures	Tutorials	Practical	Paper		Term work marks	Total
					Theory marks	Online marks		
1	Engineering Mathematics-II	3	1		100		25	125
2	Engineering Chemistry (Group A)/ Engineering Physics(Group B) $	4			100			100
3	Basic Civil Engineering	3			100			100
4	Engineering Graphics	4			100			100
5	Basic Electronics and Computer Programming	4			50@	50#		100
6	Communication Skill - II	1	2*				25	25
7	Lab II/Lab I Engineering Chemistry (Group A) / Engineering Physics(Group B) $			2			25	25
8	Lab VII : Basic Civil Enginering			2			25	25
9	Lab VIII : Engineering Graphics			4			50	50
10	Lab IX : Basic Electronics			2*			25	25
11	Lab X : Computer Programming			2			25	25
		19	2	11	450	50	200	700
		Total Hours:32			Total Marks:700			

Note: * Indicates Practicals are at alternate week.

$ At F.E. about half students shall be enrolled under Group A , who will undergo Engineering Physics in Semester – I & Engineering Chemistry in Semester – II , whereas remaining students shall be enrolled under Group B, who will undergo Engineering Chemistry in Semester – I & Engineering Physics in   Semester – II . Institute is authorised to divide the students in Group A & Group B.

@ indicates Theory paper will be on contents of Basic Electronics for two hours duration.

# indicates Online examination will be conducted on contents of Computer Programming.

Solapur University, Solapur
F.E. (All Branches) Semester-I
1. Engineering Mathematics -I

Teaching Scheme	**Examination Scheme**
Theory: - 3 Hrs/Week	**Theory -** 100Marks
Tutorial : - 1 Hr/Week	**Term-Work -** 25Marks

Course Objectives

1) To develop Logical understanding of the subject.

2) To develop mathematical skills so that students are able to apply mathematical methods and principles in solving problems from different engineering fields.

3) To inculcate computational skills.

Course Outcome

1. Solve polynomial equations of degree more than one.

2. Determine higher order derivatives of different types of function.

3. Determining the maximum and minimum values of particular functions which occur in engineering and science.

4. Solve the system of linear equations by matrix. Such equation occurs in many engineering problems.

SECTION I

Unit 1 Successive differentiation: (5 Hrs)

n^{th} derivatives of standard functions,

$$e^{ax},\ \frac{1}{ax+b}, (ax+b)^m, (ax+b)^{-m},\ \log(ax+b),\ \sin(ax+b),$$

$$\cos(ax+b), e^{ax}\sin(bx+c), e^{ax}\cos(bx+c),\ a^{mx}\ .$$

Leibnitz's Theorem (without proof), and problems.

Unit 2 Expansion of functions: (5 Hrs.)

Maclaurin's series (without proof). Expansion of standard functions, expansion of functions in power series by using (i) Maclaurin's series, (ii) standard series method, (iii) differentiation and integration method,(iv) method of substitution.

Taylor's series (without proof), expansion of function $f(x+h)$ in powers of x and h and $f(x)$ in powers of (x-a).

Indeterminate forms: $\frac{0}{0}, \frac{\infty}{\infty}, 0 \times \infty, \infty - \infty, 1^{\infty}, 0^{0}, \infty^{0}$ by L' Hospital's rule.

Unit 3 Complex Numbers: **(5 Hrs.)**

Representation of complex numbers in Cartesian and polar co-ordinate system. Argand Diagrams, De Moivre's Theorem (without proof), expansion of $\sin n\theta$, $\cos n\theta$ in powers of $\sin \theta$, $\cos \theta$, expansion of $\cos^n \theta$, $\sin^n \theta$ in terms of sines or cosines of multiples of θ and Roots of complex numbers

Unit 4 Hyperbolic Functions: **(5 Hrs.)**

Exponential form relationship between circular function & hyperbolic functions, Inverse hyperbolic functions. Separation of real and imaginary parts of functions of complex variable, logarithm of complex numbers.

SECTION II

Unit 5 Matrices-I: **(5 Hrs.)**

Rank of a matrix, Echelon and normal form of matrix. Consistency of the system of linear equation (homogeneous and Non-homogeneous equations).

Unit 6 Matrices-II: **(5 Hrs)**

Characteristic equation of matrix, Eigen value and Eigen vectors.
Cayley- Hamilton theorem (without proof). Linear dependence and independence of vectors.

Unit 7 Partial differentiation: **(5 Hrs.)**

Partial derivatives of first and higher order derivatives, total differential coefficient and total derivatives, differion of composite and implict functions. Change of independent variables, Euler's Theorem on homogeneous functions, deductions from Euler's theorem.

Unit 8 Applications of partial differentiation: **(5 Hrs.)**

Jacobians, Errors and approximations, Maxima & minima of functions of two variables, Lagrange's Method of undetermined multipliers.

GENERAL INSTRUCTION:

For the Term work of 25 marks batch wise tutorials are to be conducted. The number of students per batch should be as per university pattern for practical batches. The students should write six to eight assignments.

Text Books:

1. A Text Book of Applied Mathematics by P.N. and J.N. Wartikar,
   Vol.1, Pune Vidyarthi Griha Prakashan.

Reference Books :

1. Higher Engineering Mathematics by B.S. Grewal
   Khanna Publications, Delhi.

2. Advanced Engg. Mathematics by Jaggi Mathur
   Dhanpatrai and sons, Bhopal.

3. Avanced Engg. Mathematics by H.K.Dass
   S.Chand Publications, Delhi.

4. Clculas by Thomas & Finney
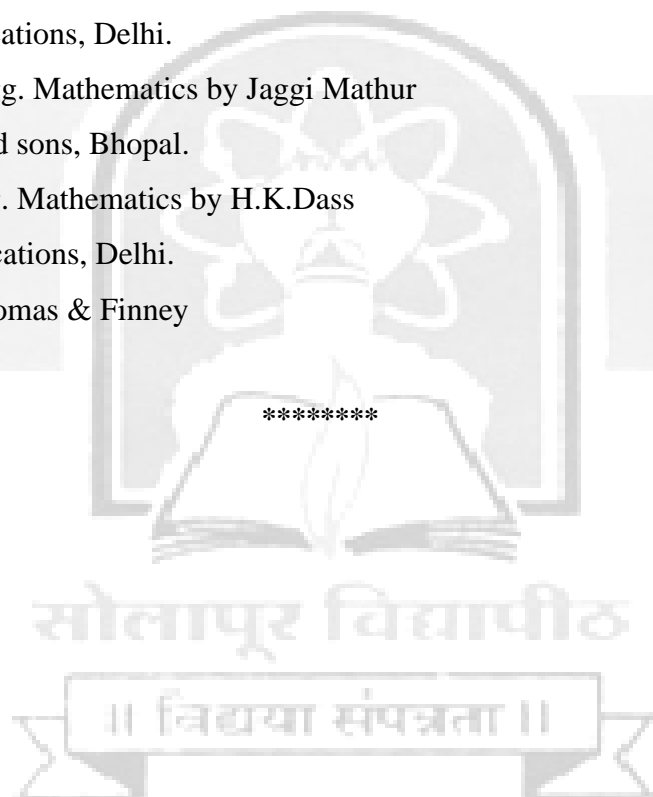
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Teaching Scheme	Examination Scheme
Theory: - 4 Hrs/Week	**Theory -** 100Marks
Practical : 2 Hr/Week	**Term-Work -** 25Marks

Course Objectives

1. To apply both scientific and engineering concepts of Physics to a wide variety of problems so as to prepare the students for courses in various engineering disciplines.

2. To facilitate the development of students ability to solve practical problems using the principles of Physics.

   To prepare the students to think and participate deeply, creatively and analytically in various engineering areas.

Course Outcome

3. Ability to apply relevant scientific and Physics principles and to solve real world engineering problems.

4. To understand the impact of engineering and Physics solutions in global, economic, environmental and societal context.

SECTION I

Unit 1. Band Theory and Semiconductors (5 Hrs)

Formation of energy bands, Types of energy bands, Classification of solids, Fermi Level, Fermi-Dirac probability distribution function (introduction only), Fermi level in intrinsic & extrinsic semiconductors, Effect of impurity concentration on shifting of Fermi level, Derivation for E_{Fin}, Hall effect & its applications.

Unit 2 Crystallography (8 Hrs)

Space lattice, Basis, Unit cell, Seven Crystal System, Bravais lattices, No of atoms per unit cell, Atomic Radius, Coordination number, Packing factor, Void space for SC, BCC, FCC, Density of crystals(Cubic only),Symmetry elements (Axis, plane, centre),Miller indices, Inter planner distance (By using miller indices), Bragg's law, Bragg's X-ray spectrometer and powder crystal method.

Unit 3 Acoustics & Ultrasonic   (5 Hrs)

Acoustics: - Basic requirements for acoustically good hall, Reverberation, Reverberation Time, Sabine's formula (no derivation), absorption coefficient (definition), Factors affecting architectural acoustics of auditorium and their remedies.

Ultrasonic: - Piezoelectric effect and Magnetostriction effect (Introduction), properties of ultrasonic waves, Determination of wavelength and velocity of ultrasonic waves (Acoustic Diffraction Method), Detection methods of ultrasonic waves and Applications.

Unit 4 Theory of relativity   (6 Hrs)

Introduction, postulates of special theory of relativity, Lorentz's transformations for space and time, Time dilation, Length contraction, Addition of velocities (Introduction only), Relativity of mass, Equivalence of mass and energy.

SECTION II

Unit 5 Diffraction & Polarization   (7 Hrs)

Fresnel and Fraunhoffer diffraction (Introduction only), Resolving Power, Rayleigh criterion, Theory of diffraction grating and its resolving power, Polarization-concept, Polarization by Double Refraction, Malus law, Optic axis, Positive and Negative crystals, Optical activity, Specific rotation, Laurent's half shade polarimeter, Applications of polarized light.

Unit 6 LASER   (5 Hrs)

Interaction of radiation with matter- stimulated absorption, Spontaneous and stimulated emission, population inversion, pumping, meta stable state, Properties of Laser, He -Ne Laser, semiconductor Laser, , Applications of Laser (industrial and medical), Holography (principle, construction and reconstruction).

Unit 7 Fiber Optics   (4 Hrs)

Concept, structure, Acceptance Angle, Acceptance cone, Fractional RI change, Numerical Aperture, Types of Optical fiber, Fiber optical comm. System (block diagram), Advantages and applications.

Unit 8 Nuclear Physics and Basic concepts of Nano Materials   (8 Hrs)

Nuclear Fission Reaction : Fission as a source of energy, energy released by 1 kg of $_{92}U^{235}$, Chain Reaction and Multiplication factor (introduction), Essentials of Nuclear reactor, classification of nuclear reactor.

Nuclear Fusion Reaction: C-N cycle and P-P cycle, Distinguish between fission and fusion.

Basic principle of nano science and technology, Principle factors (Increase in surface area to volume ratio, Quantum confinement effect), Variations of properties of nanomaterials (Physical, chemical, electrical & optical), Carbon Nano tubes and its types, Applications of nanotechnology.

Text Books:

1. A text book of Engineering Physics – M.N. Avadhanala & P.G. Kshirsagar (S Chand)

2. A text book of Engineering Physics – Uma Mukharerji (Narosa)

3. A text book of Engineering Physics – Gaur & Gupta (Dhanpat Rai)

4. A text book of Engineering Physics – R K Palanisamy (Scitech)

5. A text book of optics – Subramanyam & Brijlal (S Chand)

REFERENCE BOOKS:

1. Nanotechnology – Sulbha Kulkarni (McGraw Hill)

2. Modern physics – B.L. Theraja (S Chand)

3. Solid state physics – S.O. Pillai (McGraw Hill)

4. Introduction to solid state physics – Charles Kittle (Wiley India)

5. Optical fibre communication – Gerd Keiser

6. Laser Physics & applications – L. Tarasov

7. Nano : The Essentials – T. Pradeep (Tata McGraw Hill)

8. Nuclear Physics – D C Tayal (Himalaya)

9. Concepts Modern Physics – Arthur Beiser (Tata McGraw Hill)

10 Engg. Physics – Theraja (S Chand)

11   Classical Mech. – Takwale & Puranik

12 Theory of relativity – Robert Resnik

EXPERIMENTS (Any 8)

1. Determination of band gap using a reverse biased p-n junction diode.

2. To determine Hall coefficient and charge carrier concentration by Hall Effect.

3. To study the Crystal Structure by using different models and charts.

4. Study of polarization by reflection method

5. Determination of wavelengths of spectral lines by using a plane diffraction grating.

6. Determination of the divergence of laser beam.

7. To determine resolving power of telescope.

8. To determine specific rotation by using Laurent's half shade polarimeter

9. To determine the numerical aperture of optical fibre cable.

10. To determine wavelength using acoustic diffraction method.

11. To determine wavelength of ultrasonic waves using Kundt's tube method.

12. Determination of d (interplaner distance) using XRD pattern (study Experiment)

13. Types of optical fibres.

14. Production of ultrasonic waves (Crystal oscillator).

15. Study of Malus law.

16. Determination of wavelength of Laser beam using Diffraction Grating.

17. Photovoltaic cell.

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Solapur University, Solapur
F.E. (All Branches) Semester-I/II
2 & Lab II . Engineering Chemistry

Teaching Scheme	Examination Scheme
Theory: - 4 Hrs/Week	**Theory -** 100Marks
Practical : 2 Hr/Week	**Term-Work -** 25Marks

Course Objectives

1. To impart knowledge of the basic chemistry of the materials.

2. To make students understand the underlying chemical principles for various

   applications and the chemical behaviour under a given set of conditions.

3. To equip the students with the required analytical skill and techniques.

4. To make the students aware with the environmental pollution (soil, air , water, noise etc.)

5. To enable the students to reduce the man made pollution and make environment

   clean and have line in eco-friendly way

Course Outcome

1. Engineering graduates, through engineering chemistry course are equipped with the basic
   knowledge of a number of materials that find applications in day-to-day life, their properties,
   effect of environmental factors on the properties, and with the necessary analytical skills.

2. Enables engineering graduates to make intelligent and judicious selection of materials based
   on the performance/properties relationship

SECTION-I

UNIT-1 Water   (8-Hrs)

Introduction, sources of water, impurities in natural water, water quality parameters (definition &
determination) like pH, Acidity, Alkalinity, Total solids, Dissolved oxygen, BOD, COD,
Chlorides, Hardness: Causes of hardness, types of hardness [temporary/ permanent], calcium
carbonate equivalent hardness, units of hardness and its calculations. (Numerical problems on
hardness), Estimation of hardness by EDTA method, Scale and sludge formation in boilers**.**

Softening of water by Zeolite process, Ion exchange process & reverse osmosis process. Domestic treatment of water by sedimentation, coagulation, aeration, aerobic and anaerobic process. Disinfection by chlorine.

UNIT 2. Phase Rule: (04-Hrs)

Basic principles of Gibb's phase rule, definition, terminology, applications of phase rule to one component system (water), effect of change of temperature and pressure on equilibria, two-component system (silver-lead), eutectic point, eutectic mixture, merits and demerits of phase rule

Unit 3. Lubricants: (6- Hrs)

Lubricants & Lubrication, Functions, types of lubrication such as fluid film, Boundary (thin film) & extreme pressure. Classification of lubricants. Characteristic properties of lubricants(only definition) such as viscosity, viscosity index, flash point & fire point, cloud point & pour point, aniline point, oiliness. Selection of lubricants for cutting tools, I.C. engine, gears transformers, delicate instruments, refrigeration system.

Unit 4. Corrosion And Its Prevention: (7-Hrs)

Corrosion, definition, classification. Dry corrosion: Oxidation corrosion: nature of oxide film, other gases corrosion, liquid metal corrosion. Wet Corrosion – Electrochemical corrosion: Hydrogen evolution mechanism, Oxygen absorption mechanism. Factors influencing corrosion, testing & measurement of corrosion by weight loss method & electrical resistance method

Prevention of corrosion: By proper design & material selection, cathodic & anodic protection. Protective coatings: methods of application of metal coatings such as hot dipping, metal cladding. Organic coatings: Paints: properties of paints, constituents of paint. Varnish: properties of varnish and applications.

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SECTION-II

UNIT 5. Fuels: (06-Hrs)

Fuels: classification, characteristics of good fuel, comparison between solid, liquid and gaseous fuel, calorific value, (gross and net), Determination of calorific value by Bomb calorimeter and Boy's calorimeter.

Coal: types of coal, analysis of coal (proximate and ultimate analysis), calculation of calorific value by Dulong's formula. (Numerical problems on calorific value.)

Propellants: Definition, characteristics and types.

UNIT 6. Engineering Materials: (7-Hrs)

Metallic Materials: Types of iron: cast iron, steel & wrought iron: composition, properties & applications, Alloys: Definition, purposes of making alloys.

Ceramics: Definition, Classification, properties. Portland cement: chemical composition, compound constituents. Setting and hardening of Portland cement.

Glass: General properties, general method of manufacture of glass. Types of glasses: soft, hard, borosilicate, optical, laminated and safety glass.

Composite: Definition, properties and applications of fiber reinforced plastics.

Adhesive: Definition, preparation, properties and applications of epoxy resin.

UNIT 7. Chemistry Of Polymers: (7 –Hrs)

Polymers- polymerization, degree of polymerization (DP), numerical problems on degree of polymerization, glass transition temperature(Tg), melting temperature(Tm), molecular weight (Mn, Mw, Mv), (only Definitions), types of polymerization (No mechanism).

Plastics: Definition, properties, types of plastics (thermo softening and thermosetting). properties and applications of Polyvinyl chloride(PVC) and Polyethylene Terephthalate(PET). Compounding, moulding of plastic in articles: compression, extrusion, transfer & injection.

Rubber: Classification, processing of natural rubber, vulcanization, synthetic rubbers, properties and applications of Buna-S and Thiokol rubbers.

Conductive polymers: Basic concepts and applications.

Polymers in Medicine and Surgery: Biomaterials (Introduction), Characteristics and application of biomedical polymers.

UNIT 8. **Analytical Chemistry**:   **(5 –Hrs)**

Concentration of solution-: Molarity, Molality, Normality, Mole fraction (Numerical problems), **Chromatography:** Definition, types. GLC: Definition, instrumentation and application of GLC, **Thermal analysis**: Definition of TGA, DTA and DSC. Instrumentation and application of TGA.

Reference Books:-

1. A text book of Engineering Chemistry – M.N. Uppal
2. A text book of Engineering Chemistry – S.S. Dara

Reference Books:

1. Engineering Chemistry – Jain and Jain
2. Essential of Physical Chemistry , Tuli and Bhal
3. Instrumental Methods of chemical analysis – Chatwal and Anand
4. Industrial Chemistry – B.K.Sharma
5. Environmental Chemistry – A.K.De
6. Fundamentals of Engineering Chemistry- S.K.Singh
7. A text book of Engineering Chemistry – Shashi Chawala
8. Engineering Chemistry – N. Krishnamurty, P. Vallinayagam, D. Madhavan
9. Engineering Chemistry – Shelley Oberoi, Monika Malik

A] Experiments : (Any 8)

1. Determination of Hardness of water.
2. Determination of Alkalinity of water.
3. Determination of Chloride content in given water.
4. Determination of dissolved oxygen in water.
5. Proximate analysis of coal (Ash. Moisture, Volatile matter and fixed carbon).
6. Determination of viscosity of a lubricant by Ostwald's viscometer.
7. Determination of aniline point of lubricating oil.
8. Determination of percentage of copper in Brass.
9. Estimation of rate of corrosion of Aluminium in acidic and Basic media.
10. Estimation of Copper in Bronze metal alloy.

11.   Estimation of Zinc in Brass.

12. Volumetric estimation of calcium in lime stone.

13. Volumetric estimation of CaO and MgO from Dolomite by EDTA method.

14. Preparation of phenol formaldehyde resin.

15. Preparation of urea Formaldehyde resin.

16. Determination of COD of water sample.

17. Separation of Metal ions by paper chromatography

18. Separation of mixture of organic compounds by TLC.

19. Separation of mixture of organic compounds by Column chromatography.

20. Determination of oil and grease from waste water.

B) Demonstration of the following experiments (any2)

1). Determination of pH by pH meter

2) Determination of EMF of acid base titration potentiometer

3) Experimental demonstration of Photocolorimeter

   (Note:-Demonstration of experiments must be carried out at the end of semesters

   Term work assessment at the end of semester.

Recommended Books:

1) Laboratory manual on Engineering Chemistry-Dr.Sudha Rani

2) Experiments and calculations in Engineering Chemistry- S.S.Dara

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Solapur University, Solapur
F.E. (All Branches) Semester-I
3. & Lab III: Basic Mechanical Engineering

Teaching Scheme	Examination Scheme
Theory: - 3Hrs/Week	**Theory -** 100Marks
Practical: - 2Hrs/Week	**Term-Work -** 25Marks

Course Objectives:

1. To create interest in Mechanical Engineering course.
2. To introduce the overview of Mechanical Engineering Course.

Course Outcomes:

1. Students should get the idea of various areas of Mechanical Engineering.
2. Students should get the idea of various day to day applications of Mechanical Engineering.

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SECTION-I

Unit 1:   Thermodynamics   (9 Hrs)

Definition of Thermodynamics, Thermodynamic Systems, surrounding, universe, Types of systems, State of system, Properties- Intensive and Extensive, Thermodynamic equilibrium, Process and Cycle, Zeroth Law of Thermodynamics, Work and forms of work, Heat, First Law of Thermodynamics, First law applied to flow processes, Steady flow process, Steady Flow Energy Equation (SFEE), Limitations of first law, Kelvin Plank and Clausius statements of Second law of thermodynamics.

Refrigeration: Definition of refrigeration, Vapour Compression Refrigeration Cycle (VCRS), Domestic refrigerator.

Air Conditioning: Window Air Conditioner, Split Air Conditioner.

(Numericals on first law of thermodynamics, cyclic and non cyclic processes, SFEE)

Unit 2:   Gas Laws & Gas Processes   (4 Hrs)

Ideal gas, Boyle's law, Charle's law, Characteristic gas equation, universal gas constant, Avogadro's law, First law analysis for constant volume, constant pressure, constant temperature, reversible adiabatic process and Polytropic Process (Work done, heat Transfer,

P-V-T relation) (Numerical treatment)

Unit 3: Pumps, Compressors & Turbines (4 Hrs)

Pumps: Definition, Classification, construction, working and applications of reciprocating pump, Centrifugal pump.

Compressors: Construction, working and applications of reciprocating compressor, rotary compressors (Roots Blower, vane Blower).

Turbines: Construction, working and applications of Pelton wheel, Francis and Kaplan turbines

(No Numerical treatment)

Unit 4: Power Plants – (Description with block diagrams) (3 Hrs)

Thermal Power Plant, Hydroelectric Power Plant, Nuclear Power Plant, Elements, Advantages, Limitations.

SECTION-II

Unit 5 : Internal Combustion Engines (5 Hrs)

Definition, Classification, Components of IC engine, Two Stroke, Four stroke engines, SI and CI engines. Otto and Diesel cycles, Thermal efficiency of Otto, Diesel air standard cycle (Numerical Treatment)

Unit 6: Power Transmission Systems (5 Hrs)

Belt drives: open and cross belt drives, materials of belt, types of belts, length of belt for open and cross drive, velocity ratio of simple and compound belt drive, centrifugal tension, maximum power transmitted (Numericals on simple belt drive only)

Other Transmission Systems: Chain drive, Gear, Types of gears (excluding gear terminology), gear trains-simple and compound, epicyclical gear train.

Unit 7: Mechanical Engineering Design (5 Hrs)

Introduction, Design Considerations, Design Process, Types of Stresses & Strains , Stress-Strain Diagrams, Modes of Failure, Factor of Safety, Engineering Materials, Aesthetic Considerations, Ergonomic Considerations (No Numerical Treatment)

Unit 8: Introduction to Machine Tools & Joining Processes   **(5 Hrs)**

a) Machine Tools:

Centre Lathe - Basic elements, Construction, working, Operations on lathe, Turning, Facing.

Drilling Machine - Basic elements of Pillar drilling machine, applications

b) Joining Processes:

Welding Process: Definition, types: Arc Welding- Manual metal arc welding, Resistance Welding - Spot Welding, Gas Welding- Oxy acetylene welding

Brazing: Procedure, Filler metals, Advantages, Disadvantages, Applications

Soldering: Filler metals used, Procedure, Soldering iron, Applications

Riveting and bolting

(No Numerical Treatment)

Term Work:

Term work shall consist of demonstrations and assignments based on the following (Any 6)

1. Diesel Power Plant
2. Domestic Refrigerator and Split Air Conditioner
3. Study of 2-s and 4-s Engines with the help of models
4. Gears, Couplings, Brakes
5. Experiment for calculation of Velocity ratio of simple belt drive
6. Machine Tools – Lathe, Drilling Machine
7. Pumps and Compressors

Text Books:

1. Thermal Engineering, P.L. Ballaney, Khanna Publishers, New Delhi.
2. Thermal Engineering, Domkundwar, Kothandaraman, Domkundwar, Dhanpat Rai & co., New Delhi.
3. Elements of Workshop Technology- Vol- I & II, S.K. Hajra Choudhury, A K Hajra Choudhury, Nirjhar Roy, Media Promoters & Publishers Pvt. Ltd, Bombay
4. Design of Machine Elements, V.B. Bhandari, Tata Mc Graw Hill publications, New Delhi

Reference Books:

1. Engineering Thermodynamics, P.K. Nag, The Tata McGraw-Hill Companies
2. Mechanical Engineering Design, Joseph E Shigley, Charles R Mischke, The Tata McGraw-Hill Companies
3. Production Technology Vol. I & II, O.P. Khanna , Dhanpat Ray Publications

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Solapur University, Solapur
F.E. (All Branches) Semester-I
4. & Lab IV: Basic Electrical Engineering

Teaching Scheme	Examination Scheme
Theory: - 3 Hrs/Week	**Theory -** 100Marks
Practical: - 2 Hrs/Week	**Term-Work - 2**5Marks

Course Objectives:

1. To understand the D.C. circuits ,Work, Power & Energy.
2. To understand the magnetic circuits and A.C.fundamentals.
3. To understand Single Phase and Three Phase A.C. circuit.
4. To understand the working of Single Phase Transformer and A.C. D.C. drives.

Course Outcomes:

1. Student understands the D.C. circuits, Work, Power & Energy.
2. Student understands the magnetic circuits and A.C. fundamentals.
3. Student understands Single Phase and Three Phase A.C. circuit.
4. Student understands the working of Single Phase Transformer and A.C. D.C drives.

Section-I

UNIT 1. D.C. Circuits: (9 Hrs)

Ohm's Law, Resistance, specific resistivity, temperature dependence of resistance. Concepts of open circuit and short circuit Kirchhoff's laws &it's applications for circuit solutions, simplifications of circuits using series, parallel combinations and star-delta, delta-star conversions.Thevenin's   theorem,   maximum   power   transfer   theorem.

UNIT 2. Work, Power, Energy: (4 Hrs)

 Conversion of energy from one form to another in electrical, mechanical and thermal systems. Units of power and energy, heating effect of electrical current. Calculation of cost of electricity.

UNIT 3. Magnetic Circuits: (5 Hrs)

Concept of magnetic circuits, magneto motive force, Reluctance, B-H curve, magnetic hysteresis, examples on series composite magnetic circuits, magnetic leakage and fringing. Faraday's law of electromagnetic induction, Lenz's law. Concept of self and mutual inductance.

UNIT 4. A.C. Fundamentals: **(3 Hrs)**

 Generation of A.C., concept of cycle, period ,frequency phase, phase   difference, instantaneous. RMS, peak, average value and relationship between   them   for   sinusoidal quantity.

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Section-II

UNIT 5. Single Phase A.C. circuits: **(5 Hrs)**

A.C. through pure resistance, pure inductance and pure capacitance, A. C. circuit (series and parallel), impedance, admittance, complex power and power factor in A. C. circuits.

UNIT 6.   Polyphase Circuits: **(5 Hrs)**

Generation of three phase voltages. Voltage ,current relations in star and delta connections. Concept of balanced, unbalanced load, symmetrical and asymmetrical   supply system .

UNIT 7.   Single Phase Transformer:

Working principle, construction, EMF-equation, voltage and current   ratios,KVA rating, transformer losses, efficiency and regulation by direct loading and O.C. and S.C.tests.

                                                                   (5 Hrs)

UNIT 8 Electrical Drives:

A. Construction, working principle and applications of D.C. shunt and series motors.

B. Construction, working principle and applications of three phase squirrel

  cage induction motor.

C.Study of single phase split phase type induction motor (capacitor start,capacitor

  start and run motors).

                                                                   (5 Hrs)

Term-Work:

Term Work consists of minimum **eight** experiments as listed below.

1. Different types of wires, wiring systems & wiring circuits (simple, staircase, godown).

2. Different types of lamps (incandescent bulb, fluorescent tube, mercury vapour lamp, sodium vapour lamp, compact fluorescent lamp, and metal hellide lamps).

3. Safety precautions while working on electric installations and necessity of earthing.

4. Use of Megger for insulation test and continuity test of wiring installations and use of multimeter for measurement of A.C., D.C. and resistance measurement.

5. Verification of Kirchhoff's laws.

6. Verification of voltage relations of RLC series circuit.

7. Verification of voltage, current relations in three phase balanced Star and Delta connected loads.

8. Verification of transformation ratio of Single Phase Transformer.

9. Verification of efficiency & regulation of single phase transformer by direct loading.

10. Verification of efficiency & regulation of single phase transformer by O.C. & S.C. tests .

11. Demonstration of D.C. machine model and direction reversal of D.C.shunt motor.

12. Demonstration of three phase squirrel cage induction motor model and direction reversal of a three phase induction motor.

Text Books:

1. Electrical Technology. Volume I & 2 by B.L Thereja, 22nd edition,
   S.Chand & Company Ltd.

2.Basic Electrical Engineering by C.L. Wadhawa,2nd edition,
   New Age International.

3.Principles of Electrical Engineering& Electronics by V.K. Mehta
   S.Chand &company Ltd.

Reference Books:

1.Electrical Technology , E. Hughes, 10th edition, ELBS with longman.

2.Electrical Engineering Fundamentals, V. Del Toro, 2nd edition,
   Prentice-Hall.

3.Basic circuits analysis by John Omalley Shawn,2nd edition,schaum's
   outlines series.

4.Electrical wiring .Estimation and Costing by Dr. S L Uppal,Khanna
   Publication.

5.Fundamentals of Electrical Engineering by Leonard S Bobrow,2nd

edition ,Oxford university press.

6.Laboratory courses in Electrical Engineering by

S.G.Tarnekar,P.K.Kharbanda,S.B.Bodhe and S.D.Naik S.Chand &

Company Ltd.1980.

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Teaching Scheme	**Examination Scheme**
Theory: - 4 Hrs/Week	**Theory -** 100Marks
Practical: - 2 Hrs/Week	**Term-Work - 2**5Marks

Course Objectives:

- To understand and predict physical phenomena to lay the foundation for engineering applications by studying Statics and Dynamics.

- To develop scientific approach and its reasoning for analysis and design of various engineering applications.

- To promote processes of problem solving abilities and inculcate experimental, observational, manipulative, decision making and investigatory skills in the learners.

- To prepare the students for higher level courses in analysis and design of engineering problems.

Course Outcomes:

- The students will be able to apply basic principles of 'Statics', applicable to rigid bodies in equilibrium.

- The students will be able to solve various problems in 'dynamics'.

- The students will be able to solve variety of practical problems in mechanics and identify the effect of problem parameters on the solution.

- The students will be ready with the basic foundation for higher level courses in analysis and design of engineering problems.

Section -I

Statics

1) **Resultant of Coplanar Forces**:

   Basic units, SI units, Body, Rigid body, Particle, Scalar quantities, Vector quantities, Force, Law of Transmissibility of force, Moment of a force, couple, moment of couple, resultant. Parallelogram law of forces, triangle law of forces, polygon law of forces. Varignon's theorem, Composition of co-planar concurrent and non concurrent forces, Analytical method, Graphical Method, Bow's notation. **(7 Hrs.)**

2) **Equilibrium of Rigid Bodies:**

   Equilibrium of co-planar forces- Analytical and graphical conditions of Equilibrium, Different type of supports, free body diagrams, Lami's theorem, Problems on compound frames with hinged joints, pulleys. Friction problems on inclined planes, ladders.

   (5 Hrs.)

3) **Support Reactions:**

   Support reactions of statically determinate beams, Compound beams with point loads, Uniformly varying loads and couples, Principle of virtual work (Concept only). Introduction to forces in space. **(5 Hrs.)**

4) **Analysis of Pin-Jointed Plane Frames:**

   Pin-jointed statically determinate plane trusses, Assumptions, Perfect frame, Analysis of trusses by method of joints, Method of sections, Graphical method. **(5 Hrs.)**

5) **Center of Gravity and Moment of Inertia:**

   Centre of gravity, Centroid of a composite area. Second moment of area. Moment of inertia of section, Parallel axis theorem, Moment of inertia of unsymmetrical sections, Radius of gyration, Polar moment of inertia. **(5 Hrs.)**

Section II

DYNAMICS

6) Kinematics of Particles - Linear Motion:

Introduction to various type of motions, Kinematics of linear motion, Equation of linear motion with constant and variable acceleration, motion under gravity, Relative velocity, Least distance between two moving bodies.   **(6 Hrs.)**

7) Kinematics of Particles - Curvilinear motion:

Kinematics of curvilinear motion Angular motion, Relation between angular motion and linear motion, Equation of angular motion, Tangential and radial acceleration, Centrifugal and centripetal forces, Motion along a curved path. Super elevation, Motion of a projectile.

(6 Hrs.)

8) Kinetics of Particles:

Newton's laws of motion for linear motion and angular motion, Mass moment inertia,

D'Alembert's principle, Problem of linear motion and centroidal rotation.   **(6 Hrs.)**

9) **Work, Power, Energy:**

Potential Energy, Kinetic Energy of linear motion and rotation, work energy equation, Principle of conservation of energy, Impact – central, eccentric, direct, oblique, elastic, plastic, Impulse momentum principle.   **(6 Hrs.)**

Note: Graphical Methods in unit 1, 2, 3 are only for term work.

Term work

a) Experiments:-

   1) Law of polygon of forces,

   2) Law of parallelogram of forces

   3) Jib crane

   4) Bell crank Lever

   5) Support reaction of beams

   6) Fletcher's trolley

   7) Centrifugal force.

b) **Graphic statics**:-Problem on

   1) To find the resultant of forces (2 Problems)

   2) To find support reactions (2 Problems)

   3) Forces in the members of statically determinate truss. (2 Problems)

c) Assignments based on the various topics.

Text books:

(1) Engineering Mechanics by Bhavikatti S. S., New Age International Pvt. Ltd.

(2) Engineering Applied Mechanics by S. N. Saluja, Satya Prakashan , New Delhi.

(3) Vector Mechanics for Engineers Vol I & II, F. P. Beer & A. R. Johnson, Tata McGraw Hill Publications.

(4) Engineering Mechanics by K. L. Kumar, Tata McGraw Hill Publications.

Reference books:

(1) Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.

Engineering Mechanics Statics and Dynamics by Ferdinand Singer, Harper & Row Publications.

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Solapur University, Solapur
F.E. (All Branches) Semester-I
6.Communcation Skills-I

Teaching Scheme	**Examination Scheme**
Theory: - 1 Hr/Week	
Tutorials: - 2 Hrs/Week *	**Term-Work – 50** Marks

Course Objectives

1**.** To enhance LSRW skills of students

2. To develop students knowledge of Grammar

3. To develop Soft Skills in Students

Course Outcome

1. LSRW skills

2. Grammar

3. Soft Skills

Unit 1. Grammar **(4 Hrs)**

(Parts of Speech, Articles, Tenses, Modal Auxiliaries, Idioms & Phrases)

Unit 2. Letter Writing **(2 Hrs)**

    i.   Leave application Letter

    ii. Covering Letter/Job Application letter

Unit 3. C.V / Resume Writing **(2 Hrs)**

Unit 4. Group Discussion **(2 Hrs)**

(Group discussion as a part of selection process, structure of GD, dynamics of group behaviour,techniques of effective participation, team work and use of body language)

Unit 5. Situational Conversation **(2 Hrs)**

Unit 6. Reading Comprehension for Competitive Exams **(2 Hrs)**

Tutorials:

1. Grammar Exercises (2 Sessions)

2. Letter Writing (2 Sessions)

3. C.V / Resume Writing (2 Sessions)

4. Group Discussion (4 Sessions)

5. Situational Conversations (2 Sessions)

6. Reading Comprehension for Competitive Exams (2 Sessions)

Note: * Indicates Tutorials are at alternate week.

Text Books:

1. Realms of Gold- S.Sagare, N.Pawar, R.Ingale, Orient Longman

2. English for Practical Purposes, Z.N. Patil, B.S. Valke, A.R. Thorat, Zeenat Merchant, Macmillan

Reference Books:

1. Essentials of English Grammar - Raymond Murphy, Cambridge University Press

2. Intermediate English Grammar- Raymond Murphy, Cambridge University Press

3. High-School English Grammar and Composition - Wren and Martin, S. Chand and Co.

4. Communication Techniques and skills –K. Chaddha, Dhanpat Rai Publication

5. Professional Communication Skills -Pravil S. R. Bhatia, S. Chand and Co., New Delhi.

6. Communication Skills for Engineers –S. Mishra, C. Muralikrishna, Pearson Education.

7. Descriptive General English- S.P. Bakshi, Ms. Esha Bakshi, Arihant Publications

8. Organizational Behaviour-Fred Luthans, McGraw Hill

9. English at the Workplace - Department of English, University of Delhi

10. English for all - Coordinating Editor, Nilanjana Gupta

11. Soft Skills,know Yourself & Know the world-Dr.K.Alex.S. Chand & Company Ltd.,N.Delhi.
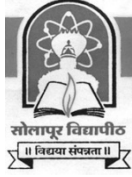
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Teaching Scheme	**Examination Scheme**
Practical: - 02hrs/week	**Term- Work –** 25 Marks

Course Objective:

To make the students acquainted with various skills involved in manufacturing/ Assembly.

Course Outcomes:

i) Outcome is to create confidence amongst the students in manufacturing activities

ii) Students should get experience about manual skills required to perform engineering. ---

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 i) **Carpentry job:** One job on carpentry including any one type of joint**. (4 turns)**

ii) **Fitting job:** One job on fitting, including any one type of joint. **(4 turns)**

iii) **Demonstration: A**rc welding, Gas welding, Resistance welding, Gas cutting (Any Two). **(1 turn)**

iv) **Assembly:** Assembly of the following five assembly/sub-assembly. (**3 turns)**

a) **Mechanical:** Three Jaw chuck/Bicycle/Centrifugal pump

b) **Computer Science and Engineering:** Cabinet / CPU of PC.

c) **Electrical**: Electrical Motor/ 3 pin wire change

d) **Electronics:** Mobile Handset/UPS.

e) **Other:** Any similar assembly from other branches of engineering

Note: While doing the assembly practical batch of 20 students is to be divided in five groups of 4 students each and all groups will do practical's simultaneously.

Term Work: Student shall be given one workbook (10 to 15 Pages) in which student is supposed to draw the Job drawing, Process plan of the job in brief.

Solapur University, Solapur
F.E. (All Branches) Semester-II
1. Engineering Mathematics -II

Teaching Scheme	**Examination Scheme**
Theory: - 3 Hrs/Week	**Theory -** 100Marks
Tutorial : - 1 Hr/Week	**Term-Work – 25** Marks

Course Objectives

The contents aims to develop the knowledge of the students in the direction of solving   practical problems in engineering and technology related to integral calculus, Differential equations and Curve Tracing.

Course Outcome

At the end of this course, the student will be able to-

1. Find the solution of ordinary differential of first order and first degree by analytical and numerical method. Most common differential equations are radioactive decay, electric circuit, simple harmonic etc., in science and technology.

2. Finding the derivatives by numerical method without finding functional relation of given data.

3. Evaluate improper definite integrals such integrals occur in many engineering problems.

4. Determine the Area, Volume, and Surface-area of the region bounded by two or more curve by multiple integration.

SECTION I

UNIT 1.Ordinary Differential Equations of first order & first degree: **(5 Hrs.)**

Introduction to differential equation, definition, order and degree differential equation. Solution of differential equation by Non-homogeneous, Exact, equation reducible to exact form by using integrating factors (four rules), Linear and equations reducible linear differential equations.

UNIT 2. Applications of differential equation: (5 Hrs)

Orthogonal trajectories, geometrical applications, simple electrical applications, mechanical engineering applications

UNIT 3. Numerical solutions of ordinary differential equation of first order and first degree: (5 Hrs)

Picard's method, Taylor's series method, Euler's method, Modified Euler's method and Runge-Kutta method of fourth order.

UNIT 4. Numerical Differentiation: (5 Hrs)

Using Newton's forward, backward, Stirling's central difference interpolation and divided difference formula (without proof) examples only.

SECTION II

UNIT 5. Integral Calculus: (5 Hrs)

Beta and Gamma functions and their properties, Relation between
Beta and Gamma functions, Duplication formula (with proof), Differentiation under integral sign with constant limits of integration.

UNIT 6. Curve tracing: (5 Hrs)

Tracing of Cartesian, parametric and polar curves, Rectification of plane curves.

UNIT 7. Multiple integrals: (5 Hrs)

Double integration in cartesian and Polar coordinates, evaluation of double integrals by changing the order of integrations and changing to polar form, Double integration over a given region, triple integration.

UNIT 8. Applications of multiple integrations: (5 Hrs)

To find area under the curves by double integration, mass of lamina, volume and surface area of solid of revolution.

GENERAL INSTRUCTION:

For the Term work of 25 marks batchwise tutorials are to be conducted. The number of students per batch should be as per university pattern for practical batches. The students should write six to eight assignments.

Text Books:

1. A Text Book of Applied Mathematics by P.N. and J.N. Wartikar,
    Vol.1, Pune Vidyarthi Griha Prakashan.

Reference Books

2. Higher Engineering Mathematics by B.S. Grewal
    Khanna Publications, Delhi.

3. Advanced Engg. Mathematics by Jaggi Mathur
    Dhanpatrai and sons, Bhopal.

4. Advanced Engg. Mathematics by H.K.Dass
    S.Chand Publications, Delhi.

5. Calculus by Thomas & Finney

6. Numerical Methods by B.S. Grewals.

7. Higher engg. Mathematics by B. V. Ramana.
    Tata McGraw Hills publications.

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Solapur University, Solapur
F.E. (All Branches) Semester-II
3& Lab VII. Basic Civil Engineering

Teaching Scheme	**Examination Scheme**
Theory: - 3 Hrs/Week	**Theory -** 100Marks
Practical : - 2 Hr/Week	**Term-Work – 25** Marks

Course Objectives:

1. To introduce Civil Engineering to the students of all branches of engineering and technology.
2. To acquaint the students with the broad scope of the different sub-branches of civil engineering.
3. To acquaint the students with basic principles of surveying and applications of surveying instruments.
4. To acquaint the students with the elements of buildings, various building materials, as well as planning & construction methods of buildings.

Course Outcomes:

1. Be able to recognize the key role of civil engineer in societal development.
2. Be able to establish broad relationship of civil engineering with other branches of engineering and technology.
3. Be conversant with buildings and common civil engineering projects.

SECTION I

1. Introduction to Civil Engineering **(2 Hrs.)**

Sub branches of civil engineering, applications of civil engineering to other branches and role of civil engineer in various construction activities.

2. Surveying **(12Hrs.)**

a) General principles of surveying, classification of surveys.

b) Measurement of horizontal distances: Use of chain and tapes.

c) Measurement of horizontal angles: types of bearing, calculation of included angles, study and use of Prismatic compass, local attraction.

d) Levelling: Various terms used in levelling, use of dumpy level, temporary adjustments, methods of reduction of levels, contouring, characteristics and uses of contour maps.

3. Water Management **(3 Hrs.)**

Sources of water, introduction to dams & canals, storage reservoirs, brief introduction to methods of irrigation, rain water harvesting.

4. Transportation Engineering **(3 Hrs.)**

Introduction to roads**,** bridges, tunnels, railways, airports, docks and harbours.

SECTION II

5. Components of a Building **(5 Hrs.)**

   a) General idea about substructure, super structure and their various elements: (foundation types, plinth, lintel, chajja, roof, parapet, spout etc.) and their functions.

   b) Superstructure**:** Principle of load transfer, frame action, Load bearing wall action.

6. Building Planning **(5 Hrs.)**

a) Principles of planning, introduction to building Bye-laws regarding building line, open space, carpet area, built up area requirements, Floor Area Ratio (F.A.R.) and height of building.

b) Requirements of earthquake resistant buildings.

7. Building Materials **(5 Hrs.)**

Materials: stone, brick, cement, sand, timber, steel, plastic, aluminum, roofing material etc. -uses and ideal engineering properties.

Concrete: Plain and reinforced cement concrete, water cement ratio, requirements of good concrete, various grades of concrete and their uses.

8. Advances in Civil Engineering **(4 Hrs.)**

   a) Green Building :   Concept of planning and construction of green building

   b) Geoinformatics: Basic concept of remote sensing and its application in various fields, Introduction to Geographic Information system (GIS) and Global Positioning System (GPS).

Term Work (25 marks)

Practical exercises given below shall be carried out and recorded in field book. The term work to be submitted at the end of semester shall consist of the field book and drawing sheets.

i) Sign conventions
ii) Introduction to chaining , ranging and offsetting
iii) Study of prismatic compass
iv) Observation of bearing and measurement of included angles.
v) Study of dumpy level
vi) Reduction of levels by collimation plane method and rise and fall method.
vii) Drawing plan, elevation and section for a single room indicating various elements of buildings such as column footing, plinth and superstructure.
viii) Site visit and its report

Text books:
1. Basic Civil Engineering – L.G.Gole, Mahalaxmi Publications.
2. Introduction to Civil Engineering. – G.R.Hiraskar, Dhanpat Rai Publications.
3. Surveying and Levelling Vol. I- B.C.Punmia, Laxmi Publications.
4. Surveying and Levelling Vol. I- Kanetkar & Kulkarni, PVG Publications.
5. Surveying and Levelling-N.N.Basak, Tata McGraw Hill Publications.
6. Building Construction and Drawing- Bindra and Arora, Dhanpat Rai Publications.

References:
1. Building Planning and Design- Y.S. Sane, Allies Book Stall, Engineering Books Publishing Company Pune.
2. Building Planning and Design-Shah & Kale, Tata McGraw Hill Publications.
3. Building Construction and Drawing-Rangwala, Dhanpat Rai & Sons.
4. Building Construction and Drawing-Sushilkumar, Standard Publishers Delhi
5. Manual on Green Building- Kolhatkar
6. Energy-efficient buildings in India, by Mili Majumdar, TERI Press.

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Teaching Scheme	**Examination Scheme**
Theory: - 4 Hrs/Week	**Theory -** 100Marks
Practical : -4 Hr/Week	**Term-Work – 50** Marks

Course Objective: To learn the language of Engineers.

Course Outcome:

1. Students should read and draw two dimensional drawing.
2. Student should be able to convey their ideas with the help of different views.

SECTION-I

UNIT1: Engineering curves   (03 Hrs)

Plane curves of following type conic section (Ellipse, Parabola, and Hyperbola)
Ellipse – Focus directrix, Arcs of circle method
Parabola - Focus directrix, Rectangle method
Hyperbola- Focus directrix, Rectangle method
Involutes – Simple planes up to six sides and circle (Forward problems)
Cycloid – Plane cycloid

UNIT 2: Projection of lines

Basic concept: Introduction to first and third angle method of projection.
Projection of points: Projection of points on regular reference plane and on auxiliary planes including coordinate system of points.
Projection of lines: (10 Hrs)
Horizontal, frontal, profile and oblique lines, true length of line. Grade and Bearing of line. Angle between lines, intersecting, skew, parallel and Perpendicular lines
Projections of planes: (07 Hrs)
Projection of oblique planes, True shape, Edge view, Angle with reference plane. Dip & strike of plane (for objective type question only)

UNIT 3: Projection of Solids   (06 Hrs)

Prism, Pyramid, Cylinders, Cone (Excluding composite solids)

SECTION-II

UNIT 4: Orthographic projections   (05 Hrs)

Type of lines used in drawing, Convention in section drawing required views from given pictorial view. (Three views of simple machine component with only one full sectional view)

UNIT 5: Isometric Projections   (05 Hrs)

Isometric scale, Isometric projection, Isometric drawing, Circles in isometric view, Isometric views of simple object, Isometric projection from given orthographic views.

UNIT 6: Section of Solids   (04 Hrs)

AIP, AVP, Solids - Prism, Pyramid, Cylinder, Cone. True shape of section

UNIT 7: Development of lateral surfaces   (04 Hrs)

Development of plane and curved surface

UNIT 8: Perspective projections   (04 Hrs)

Parallel (Single Point), Angular (Two point), Perspective edge or point on picture plane

Term Work:

SR .No.	Name of Sheet	No. Of Sheet
01	Engineering curves	01
02	Projection of lines	01
03	Projection of planes	01
04	Projection of solids	01
05	Section of solids	01
06	Orthographic projections	01
07	Development of lateral surfaces	01
08	Isometric projections	01
09	Perspective projections	01

Text Book:

1. D.N. Jolhe, Engg. Drawing TATA McGraw Publishing Co-Ltd.
2. Engineering drawing by N.D. Bhatt

Reference Book:

1. Warren J. Luzzadar Fundamentals of Engineering drawing prentice hall ofIndia, New Delhi.
2. TE French, C.J Viereck & R.J foster "Graphics Science and Design" McGraw-Hill.
3. N.B. Shha & B.C Rana. " Engineering Drawing" Pearson Education.

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Solapur University, Solapur
F.E. (All Branches) Semester-II
5. & Lab IX: Basic Electronics

Teaching Scheme	Examination Scheme
Theory: - 2 Hrs/Week	**Theory -** 50Marks
Practical : -2 Hr/Week	**Term-Work – 25** Marks

Course Objectives:

5. To understand testing and measurement of Electronic Components.
6. To understand construction, biasing, V-I characteristics and application of Diode and BJT.
7. To gain knowledge of transducers for measurement of physical parameters like distance, temperature etc.
8. To understand basics of Digital Electronics

Course Outcomes:

1. Students can test and measure different Electronic Components.
2. Students understand construction, biasing, V-I characteristics and application of Diode and BJT.
3. Students gain knowledge of transducers for measurement of physical parameters like distance, temperature etc.
4. Students understand basics of Digital Electronics

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1.   **Introduction to Electronic Components**-Active Components, Passive components,

  - **Resistors**- color coding, ratings

    Fixed Resistors -carbon composition, wire wound,

    Variable Resistors--Potentiometer, presets, multi-turn POTs,

    Special type resistors- Thermisters (NTC & PTC), LDR

  - **Capacitors**- Ratings of capacitor

    Types Fixed capacitors- Ceramic, Electrolytic

    Types variable capacitors- Gang, Trimmer

  - **Inductors-** Fixed & variable inductors

  - **Relays-** General purpose relay

  - **Switches-** Toggle switch (ON/OFF,SPST,DPDT) , Micro switch

  - **Chassis & Ground**   -   **4 Hrs**

2. **Semiconductors and p-n junction**- Doping, depletion layer, barrier potential

- **Diode**-construction, working, biasing, V-I characteristics, ratings
    - **Diode applications**-Circuit diagram & working of Half wave rectifier, Full wave rectifier, Bridge rectifier. Analysis of above rectifiers- RMS & Average value of voltage & current, ripple factor and efficiency.
    - **Capacitor Filter using full wave rectifier**- Circuit diagram, Working and derivation of ripple factor.
    - **Special Purpose Diodes**- Photo diode, LED- Application of LED as 7-segment display and its comparison with LCD
- **Zener diode**- Working principle, V-I characteristics, ratings, application of Zener as voltage regulator
- **Bipolar Junction Transistor**- construction, biasing, configuration with I/O characteristics for -CB,CE,CC, comparison between CB,CE,CC configurations, Ratings
- **Application of transistor**- CE amplifier, BJT as switch

Special Purpose Transistors- Photo transistor

3. **Electrical Transducers**- Introduction, parameters for selection of transducers , wire type Strain gauge, Load cell, LVDT, Temperature transducers- Thermocouple, Reluctance pulse pickup, photoelectric pickup-   - **4 Hrs**

4. **Digital Electronics**-

- **Number System**- Decimal- Binary- Octal- Hexadecimal & their inter-conversion , BCD code
- **Binary Arithmetic**- Addition, Subtraction, Subtraction by using 2's complement
- **Logic Gates**- AND, OR, NOT, NAND, NOR, and EX-OR, EX-NOR Gates - symbol, output equation, Truth table, Realization of basic gates using Universal gates
- **Boolean Algebra**- Laws & Rules, De-Morgan Theorem, Simplification of logical expressions using Boolean algebra.   - **9 Hrs**

Theory paper shall cover Numerical problems on Unit-4 only

- **List of Experiments-**

Any Five experiments out of below list -

1. Testing of Electronic components- resistors, capacitors, inductor, diode, transistor, LED and switches.

2. V-I Characteristics of PN junction diode

3. Half and Full wave rectifier and their comparison

4. Frequency response of CE amplifier

5. Controlling relay using transistor as switch

6. Measurement of Distance using LVDT

7. Measurement of Temperature using any transducer

8. Verification of Truth table of basic & universal Gates using ICs

- *For soldering and testing practice conduct any two of above practical using General Purpose PCB / Lug Board*

Text Books-

1. Electronic Components & Materials- M.A. Joshi- (Wheeler Publication)

2. Principles of Electronic Devices & Circuits (Analog & Digital)- B. L. Theraja, R. S. Sedha- (S. Chand Publication)

3. Electronic Instrumentation- H. S. Kalasi (Tata Mc Graw Hills Publication)

4. Digital Principals & Applications- Albert Malvino , Donald Leach (Tata Mc Graw Hills Publication)

Reference Books-

1. Electronics Devices – Floyd (Pearson Education Publication)

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Teaching Scheme	**Examination Scheme**
Theory: - 2Hrs/Week	**University Online Exam:** 50Marks
Practical: - 2Hrs/Week	**Term-Work - 2**5Marks

Course Objective: To build computer awareness and programming skill in a student to build simple applications.

Course Outcomes: Student will acquire basic knowledge of computers and will be able to use the programming skills acquired to build programs for simple applications.

UNIT 1.

(A) Fundamental of computers : (4)

Block Diagram of computer with description, Algorithm , sequence , selection, Flowchart

(B)   Structure of 'C' Program (6)

Structure of 'C' program ,building blocks of 'C' program (preprocessor ,compilation and execution of 'C' program),C character set, tokens, constants,   variables , keywords , primitive data types , 'C' operators (arithmetic, unary, binary , ternary ,Logical, assignment, relational, increment and decrement, conditional, bit wise, sizeof) , operator precedence, expressions, type casting and type conversion, formatting input and output (getchar, putchar , printf, scanf)

UNIT 2.

Programming control: (4)

Loops using (i) if (ii) if-else (iii) nested if –else (iv) else if ladder (v) while vi) do-while

vii) for, break, continue, goto statement, nesting of loops,   (vi) switch case

UNIT 3.

Array and String : (4)

Declaration and initialization of one dimensional array, accessing elements and displaying, finding element from array, string handling functions (strlen ,strcpy,strcmp, strcat, gets,puts)

 Declaration and initialization of two dimensional array, accessing and displaying elements

Unit 4.

(A) Structure (2)

Definition of structure and union ,declaration , accessing elements and displaying elements, difference between structure and union .

(B) Function (3)

Declaration & definition , passing parameters to functions, pass by value, scope of variable, return statement

Unit 5.

Basics of Pointers (3)

Declaration of pointer , initialization ,accessing pointer, pointer to basic data types, pointer to array (one dimensional) , function using pass by reference .

Text Books:

1. Lets 'C' – Yaswant Kanetkar (BPB publication)
2. Schaums outline of theory and problems of programming with C – Byron S. Gottfried (Tata Mc. Graw Hill)

Reference Books

1. C and Data structures – Ashok N. Kamthane (Pearson Education)
2. C Balgurusamy

Termwork :

Practicals : Practical assignments –

1. Study of basics of computer
2. Formatted input and display it. (using scanf and printf)
3. Creating variables, constants, datatypes , expressions and applying type casting and type conversion rules
4. Decision control statement (if ,if-else , nested if-else, else if ladder)
5. Loop statement (for, while, do-while, nested loop)
6. Switch case menu driven
7. Manipulation of one dimensional e.g finding element

8. Manipulation of string

9. Manipulation of two dimensional (addition , multiplication)

10. Manipulation on structure (accessing and displaying elements)

11. Function using pass by value

12. Basic operations of pointers (storing and displaying the values and addresses of various datatypes , pointer to array etc.)

13. Program on function pass by reference

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Solapur University, Solapur
F.E. (All Branches) Semester-II
6. : Communication Skills-II

Teaching Scheme	Examination Scheme
Theory: - 1 Hr /Week	
Tutorial: - 2Hrs/Week *	**Term-Work - 2**5Marks

Course Objectives

1**.** To enhance LSRW skills of students

2. To develop students knowledge of Grammar

3. To develop Soft Skills in Students

Course Outcome

1. LSRW skills

2. Grammar

3. Soft Skills

Unit 1. Vocabulary	**(2 Hrs)**

(Antonyms and Synonyms, Prefixes and Suffixes, Homophones)

Unit 2. Email	**(2 Hrs)**
Unit 3. Introduction to Soft Skills and Personality Development	**(4 Hours)**
Unit 4. Personal Interview	**(4 Hrs)**
Unit 5. Presentation Skills	**(2 Hrs)**

Tutorials

1. Vocabulary Building Exercises (2 Sessions)

2. Email (2 Sessions)

3. Soft Skills and Personality Development – Role Plays, Activities, Skits (4 Sessions)

4. Personal Interview (4 Sessions)

5. Presentation Skills – PPT Presentations, Seminars (2 Sessions)

Note: * Indicates Tutorials are at alternate week.

Text Books

1. Realms of Gold- S.Sagare, N.Pawar, R.Ingale, Orient Longman

2. English for Practical Purposes, Z.N. Patil, B.S. Valke, A.R. Thorat, Zeenat Merchant, Macmillan

Reference Books:

1. Communication Techniques and skills –K. Chaddha, Dhanpat Rai Publication

2. Professional Communication Skills -Pravil S. R. Bhatia, S. Chand and Co., New Delhi.

3. Communication Skills for Engineers –S. Mishra, C. Muralikrishna, Pearson Education.

4. Descriptive General English- S.P. Bakshi, Ms. Esha Bakshi, Arihant Publications

5. Organizational Behaviour-Fred Luthans, McGraw Hill

6. English at the Workplace - Department of English, University of Delhi

7. English for all - Coordinating Editor, Nilanjana Gupta

8. Word Power Made Easy, Norman Lewis

9. Soft Skills,know Yourself & Know the world-Dr.K.Alex.S. Chand & Company Ltd.,N.Delhi.

10. Oxford Advanced Learners Dictionary, A S Hornby, Oxford University Press.

11. Longman Dictionary of Contemporary English, Longman.

12.. Essential Activator, Longman.

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