

# Swami Ramanand Teerth Marathwada University, Nanded

## First Year Engineering Revised Syllabus

### (Revision – 2016) Group A Sem -I

Sr. No.	Course Name	Teaching Scheme			Credit Structure			Evaluation Scheme			
		L	T	P	T	P	Total	TH	MCQ	TEST	TW
1	Engineering Mathematics -I	4	2	0	3	1	4	60	20	20	25
2	Engineering Physics	4	0	2	3	1	4	80	0	20	25
3	Engineering Drawing	4	0	4	3	2	5	80	0	20	50
4	Basic Electrical & Electronics Engineering	4	0	2	3	1	4	60	20	20	25
5	Elements of Civil & Environmental Engineering	4	0	2	3	1	4	80	0	20	25
6	Workshop	0	0	4	0	2	2	0	0	0	50
<b>Total</b>		<b>20</b>	<b>2</b>	<b>14</b>	<b>15</b>	<b>8</b>	<b>23</b>	<b>360</b>	<b>40</b>	<b>100</b>	<b>200</b>

### (Revision – 2016) Group B Sem -I

Sr. No.	Course Name	Teaching Scheme			Credit Structure			Evaluation Scheme			
		L	T	P	T	P	Total	TH	MCQ	TEST	TW
1	Engineering Mathematics -I	4	2	0	3	1	4	60	20	20	25
2	Engineering Chemistry	4	0	2	3	1	4	80	0	20	25
3	Elements of Mechanical Engineering	4	0	2	3	1	4	80	0	20	25
4	Fundamentals of Computer Programming	4	0	4	3	2	5	60	20	20	50
5	Engineering Mechanics	4	0	2	3	1	4	60	20	20	25
6	Communication Skills	2	0	2	0	0	0	0	0	0	50
<b>Total</b>		<b>22</b>	<b>2</b>	<b>12</b>	<b>15</b>	<b>6</b>	<b>21</b>	<b>340</b>	<b>60</b>	<b>100</b>	<b>200</b>

### (Revision – 2016) Group A Sem –II

Sr.No.	Course Name	Teaching Scheme			Credit Structure			Evaluation Scheme			
		L	T	P	T	P	Total	TH	MCQ	TEST	TW
1	Engineering Mathematics -II	4	2	0	3	1	4	60	20	20	25
2	Engineering Chemistry	4	0	2	3	1	4	80	0	20	25
3	Elements of Mechanical Engineering	4	0	2	3	1	4	80	0	20	25
4	Fundamentals of Computer Programming	4	0	4	3	2	5	60	20	20	50
5	Engineering Mechanics	4	0	2	3	1	4	60	20	20	25
6	Communication Skills	0	0	2	0	0	0	0	0	0	50
<b>Total</b>		<b>20</b>	<b>2</b>	<b>12</b>	<b>15</b>	<b>6</b>	<b>21</b>	<b>340</b>	<b>60</b>	<b>100</b>	<b>200</b>

### (Revision – 2016) Group B Sem -II

Sr.No.	Course Name	Teaching Scheme			Credit Structure			Evaluation Scheme			
		L	T	P	T	P	Total	TH	MCQ	TEST	TW
1	Engineering Mathematics -II	4	2	0	3	1	4	60	20	20	25
2	Engineering Physics	4	0	2	3	1	4	80	0	20	25
3	Engineering Drawing	4	0	4	3	2	5	80	0	20	50
4	Basic Electrical & Electronics Engineering	4	0	2	3	1	4	60	20	20	25
5	Elements of Civil & Environmental Engineering	4	0	2	3	1	4	80	0	20	25
6	Workshop	0	0	4	0	2	2	0	0	0	50
<b>Total</b>		<b>20</b>	<b>2</b>	<b>14</b>	<b>15</b>	<b>8</b>	<b>23</b>	<b>360</b>	<b>40</b>	<b>100</b>	<b>200</b>

## ENGINEERING MATHEMATICS –I

**Theory: 60 Marks    Online MCQ Test : 20 Marks    Test : 20 Marks    Term Work : 25 Marks**

### Course Objectives

1. Awareness of concept of convergence of sequences and series with applications to modeling of realistic problems
2. Some concepts of matrices and applications to test of existence of real solutions of systems of equations.
3. Some method to find the solution of first order and first degree ordinary differential equations with applications in geometry, electric circuits and motion of particle under resistance

### Course outcomes

1. It will be possible to express the physical problems in to mathematical formulation and to find the proper solutions.

Course Contents	Hrs
Unit 1 <b>MITRCES</b> Rank of matrix, properties and applications of rank,rank of matrix by Echelon and Normal form,Test for consistency of the roots of the system of homogeneous and non-homogeneous equations, Eigen values and Eigen vectors, properties of eigen values, Similar and digonalizable mitrices. T.B. 4 : 3.4.3, 3.4.4, 3.4.5, 3.5.1, 3.5.2	7
Unit 2 <b>Sequences and Series</b> Limit of sequence, Convergence and divergence of sequences, Infinities series, Comparison tests Ratio tests, Integral tests, Cauchy’s Root Test TB -1: 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, TB-2 : 8.1, 8.2, 8.3, 8.4, 8.5	7
Unit 3 <b>POWER SERIES</b> Alternating series, Absolute and conditional convergence, Taylor’s and Maclaurin series, Convergence of Taylor’s theory. TB-1 : 8.7, 8.8, 8.9, 8.10, TB-2 : 8.6, 8.7, 8.8	7
Unit 4 <b>IMPROER INTEGRALS</b> Beta functions and its Properties, Gamma functions and its Properties ,Error functions and its Properties TB-4 : 1.5.1, 1.5.2, 1.5.4, 1.5.6	7
Unit 5 <b>DIFFERENTIAL EQUATION OF FIRST ORDER &amp; FIRST DIGREE</b> Exact Differential equation, Reducible to Exact differential equation by integrating factor, Linear Differential equation, Equations reducible to Linear Differential equation, ( i )Bernouli, (ii) Riccati Equation, (iii) Clairaut. TB-4 : 4.6, 4.7, 4.8 TB- 3 : 1.5, 1.6, 1.7	7

<p>Unit 6  <b>APPLICATIONS OF FIRST ORDER &amp; FIRST DIGREE DIFFERENTIAL EQUATION</b>  Orthogonal Trajectory, (i) Cartesian form , (ii) Polar form, Application to Electrical 7 circuit, Resisted Motion.  TB- 4 : 4.9  TB-3 : 1.8, 1.7</p>	<p>Resisted</p>
<p>Term Work/Practicals/Assignments</p>	
<p>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)  <b>TEXT BOOKS: ( T.B.)</b>  George B.Thomas, Jr. &amp; Ross L. Finney, <i>Calculus</i>, pub. Pearson Education, Ninth Edition ,2008.  Monty J. Strauss, Gerald L . Bradley, Karl J. Smith, <i>Calculus</i>, Pearson Education, 2007  Erawin Kreyszig, <i>Advance Engineering Mathematics</i>, Wiley India Pvt. Ltd New D elhi , Ninth Edition, 2008  R.K. Jain and S.R,K, Iyenger, <i>Advanced Engineering Mathematics</i>, Narosa Publication House, New Delhi, third edition 2009</p> <p><b>References:</b>  <b>Howard Anton, Irlbivens Stephen Davis , <i>CALCULUS</i> pub. Willy Indian , 7<sup>th</sup> edition. 2012</b>  <b>Dr. B. S. Grewal, <i>Higher Engineering Mathematics</i>, pub. Khanna publishers, 41<sup>st</sup> Edition, 2011.</b></p>	

<b>Engineering Physics</b>		
<b>Theory paper: 80 Marks</b>	<b>Test : 20 Marks</b>	<b>Term Work : 25 Marks</b>
<b>Course Objectives</b>		
<p>By studying Applied Physics, students will able to know; how the Physics concepts are applied in the different branches of engineering.</p> <p>The subject syllabus highlights all required basic terms used for all branches of engineering.</p>		
<b>Course Outcomes</b>		
<b>Course Contents</b>		
<b>Unit 1</b>		
<b>1.1 THE ELECTRON</b>		<b>4</b>
<p>Motion of charged particles in both electric and magnetic fields simultaneously, Determination of charge to mass ratio of electron, Determination of charge of an electron, Positive rays, Determination of charge to mass ratio of Positive rays by Thomson's parabola method.</p>		
<b>1.2 ELECTRON OPTICS</b>		<b>3</b>
<p>Applications of electron beam in CRO, Construction, Action and Applications of CRO, Electron microscope and its applications.</p>		
<b>Unit 2</b>		
<b>2.1 INTERFERENCE</b>		<b>4</b>
<p>Interference in thin films, film with uniform thickness and varying thickness(wedge shaped thin films), Newton's ring theory and engineering applications (refractive index of liquid, coefficient of expansion of crystal)</p>		
<b>2.2 DIFFRACTION</b>		<b>3</b>
<p>Fraunhoffers diffraction at a single slit, condition for maxima and minima, plane transmission grating, Bragg's law and Bragg's X-ray spectrometer.</p>		
<b>Unit 3</b>		
<b>3.1 SUPERCONDUCTIVITY</b>		<b>4</b>
<p>Introduction to superconductors, properties (zero resistance, Messner effect, critical field, critical currents, isotope effect,persistence current), Type-I and Type-II super conductors, BCS theory, Applications (superconducting magnets, transmission lines etc.), josephson's effect.</p>		
<b>3.2 POLARIZATION</b>		<b>4</b>
<p>Plane polarized light, plane of vibration, plane of polarization, production of PPL i) by reflection, Brewster's law ii)refraction by double refraction, Nicol prism, difference between ordinary and extra ordinary rays, Quarter and Half wave plates.</p>		
<b>Unit 4</b>		
<b>4.1 LASER</b>		<b>3</b>
<p>Ordinary light Vs laser light, spontaneous emission Vs stimulated emission, population inversion, metastable state active medium, pumping mechanism, ruby laser, He-Ne laser, applications of laser in industry and medicine.</p>		

<p><b>4.2 FIBER OPTICS</b> Total internal reflection, construction of optical fiber, acceptance angle and acceptance cone, fractional refractive index change, numerical aperture, applications in sensor and telecommunication, advantages of optical fiber over conducting wires.</p>	4																
<p><b>Unit 5</b> <b>5.1 ACOUSTICS</b> Basic requirements for the acoustically good hall, reverberation and time of reverberation, Sabin's formula for reverberation time, factors affecting the architectural acoustics and its remedy. <b>5.2 ULTRASONIC</b> Ultrasonic waves, production of ultrasonic waves by piezo-electric oscillators and magnetostiction oscillators, SONAR &amp; applications of ultrasonic waves(engineering and medical application).</p>	3  3																
<p><b>Unit 6</b> <b>6.1 NANO TECHNOLOGY</b> Introduction, characterization of Nano particles, STM, carbon nano tube, properties (Electrical, Optical, Magnetic, Elastic), Applications (cosmetic, textile, energy &amp; environmental, medicine &amp; health cons, industry, electronics).</p>	5																
<p><b>Term Work/Practicals/Assignments</b> Any seven expts.</p> <ol style="list-style-type: none"> <li>i. Effect of Magnetic field on electron beam.</li> <li>ii. Determination of e/m by Thomson's method.</li> <li>iii. Study of Front panel of CRO.</li> <li>iv. Measurement of frequency and voltage using CRO.</li> <li>v. Determination of radius of curvature of a lens by Newton's ring apparatus.</li> <li>vi. Measurement of wavelength of light using plane transmission grating.</li> <li>vii. Study of optical fiber.</li> <li>viii. Experiment based on laser.</li> <li>ix. P-n junction/ Zener diode characteristics.</li> <li>x. Transistor characteristics CE/CB mode.</li> <li>xi. Characteristics of photo cell / photo diode.</li> </ol>																	
<p><b>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)</b></p> <table border="0"> <tr> <td>1) Engineering physics</td> <td>Gaur and Gupta, Dhanpatrai Publications</td> </tr> <tr> <td>2) Engineering physics</td> <td>Avadhanalu and Kshirsagar. S. Chand publication.( Revised edition)</td> </tr> </table> <p><b>REFERANCE BOOKS:</b></p> <table border="0"> <tr> <td>i. Modern physics</td> <td>J. B. Rajam</td> </tr> <tr> <td>ii. Optics</td> <td>Brijlal and Subramanyam,</td> </tr> <tr> <td>iii. Optics</td> <td>Mathur</td> </tr> <tr> <td>iv. Fiber optics</td> <td>Cherins, Tata Mcgrhill Publications</td> </tr> <tr> <td>v. Applied Physics</td> <td>Sanjay Jain &amp;Sunil Pandey, First edition 2013, University Press Publication, HYDERABAD</td> </tr> <tr> <td>vi. Nano technology, Principles And Practices</td> <td>Dr. S. K. Kulkarni, Capital Publishing Company</td> </tr> </table>		1) Engineering physics	Gaur and Gupta, Dhanpatrai Publications	2) Engineering physics	Avadhanalu and Kshirsagar. S. Chand publication.( Revised edition)	i. Modern physics	J. B. Rajam	ii. Optics	Brijlal and Subramanyam,	iii. Optics	Mathur	iv. Fiber optics	Cherins, Tata Mcgrhill Publications	v. Applied Physics	Sanjay Jain &Sunil Pandey, First edition 2013, University Press Publication, HYDERABAD	vi. Nano technology, Principles And Practices	Dr. S. K. Kulkarni, Capital Publishing Company
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# Engineering Drawing

**Theory paper: 80 marks**

**Test: 20 marks**

**Term work: 50 marks**

**Course Objectives**

1. Students should know the fundamental principles of geometric and machine drawing.
2. Students should be able to visualize the objects.
3. They should be able to understand and read drawing and able to present the same.
4. To develop the manual drawing skill.

**Course outcomes:**

1. At the end of course students are able to represent 3D objects on a plane paper. They will understand methods of projection i.e orthographic and isometric projections.
2. Students will be able to apply the knowledge of the subject to represent ideas on a paper.

Course Contents	Hrs
<p><b>Unit 1</b>  <b>Introduction:</b> Introduction to drawing instruments, Sheet layout, scaling, Concept of reference planes and quadrants, orthographic drawing and allied concepts, projection systems (first angle and third angle), types of lines.  <b>Projections of points and lines:</b> Projections of points in various quadrants with all possible positions, projections of lines inclined to horizontal plane, vertical plane and both planes, traces of line, use of traces in obtaining projections, finding true length and true inclinations.</p>	8
<p><b>Unit 2</b>  <b>Projections of planes:</b> Projections of planes inclined to horizontal plane, vertical plane and both planes by reference and auxiliary plane method, (Regular and composite planes).  <b>Note:</b> First angle method of projections only to be used from Unit-II onwards.</p>	6
<p><b>Unit 3</b>  <b>Projections of solids:</b> Introduction of solids (cube, tetrahedron, prism, pyramid, cylinder, cone), projections of solids with axis inclined to both the reference planes. (Composite solids and spheres need not be dealt).</p>	6
<p><b>Unit 4</b>  <b>Orthographic projections:</b> Conversion of pictorial view in to orthographic views and drawing full sectional views.</p>	8
<p><b>Unit 5</b>  <b>Isometric Projections:</b> Introduction to pictorial views, isometric axes, isometric scale, conversion of orthographic views in to isometric views/projections. (Isometric and non isometric planes)</p>	7
<p><b>Unit 6</b>  <b>Orthographic reading:</b> Missing views, adding the missing views and missing lines in the given orthographic views.</p>	5

**Term Work/Practicals/Assignments:**

- a. At least one sheet (Half imperial size) shall be drawn, containing minimum 4 problems on every unit.
- b. A sketch book containing assignment problems on each unit.

**Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)**

**Text books:**

1. N.D. Bhatt and V.M. Panchal, Engineering Drawing ,Plane and Solid Geometry, Charotar Publishing House, Anand
2. P. J. Shah, A text book of Engineering Drawing, S. Chand and Co. New Delhi.
3. M.L. Dabhade, Engineering Graphics-I, Vision Publications, Pune

**Reference books:**

1. N.D. Bhatt and V.M. Panchal, Machine Drawing, Charotar Publishing House, Anand.
2. Dhanajay A Jolhe, Engineeiring Drawing with an Introduction to AutoCAD, Tata McGraw Hill Publications, New Delhi
3. K. VenuGopal, Engineering Drawing with Graphics, New Age International Publications
4. W.J. Luzzader, Fundamentals of Engineering Drawing, Prentice Hall India, New Delhi
5. N.B. Shaha and B.C. Rana, Engineering Drawing, Pearson Education Amar Phatak, Engineering Drawing , Dreamtech Press, Mumbai



## Basic Electrical and Electronics Engineering

**Theory: 60 Marks    Online MCQ Test : 20 Marks    Test : 20 Marks    Term Work : 25 Marks**

### Course Objectives

- a. To expose the undergraduate first-year engineering students to the fundamental laws of electricity and electronics and their applications in day-to-day life.
- b. To lay a course foundation for the students who would be trained in the related core subjects like electrical, electronics, instrumentation and control, tele-communications etc.

### Course outcomes

- a. Learner should understand and grasp the analytical treatment of electrical quantities with the help of phasor-algebra
- b. To understand the difference between DC and AC Systems and between Single-phase and three-phase utility AC Source.
- c. To understand equivalent circuits of physical electrical systems and gadgets.
- d. To understand functioning of basic electronic circuits with common topologies consisting of the semiconductor devices such as diodes and transistors, useful in domestic and industrial power supplies.
- e. To train the learner in adequate experimentation related to high power electricity and train them in measurements of electrical quantities such as voltage, current and power

### Course Pre-requisites

- a. **Resistance** : Calculation of Resistance of a given physical conductor, Conductance, Ohm's Law, Resistivity
- b. **Electromagnetism** Faradays law of Electromagnetic induction, self and mutual Inductance, coefficient of coupling, Definitions: Magnetic Flux, Flux density, field intensity, MMF, Reluctance, Permeability, Basic Magnetic circuits, Force on Current carrying conductor placed in magnetic field, Fleming's rules
- c. **Electrostatics**: Definition of Electrostatic field, field intensity, permittivity, Capacitance.

Course Contents	Hrs
<b>Unit 1</b> <b>D.C. Circuits:</b> (only independent sources). Resistance, Effect of temperature on resistivity, temperature coefficient of resistance and applications. Kirchhoff 's laws, Ideal and practical voltage and current source, simple Mesh and Nodal analysis (excluding super node and super mesh), Source transformation, Star-delta transformation , Superposition theorem, Thevenin's theorem.	8
<b>Unit 2</b> <b>AC Circuits:</b> Generation of alternating voltage and currents, RMS and Average value, form factor, crest factor, phase and phasor diagrams, AC through Pure resistance, inductance and capacitance, R-L , R-C and R-L-C series and parallel circuits, power and power factor, series and parallel resonance conditions.	8
<b>Unit 3</b> <b>Three Phase Circuits and Systems:</b> Three phase waveforms, balanced and unbalanced three phase systems and circuits, Current and voltage relationships for the Star connection, Current and voltage relationships in a Delta connected three phase system (Problems based on balanced load system). Three Phase Powers: Apparent, Active, and Reactive powers and their physical interpretations.	6
<b>Unit 4</b> <b>Electrical Machines:</b> <b>Single phase transformer :</b> Construction, working principle, EMF equation, ideal and practical transformer,	

transformer on no load and on load, phasor diagrams, equivalent circuit, transformer losses, O.C. and S.C test, Calculation of Efficiency and Regulation. <b>Rotating Machines</b> Fundamentals of DC and AC Machines, Types and Applications.	<b>8</b>
<b>Unit 5</b> <b>Semiconductor devices and Circuits:</b> Semiconductor diode, Diode as Half wave, full wave and bridge rectifier, performance evaluation of these rectifier w.r.t. output voltage ripple factor and rectification efficiency etc., rectifier filters with Capacitor and inductor. Introduction to BJT as switch and as an amplifier. BJT configurations: CE, CB, CC configuration, Single-stage CE amplifier.	<b>6</b>
<b>Unit 6</b> <b>Digital Circuits and Communications:</b> Number systems, logic gates AND, OR, NOT, NOR, NAND, XOR with symbols, Boolean algebra, De Morgan's theorem, Introduction to sequential and combinational logic circuits, Fundamentals of Analog and Digital Communication, Need of Modulation, Types of Modulation.	<b>6</b>
<b>Term Work/Practicals/Assignments</b> The term work for the subject shall consist of a report on the performance of any eight experiments (minimum 8) from the following: Total Marks reserved for Term-work = 25 Distribution: (1) Laboratory work (Experiments) = 10 (2) Assignments and Journal writing = 10 (3) Overall Attendance (Theory+Practicals) = 5 <b>Suggested Experimental List:</b> <ol style="list-style-type: none"> <li>i. Determination of temperature rise of a field winding, and estimation of its absolute temperature.</li> <li>ii. Verification of Superposition Theorem.</li> <li>iii. Verification of Thevenin's Theorem. .</li> <li>iv. Determination of Performance of R-L Series and R-C Series circuits for DC transients.</li> <li>v. Determination of Performance of R-L-C Series and A.C. parallel Circuit.</li> <li>vi. Measurement of power in single phase circuit with R-L load and calculations of A.C. Parameters.</li> <li>vii. Determination of efficiency and Regulation of a single phase transformer by O.C &amp; S.C. tests</li> <li>viii. Study of DC and AC machines.</li> <li>ix. Study of Single phase CE amplifier.</li> <li>x. Verification of truth table of logic gates: NOT, AND, OR, NOR, NAND, EX-OR.</li> </ol>	
<b>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)</b> <b>Text Books:</b> <ol style="list-style-type: none"> <li>1. Electrical Engineering Fundamentals" by Vincent Del Toro, PHI Second edition ,2011</li> <li>2. Edward Hughes: Electrical and Electrical Technology, Pearson Education (Tenth edition)</li> <li>3. D P Kothari and I J Nagrath "Theory and Problems of Basic Electrical Engineering", PHI 13<sup>th</sup> edn 2011.</li> <li>4. Robert Boylestad and Louis Nashelsky, Electronic devices and circuit theory: Pearson Ed., 2004</li> <li>5. J. Millman and C. C. Halkias, Integrated Electronics: Analog and Digital Circuits and Systems, Tata McGraw-Hill</li> <li>6. R P JAIN :modern digital electronics, tata McGraw- Hill, Publishing company limited</li> <li>7. Kennedy, Dave, Electronic Communication Systems, Tata McGraw Hill, Fourth edition</li> </ol> <b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. B.L.Theraja "Electrical Engineering " Vol-I and II,</li> <li>2. S.N.Singh, "Basic Electrical Engineering" PHI , 2011</li> <li>3. Debashisha Jena, Basic Electrical Engineering, Wiley India India</li> </ol>	

4. V Jegathesan, K. Vinoth Kumar and R. Shrivankumar, Basic Electrical and Electronics Engineering,
  5. Wiley India, 2013
  6. Kogent, Vijay Baru, R Kaduskar, Sunil Gaikwad, Basic Electronics Engineering, Wile India, 2013
  7. Ravish R Singh, Basic Electrical and Electronics Engineering, MC Graw Hill India Ltd
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<b>Elements of Civil &amp; Environmental Engineering</b>		
<b>Theory paper: 80 Marks</b>	<b>Test : 20 Marks</b>	<b>Term Work : 25 Marks</b>
<b>Course Objectives</b> <ol style="list-style-type: none"> <li>1. Introduction of Civil Engineering to students from all branches of engineering</li> <li>2. To understand the scope of different fields of Civil Engineering</li> <li>3. To give understanding of various elements, devices and processes useful in day to day life</li> <li>4. To know various Types of Structures</li> <li>5. To know the various components of Building</li> <li>6. To know different building materials and their requirement</li> <li>7. To know the importance of Surveying to prepare plan and maps to execute any project</li> </ol>		
<b>Course outcomes</b> <ol style="list-style-type: none"> <li>1. Understand the role of Civil Engineer</li> <li>2. To understand levelling which helps to find out relative height of distinct features</li> <li>3. Earthquake helps to understand the precautions to be taken to minimise loss of life and property and also to know the design considerations of buildings</li> <li>4. Water Resource engineering helps to understand different techniques to save water and to meet water scarcity problems</li> <li>5. Study of Environmental Engineering helps to understand adverse effects due to air, water, noise and land pollution and measures to be adopted to improve quality of environment for the safety of human being.</li> </ol>		
<b>Course Contents</b>		<b>Hrs</b>
<b>Unit 1</b> <b>Introduction to Civil Engineering</b> <b>a) Role of Civil Engineer in the field of</b> 1) Surveying 2) Construction 3) Transportation 4) Irrigation 5) Geotechnical Engineering 6) Fluid Mechanics 7) Structural Engineering 8) Remote Sensing etc <b>b) Role of Civil Engineer in other streams of engineering</b> i.e. Mechanical, Electrical, Electronics, Computer Science, Information Technology etc. <b>c) Building Materials</b> Types, Requirements and Uses of Bricks, Sand, Stones, Cement, Timber, Steel, Mortar, Concrete <b>d) Building Planning</b> -Site Selection, plinth area, carpet area, floor space index, cost of building <b>e) Types of Load</b> i.e. Dead load, live load, wind load, & seismic load <b>f) Types of Structures</b> i.e. Load bearing structure, framed structures and composite structures		7
<b>Unit 2</b> <b>Sub Structure</b> Foundation -Functions, Types, details of shallow foundation only, causes of failure of foundation <b>b) Super structure</b> i) Masonry -Terms used in masonry, English bond, Flemish bond, Points to be observed while supervising the brick and stone work, Coursed and Un-coursed rubble masonry. ii) Doors and Windows-Types & its suitability/uses iii) Floors- Types & its suitability/uses iv) Lintel- Types & its suitability/uses v) Stairs- Types & its suitability/uses vi) Roofs- (R.C.C. flat slab, lean to roof, King post and Queen post roof, Roofing materials)		

<p><b>Unit 3</b>  <b>a) Earthquake:</b>  Definition, Technical terms (focus, epicentre, magnitude intensity etc.)  Measurements, Causes, Effects, Precautions to minimize loss of lives property, general design considerations for construction of building in seismic zone. Earthquake resistant low cost buildings</p> <p><b>b) Water resource management:</b>  Hydrological cycle, water conservation (Rain water harvesting, Roof top harvesting, water shed development and management) different structure involved in water shed management. Types of dams</p>	7
<p><b>Unit 4</b>  <b>a) Surveying:</b>  Definition, Classification, Linear measurements (Metric Chain, Metallic taps, Chaining, Ranging, Offsetting) Angular measurements (bearings, meridians, study of Prismatic Compass and Surveyors Compass, measurement of bearings) Calculation of included angles</p> <p><b>b) Levelling:</b>  Definition, terminology, study of Dumpy levels, Process of simple and differential levelling and numericals based on it.</p>	7
<p><b>Unit 5</b>  <b>Environmental Engineering</b></p> <ol style="list-style-type: none"> <li>a) Water demands; design period, per capita demand for a water supply scheme</li> <li>b) Drainage of water from buildings, construction of septic tank, soak pits</li> <li>c) Definition: Environment, Ecology. <ol style="list-style-type: none"> <li>1) Air pollution: Sources, Causes, effects and remedial measures.</li> <li>2) Water pollution: Definition, Sources, Causes, effects and remedial measures, water quality standards, water treatment process.</li> <li>3) Noise Pollution: Definition, Sources, Causes, effects and remedial measures, Requirements of good acoustical conditions.</li> <li>4) Land pollution: Definition, Sources, Causes, effects and remedial measures, waste land managements.</li> <li>5) Solid Waste Management &amp; Disposal of Electronic Wastes</li> <li>6) Use of Eco-friendly materials in Construction, Concept of Green Building</li> </ol> </li> </ol>	7
<p><b>Unit 6</b>  <b>Protection of Environment:-</b>  Environmental education and awareness, conservation of natural resources, legislations and legislation and acts:-</p> <ol style="list-style-type: none"> <li>1) The Water (prevention and control of pollution) Act 1974.</li> <li>2) The Air (prevention and control of pollution) Act 1981.</li> <li>3) The Wild Life Protection Act 1972.</li> <li>4) The Indian Forest (conservation) Act 1927.</li> <li>5) The Environmental Protection Act 1986.</li> <li>6) The Motor Vehicle Act 1988.</li> </ol> <p><b>Note:-knowledge of salient features, objective and powers for violating various acts is desirable.</b></p>	7

**Term Work/Practicals/Assignments**

The term work shall consist of list of experiment to be performed in the field and drawing of sketches

**List of Experiments:**

- 1) Chaining and Ranging.
- 2) Measurement of bearings using Prismatic Compass.
- 3) Measurements of R.L.'S of given points using Dumpy Level.
- 4) Visit to building construction site for the study of various building components.

And

Drawing of sketches on quarter part of sheets: - (Any four from the followings)

- 5) Foundation ----- 2 nos.
- 6) Masonry ----- 2 nos.
- 7) Doors and Windows ---- 2 nos.
- 8) Stairs ----- 2 nos.
- 9) Lintel and Floor----- 1 no.
- 10) Roof ----- 1 no.
- 11) Flow diagrams of conventional Water and Waste Water treatments.

**Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)****References:**

- 1) Building Design and Drawing ..... By Kale & Patki. (Tata-McGraw Hill Publication).
- 2) Introduction to Surveying ..... By Anderson (McGraw Hill international )
- 3) Elementary Seismology ..... By Richter C. F.
- 4) Water Resource Engineering ..... By Garg S. K.
- 5) Environmental Engineering and Management .... By Dhaneja.
- 6) Elements of Civil and Environmental Engineering by R Rajendra Prasad

**Text Books:**

- 1) Building Materials ..... By Rangwala.
- 2) Building Construction ..... By Punmia B. C.
- 3) Surveying I & II..... By Punmia B. C.
- 4) Hydrology and Water Resource Engineering ..... By Garg S. K.
- 5) Water Supply and Sanitary Engineering ..... By Birdie.
- 6) Acts – Published By The Director, Government Printing Stationary & Publications, Maharashtra, Mumbai.
- 7) Environmental pollution Control Engineering ..... By Rao C. S.
- 8) Environmental Engineering Vol. – II ..... By Garg S. K.

## Workshop

**Practical – 4 hrs/week**

**Term Work 50 marks.**

### Course Objectives

Students should know the basic manufacturing processes, engineering materials, use of hand and power tools, common measurement tools.

### Course outcomes

Course Contents	Hrs
<b>Unit 1</b> <b>MEASURING INSTRUMENTS</b> Brief introduction to instruments like Steel rule, Vernier caliper, Micrometer, Dial indicator, Their least counts, common errors & care while using them, Use of marking gauge, 'V' block and surface plate.	4
<b>Unit 2</b> <b>CARPENTRY</b> 1. Workshop Diary recording the following contents a) Study of timber, classification, defects, seasoning and preservation. b) Study of carpentry tools, uses, care & maintenance. c) Study of carpentry joints and operations. d) Study of wood turning lathe 2. Practical: Simplex exercise involving planning, sawing, chiseling, formation of a carpentry joint (one job) Demonstration: Wood turning operation	12
<b>Unit 3</b> <b>SHEET METAL WORKING</b> 1. Workshop diary: Sheet metal working tools and their use, various joints in sheet metal working. 2. Practical: A job involving development of surface, marking, cutting, bending, brazing and formation of joints.(any one type.)	8
<b>Unit 4</b> <b>FITTING:</b> 1. Workshop diary: Study of fitting tools, operations and joints 2. Simple exercise involving marking, sawing, drilling and tapping operation (one job with Male Female Joint)	12
<b>Unit 5</b> <b>WELDING:</b> Study of electric arc welding tools and equipments, welding joints. Demonstration of Arc welding (Minimum two joints from lap, butt, T joints)	6
<b>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)</b> <b>RECOMMENDED BOOKS:</b> 1. B. S. Raghuvanshi, A Course in Workshop Technology, Vol – I, Dhanapat Rai and Sons. 2. Hajara Choudhari, Elements of Workshop Technology, Vol – I, Media Promoters. 3. Gupta and Kaushik, Workshop Technology, Vol – I, New Heights. 4. Chapman, Workshop Technology, Vol – I, The English Language Book Society. 5. H.S.Bawa, Workshop technology, Vol.-I, TMH Publications, New Delhi	

## ENGINEERING MATHEMATICS –II

**Theory: 60 Marks    Online MCQ Test : 20 Marks    Test : 20 Marks    Term Work : 25 Marks**

### Course Objectives

1. Provide a conceptual study of functions of several variables viz. Limits and continuity, derivatives, and integration along with its applications to engineering problems.
2. Study Fourier series expansion of functions on a finite domain

### Course outcomes

1. Understand the concept of limits and continuity of functions of multiple variables.
2. Partial differentiation and application to extreme values of functions.
3. Able to express continuous and piecewise continuous functions as series of periodic functions.

Course Contents	Hrs
<b>Unit 1</b> <b>Functions of Several Variables</b> Introduction, Function of Two Variables, Chain Rule, Implicit Function, Partial Derivatives with Constrained Variable, Homogeneous Function. TB-2 : 11.1, 11.2, 11.3, 11.4, 11.5 TB-1: 12.1, 12.2, 12.3, 12.5, 12.6 TB-4: 2.2, 2.3, 2.4.1	7
<b>Unit 2</b> <b>Application of Partial Derivative</b> Jacobians, Properties of Jacobian a) Chain Rule b) $j_{ij}=1$ , Functional Dependence, Extreme values of two or more Variables. (No Lagrange method of multipliers) TB-2: 11.7 TB-1: 12.8 TB-4: 2.5	7
<b>Unit 3</b> <b>Double Integral</b> Introduction to some standard curves Cartesian and polar form of curve Astroid, b) Cycloid, c) Cardioid, d) Catenary, double integrals in Cartesian Form, Double Integrals in Polar Form, Change of Order. TB-1: 13.1, 13.3, 13.7 TB-2: 12.1, 12.2, 12.3 TB-4: 2.6.1, 2.6.3	7
<b>Unit 4</b> <b>Triple Integrals</b> Triple Integrals in Rectangular Co-ordinates, Triple Integrals in Cylindrical Co-ordinates, Triple Integrals in Spherical Polar Co-ordinates TB-1: 13.4, 13.6 TB-4: 2.6.2, 2.6.2 TB-2: 12.4, 12.5	7
<b>Unit 5</b> <b>Application of Multiple Integrals</b> Applications of Double Integral to find area and Volume, Applications of Triple Integrals for Volume. TB-4: 2.6.2 TB-2: 12.2, 12.3, 12.4, 12.5	7



TB-1: 13.1, 13.2, 13.3, 13.4	
<b>Unit 6</b> <b>Fourier Series</b> Introduction (Dirichelt's Conditions), Fourier Series of any period $p=1l$ , Fourier series of Even and Odd function, Half Range Expansions. TB-3: 10.2, 10.3, 10.4 TB-4: 9.2, 9.2.1, 9.3, 9.3.1	7
Term Work/Practicals/Assignments	
<b>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)</b> <ol style="list-style-type: none"> <li>a) George B.Thomas, Jr. &amp; Ross L. Finney, <i>Calculus</i>, pub. Pearson Education,</li> <li>b) Ninth Edition ,2008.</li> <li>c) Monty J. Strauss, Gerald L . Bradley, Karl J. Smith, <i>Calculus</i>, Pearson Education, 2007</li> <li>d) Erawin Kreyszig, <i>Advance Engineering Mathematics</i>, Wiley India Pvt. Ltd New D elhi , Ninth Edition, 2008.</li> <li>e) R.K. Jain and S.R,K, Iyenger, <i>Advanced Engineering Mathematics</i>, Narosa Publication House, New Delhi,third edition 2009.</li> </ol> <b>REFERENCE BOOK</b> <ol style="list-style-type: none"> <li>a) Howard Anton, Irlbivens Stephen Davis , <i>CALCULUS publication</i> Willy Indian , 7<sup>th</sup> edition,2012.</li> </ol> Dr. B. S. Grewal, <i>Higher Engineering Mathematics</i> , pub. Khanna publishers, 41 <sup>st</sup> Edition,2011.	

<b>Engineering Chemistry</b>		
<b>Theory paper: 80 Marks</b>	<b>Test : 20 Marks</b>	<b>Term Work : 25 Marks</b>
<b>Course Objectives</b>		
<ol style="list-style-type: none"> <li>1. To develop analytical ability.</li> <li>2. To integrate pure chemistry principles with Engg. Applications.</li> <li>3. To understand the chemistry behind the development of engineering materials.</li> </ol>		
<b>Course Outcome:</b>		
At the end of course student will come to know about analytical skills for quality control. Students will also understand chemical approach behind the development of engineering materials.		
<b>Course Contents</b>		<b>Hrs</b>
<b>Unit 1</b>		
<b>WATERS</b>		
Hardness, types of hardness, causes of hardness, disadvantageous of hard water, determination of hardness by EDTA method & its Numerical, effect of hard water in steam generation and its prevention measures Water softening methods:- Lime soda, Zeolite and Ion exchange process. Methods for Desalination of water: a) Electrodialysis b) Reverse osmosis.		<b>7</b>
<b>Unit 2</b>		
<b>FUELS</b>		
Definition, classification, characteristics of good fuel, calorific value and its types, Dulong's formula for calculation of GCV and NCV Determination of calorific value of fuel: - i) Bomb calorimeter, ii) Boys gas calorimeter and its numerical. Analysis of solid fuel:- i) proximate analysis ii) Ultimate analysis & numerical, Carbonization of coal. Liquid fuels: octane number of petrol and cetane number of diesel, power alcohol. Gaseous fuel: comp. properties and uses of NG, LNG, CNG and LPG. Numerical based on combustion calculation.		<b>8</b>
<b>Unit 3</b>		
<b>POLYMERS.</b>		
Introduction, classification, techniques of polymerization with examples, free radical mechanism of addition polymerization, Condensation and Copolymerization. Plastics: Introduction and types (thermosofts and thermosets) Rubber: Introduction Extraction, treatment and vulcanization of rubber, advt. of vulcanized rubber over natural rubber. Speciality polymer: Biodegradable and Conducting polymers.		<b>8</b>
<b>Unit 4</b>		
<b>COMPOSITES</b>		
Composites: introduction, characteristics, applications of composites, constituents of composites, types of composites- 1) Fibre reinforced composites:-glass fibre reinforced, carbon fibre reinforced 2) Particulate Composites:-oxide based, carbide based 3) Layered composites.		<b>6</b>
<b>Unit 5</b>		
<b>LUBRICANTS</b>		
Introduction, classification with examples, functions of a good lubricant, lubrication, mechanism of lubrication (thick film, boundary and extreme pressure lubrication), Properties of Lubricant: - Acid value, saponification number, flash and fire point, viscosity & Viscosity index.		<b>5</b>

<p><b>Unit 6</b>  <b>CORROSION SCIENCE</b>  Definition, types of corrosion: dry and wet corrosion, galvanic, differential aeration corrosion, pitting bed-worth rule, factors affecting rate of corrosion, methods of corrosion control:  i) Proper designing ii) Using pure metal iii) Using metal alloys iv) cathodic protection v) metal coatings-galvanizing, tinning, metal cladding.</p>	<p><b>6</b></p>
<p><b>List of Experiment:</b></p> <ol style="list-style-type: none"> <li>i. Determination of Total hardness of water by EDTA method.</li> <li>ii. Determination of alkalinity of given water sample.</li> <li>iii. To determine chloride ion in a given water sample by Mohr's method.</li> <li>iv. Determination of free CO<sub>2</sub> in a given sample of water.</li> <li>v. To determine moisture content of given coal sample by proximate analysis.</li> <li>vi. To determine Ash content of given coal sample by proximate analysis.</li> <li>vii. To study determination of calorific value of solid fuel by Bomb calorimeter.</li> <li>viii. To study determination of calorific value of gaseous fuel by Boys gas calorimeter.</li> <li>ix. Preparation of Urea formaldehyde resin (Amino Resin).</li> <li>x. Preparation of Phenol formaldehyde resin (Bakelite).</li> <li>xi. To study the rate of corrosion of metal sample in given medium.</li> <li>xii. Determination of acid value of given oil sample.</li> </ol>	
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1) Engineering Chemistry by P. C. Jain &amp; M. Jain, Dhanpat Rai and Sons Publication. 15<sup>th</sup> edition</li> <li>2) Engineering Chemistry, Wiley India Pvt. Ltd.</li> <li>3) Engineering Chemistry by S. S. Dara, S. Chand Publication.</li> <li>4) Fundamentals of Engineering Chemistry by S. K. Singh, New Age International Publications</li> </ol>	

<b>Elements of Mechanical Engineering</b>		
<b>Theory: 80 Marks</b>	<b>Test: 20 Marks</b>	<b>Term-Work: 25 Marks</b>
<p><b>Course Objectives</b></p> <p>The subject Elements of Mechanical Engineering deals with the basic mechanical devices and their applications. Being an engineering graduate of any discipline, he/she should know about the basic mechanical devices and how to operate them efficiently in day to day life. The subject covers the power consuming devices like air conditioners, refrigerators, air compressors, etc. power developing devices like I.C. engines, turbines and the simple machining processes like drilling, milling, grinding, casting etc.</p> <p>Also everyone should know the different types of conventional as well as non-conventional energy sources and their harvesting to avoid energy crisis.</p>		
<p><b>Course outcomes</b></p> <p>After the study of subject Elements of Mechanical Engineering, the student will be able to understand the basic working principle of power consuming devices, power developing devices and various machining processes etc. The student should know how to consume power and how to develop power efficiently. Also the student know the various energy sources, various thermodynamic properties, various Engineering materials and their properties and various power cycle to operate the devices efficiently to save power and energy .</p>		
<b>Course Contents</b>		<b>Hrs</b>
<p><b>Unit 1</b></p> <p><b>a) Sources of Energy:</b>            Conventional energy sources: Thermal, Nuclear, Hydraulic power plants            Non conventional energy sources: Wind, Solar, Tidal, Geothermal, Ocean, Wave energies,            Energy crises and saving of energy.</p> <p><b>b) Fundamentals of Thermodynamics</b>            Thermodynamic systems, properties and processes, quasistatic process. State and path function, thermodynamic equilibrium, pure and working substances, basic properties            Temperature, pressure, volume.</p>		<b>7</b>
<p><b>Unit 2</b></p> <p><b>Basic laws of Thermodynamics:</b>            Zeroth law of thermodynamics, measurement of temperature, mercury thermometers, pyrometer, manometer, bourdon tube pressure gauge and its measurements (simple numerical treatment) heat and work. First law of thermodynamics: Law of conservation of mass and energy, Joules experiment, PMMI, first law of cyclic and non cyclic process, concept of internal energy, specific heat, enthalpy, entropy, limitation of first law and statements of second law of thermodynamics.</p>		<b>7</b>
<p><b>Unit 3</b></p> <p><b>Ideal gases:</b>            Definition, laws of ideal gases, characteristics gas equation, universal gas constant, various ideal gas processes for non flow system to calculate internal energy, heat transfer, work transfer, enthalpy with numerical treatment.</p>		<b>7</b>

<p><b>Unit 4</b>  <b>Introduction to thermal machines:</b>  <b>a)</b> Working principle and applications of Power developing devices: I.C. Engines (Two stroke, Four stroke) comparison, constant pressure gas turbine, water turbine (Pelton turbine only).  <b>b)</b> Working principle &amp; application of Power consuming devices: Air compressor, house hold refrigerator, window air conditioner.</p>	<p style="text-align: center;"><b>4</b></p> <p style="text-align: center;"><b>3</b></p>
<p><b>Unit 5</b>  <b>Power transmission drives and material properties:</b>  a) Introduction to velocity ratio, belts, types of belts, pulleys, working and applications, gear, gear tooth terminology,(limited to spur gear), types of gears and their applications.  b) <b>Material properties:</b>  Ferrous metal (cast iron, mild steel, stainless steel) and non ferrous metals (Aluminum, copper) Non-metal (Timber, glass, plastic and polymers.)  Limited to properties and application.</p>	<p style="text-align: center;"><b>4</b></p> <p style="text-align: center;"><b>3</b></p>
<p><b>Unit 6</b>  <b>Manufacturing processes:</b>  Working principle and applications of Casting, Rolling, Welding, Brazing and Soldering, machining processes on lathe machine, drilling machine, milling machine, grinding machine, CNC machines.</p>	<p style="text-align: center;"><b>7</b></p>
<p><b>Term Work/Practicals/Assignments</b></p> <ol style="list-style-type: none"> <li>i. Study and demonstration of 2/4 Stroke engine.</li> <li>ii. Study and demonstration of House hold refrigerator.</li> <li>iii. Study and demonstration of Air conditioner</li> <li>iv. Study and demonstration of Air compressor</li> <li>v. Study and demonstration of Boilers: (one H.P. and one L.P.)</li> <li>vi. Study and demonstration of Lathe machine</li> <li>vii. Study and demonstration of Grinding machine</li> <li>viii. Study and demonstration of Milling machine</li> <li>ix. Study and demonstration of Drilling machine</li> <li>x. Study and demonstration of CNC machine</li> </ol>	

**Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)**

- |   |    |   |
|---|----|---|
| 1. Thermal Engineering                                | by | R.K. Rajput -Laxmi publications                               |
| 2. Thermal Engineering                                | by | D.S. Kumar-katari publications                                |
| 3. Thermodynamics                                     | by | P.K. Nag - Tata McGraw hill                                   |
| 4. Manufacturing processes                            | by | R.K. Jain – Khanna publications                               |
| 5. Machine Design                                     | by | V.B.Bhandari -Tata McGraw hill                                |
| 6. Workshop technology                                | by | HajaraChoudhary-media promotors                               |
| 7. Thermal Engineering                                | by | P.L.Ballaney – Khanna publications                            |
| 8. Thermodynamics                                     | by | Yunus A. Cengel, Machael A Boles Tata McGraw hill Publication |
| 9. Workshop Technology Vol.-I, II, III                | by | Chapman-India Publishing House.                               |
| 10. Heat Engine Vol.-I, II, III                       | by | R.C. Patel –charotar publishing.                              |
| 11. Thermodynamics                                    | by | Zeemansky-McGraw hill   |
| 12. Material science and engineering an introduction. | by | William.D.callister-john wiley and sons.                      |
| 13. Principles of refrigeration                       | by | Roy.J. Dossat- Pearson education.                             |
| 14. CNC Machines                                      | by | B.S. Pabla-willey eastern Ltd.                                |
| 15. Fundamentals of metal cutting And machine tools   | by | G.S. Sekhon-New age international publishers.                 |

<b>Computer Fundamentals and C-Programming</b>	
<b>Theory: 60 Marks Online MCQ Test : 20 Marks Test : 20 Marks Term Work/Practical : 50 Marks</b>	
<b>Course Objectives</b>	
<ol style="list-style-type: none"> <li>1. To make students aware of basics about computers, hardware, software and operating system.</li> <li>2. To identify a problem that requires programmed solution.</li> <li>3. To develop programming skill in a student to write programs in C language.</li> </ol>	
<b>Course outcomes</b>	
<ol style="list-style-type: none"> <li>1. Students will understand fundamentals of computer.</li> <li>2. Students will able to write programs using various concepts of C language.</li> </ol>	
<b>Course Contents</b>	<b>Hrs</b>
<b>Unit 1</b> <b>Computer and C-Programming Fundamentals</b> Introduction to computer, hardware, software, operating system. Introduction to computer problem solving, fundamental algorithms, algorithm and flowchart, types of programming language. Introduction to C language, tokens, character set, constants, variables, data types, keywords, expressions, operators in C and its types, standard input- output statements in C, structure of C-program.	<b>8</b>
<b>Unit 2</b> <b>Decision making statements, control statements and loops in C</b> Decision making statements- if-statement, if-else statement, nested if-else statement, if-else-if statement, control statement - switch-case statement, loops - while loop, do-while loop and for loop, break, continue and go-to statement.	<b>8</b>
<b>Unit 3</b> <b>Arrays and Strings</b> Introduction to arrays, types of arrays- one dimensional array and two dimensional array, initialization and declaration of one and two dimensional arrays, operations on one and two dimensional arrays, introduction to strings, initialization and declaration of strings, operations on strings.	<b>6</b>
<b>Unit 4</b> <b>Introduction to function and its types</b> Standard library functions and user defined functions, function declaration, function definition and function call - call by value and call by reference, return statement, recursion, introduction to pointers, pointer declaration, pointer operators, pointer arithmetic, use of pointers with functions, arrays and strings.	<b>6</b>
<b>Unit 5</b> <b>Structure and Union</b> Introduction to structure- declaration of structure, initialization and declaration of structure variables and accessing members of structure variables, arrays of structure, structure within structure, pointer to structure, passing structure to functions, unions.	<b>6</b>
<b>Unit 6</b> <b>File Handling</b> File declaration, opening a file, closing a file, writing data into files, reading data from files and random access files.	<b>6</b>

**Term Work/Practicals/Assignments**

Term work should consist of a record in the form of a journal with at least 20 programs from the guidelines given below. Journal should include algorithms, flowcharts and printouts of the programs along with output. All C programs should be implemented in linux environment in gcc compiler.

1. Study of computer system and its peripherals - CPU, Input Unit - Keyboard, Mouse, Joystick, Scanner, Output Unit - Monitor, Printer, Plotter. Storage Unit – RAM, HDD, CDROM, LAN, Computer lab Network.
2. Study of operating system – Windows, Unix, Linux etc.
3. Write programs to implement simple/basic concepts of C.
4. Write programs to implement decision making and control statements in C – if-else, nested if-else, if-else-if and switch-case statement.
5. Write programs to implement loops in C – while, do-while and for loop.
6. Write programs to implement arrays in C – one dimensional and two dimensional arrays.
7. Write programs to implement string operations in C – strlen(), strcpy(), strcat(), etc.
8. Write programs to implement functions in C.
9. Write programs to implement pointers in C.
10. Write programs to implement structures in C.

Write programs to implement file handling functions in C – fopen(), fclose(), fread(), fwrite(), etc.

**Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)****Text Books**

1. E.Balagurusamy, “Programming in ANSI C” , Tata McGraw Hill
2. Bayron S Gottfried, “Programming with C”, Tata McGraw Hill

**Reference Books**

1. R.G.Dromey, “How to Solve It By Computer”, Pearson Education
2. K. R. Venugopal, Sudeep R. Prasad, “Programming with C”, Tata McGraw Hill.
3. Kernighan Brian W. & Ritchie Dennis M., “The C ANSI C Programming Language”, Pearson Education Asia.
4. Yeshwant Kanetkar, “Let Us C”, BPB Publication.
5. E.Balagurusamy, “Fundamentals of Computers”, Tata McGraw Hill



## Engineering Mechanics

**Theory: 60 Marks    Online MCQ Test : 20 Marks    Test : 20 Marks    Term Work : 25 Marks**

### Course Objectives

Basic concepts of Mechanics for Static and Dynamics have to be implanted into the student.

### Course outcomes

At the end of this course the student should be able to understand, static equilibrium of particles and rigid bodies in two dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

Course Contents	Hrs
<b>Unit 1</b> <b>1.1 System of Coplanar forces:</b> Resultant of Concurrent forces, Parallel forces, Non Concurrent Non Parallel system of forces, Moment of force about a point, Couples, Varignon's Theorem. Equivalent force-couple system, Distributed Forces in plane.	7
<b>Unit 2</b> <b>2.1 Equilibrium of system of coplanar forces:</b> Condition of equilibrium for concurrent forces, parallel forces and Non concurrent Non Parallel general forces and Couples. <b>2.2 Beam:</b> Types of beams, Types of Supports, Types of loading, Support reaction	7
<b>Unit 3</b> Analysis of plane trusses by using method of joints and method of sections (max.10 members truss) <b>3.1</b> members truss) <b>3.2</b> Centroid of plane laminas, moment of inertia of plane laminas & Polar M.I.	7
<b>Unit 4</b> <b>4.1 Friction :</b> Laws of friction, cone of friction ,equilibrium of bodies on horizontal plane, an inclined plane, connected bodies, application to problems involving wedge friction and ladders. <b>4.2 Belt Friction:</b> Transmission of power by belts and ropes, centrifugal and initial tension in the belts and ropes. Condition for maximum power transmission. Flat belts on flat pulleys & ropes on grooved pulleys.	6
<b>Unit 5</b> <b>5.1 Kinematics of Particle:</b> <b>a. Rectilinear Motion:</b> Introduction to Types of motions, Displacement, Velocity & acceleration rectilinear motion with uniform velocity, uniform acceleration and variable acceleration, motion curves (s-t, v-t & a-t curves), relative velocity. <b>b. Curvilinear Motion:</b> Tangential and normal components of acceleration. Projectile motion	7
<b>Unit 6</b> <b>6.1 Kinetic of a Particle:</b> Newton's laws of motion, D'alambert's Principle <b>6.2</b> Work, Power, Energy, conservation of energy, principle of work energy, impulse momentum principle, collision of elastic bodies, Coefficient of restitution, Direct and oblique	

collision.

6

**6.3 Kinetics of rigid body:** centroidal & Non- Centroidal rotation of rigid body.

### **Term Work/Practicals/Assignments**

The distribution of marks for term work shall be as follows:

Laboratory work (Experiment / journals): **10 marks**

Assignments : **10 marks**

Attendance (Theory and Practical) : **05 marks**

Term work shall consist of record of laboratory/ practical work as listed below

**A) Graphical solution of Engineering Mechanics problems, Two problems each on resultant & Equilibrium.**

#### **B) Any three Experiments from the following**

1. Verification of law of polygon of force/parallelogram of forces
2. Determination of coefficient of friction by inclined plane apparatus
3. To find the coefficient of friction between Belt and pulley friction
4. To find the moment of inertia of fly wheel

#### **C) Study of machines**

1. Single purchase crab / Worm and worm wheel
2. Screw Jack / Different axle and wheel of differential pulley block

#### **D) Assignments**

Analytical solution of at least four problems on each unit based on above syllabus

### **Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)**

#### **Text Book**

1. Engineering Mechanics by Merium, Wiley
2. Engg. Mechanics by Timoshenko and Young
3. Engg. Mechanic by Beer and Jonhston
4. Engg. Mechanics by Bhavikatti

#### **Reference Book**

1. Engg. Mechanics by Nelson
2. Engg. Mechanics by Singer
3. Engg. Mechanics by Hibbler

## COMMUNICATION SKILLS

<b>Lectures: 2 Hrs/week</b>	<b>Practical: 2 Hrs/week</b>	<b>Term Work: 50 Marks</b>
<b>Course Objectives</b> <ol style="list-style-type: none"> <li>1. To hone basic Communication Skills (LSRW) of the students by exposing them to the key communication techniques, and thereby</li> <li>2. To improvise Comprehension and Expressional Skills of the students required for day to day; classroom and academic situations</li> </ol>		
<b>Course outcomes</b> <ol style="list-style-type: none"> <li>1. At the end of the Course, a student will be able to express himself and participate in the classroom discussions and other such academic or academic support activities.</li> <li>2. In general, the students will develop the ability to communicate effectively using suitable styles and techniques</li> </ol>		
<b>Course Contents</b>		<b>Hrs</b>
<b>Unit 1</b> <b>Grammar and Vocabulary</b> <ol style="list-style-type: none"> <li>1. Forms of Tenses</li> <li>2. Articles</li> <li>3. Prepositions</li> <li>4. Use of Auxiliaries &amp; Model-auxiliaries</li> <li>5. Synonyms and Antonyms</li> <li>6. Common Errors</li> </ol>		<b>10</b>
<b>Unit 2</b> <b>Phonetics</b> <ol style="list-style-type: none"> <li>1. Study of Speech Organs' figure</li> <li>2. Understanding Phonetics</li> <li>3. List of phonetic alphabets</li> </ol>		<b>2</b>
<b>Unit 3</b> <b>Oral Communication Skills</b> <ol style="list-style-type: none"> <li>1. Effective Speech</li> <li>2. Telephonic Etiquettes</li> <li>3. Extempore</li> <li>4. Elocution</li> <li>5. Describing Experience, Event or Story</li> </ol>		<b>3</b>
<b>Unit 4</b> <b>Listening Skills</b> <ol style="list-style-type: none"> <li>1. Importance of Listening</li> <li>2. Types of Listening</li> <li>3. Barriers to Listening</li> <li>4. Commands of Listening</li> </ol>		<b>3</b>
<b>Unit 5</b> <b>Reading Skills</b> Importance of Reading Types of Reading An Introduction to Reading Comprehension		<b>2</b>

<p><b>Unit 6</b></p> <p><b>Written Communication Skills</b></p> <ol style="list-style-type: none"> <li>1. Letter writing       <ol style="list-style-type: none"> <li>a. Formal letters (Letter of Inquiry, Complaint, Order &amp; Application for T.C., and Leave</li> <li>b. Personal Letters ( Letter to Family Members, Friends &amp; Relatives )</li> </ol> </li> <li>2. Essay writing (Technical, Social or Current Topics)</li> <li>3. Story Building</li> <li>4. Dialogue writing</li> </ol>	<p><b>5</b></p>
<p><b>Term Work/Practicals/Assignments</b></p> <p>Minimum 8 should be performed from the following list.</p> <ol style="list-style-type: none"> <li>i. Elocution</li> <li>ii. Vocabulary building</li> <li>iii. Comprehension (Ask students to read given passage carefully and solve questions based on it)</li> <li>iv. R.P (Make use of Language Laboratory for Received Pronunciation word Practice)</li> <li>v. Express Daily routine</li> <li>vi. Extempore</li> <li>vii. Teamwork- story making</li> <li>viii. Effective reading (Newspaper articles)</li> <li>ix. Active listening and Note making</li> <li>x. Grammar activities</li> <li>xi. Letter writing Activities</li> <li>xii. Situational conversation</li> </ol>	
<p>Text Books (Name of the author, Book Title, name of the Publisher, edition, year of publication)</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>i. Business Communication by Sangeeta Magan, Biztantra, 2010</li> <li>ii. Professional Communication Skills (Revised Edition) by Er. A.K. Jain, Dr. Pravin, S.R. Bhatia, Dr. A.M. Sheikh, S.Chand, New Delhi, 2011</li> <li>iii. Spoken English: A Manual of Speech and Phonetics (4<sup>th</sup> Edition) by R.K. Bansal and J.B. Harrison, Orient Blackswan,2013</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>i. Communication Skills Handbook: How to Succeed in Written and Oral Communication by Jane Summers, Brette Smith, Wiley India Pvt.Ltd.</li> <li>ii. Speaking Accurately by K.C. Nambiar, Cambridge University Press New Delhi.</li> <li>iii. Effective Technical Communication by Ashraf Rizvi, Tata McGraw-Hill</li> <li>iv. Better English Pronunciation by J.D. O'Connor, Cambridge University Press Delhi, 2009</li> <li>v. Speaking Effectively by Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi.</li> <li>vi. Improve your Communication Skills by Barker, Kogan Page India Pvt, Ltd.</li> <li>vii. Technical Writing and Professional Communication for Non-native Speakers of English by Thomas N. Huckin &amp; Leslie A. Olsen, McGraw-Hill</li> <li>viii. Mastering Communication by Nicky Stanton, Palgrave Master Series</li> <li>ix. The Oxford Guide to Writing and Speaking by John Seely, Oxford University Press, New Delhi</li> <li>x. The Ace of Soft Skills: Attitude, Communication and Etiquette for Success: by Gopaldaswamy Ramesh, Mahadevan Ramesh, Pearson Education India,2010</li> <li>xi. Technical Communication: Principles and Practice (2<sup>nd</sup> Edition), Sangeeta Sharama, Meenakshi Raman, Oxford University Press, 2012</li> <li>xii. English Grammar and Composition by Rajendra Pal and Prem Lata Suri, Sultan Chanda and Sons Publisher.</li> </ol>	