SOLAPUR UNIVERSITY, SOLAPUR

FACULTY OF ENGINEERING & TECHNOLOGY

ALL BRANCHES

CBCS Syllabus for

F.E. (All Branches) w.e.f. Academic Year 2016-17

SOLAPUR UNIVERSITY, SOLAPUR
FACULTY OF ENGINEERING & TECHNOLOGY
CBCS Curriculum for First Year (All Branches)
WEF 2016-17

- Semester I : Theory Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
C011/ C012	Engineering Physics / Engineering Chemistry$	4			4	70	30		100
C112	Engineering Mathematics I	3			3	70	30		100
C113	Applied Mechanics	4			4	70	30		100
C114	Basic Electrical Engineering	3			3	70	30		100
C115	Basic Mechanical Engineering	3			3	70	30		100
C116	Communication Skills	1			1		25		25
	Total	18			18	350	175		525

- Semester I : Laboratory / Tutorial Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
C011/ C012	Engineering Physics / Engineering Chemistry$			2	1			25	25
C112	Engineering Mathematics I		1		1			25	25
C113	Applied Mechanics			2	1			25	25
C114	Basic Electrical Engineering			2	1			25	25
C115	Basic Mechanical Engineering			2	1			25	25
C116	Communication Skills			2	1			25	25
C117	Workshop Practice			2	1			25	25
	Total		1	12	7			175	175
	Grand Total	**18**	**1**	**12**	**25**	**350**	**175**	**175**	**700**

- Semester II : Theory Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
C011/ C012	Engineering Physics / Engineering Chemistry$	4			4	70	30		100
C122	Engineering Mathematics II	3			3	70	30		100
C123	Engineering Graphics	3			3	70	30		100
C124	Basic Civil Engineering	3			3	70	30		100
C125	Computer Programming	2			2		25		25
C126	Basic Electronics	2			2	35	15		50
C127	Professional Communication	1			1		25		25
	Total	18			18	315	185		500

- Semester II : Laboratory / Tutorial Courses

Course Code	*Name of the Course*	*Engagement Hours*			*Credits*	*FA*	*SA*		*Total*
		L	*T*	*P*		*ESE*	*ISE*	*ICA*	
C011/ C012	Engineering Physics / Engineering Chemistry$			2	1			25	25
C122	Engineering Mathematics II		1		1			25	25
C123	Engineering Graphics			4	2			25	25
C124	Basic Civil Engineering			2	1			25	25
C125	Computer Programming			2	1	25#		25	50
C126	Basic Electronics			2*	1			25	25
C127	Professional Communication			2	1			25	25
C128	Audit Course- Workshop for Skill Development			@	AU	Audit Course			
	Total		1	13	8	25		175	200
	Grand Total	**18**	**1**	**13**	**26**	**340**	**185**	**175**	**700**

- Legends used –

L	Lecture	FA	Formative Assessment
T	Tutorial	SA	Summative Assessment
P	Lab Session	ESE	End Semester Examination
		ISE	In Semester Evaluation
		ICA	Internal Continuous Assessment

- **Notes-**

1. $ - Indicates approximately half of the total students at FE will enroll under Group A and remaining will enroll under Group B.

   Group A will take up course of Engineering Physics (theory & laboratory) in Semester I and will take up course of Engineering Chemistry (theory & laboratory) in semester II.

   Group B will take up course of Engineering Chemistry (theory & laboratory) in Semester I and will take up course of Engineering Physics (theory & laboratory) in semester II

2. * - Indicates the subject 'Basic Electronics' shall have lab session every alternate week

3. # - Indicates the subject 'Computer Programming' shall have a University 'Practical and Oral Examination' at the end of the semester assessing student's programming skills.

4. In Semester Evaluation (ISE) marks shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

   Internal Continuous Assessment Marks (ICA) are calculated based upon student's performance during laboratory sessions / tutorial sessions

5. Audit Course 'Workshop for Skill Development' intends to develop few basic skills amongst student related to any one engineering discipline of student's choice (irrespective of his discipline of admission). There is no separate laboratory hours specified for this course. Student can use some of the respective laboratory sessions in the semester for this course as indicated below. If required, student can work beyond regular engagement hours under supervision of the concerned teacher to complete this course.

Sr.	*Skill Development in*	*Course of which some laboratory hours can be used*
1	Electronics, Electronics & Telecommunication, Electrical, Electrical & Electronics, Biomedical Engineering	Basic Electronics
2	Computer Science & Engineering, Information Technology	Computer Programming
3	Mechanical Engineering, Biomedical Engineering	Engineering Graphics
4	Civil Engineering	Basic Civil Engineering

Each institute is at liberty to decide content to be delivered under this course by an apt teacher. However it is desirable that this course shall nurture individual and team working skills of the student. Some of the exemplary skills (but not limited to) are listed in curriculum of this course.

The summative assessment of this course shall be carried out at institute level and the institute shall certify successful completion of this audit course by student.

6. @- indicates there is no separate laboratory hours for Audit Course- Workshop for Skill Development

Solapur University, Solapur

F.E. (All Branches) Semester-I/II

C011 ENGINERING PHYSICS

Teaching Scheme
Theory – 4 Hrs. /Week

Laboratory– 2 Hrs. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C011.O1	To make student understand basic concepts of crystal.
C011.O2	To make student understand fundamentals of materials and their electronic properties to apply in engineering fields.
C011.O3	To introduce to student concepts of architectural acoustics and non-destructive testing through use of ultrasonic.
C011.O4	To make student develop the orientation towards space-time formulation.
C011.O5	To introduce to student concepts of diffraction and polarization.
C011.O6	To make student comprehend basics of laser devices and optical fiber.
C011.O7	To make student comprehend principles of fission, fusion and nanoscience.

- **Course Outcomes :**

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

C011.1	Express the basic concepts of diffraction and polarization and can relate them to day to day observable phenomena.
C011.2	Reveal the formation of materials and their internal structure.
C011.3	Apply basic concepts of acoustics and ultrasonic for basic civil and other engineering applications.
C011.4	Relate space, time, mass and energy equations.
C011.5	Compile the applications of laser and fiber optics in the field of industry, medical and telecommunication.
C011.6	Explain the principles of fission and fusion, significance for power generation and basic concepts of nanoscience

- **Course Curriculum**

Section I

Unit No 01: Band Theory and Semiconductors			**Hours : 06**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Formation of energy bands (introduction), types of energy bands, classification of solids, semiconductors, Fermi level (definition), Fermi-Dirac probability distribution function (introduction only), Fermi level in intrinsic and extrinsic semiconductors	03	03	Explanation, classification	Remembering, understanding
1.2	Effect of impurity concentration on Fermi level, derivation for E_{Fin}	04	02	Explanation, definition	Remembering, applying
1.3	Hall effect and its applications	05	01	Explanation, derivation numerical	Understanding, applying

Unit No 02: Crystal Physics			**Hours : 09**		**Marks: 14**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Space lattice, basis, unit cell,seven systems of crystals, Bravias lattices	04	03	Explanation, state define	Understanding, remembering
2.2	No of atoms per unit cell, atomic radius, co-ordination number,atomic packing factor, void space, density of crystal (cubic only)	05	04	Explanation, numerical	Remembering, applying
2.3	Symmetry elements (axis, center and plane), Miller indices, inter planner distance (by using Miller indices), Bragg's law	05	02	Explanation, derivation, numerical	Remembering, understanding, applying

Unit No 03: Architectural Acoustics and Ultrasonic			**Hours : 05**		**Marks: 11**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Introduction, reverberation, reverberation time, absorption coefficient (definition only), Sabine's formula, basic requiremnets for acoustically good hall	03	02	Explanation, State define numerical	Understanding, remembering, applying
3.2	Factors affecting acoustics of auditorium and their remedies.	04	01	Explanation, state	Remembering
3.3	Ultrasonic **:**Introduction, 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.	04	02	Explanation, derivation, state	Remembering, understanding,

Unit No 04: Special Theory of Relativity			**Hours : 07**		**Marks: 13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Introduction, postulates of special theory of relativity, Lorentz transformation of space and time	05	02	Explanation, show state	Understanding, remembering, applying
4.2	Length contraction, time dilation, addition of velocities (introduction only),	03	02	Explanation, derivation, numerical	Remembering, understanding, applying
4.3	Relativity of mass, equivalence of mass and energy	05	03	Explanation, derivation, numerical	Remembering, understanding, applying

Section II

Unit No 05: Diffraction and Polarization			**Hours : 08**		**Marks: 14**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Diffraction**:** Fresnel and Fraunhoffer diffraction (introduction only),	03	01	Explanation, classify, state	Understanding
5.2	Resolving power, Rayleigh criterion, theory of diffraction grating and its resolving power.	04	03	Explanation, numerical	Remembering, applying
5.3	Polarization: concept, optic axis, polarization by double refraction, Malus law, positive and negative crystals	03	02	Explanation, state, define classify	Remembering, understanding
5.4	Optical activity, specific rotation, Laurent's half shade polarimeter, application of polarized light.	04	02	Explanation Numerical	Remembering, applying

Unit No 06: LASER			**Hours : 06**		**Marks: 11**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Interaction of radiation with matter- Stimulated absorption, spontaneous and stimulated emission, population inversion, pumping, metastable state, properties of laser	03	02	Explanation, state	Remembering, understanding
6.2	He-Ne laser, semiconductor (injection) laser	05	02	Explanation, state	Remembering, understanding
6.3	Application of laser (industrial and medical), holography (principle, construction and reconstruction)	03	02	Explanation, state	Remembering, understanding

Unit No 07: Optical Fibers			**Hours : 05**		**Marks: 11**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Introduction, structure of optical fiber, basic principle of optical fiber (TIR), propagation of light waves in optical fibers	03	01	Explanation, state	Remembering, understanding
7.2	Derivation for acceptance angle, acceptance cone and numerical aperture, fractional RI change, normalized frequency,	05	02	Derivation, numerical	Remembering, applying
7.3	Classification of optical fibers, difference between- step index and graded index fibers and single mode and multi-mode fiber, power losses in optical fibers, advatntages of optical fibers over conducting wires, fiber optics communication system, applications of optical fibers	03	02	Explanation, classify	Remembering, understanding

Unit No 08: Nuclear Physics and Nanotechnology			**Hours : 08**		**Marks: 14**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
8.1	Nuclear Fission**:** fission as a source of energy, energy released by 1 kg of U235, chain reaction and multiplication factor (introduction),	03	02	Explanation, numerical	Understanding, applying
8.2	Essentials of nuclear reactor and classification of nuclear reactor	05	01	Explanation, classify	Remembering, understanding
8.3	Nuclear Fusion:thermonuclear reactions, P-P cycle, C-N cycle, distinguish between fission and fusion	03	03	Explanation, define, distinguish	Understanding,
8.4	Nanotechnology: introduction,need of nanotechnology, properties of nanomaterials (physical, optical, electrical, magnetic, structural, mechanical), different types of nanostructures: (confinement Dimensions 0-D, 1-D, 2-D and 3-D), carbon nano tubes and its	03	02	Explanation, state, define, classify	Remembering, understanding

	classification, applications of nanotechnology-electronics, energy, automobiles, space and defense, medical, environmental, textile, cosmetics				

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**

ICA shall be based on performance of minimum eight experiments out of below list

1. Measurement of band gap energy of a semiconductor diode.
2. To determine Hall coefficient and charge carrier concentration by Hall Effect.
3. Crystal structures.
4. Determination of velocity of sound using Kundt's tube apparatus.
5. Determination of wavelength of light by using diffraction grating.
6. Resolving power of a telescope/ diffraction grating.
7. Verification of inverse square law of intensity of light (Malus law).
8. To determine specific rotation by using Laurent's half shade Polarimeter.
9. Calculation of divergence of LASER beam.
10. Determination of wavelength of LASER using diffraction grating.
11. Determination of interplanar distance'd' using XRD pattern.
12. Fiber optics.
13. To determine the Numerical Aperture of the optical fiber.
14. To determine the wavelength using Acoustic Diffraction method.

- **Text / Reference Books:**

1. Engineering Physics, R.K. Gaur and S.L. Gupta, Dhanapat Rai Publications
2. A Text Book of Engineering Physics, M.N. Avadhanulu, P.G. Kshirsagar, S. Chand and Company Ltd.
3. Modern Physics,B.L. Theraja, S. Chand and Company Ltd.
4. A Text Book of Optics, Subramanya and Brij Lal, S. Chand and Company Ltd.
5. Nanotechnology: Principles and Practices, Sulabha K. Kulkarni, Capital Publishing Company
6. Nanoscience and Nanotechnology: Fundamentals to Frontiers – M.S. Ramachandra Rao, Shubra Singh, Wiley India Pvt Ltd, New Delhi
7. Engineering Physics, D.K. Bhattacharya, Poonam Tandon, Oxford University Press
8. Solid State Physics, S.O. Pillai, McGraw Hill Publications

Solapur University, Solapur
F.E. (All Branches) Semester-I / II
C012 ENGINEERING CHEMISTRY

Teaching Scheme
Theory – 4 Hrs. /Week

Laboratory– 2 Hrs. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C012.O1	To impart knowledge of importance of quality of water and appropriate water treatment process
C012.O2	To impart knowledge of corrosion & its prevention techniques.
C012.O3	To equip student with the required analytical skills and green chemistry techniques.
C012.O4	To introduce student different engineering materials and their applications.
C012.O5	To make student apply knowledge for determining quality of water, fuel, polymer & oils.

- **Course Outcomes :**

At the end of this course, student will able to

C012.1	Describe importance of quality of water and appropriate water treatment process.
C012.2	Recognize various types of corrosion & propose a suitable prevention technique.
C012.3	Describe various instrumental techniques and environmental friendly chemical syntheses.
C012.4	Identify and explain different engineering materials like metals, ceramics, fuels, lubricants, polymers for various engineering and day to day applications.
C012.5	Calculate hardness of water, concentration of unknown solution, calorific value of fuels, saponification & acid value of oils, molecular weight of polymers etc.

- **Course Curriculum**

Section I

Unit No 01: Water Technology			**Hours : 09**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Introduction, sources of water, impurities in natural water, water quality parameters like pH, acidity, alkalinity, total solids (definition only), dissolved oxygen, BOD, COD, chlorides (definition & determination).	03	02	Explanation	Understanding remembering
1.2	Hardness: causes of hardness, types of hardness (temporary/ permanent), calcium carbonate equivalent hardness, units of hardness and its calculations. (numerical problems on hardness),	04	02	Explanation, numerical	Remembering, understanding, applying
1.3	Estimation of hardness by EDTA method, disadvantages of hard water-domestic, industrial purposes-causes, disadvantages and prevention of scale and sludge formation in boilers**.**	03	02	Explanation	Understanding, remembering,
1.4	Softening of water by Zeolite process, ion exchange process, reverse osmosis process, treatment of water for domestic purpose by aeration, sedimentation, coagulation process, disinfection of water by chloramine, bleaching powder, chlorine, break point chlorination	06	03	Explanation, applications	Remembering, understanding

Unit No 02: Green Chemistry			**Hours : 04**		**Marks:08**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Definition, concept, twelve principles,	04	02	Explanation	Remembering, understanding
2.2	Traditional and greener pathways for synthesis of Indigo dye and Adipic acid.	04	02	Explanation, applications	Remembering, understanding

Unit No 03: Lubricants		**Hours: 07**			**Marks:13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Lubricants & lubrication, functions, classification of lubricants.	04	02	Explanation	Remembering, understanding
3.2	Characteristic properties of lubricants(only definition) such as viscosity, viscosity index, flash point & fire point, cloud point & pour point, aniline point, oiliness, saponification value & acid value (numerical problems on saponification & acid value) types of lubrication such as fluid film,	05	03	Explanation, numerical	Remembering, understanding, applying
3.3	Boundary (thin film) & extreme pressure, selection of lubricants for cutting tools, I.C. engine, gears, transformers, delicate instruments & refrigeration system.	04	02	Explanation, application	Remembering, understanding

Unit No 04: Corrosion and Prevention		**Hours : 07**			**Marks:13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	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.	05	03	Explanation	Remembering, understanding
4.2	Factors influencing corrosion, testing & measurement of corrosion by weight loss method & electrical resistance method Prevention: by proper design & material selection,	04	02	Explanation	Remembering, understanding
4.3	Cathodic protection, anodic protection by anodizing and potentiostat. Protective coatings: methods of application of metal coatings such as hot dipping (galvanization & tinning), metal cladding.	04	02	Explanation	Remembering, understanding

Section II

Unit No 05: : Engineering Materials		**Hours : 07**			**Marks:13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Metallic Materials: types of iron: cast iron, steel & wrought iron: composition, properties & applications, alloys: definition, purposes of making alloys.	04	02	Explanation, application	Remembering, understanding
5.2	Ceramics: definition, classification, properties. Glass: general properties, general method of manufacture of glass, types of glasses: soft, hard, borosilicate, optical, laminated and safety glass.	04	02	Explanation, application	Remembering, understanding
5.3	Composite: definition, properties and applications of fiber reinforced plastics. Adhesive: definition, preparation, properties and applications of epoxy resin. Conductive polymers: basic concepts and applications. Biodegradable Polymers: definition, classification and applications.	05	03	Explanation, application	Remembering, understanding

Unit No 06: Fuels		**Hours : 08**			**Marks:15**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Introduction, classification, characteristics of good fuel, comparison between solid, liquid and gaseous fuel, calorific value (gross and net),	04	02	Explanation	Remembering, understanding
6.2	Determination of calorific value by bomb calorimeter and Boy's calorimeter. Dulong's formula for calorific value. (numerical problems on calorific value.)	07	04	Explanation, Application, Numerical	Remembering, understanding, applying
6.3	Petroleum: introduction, composition, classification, origin, refining of crude oil. Biodiesel: introduction, preparation, advantages and disadvantages.	04	02	Explanation	Remembering, understanding

Unit No 07: Polymers		**Hours : 07**			**Marks:13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Polymerization, degree of polymerization (DP), numerical problems on degree of polymerization, glass transition temperature, melting temperature (only definition), number average & weight average molecular weight (definitions and numerical problems), types of polymerization (no mechanism).	04	02	Explanation, application, numerical	Remembering, understanding, applying
7.2	Plastics: definition, properties, types of plastics (thermo softening and thermosetting), properties and applications of PVC and PET, compounding and molding of plastic into articles: compression, extrusion, transfer & injection.	06	03	Explanation, application	Remembering, understanding
7.3	Rubber: classification, processing of natural rubber, vulcanization, synthetic rubbers, properties and applications of Buna-S and Thiokol rubbers.	03	02	Explanation, application	Remembering, understanding

Unit No 08: Analytical Chemistry		**Hours : 05**			**Marks:09**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
8.1	Concentration of solution-: molarity, molality, normality, mole fraction (definition & numerical problems),	04	03	Explanation, application, numerical	Remembering, understanding, applying
8.2	Chromatography: definition, types. GLC: definition, instrumentation and application of GLC. Thermal analysis: definition of TGA, instrumentation and application of TGA.	05	02	Explanation	Remembering, understanding

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**

  *ICA shall be based on minimum **eight** experiments out of below list*

  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 aluminum 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.
  21. Hands on determination of pH by pH meter
  22. Hands on determination of EMF of acid base titration potentiometer
  23. Hands on Photo colorimeter

- **Text Books:**
  1. A text book of Engineering Chemistry, S.S. Dara, S. S. Umare ,S Chand
  2. A text book of Engineering Chemistry, Shashi Chawala , Dhanpat Rai & Co
  3. A text book of Experiments and Calculations in Engineering Chemistry, S.S. Dara ,S Chand
- **Reference Books:**
  1. Engineering Chemistry, Jain and Jain , Dhanpat Rai & Co
  2. Engineering Chemistry, M. Subha Ramesh, Dr. S. Vairan-Ed.-IInd Wiley
  3. Instrumental Methods of chemical analysis, Chatwal and Anand, Himalaya Pub House
  4. Industrial Chemistry, B.K.Sharma, Goyal
  5. Chemistry for Engineers, Rajesh Agnihotri, Wiley
  6. Fundamentals of Engineering Chemistry, S.K.Singh, New Age Int.

Solapur University, Solapur

F.E. (All Branches) Semester-I

C112 ENGINEERING MATHEMATICS- I

Teaching Scheme
Theory – 3 Hrs. /Week

Tutorial– 1 Hr. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C112.O1	To introduce to student higher order derivatives of various standard functions and Leibnitz's Theorem.
C112.O2	To introduce to student the expansion of functions about any point and to evaluate the indeterminate forms of limits.
C112.O3	To introduce to student De-Moivre's theorem and its application, hyperbolic functions.
C112.O4	To introduce to student rank of matrix, solution of simultaneous equations, Eigen values and Eigen vectors.
C112.O5	To introduce to student partial differentiation and its applications

- **Course Outcomes :**

At the end of this course,

C112.1	Student can write higher order derivative of standard functions
C112.2	Student can express the power series expansion of a given function and evaluate limits
C112.3	Student can apply De-Moivre's theorem to determine roots of polynomial and can express hyperbolic, inverse hyperbolic functions.
C112.4	Students are able to use matrices techniques for solving system simultaneous linear equations , Eigen values and Eigen vectors of the matrix
C112.5	Student can evaluate partial derivatives and can implement to estimate maxima and minima of multivariable function

- **Course Curriculum**

Section I

Unit No 01: Successive Differentiation			**Hours : 05**		**Marks: 13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Definition & symbol, nth derivatives of standard functions like $e^{ax}, \frac{1}{ax+b}, (ax+b)^m, \frac{1}{(ax+b)^m}, \log(ax+b), \sin(ax+b), \cos(ax+b), a^x, e^{ax}Sin(bx+c)$ *and* $e^{ax}\cos(bx+c)$	01	01	Definition	Remembering
1.2	n^{th} derivatives of algebraic functions, n^{th} derivatives of functions belongs to polar form	06	02	Determination of n^{th} order derivative	Remembering, understanding, applying
1.3	Statement of Leibnitz's Theorem (without proof), nth derivative of product of two functions by Leibnitz theorem, formation of higher order differential equations for the given functions	06	02	Determination of n^{th} order derivative	Remembering, understanding, applying

Unit No 02: Expansion of Functions			**Hours : 07**		**Marks: 19**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Statement of Maclaurin's series (without proof), expansion of standard functions and examples using Maclaurin's series. Expansion of functions by standard series method, differentiation and integration, method of substitution.	09	03	Numerical example, evaluate	Remembering, understanding, applying
2.2	Statement of Taylor's series (without proof), expansion of functions *f(x)* about any point	04	02	Numerical example, evaluate	Remembering, applying
2.3	Indeterminate forms of the type $\frac{0}{0}, \frac{\infty}{\infty}, 0\times\infty, \infty-\infty, 1^{\infty}, 0^0, \infty^0$ *by* L Hospital's rule.	06	02	Evaluate, applications	Understanding, applying

Unit No 03:Complex Numbers			**Hours : 09**		**Marks: 20**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Statement of De-Moivre's Theorem (without proof), application of De-Moivre's theorem –roots of algebraic equations	07	04	Numerical example, evaluate, applications	Remembering, understanding Applying
3.2	Circular and Hyperbolic functions , Inverse hyperbolic functions	04	02	Definition, evaluate	Remembering, applying
3.3	Separation of real and imaginary parts, Logarithm of a complex number	09	03	Simplification , applications	Remembering, applying

Section II

Unit No 04: Matrix Algebra			**Hours : 09**		**Marks: 20**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Rank of matrix, canonical form or normal form of matrix	04	02	Numerical example, evaluate	Remembering, understanding
4.2	Solution of homogeneous and non-homogeneous linear equations	04	03	Numerical example, evaluate	Understanding, applying
4.3	Linear dependence and independence of vectors, Cayley - Hamilton Theorem (without proof)	06	02	Definition, applications	Understanding, applying
4.4	Eigen values , Eigen vectors and their properties	06	02	Definition , determination	Remembering, understanding, applying

Unit No 05: Partial Differentiation			**Hours : 06**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Partial derivatives of first and higher order , variable to be treated as constant	04	02	Evaluate	Remembering, understanding
5.2	Total derivative, Partial differentiation of composite function	06	02	Determination	Remembering, understanding,
5.3	Homogeneous functions and Euler's Theorem (without proof)	06	02	Applications	Remembering, applying

Unit No 06 : Applications of Partial Differentiation			**Hours : 06**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Jacobians , properties of Jacobians i.e. $J.J^* = 1$, Jacobians of composite functions	04	02	Definition, applications	Remembering, understanding, applying
6.2	Errors and approximations	04	01	Application, numerical example, evaluate	Remembering, understanding, applying
6.3	Maxima & minima of functions of two variables	05	02	Definition, applications	Remembering, understanding, applying
6.4	Lagrange's method of Undetermined multipliers (one condition)	03	01	applications	Understanding, applying

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**
  ICA shall be based on student's performance during tutorial sessions and on completion of minimum six assignments assignment

- **Text Books:**
  1. A Text Book of Applied Mathematics, P.N. and J.N. Wartikar, Vol.1, Pune Vidyarthi Griha Prakashan.
  2. Advanced Engineering Mathematics, H. K. Dass, S. Chand Publications, Delhi.
  3. Engineering Mathematics (Volume I), ITL Education, Cengage Learning.
  4. Engineering Mathematics, Ravish R Sing and Mukul Bhatt, McGraw Hill.
  5. Applied Mathematics-I,II, Kreyzig's, Wiley.

- **Reference Books**:

  1. Higher Engineering Mathematics (42nd Edition), B.S. Grewal Khanna Publications, Delhi.
  2. Engineering Mathematics, Srimanta Pal and Subodh C. Bhunia, Oxford Higher Education.
  3. Mathematics for Engineering Applications, Kuldip S. Rattan and Naathan W. Klingbeil Wiley. (Modeling and Core Engineering Application)

Solapur University, Solapur
F.E. (All Branches) Semester-I
C113 APPLIED MECHANICS

Teaching Scheme
Theory – 4 Hrs. /Week

Laboratory– 2 Hrs. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C113.O1	To make student understand and predict physical phenomena in engineering mechanics and to lay the foundation for engineering applications by studying statics and dynamics.
C113.O2	To develop amongst student scientific approach and its reasoning for analysis and design of various structural and machine elements.
C113.O3	To promote amongst student processes of problem solving abilities and inculcate experimental, observational, manipulative and investigatory skills in the learners.
C113.O4	To prepare the student for higher level courses in analysis and design of engineering structures and machines.

- **Course Outcomes :**

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

C113.1	Apply fundamental knowledge of engineering mechanics for rigid bodies acted upon by system of forces.
C113.2	Analyze various types of statically determinate pin jointed trusses by analytical and graphical methods.
C113.3	Apply knowledge of kinematics of rigid body motion to solve engineering problems in dynamics.
C113.4	Apply knowledge of kinetics of rigid body motion to solve engineering problems in dynamics.
C113.5	Solve problems relating work, power and energy in various contexts of engineering.

- **Course Curriculum**

Section I: Statics

Unit No 01: Resultant of coplanar forces			**Hours : 07**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	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 a couple, resultant, parallelogram law of forces, triangle law of forces, polygon law of forces. Varignon's theorem	04	03	Definition, explanation, derivations	Remembering, understanding, applying, analyzing
1.2	Composition of co-planar concurrent and non concurrent forces: analytical method, graphical method, Bow's notation.	08	04	Explanation, derivations, numerical examples	Remembering, understanding, applying

Unit No 02: Equilibrium of Rigid Bodies,			**Hours : 08**		**Marks: 15**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Equilibrium of co-planar forces- analytical and graphical conditions of Equilibrium, different type of supports, free body diagrams, Lami's theorem	03	03	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying
2.2	Problems on compound frames with hinged joints, pulleys, friction problems on inclined planes, ladders, support reactions of statically determinate beams, compound beams with point loads, uniformly varying loads and couples.	08	04	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying, analyzing
2.3	Principle of virtual work (concept only), introduction to forces in space.	04	01	Explanation	Remembering, understanding

Unit No 03: Analysis of Pin-Jointed Plane Frames			**Hours : 05**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Pin-jointed statically determinate plane trusses, assumptions, perfect frame	03	01	Definition, explanation	Remembering, understanding
3.2	Analysis of trusses by method of joints, method of sections, graphical method.	09	04	Explanation, numerical examples	Remembering, understanding, applying, analyzing

Unit No 04: Center of Gravity and Moment of Inertia			**Hours : 06**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Centre of gravity, centroid of a composite area, second moment of area, moment of inertia of section, parallel axis theorem	03	02	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying
4.2	Moment of inertia of unsymmetrical sections, radius of gyration, polar moment of inertia**.**	07	04	Explanation, numerical examples	Remembering, understanding, applying, analyzing

Section-II: Dynamics

Unit No 05: Kinematics of particles			**Hours : 09**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Rectilinear motion, equations of motion, motion curves and their applications, relative velocity, least distance between two moving bodies.	08	04	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying
5.2	Curvilinear motion, angular motion, relation between angular motion and linear motion, equation of angular motion, tangential and radial acceleration, motion of a projectile.	08	05	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying, analyzing

Unit No 06: Kinetics of Particles			**Hours : 09**		**Marks: 17**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Newton's laws of motion for linear motion and angular motion, D'Alembert's principle, rectilinear motion on rough inclined plane, motion of a lift, motion of connected bodies,	09	05	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying
6.2	Circular motion, motion of a bicycle, car along a curved track, railway curves, kinetics of rotation-torque, mass moment inertia, problems on centroidal rotation	08	04	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying, analyzing

Unit No 07: Work Energy Methods			**Hours : 08**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Potential energy, kinetic energy of linear motion and rotation, principle of conservation of energy, work energy equation,	08	04	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying, analyzing
7.2	Impulse momentum method, collision: impact- central, eccentric, direct, oblique, elastic, plastic, coefficient of restitution, loss of kinetic energy due to impact.	08	04	Definition, explanation, derivations, numerical examples	Remembering, understanding, applying, analyzing

- **Note:** Scope of graphical methods in unit 1, 2, 3 is limited to ICA only

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted and evaluated at institute level.

- **In Semester Continuous Assessment (ICA):**
  ICA shall be based on below experiments and assignments

  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 : Problems 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 units in curriculum*

- **Text Books:**

1. Engineering Mechanics, Bhavikatti S. S., New Age International Pvt. Ltd
2. Engineering Applied Mechanics, S. N. Saluja, Satya Prakashan , New Delhi
3. Engineering Mechanics, K. L. Kumar, Tata McGraw Hill Publications
4. Foundations and Applications of Engineering Mechanics, H. D. Ram & A. K. Chauhan, Cambridge University Press.
5. Engineering Mechanics, Arvind Kumar Dubey and Anil Kumar, New Age International (P) Ltd, Publishers.
6. Engineering Mechanics, 2nd Edition, Basudeb Bhattacharyya, Oxford University Press.
7. Engineering Mechanics - Statics and Dynamics, A. Nelson, McGraw Hill Education (India) Pvt. Ltd.
8. Engineering Mechanics - Statics and Dynamics, N. H. Dubey, McGraw Hill Education (India) Pvt. Ltd.
9. Engineering Mechanics Statics and Dynamics, A. K. Dhiman, P. Dhiman & D.C. Kelshreshtha, McGraw Hill Education (India) Pvt. Ltd
10. Engineering Mechanics, 2nd Edition, R. Kumaravelan & P. Yugananth, Scitech Publications (India) Pvt. Ltd.
11. A Text book of Engineering Mechanics, R.S. Khurmi, S. Chand Publications

- **Reference Books:**

1. Vector Mechanics for Engineers Vol I & II, F. P. Beer & A. R. Johnson, Tata McGrawHill Publications.
2. Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
3. Engineering Mechanics Statics and Dynamics by Ferdinand Singer, Harper & Row Publications.
4. Engineering Mechanics Statics, Vol.1, SI Version, 7th Edition – J. L. Meriam, L. G. Kraige, Wiley India Pvt. Ltd., New Delhi.
5. Engineering Mechanics Dynamics, SI Version, 7th Edition – J. L. Meriam, L. G. Kraige, Wiley India Pvt. Ltd., New Delhi.

Solapur University, Solapur

F.E. (All Branches) Semester-I

C114 BASIC ELECTRICAL ENGINEERING

Teaching Scheme
Theory – 3 Hrs /Week

Laboratory– 2 Hrs /Week

Examination Scheme
Theory – ESE - 70 Marks
ISE – 30 Marks
ICA – 25 Marks

- ## Course Objectives :

C114.O1	To introduce to student various network theorems for dc circuits so as student can analyze dc circuits and can solve numerical problems based on it
C114.O2	To introduce to student fundamentals of magnetic circuits and electromagnetic.
C114.O3	To make student comprehend generation and behavior of single and three phase ac circuits for R,L,C load
C114.O4	To make student familiar to construction, working and applications of single phase transformer, dc motors, single phase & three phase ac motors

- ## Course Outcomes :

At the end of this course,

C114.1	Student can apply the network theorems to analyze dc circuits and calculate energy consumption in electrical systems.
C114.2	Student can use the concept of magnetic circuits to calculate parameters of circuits and single phase transformer
C114.3	Student can apply knowledge of ac fundamentals to analyze series & parallel ac circuits.
C114.4	Student can use the concept of poly phase ac circuit to analyze three phase star, delta circuits and working of electrical drives.

- **Course Curriculum**

Section I

Unit No 01: DC Circuits			**Hours : 09**		**Marks: 21**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Ohm's law, resistance, specific resistively, temperature dependence of resistance, concepts of open circuit and short circuit	04	02	Numerical, derivations, apply laws	Understanding, applying
1.2	Kirchhoff's laws & it's applications for circuit solutions, simplifications of circuits using series, parallel combinations	04	02	Explanation, simplification of circuits (numerical), applications	Remembering, understanding, applying
1.3	Star-delta, delta-star conversions	06	02	Derivation, numerical	Understanding
1.4	Thevenin's theorem, maximum power transfer theorem	04	02	Explanation, numerical, applications	Remembering, understanding
1.5	Introduction to battery, types of connection	03	01	Explanation, numerical, applications	Remembering, understanding, applying

Unit No 02: Work, Power, Energy			**Hours : 04**		**Marks: 08**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Conversion of energy from one form to another in electrical, mechanical and thermal systems.	04	02	Explanation, numerical, applications	Remembering, understanding
2.2	Units of power and energy, calculation of cost of electricity.	02	01	Numerical, definitions	Remembering, understanding
2.3	Heating effect of electrical current	02	01	Selection, discussion	Remembering, understanding

Unit No 03: Magnetic Circuits			**Hours : 05**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Concept of magnetic circuits, magneto motive force, reluctance, B-H curve, magnetic hysteresis,	04	02	Explanation, numerical, applications	Remembering, understanding
3.2	Examples on series composite magnetic circuits, magnetic leakage and fringing	04	02	Numerical, applying	Remembering, understanding
3.3	Faraday's law of electromagnetic induction, Lenz's law, concept of self and mutual inductance	02	01	Selection, discussion	Remembering, understanding

Unit No 04: AC Fundamentals			**Hours : 04**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Introduction to AC, concept of cycle, period, frequency phase, phase difference Instantaneous, peak value	04	02	Explanation, Understandings, applications	Understanding, applying
4.2	RMS value of an alternating quantity, average value an alternating quantity and relationship between them for sinusoidal quantity	02	01	Explanation, understandings, applications	Remembering, understanding, applying
4.3	Phasor diagram	04	01	Explanation, applications, numerical	Understanding

Section-II

Unit No 05: AC Circuits			**Hours : 08**		**Marks: 24**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	AC through pure resistance, pure inductance and pure capacitance, numerical on above	12	04	Explanation, simplification of circuits (numerical), applications	Understanding, applying
5.2	AC circuit (series and parallel): impedance, admittance, complex power and power factor in AC circuits, numerical	12	04	Explanation, simplification of circuits (numerical), applications	Remembering, understanding, applying

Unit No 06: Poly-Phase Circuits			**Hours : 04**		**Marks: 09**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Generation of three phase voltages	01	01	Explanation, simplification of circuits (numerical), applications	Understanding, applying
6.2	Relations of voltage and current in star and delta connections	04	01	Explanation, simplification of circuits (numerical), applications, Derivation	Remembering, understanding, applying
6.3	Concept of balanced, unbalanced load, symmetrical and asymmetrical supply system	04	02	Explanation, numerical	Remembering, understanding, applying

Unit No 07: Single Phase Transformer			**Hours : 06**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Working principle, construction,	02	01	Explanation, simplification of circuits (numerical), applications	Explanation, understanding
7.2	EMF-equation, voltage and current ratios,	02	01	Explanation, Derivation, simplification of circuits (numerical), applications	Remembering, understanding, applying
7.3	KVA rating, transformer losses, efficiency and regulation by direct loading	04	03	Derivation, numerical	Understanding
7.4	OC and SC tests of 1 phase of Transformer	04	01	Explanation, numerical, applications	Remembering, understanding

Unit No 08: Electrical Drives			**Hours : 04**		**Marks: 04**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
8.1	Construction, working principle and applications of DC shunt and series motors	02	02	Explanation, applications	Explanation, understanding
8.2	Construction, working principle and applications of three phase squirrel cage induction motor.	01	01	Explanation, derivation, simplification of circuits (numerical), applications	Remembering, understanding, applying
8.3	Study of single phase split phase type induction motor (capacitor start, capacitor start and run motors).	01	01	Derivation, numerical	Understanding

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written Test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**

  *ICA shall be based on minimum **six** experiments out of below list*

  1. Hands on types of wires, wiring systems and wiring exercises.
  2. To measure the insulation resistance of electrical machines.
  3. To measure electrical energy bill of single phase load.
  4. To measure the earth resistance.
  5. Verification of KVL
  6. Verification of KCL
  7. Verification of voltage relation of RL, RC and RLC series connected AC circuits
  8. Verification of line and phase relation for star connected load.
  9. Verification of line and phase relation for delta connected load
  10. Finding regulation of a single phase transformer
  11. Finding transformation ratio of a single phase transformer
  12. Finding efficiency of a single phase transformer by direct loading
  13. OC test on a single phase transformer.
  14. SC test on a single phase transformer.
  15. Speed reversal of a three phase induction motors

- **Text-Books :**

  1. Electrical Technology (Volume I & 2), B L Thereja, 22nd edition, S Chand & Company Ltd
  2. Basic Electrical Engineering, Sunil T Gaikwad, Rvised Edition, Dream Tech Wiley Engineering Press
  3. Electrical Engineering (Concepts and Applications), P V Prasad and S Sivanagaraju, Cengage Learning
  4. Basic Electrical Engineering, C.L. Wadhawa,2nd edition, New Age International
  5. Basic Electrical Engineering, C.L. Wadhawa,2nd edition, New Age International
  6. Basic Electrical Engineering, V K Mehta, Revised edition, S Chand & Company Ltd
  7. Basic Electrical Engineering, R Anandrajan and P Ramesh Babu , 2nd edition, Scitech Publications India Private Ltd

- **Reference-Books :**

  1. Basic Electrical Engineering, Dr Debashisha Jena, Rvised Edition, Wiley Engineering Press
  2. Electrical Engineering Fundamentals, V Del Toro, 2nd edition, Prentice-Hall
  3. Electrical Technology, E Hughes, 10th edition, ELBS, Longman
  4. Basic circuits analysis, John Omalley Shawn, 2nd edition, Schaum's outlines series
  5. Fundamentals of Electrical Engineering by Leonard S Bobrow, 2nd edition ,Oxford University Press
  6. Laboratory courses in Electrical Engineering, S G Tarnekar, P K Kharbanda, S B Bodhe and S D Naik, S Chand & Company Ltd

Solapur University, Solapur

F.E. (All Branches) Semester-I

C115 BASIC MECHANICAL ENGINERING

Teaching Scheme	**Examination Scheme**
Theory – 3 Hrs. /Week	**Theory –** ESE -70 Marks ISE – 30 Marks
Laboratory– 2 Hrs. /Week	**ICA –** 25 Marks

- **Course Objectives :**

C115.O1	To introduce to student refrigeration & air conditioning system and IC engines.
C115.O2	To introduce to student power producing and power absorbing devices.
C115.O3	To make student aware of different power transmission system elements for day to day applications and fundamentals of mechanical engineering design
C115.O4	To make student aware of various machining and joining processes

- **Course Outcomes :**

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

C115.1	Calculate the heat and work quantum in the area of refrigeration & air conditioning system and I.C. engines.
C115.2	Categorize and select the type of power producing/absorbing systems for a typical application.
C115.3	Select the power transmission element for day to day applications and identify various design considerations in mechanical engineering design.
C115.4	Select a proper machining/joining process for required application.

- **Course Curriculum**

Section I

Unit No 01: Thermodynamics			**Hours : 09**		**Marks: 20**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	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	04	02	Explanation	Remembering understanding
1,2	Work and forms of work, heat, first law of thermodynamics, first law applied to flow processes, steady flow process, steady flow energy equation (SFEE), (numerical on first law of thermodynamics, cyclic and non cyclic processes, SFEE)	08	03	Explanation, derivations, numerical on P-V relations, work done and SFEE applications	Remembering, understanding, applying
1.3	Limitations of first law, Kelvin Plank and Clausius statements of second law of thermodynamics.	04	02	Explanation	Remembering understanding
1.4	Refrigeration: definition of refrigeration, vapour compression refrigeration cycle (VCRS), domestic refrigerator, air conditioning: window air conditioner, split air conditioner.	04	02	Explanation	Remembering, understanding

Unit No 02: Gas Laws & Gas Processes			**Hours : 04**		**Marks: 09**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Ideal gas, Boyle's law, Charle's law, characteristic gas equation, universal gas constant, Avogadro's law	04	02	Explanation, derivation	Remembering, understanding

2.2	First law applied to constant volume, constant pressure, constant temperature, reversible adiabatic process and polytropic process (work done, heat transfer, P-V-T relation) (Numerical treatment)	05	02	Explanation, derivations, numerical	Remembering, understanding, applying

Unit No 03: Pumps, Compressors & Turbines			**Hours : 04**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Power absorbing devices 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)	08	03	Definition, explanation	Remembering Understanding
3.2	Power producing devices Turbines: construction, working and applications of Pelton wheel, Francis and Kaplan turbines	04	01	Definition, explanation	Remembering, understanding

Unit No 04: Power Plants			**Hours : 04**		**Marks: 08**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Thermal power plant, site selection criteria, advantages, disadvantages	04*	01	Explanation,	Remembering Understanding
4.2	Hydroelectric power plant, site selection criteria, advantages, disadvantages	04*	01	Explanation,	Remembering, understanding
4.3	Nuclear power plant, BWR, PWR, site selection criteria, advantages, disadvantages	04*	02	Explanation	Remembering, understanding,
** Question will be based on any two subunits.*					

Section-II

Unit No 05: Internal Combustion Engines			**Hours : 05**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Definition, classification, components of IC engine	03	01	Explanation	Remembering understanding
5.2	Two stroke, four stroke engines, SI and CI engines	05	01	Comparison, explanation	Remembering, understanding
5.3	Otto and diesel cycles, thermal efficiency of Otto, diesel air standard cycle (numerical treatment)	04	03	Explanation numerical on Otto and diesel cycle	Remembering, understanding, Applying

Unit No 06: Power Transmission Systems			**Hours : 05**		**Marks: 13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	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 (numerical on simple belt drive only)	09	04	Explanation, derivations, numerical on simple belt drives	Remembering understanding applying
6.2	Other Transmission Systems: chain drive, gear, types of gears (excluding gear terminology), gear trains-simple and compound, epicyclical gear train.	04	01	Explanation	Remembering, understanding

Unit No 07: Mechanical Engineering Design			**Hours : 05**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Introduction, design considerations, design process, types of stresses & strains, stress-strain diagrams, modes of failure, factor of safety, engineering materials properties	08	03	Explanation	Remembering understanding
7.2	Aesthetic considerations, ergonomic considerations, introduction to environmental conscious design (sustainable design) (no numerical treatment)	04	02	Explanation	Remembering, understanding

Unit No 08: Introduction to Machine Tools & Joining Processes			**Hours : 05**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
8.1	Machine tools: Centre lathe - basic elements, construction, working, operations on lathe, turning, facing. Drilling machine - basic elements of pillar drilling machine, applications (no numerical treatment)	04	02	Explanation	Remembering understanding
8.2	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)	08	03	Explanation	Remembering, understanding

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**
  *ICA shall be based on minimum **six** experiments out of below list*

1. Hands on- domestic refrigerator and split air conditioner
2. Hands on- 2 stroke and 4 stroke engines
3. Hands on- gears, couplings, brakes, bearings
4. Estimation velocity ratio and slip in simple belt drive
5. Hand on- machine tools : lathe, drilling machine and various operations performed on them
6. Hands on- joining processes
7. Hands on - pumps and compressors
8. Survey: types and specifications of following mechanical systems - refrigerators, air conditioners, engines, pumps, compressors. Student shall make a comprehensive survey and submit a survey report comprising of – name of product chosen, image (if required), name of manufacturer, technical specifications of the product chosen, its applications

- **Text Books :**

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

- **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

Solapur University, Solapur
F.E. (All Branches) Semester-I
C116 COMMUNICATION SKILLS

Teaching Scheme
Theory – 1 Hrs. /Week
Laboratory– 2 Hr. /Week

Examination Scheme
ISE - 25 Marks
ICA – 25 Marks

- **Course Objectives :**

C116.O1	To make student comprehend and apply rules of grammar for his written and spoken communication
C116.O2	To enhance student's skill in word usage and sentence formation for day to day communication.
C116.O3	To enhance speaking skills of the student.
C116.O4	To nurture reading and comprehension skills of the students.
C116.O5	To prepare students for professional written communication.

- **Course Outcomes :**

At the end of this course,

C116.1	Student can frame grammatically correct sentences for day to day communication
C116.2	Student can use appropriate words in oral and written communication.
C116.3	Student can demonstrate effective speaking skills in various situations
C116.4	Student can comprehend and analyze a passage.
C116.5	Student can draft letters, emails and write paragraphs with appropriate content and context.

- **Course Curriculum**

Unit No 01: English Grammar		**Hours : 06**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Articles, nouns, pronouns, verbs, modal verbs, auxiliary verbs & tenses	03	Sentence formation, corrections / error finding	Receiving, responding, organizing
1.2	Adjectives, adverbs, prepositions, conjunctions	02	Sentence formation, corrections / error finding	Receiving, responding, organizing
1.3	Idioms & phrases	01	Meaning of the idioms & phrases and using them appropriately	Receiving, responding

Unit No 02: Vocabulary		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Synonyms & antonyms	01	Synonym / antonym of the given word	Receiving, responding
2.2	Prefixes & suffixes	01	Word formation.	Receiving, responding

Unit No 03: Speaking Skills		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Situational conversation	01	Role play based on formal or informal conversation, writing a conversation based on a situation	Receiving, responding, organizing
3.2	Impromptu speaking –extempore	01	Extempore speech	Receiving, responding, organizing, characterizing

Unit No 04: Reading Comprehension		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
4.0	Reading comprehension	02	Questions based on paragraph	Receiving, responding

Unit No 05: Fundamental Writing Skills		**Hours : 03**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Writing business letters	01	Writing a professional / business letter	Receiving, responding, organizing
5.2	E-mail communication	01	Writing a professional email	Receiving, responding, organizing
5.3	Paragraph writing	01	Writing a paragraph of about 150 words	Receiving, responding, organizing

- **In Semester Evaluation (ISE) –**
  ISE shall be based on three theory examination conducted at institute level covering above curriculum. Examinations shall include sufficient questions covering all topics / subtopics
- **Internal Continuous Assessment (ICA) -**
  ICA shall be based on performance of the student during the laboratory sessions in Language Lab covering minimum 12 exercises out of the below-

1. Grammar Exercise –I based on articles, nouns and pronouns.
2. Grammar Exercise –II based on verbs, modal verbs, auxiliary verbs & tenses
3. Grammar Exercise –III based on adjectives, adverbs, prepositions, conjunctions
4. Grammar Exercise –IV based on idioms and phrases
5. Vocabulary – Based on the synonym of the given word
6. Vocabulary – Based on antonym of the given word
7. Exercise on word formation (prefixes / suffixes)
8. Writing a conversation based on a formal situation
9. Writing a conversation based on a informal situation
10. Exercise based on reading comprehension
11. Professional / business letter writing
12. Professional / business Email writing
13. Writing a paragraph of about 150 words on a given topic.
14. Extempore speech on a given topic

- **Text Books:**

1. English Grammar Just for You, Rajeevan Karal, Oxford University Press
2. Technical English, Dr. M. Hemamalini, Wiley India Pvt. Ltd
3. Word Power Made Easy, Norman Lewis, Goyal Publishers
4. English for Practical Purposes , Z. N. Patil, B.S. Valke, A.R. Thorat, Zeenath Merchant
5. Communication Skills, Sanjay Kumar, Pushpa Lata, Oxford Publication

- **References Books:**

1. English Grammar & Composition , Wrenn & Martin, S. Chand
2. Business Communication, Shalini Kalia, Shailja Agarwal, Wiley
3. Communication Skills for Technical Students, T. M. Farhathullah, Orient Black Swan
4. Longman Dictionary of Contemporary English, Longman
5. Longman Essential Activator, Longman Pearson
6. Technical English, Dr. M. Sambaiah, Wiley India Pvt Ltd
7. Business Communication, Shruti D. Naik, Biztantra

Solapur University, Solapur

F.E. (All Branches) Semester-I

C117 WORKSHOP PRACTICE

Teaching Scheme
Laboratory- 02 Hrs/Week

Examination Scheme
ICA -25 Marks

- **Course Objective:**

C117.O1	To make the students acquainted with various skills involved in manufacturing and assembly.
C117.O2	To make student aware of various cutting, filling and joining processes and to have hands on for the same.

- **Course Outcomes:**

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

C117.1	Draw, design and fabricate different carpentry joints.
C117.2	Prepare different shaped metal work piece joints from the given metal blanks by selecting different tools and machines.
C117.3	Perform different types of welding of metal components.
C117.4	Select different engineering tools required to perform carpentry, fitting and welding processes.
C117.5	Carry out pipe fitting and plumbing work.

- **Course Curriculum:**

Unit No.	Unit Title	No. of Lab Hours	Assessment	Bloom's Level
01	Carpentry job- One job on carpentry including any one type of joint	04	Carpentry job, report writing	Perception, set, mechanism
02	Fitting job : One job on fitting, to size, male-female fitting including, marking, cutting, shearing, chipping sizing of metals, drilling and tapping to know concept of inter changeability.	04	Fitting job, report writing	Perception, set, mechanism
03	Welding: demonstration and hands on- arc welding, gas welding, resistance welding, gas cutting, spot welding.	01	Explaining, report writing	Perception, set, guided response
04	Plumbing: demonstration and hands on of pipe fittings using different types of pipe fittings like socket, elbow, bend, tee, four way cross, valves, pipe union, socket reducer etc. by using different tools in plumbing.	01	Explaining, report writing	Perception, set, guided response
05	Assembly: assembly of one or more of the below assemblies/sub-assembly- 1. Mechanical: three jaw chuck/bicycle/centrifugal pump. 2. Computer Science and Engineering & Allied: CPU of PC. 3. Electrical: electrical motor / 3 pin wire change / domestic wiring 4. Electronics & Allied: mobile handset/UPS/ stabilizer 5. Other: Any similar assembly from other applications of engineering. • Note- Assembly work shall be carried out as a group activity with a group of not more than 4 students.	03	Assembly job, team working, report writing	Perception, set, guided response, mechanism

- **In Semester Continuous Assessment (ICA) :**

  ICA shall be based on completion five tasks/jobs given below along with the report writing. The report writing shall include job drawing, process plan of the job in brief, sketches of tools and equipments required to complete the tasks/jobs-

  1. Carpentry Job of any one type of joint
  2. Fitting job of male-female type
  3. Hands on for different types of welding
  4. Plumbing- Hands on for different types of pipe fittings by using tools in plumbing
  5. Hands on assembly

- **Text Books:**

  1. Engineering Practices, M Karthik.
  2. Workshop Technology, Raghuvanshi,
  3. Workshop Technology, Hajra Chowdhary, Media Promoters & Publishers Pvt. Ltd.

Solapur University, Solapur
F. E. Semester-II
C122 ENGINEERING MATHEMATICS -II

Teaching Scheme
Theory – 3 Hrs. /Week

Tutorial– 1 Hr. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C122.O1	To introduce to student some methods to find the solution of first order & first degree ordinary differential equations with its applications
C122.O2	To introduce to student vector differentiation with vector differential operator.
C122.O3	To introduce to student awareness of concept of convergence of sequences and series.
C122.O4	To make familiar to tracing of Cartesian, polar, parametric curves and rectification of curve.
C122.O5	To introduce to student to evaluate improper & multiple integrals and their applications.

- **Course Outcomes :**

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

C122.1	Solve first order ordinary differential equation and able to apply in different engineering applications
C122.2	Use different vector differential operators
C122.3	Test divergence & convergence of infinite series
C122.4	Explain curve tracing with justification.
C122.5	Evaluate improper and multiple integrals and determine area, mass of region bounded between curves

- **Course Curriculum**

Section I

Unit No 01: ODE of First order and Degree and Application			**Hours : 09**		**Marks: 22**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Order, degree and general solution of differential equations, non homogeneous differential equations.	04	03	Solution of differential equations.	Remembering, understanding,
1.2	Exact differential equations, non-exact reducible to exact, linear differential equations, non linear reducible to linear.	09	03	Solution of differential equations.	Understanding, applying
1.3	Applications to orthogonal trajectories, electrical and mechanical engineering (projectile motion and Newton's law of cooling)	09	03	Application of ordinary differential equations.	Remembering, understanding, applying

Unit No 02: Vector Differentiation			**Hours : 07**		**Marks: 17**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Velocity vector, acceleration vector, tangential and normal component of acceleration	04	02	Evaluate	Remembering, understanding,
2.2	Vector differential operator, gradient, directional derivatives, angle between surfaces,	06	03	Evaluate/numerical	Understanding, applying
2.3	Divergence and curl, solenoidal and irrotational field	07	02	Evaluate/ apply standard results	Understanding, applying

Unit No 02: Infinite Series			**Hours : 05**		**Marks: 13**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Infinite sequences , infinite series, types of series	01	01	Examine	Remembering, understanding,
3.2	Test of convergence, absolute and conditional convergence,	05	02	Apply standard results	Remembering, applying
3.3	Cauchy test, comparison test and De Alembert's test	07	02	Numerical, apply standard results	Remembering, understanding, applying

Section II

Unit No 04: Integral Calculus			**Hours : 06**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Gamma function and properties,	04	02	Evaluate/numerical,	Remembering, understanding, applying
4.2	Beta function and properties, duplication formula with proof.	09	02	Evaluate/numerical,	Remembering, understanding, applying
4.3	Differentiation under integral sign with constant limit	03	02	Evaluate/numerical,	Remembering, understanding, applying

Unit No 05: Curve Tracing And Rectification			**Hours : 06**		**Marks: 16**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Tracing of Cartesian curves	04	02	Trace of curve	Understanding, applying
5.2	Tracing of polar and parametric curves	06	02	Trace of curve	Understanding, applying
5.3	Rectification of plane curves	06	02	Numerical	Remembering, understanding, applying

Unit No 06: Multiple Integration and Applications		**Hours : 09**			**Marks: 20**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Double integral, change of order, change to polar	08	03	Evaluate/numerical,	Understanding, applying
6.2	Evaluation over the given region, triple integration	06	03	Evaluate/numerical,	Understanding, applying
6.3	Application of double integral to find area and mass of lamina.	06	03	Application/numerical	Remembering, understanding, applying

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**
  ICA shall be based on student's performance during tutorial sessions and on completion of minimum six assignments based on above curriculum.

- **Text Books:**
  1. A Text Book of Applied Mathematics, P.N. and J.N. Wartikar, Vol.1, Pune Vidyarthi Griha Prakashan.
  2. Advanced Engg. Mathematic, H. K. Dass S. Chand Publications, Delhi.
  3. Engineering Mathematics, Volume I, ITL Education, Cengage Learning.
  4. Engineering Mathematics, Ravish R Sing and Mukul Bhatt,Mc Graw Hill.
  5. Applied Mathematics-I ,Kreyzig's, Wiley.

- **Reference Books**:

  1. Higher Engineering Mathematics, 42nd Edition, B.S. Grewal, Khanna Publications, Delhi.
  2. Engineering Mathematics, Srimanta Pal and Subodh C. Bhunia, Oxford Higher Education.
  3. Mathematics for Engineering Applications, Kuldip S. Rattan and Naathan W. Klingbeil Wiley. (Modeling and Core Engineering Application)

Solapur University, Solapur

F.E. (All Branches) Semester-II

C123 ENGINEERING GRAPHICS

Teaching Scheme
Theory – 3 Hrs. /Week

Laboratory–4 Hrs. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives**

C123.O1	To make student draw the projections of oblique lines and planes.
C123.O2	To make student interpret and draw the cut sections of solids.
C123.O3	To make student visualize and draw the orthogonal views.
C123.O4	To introduce to student the development of surfaces and make him to draw the developments of truncated solids

- **Course Outcomes**

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

C123.1	Draw projection of lines and planes for engineering applications.
C123.2	Draw regular and sectional views of various types of solids.
C123.3	Draw the 2 D view (orthogonal views) given 3D drawing
C123.4	Draw the development of the regular and truncated solids.

- **Course Curriculum**

Section I

Unit No 01:Projections of Lines			**Hours : 09**		**Marks: 17**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Introduction to first and third angle method of projection, Projections of points on Principal reference planes and on auxiliary planes including coordinate system of points.	--	02	Explanation, drawing	Remembering understanding applying
1.2	Horizontal, frontal, profile and oblique lines, true length of line. Projections of lines with its inclination to one reference plane and with two reference planes (oblique lines). True length and inclination with the reference planes, point view of line.	09	03	Graphical problem horizontal , frontal and oblique lines , problems on TL of line	understanding, applying
1.3	Grade and bearing of line.	04	02	Graphical problem on grade and bearing of lines	Understanding applying
1.4	Angle between lines, intersecting, skew, parallel and Perpendicular lines	04	02	Problems on intersecting, skew, parallel lines and perpendicular lines	Understanding applying

Unit No 02: Projections of Planes			**Hours : 07**		**Marks: 15**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Projections of planes (regular polygons, circle)	--	01	Explanation , graphical problem,	Remembering, understanding, applying
2.2	Plane inclined to one reference plane and with two reference planes	08	03	Graphical problem on oblique planes by three stage and auxiliary plane methods	understanding, applying
2.3	True shape, edge view ,angle with reference plane dip & strike of plane (for objective type question only)	07	03	Graphical problem	understanding, applying

Unit No 03: Projections of Solids			**Hours : 05**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Classification of solids, projections of solids (cylinder, cone, pyramid and prism)	--	01	Explanation , graphical problem	Remembering, understanding, applying
3.2	Solid inclination to one reference plane and with two reference planes (excluding composite solids)	10	04	Graphical problem on oblique planes by three stage and auxiliary plane methods	Understanding, applying

Section-II

Unit No 04: Orthographic Projections			**Hours : 09**		**Marks: 14**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Fundamental of projection along with classification, type of lines used in drawing, conventions used in sectional drawings	--	02	Explanation, graphical problem	Remembering, understanding, applying
4.2	Projections from the pictorial - view of the objects on the principal planes by viewing from front, top and sides using first angle projection method ,full sectional view	14	07	Graphical problem to draw principal views of objects.	Understanding, applying

Unit No 05: Sections of Solids			**Hours : 06**		**Marks: 07**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Sections of above solids by cutting planes inclined to one reference plane and perpendicular to other	--	01	Explanation	Remembering, Understanding
5.2	Auxiliary inclined plane, auxiliary vertical plane, true shape of section	07	05	Drawing views of solids cut by section plane inclined to one reference plane	understanding, applying

Unit No 06: Development of plane and curved surface			**Hours : 06**		**Marks: 07**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Introduction to development of lateral surfaces of solids.	--	01	Explanation	Remembering understanding
6.2	Development of lateral surfaces of of simple and truncated solids	07	05	Graphical Problems on DLS of simple and truncated solids	understanding, applying

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**
  ICA shall be based on below drawing assignments

Sr. No.	*Name of Sheet*	*No. of Sheets*
1.	Projection of lines	02
2.	Projection of planes	01
3.	Projection of solids	01
4.	Section of solids	01
5.	Orthographic projections	02
6.	Development of lateral surfaces	01

- **Text Book:**

1. Engineering Drawing, D.N. Jolhe, TATA McGraw Publishing Co-Ltd.
2. Engineering drawing, N.D. Bhatt, Charotar Publishing House Pvt. Ltd.

- **Reference Book:**

1. Engineering Drawing, N. S. Parthasarathy & Vela Murali, Oxford Publication.
2. Engineering Drawing, K. L. Narayana & P. Kannaiah , Scitech Publication.
3. Engineering Graphics, A. M. Chandra, New Age International Publishers.

Solapur University, Solapur

F.E. (All Branches) Semester-I

C124 BASIC CIVIL ENGINERING

Teaching Scheme
Theory – 3 Hrs. /Week
Laboratory– 2 Hrs. /Week

Examination Scheme
Theory – ESE -70 Marks
ISE – 30 Marks
ICA – 25 Marks

- **Course Objectives :**

C124.O1	To introduce to student relevance of civil engineering for various engineering applications
C124.O2	To introduce to student various elements of buildings and construction materials.
C124.O3	To introduce to student various methods of land survey and to make him use surveying equipments
C124.O4	To make student aware of modern investigation techniques in land survey.
C124.O5	To introduce to student about the water management and transportation engineering

- **Course Outcomes :**

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

C124.1	Describe the role of civil engineer in the development of the society and explain relationship of civil engineering with other branches of engineering and technology.
C124.2	Discuss types of buildings and select materials of construction.
C124.3	Explain the elements of water supply such as dam, canal and elements of transportation structures.
C124.4	Measure heights, distances and angles on ground using basic surveying instruments and plot them on paper.
C124.5	Explain the advantages of advances in civil engineering like remote sensing techniques, GIS and GPS.

- **Course Curriculum**

Section I

Unit No. 01: Introduction to Civil Engineering			**Hours : 03**		**Marks: 06**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Definition and sub domains of civil engineering.	02	01	Explanation	Remembering understanding
1,2	Applications of civil engineering and relevance to other branches of engineering.	02	01	Explanation	Remembering, understanding,
1.3	Role of civil engineer in various construction activities in society	02	01	Explanation	Remembering, understanding

Unit No 02: Surveying			**Hours : 15**		**Marks: 30**
Sr.	Subunit	Marks	Hours	Assessment	Bloom's Level
2.1	Definition, general principles of surveying, classification of surveying.	04	02	Definition, explanation	Remembering, understanding
2.2	Measurement of horizontal distances: use of chain and tapes.	06	03	Explanation, numerical	Remembering, understanding, applying
2.3	Measurement of horizontal angles: types of bearing, calculation of included angles, study and use of prismatic compass, local attraction.	10	05	Explanation, numerical	Remembering, understanding, applying
2.4	Levelling : Various terms used in levelling, use of dumpy level, auto level, temporary adjustments, methods of reduction of levels, contouring, characteristics and uses of contour maps.	10	05	Explanation, numerical	Remembering, understanding, applying

Unit No 03: Water Management			**Hours : 02**		**Marks: 04**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Sources of water, rain water harvesting, storage reservoirs.	02	01	Definition, explanation	Remembering, understanding
3.2	Introduction to gravity dam and earthen dam (typical cross sections), brief introduction to methods of irrigation, types of canals.	02	01	Definition, explanation	Remembering, understanding

Unit No. 04: Transportation Engineering			**Hours : 02**		**Marks: 04**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Introduction to roads**,** IRC classification, typical functional cross sections.	02	01	Explanation	Remembering, understanding
4.2	Various purposes of the modes of transportation, Bridges, tunnels railways, airports, docks and harbours.	02	01	Explanation	Remembering, understanding

Section-II

Unit No 05: Components of Building			**Hours : 06**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
5.1	General idea about substructure, super structure and their various elements and their functions (foundation types, plinth, lintel, chajja, roof, parapet, spout etc.)	06	03	Definition, explanation	Remembering, understanding
5.2	Superstructure**:** principle of load transfer, frame action, loads bearing wall action.	04	02	Definition, explanation	Remembering, understanding
5.3	Requirements of earthquake resistant buildings	02	01	Explanation	Remembering, understanding

Unit No. 06: Building Planning Systems			**Hours : 04**		**Marks: 08**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
6.1	Principles of planning, introduction to building bylaws regarding building line, open space, carpet area, built up area requirements, floor area ratio (F.A.R.) and height of building.	08	04	Explanation, numerical on F.A.R.	Remembering, understanding, applying

Unit No 07: Building Materials			**Hours : 05**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
7.1	Materials: stone, brick, cement, sand, timber, steel, plastic, aluminum, roofing material (G.I., A.C., Mangalore). -uses and ideal engineering properties	06	03	Explanation	Remembering, understanding
7.2	Concrete: plain and reinforced cement concrete, water cement ratio, requirements of good concrete, various grades of concrete and their uses	04	02	Explanation	Remembering, understanding

Unit No 08: Advances in Civil Engineering			**Hours : 06**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
8.1	Green Building: concept of planning and construction of green building	04	02	Explanation	Remembering, understanding
8.2	Geo Informatics: Fundamentals of remote sensing and its application in various fields, introduction to Geographic Information system (GIS) and Global Positioning System (GPS)	08	04	Explanation	Remembering, understanding

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests & mid-term written test conducted & evaluated at institute level.

- **In Semester Continuous Assessment (ICA):**
  ICA shall be based on below eight experiments. Any other appropriate experiments based on above curriculum may also be added to the list. Student shall record them in a field book. As a part of the completion of ICA, student shall submit completed filed book and drawing sheets at the end of the course.

  1. Sign conventions
  2. Chaining, ranging and offsetting
  3. Applying prismatic compass
  4. Observation of bearing and measurement of included angles
  5. Applying dumpy level and auto level
  6. Reduction of levels by collimation plane method and rise and fall method
  7. Drawing plan, elevation and section for a single room indicating various elements of buildings such as column footing, plinth and superstructure
  8. Site visit and its report

- **Text books:**

  1. Elements of Civil Engineering, S.S.Bhavikatti, New Age International Publishers.
  2. Surveying and Levellin, N.N.Basak, Tata McGraw Hill Publications.
  3. Basic Civil Engineering, L.G.Gole, Mahalaxmi Publications
  4. Building Construction and Drawing, Bindra and Arora, Dhanpat Rai Publications

- **Reference Books:**

  1. Building Planning and Design-Shah & Kale, Tata McGraw Hill Publications.
  2. Manual on Green Building, Kolhatkar.
  3. Energy-efficient buildings in India, Mili Majumdar, TERI Press.
  4. Building Planning and Desig, Y.S. Sane, Allies Book Stall, Engineering Books Publishing Company Pune.

Solapur University, Solapur

F.E. (All Branches) Semester-I

C125 COMPUTER PROGRAMMING

Teaching Scheme
Theory – 2 Hrs. /Week
Laboratory– 2 Hr. /Week

Examination Scheme
ESE – 25 Marks
ISE – 25 Marks
ICA – 25 Marks

- **Course Objectives :**

C125.O1	To introduce to student concept of algorithm for problem solving
C125.O2	To introduce to student fundamentals of structured programming
C125.O3	To make student to formulate simple C programs using various control structures, loop structures & functions.
C125.O4	To make student to apply knowledge of structures, unions & pointers in programs.

- **Course Outcomes :**

At the end of this course, students will be able to

C125.1	Design flowchart / algorithms for given problem
C125.2	Write, compile, debug & execute structured C programs by applying knowledge of various C features like control and loop structures.
C125.3	Write, compile, debug & execute structured C programs by applying knowledge of various C features like array, pointer and function.
C125.4	Apply features like structure and unions efficiently in small C applications.

- **Course Curriculum**

Unit No 01: Introduction to C Language			**Hours : 07**			**Marks: 08**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
1.1	Techniques for Problem Solving: algorithm, flow chart, examples, structure of C program, building blocks of C program (preprocessor ,compilation and execution of C program), IDE	02	03	Explanation	Remembering, understanding	Receiving
1.2	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), printf(), scanf() functions	03	02	Explanation	Remembering, understanding	Receiving
1.3	Operator precedence, expressions, type casting and type conversion, formatting input and output (getchar(), putchar())	03	02	Explanation Application	Understanding	Receiving

Unit No 02: Control Structures			**Hours : 05**			**Marks: 12**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
2.1	Control statements: if, if-else, nested if –else, else if ladder	03	02	Programming	Understanding, applying, creating	Receiving responding
2.2	Loops: while, do-while, for, nested loops	06	02	Programming	Understanding, applying creating	Receiving responding
2.3	Break, continue, goto statement, switch-case statement	03	01	Programming	Understanding, applying creating	Receiving responding

Unit No 03: Array and String			**Hours : 04**			**Marks: 09**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
3.1	Declaration and initialization of one dimensional array, accessing elements, array handling	04	02	Programming	Understanding, applying creating	Receiving responding
3.2	String handling functions strlen(), strcpy(), strcmp(), strcat(), gets(), puts()	02	01	Programming	Understanding, applying	Receiving responding
3.3	Declaration and initialization of two dimensional array, accessing elements, array handling	03	01	Programming	Understanding, applying	Receiving responding

Unit No 04: Structures and Unions		**Hours : 04**				**Marks: 06**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
4.1	Definition of structure and union, declaration	04	02	Programming	Applying, creating	Receiving responding
4.2	Accessing elements, difference between structure and union.	02	02	Programming	Applying, creating	Receiving responding

Unit No 05: Functions		**Hours : 04**				**Marks: 07**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
5.1	Declaration & definition passing parameters to functions, scope of variables, return statement	05	03	Programming	Understanding, applying	Receiving, responding
5.2	Function using passing by value	02	01	Programming	Understanding applying	Receiving, Responding

Unit No 06: Pointers		**Hours : 04**				**Marks: 08**
Sr.	*Subunit*	*Marks#*	*Hours*	*Assessment*	*Bloom's Level (Cognitive)*	*Bloom's Level (Affective)*
6.1	Declaration of pointer , initialization, accessing pointer	03	01	Programming	Understanding, applying	Receiving, responding
6.2	Pointer to basic data types, pointer arithmetic, pointers & array (one dimensional)	03	02	Programming	Understanding	Receiving
6.3	Function using pass by reference	02	01	Programming	Understanding	Receiving

# indicates contribution for ISE. For ISE - Marks are allotted 'out of 50' and are scaled to 'out of 25'

- **End Semester Evaluation (ESE):**
  University 'Practical and Oral Examination' at the end of the semester assessing student's programming skills.

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum three tests conducted & evaluated at institute level
  Test-I – Written paper based on Unit-I of minimum of 30 marks
  Test-II & Test-III – Practical & Oral Examination based on remaining units.

- **In Semester Continuous Assessment (ICA):**

ICA shall be based on the following experiments.

1. Assignment based on fundamentals of algorithm & flowchart
   - What is programming & steps of execution
   - What is an algorithm
   - Flowchart and its elements

2. Fundamentals of C programming & IDE
   - Structure of C program (documentation section, header section, main function, declaration of variables, set of instructions)
   - C character set, tokens, constants , variables , keywords
   - C operators

3. Formatted input output functions in C
   - Programs based on simple arithmetic & logical operators
   - Programs based on getchar() and putchar() functions

4. Different operators in C
   - Programs based on multiple arithmetic operations (+, - , / , * and %)
   - Programs based on left shift (<<), right shift (>>), and(&) , or(|) and xor(^) bitwise operators.
   - Programs based on increment, decrement operators.
   - Programs based on type casting using cast operator.
   - Programs based on sizeof () operator.

5. Decision control statement (if, if-else , nested if-else, else if ladder)
   - Programs based on use of single control statement
   - Programs based on multiple control statement
   - Programs based on nested control statements combined with other operators

6. Loop statement (for, while, do-while, nested loop)
   - Programs based on for loop.
   - Programs based on while loop.
   - Programs based on do-while loop.

- Program demonstrating difference in while & do-while loop.
- Programs based on nested loops.
- Programs demonstrating use of break, continue & goto statements.

7. Switch-case statement
   - Programs based on switch-case statement
   - Programs demonstrating variations in switch-case statement.
   - Menu driven programs.

8. Arrays
   - Programs based on single dimension array manipulations.
   - Programs based on two dimension array manipulations & matrix operations.
   - Programs based on string handling & manipulations.

9. Structures & Unions
   - Programs based on Structure & its manipulation operations.
   - Programs demonstrating use Unions.
   - Program demonstrating the difference between structure & union.

10. Functions
    - Programs based on simple use of functions.
    - Programs demonstrating function call by passing parameters by value.

11. Pointers
    - Program demonstrating basics of pointers.
    - Programs based on pointer arithmetics & operations.
    - Program based on pointers & array

12. Programs based on functions & pointers: pass by reference

- **Text Books :**

1. Simplifying C – Harshal Arolkar & Sonal Jain, Dreamtech (For Unit-01)
2. Let s 'C' – Yaswant Kanetkar ,BPB Publication
3. Programming in ANSI C- C Balgurusamy, Tata McGraw Hill

- **Reference Books:**

1. The C Programming Language (ANSI C Version), Brian W. Kernighan, Dennis M. Ritchie, PHI Publications
2. Schaums Outline- Theory and Problems of Programming with C – Byron S. Gottfried, Tata Mc.Graw Hill
3. Programming in C – B.L.Juneja, Cengage Learning
4. Projects using C- PVN Varalaxmi, Scitech Publications

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

C126 BASIC ELECTRONICS

Teaching Scheme
Theory– 2 Hrs. /Week

Laboratory– 2 Hrs. / 2 Week

Examination Scheme
Theory–ESE -35 Marks
ISE – 15 Marks
ICA– 25 Marks

- **Course Objectives :**

C126.O1	To introduce to student various electronic componentsand make themtest and measure.
C126.O2	To introduce to student fundamentals of construction, biasing, V-I characteristics and application of Diode and BJT.
C126.O3	To make student understand different types of transducers & application areas of transducers.
C126.O4	To introduce to student fundamental of digital electronics.

- **Course Outcomes :**

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

C126.1	Test and measure various electronic components.
C126.2	Explain construction, biasing, V-I characteristics and application of diode and BJT.
C126.3	Select appropriate transducers to measure various physical parameters like distance, temperature etc.
C126.4	Perform arithmetic operations on digital number system.
C126.5	Draw truth table of logic gate and solve Boolean expressions.

- **Course Curriculum**

Section I

Unit No 01: Semiconductor Diodes			**Hours : 07**		**Marks: 10**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
1.1	Semiconductors and p-n junction diode **-**Doping, depletion layer, barrier potential, construction, working, biasing, V-I characteristics, ratings.	02	02	Explanation, definition	Recalling, understanding
1.2	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 formula of ripple factor.	04	03	Explanation, definition, application	Recalling, understanding, applying
1.3	Special Purpose Diodes- photo diode, LED- application of LED as 7-segment display ,Zener diode- Working principle, V-I characteristics, ratings, application of zener as voltage regulator	04	02	Explanation, definition, application	Recalling, defining, understanding

Unit No 02: Electronic Devices and Circuits			**Hours : 05**		**Marks: 07**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
2.1	Bipolar Junction Transistor-construction, biasing, configuration with I/O characteristics for -CB,CE,CC, comparison between CB,CE,CC configurations, ratings of transistor	05	04	Explanation, definition, application	Recalling, understanding
2.2	Application of transistor-BJT as switch	02	01	Explanation, application	Recalling, understanding, applying

Section II

Unit No 03: Electrical Transducers			**Hours : 05**		**Marks: 06**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
3.1	Introduction, parameters for selection of transducers, wire type strain gauge , load cell , LVDT	03	02	Explanation, definition, application, selection	Recalling, understanding, applying
3.2	Temperature & other transducers- thermocouple , thermistor, reluctance pulse pickup, photoelectric pickup, LDR , solar cell	03	03	Explanation, definition, selection	Recalling, understanding, applying

Unit No 04: Digital Electronics			**Hours : 07**		**Marks: 12**
Sr.	*Subunit*	*Marks*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Number system- decimal, binary, octal, hexadecimal & their inter-conversion , BCD code	03	02	Numerical	Recalling, understanding, applying
4.2	Binary Arithmetic- addition, subtraction, subtraction using 2's complement	03	02	Numerical	Recalling, understanding, applying
4.3	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	03	02	Explanation, definition, numerical	Recalling, understanding, applying
4.4	Boolean Algebra- laws & rules, De-Morgan theorem, simplification of logical expressions using Boolean algebra	03	01	Explanation, definition, simplification	Recalling understanding, applying

- **In Semester Evaluation (ISE):**
  ISE shall be based upon student's performance in minimum two tests& mid-term written test conducted & evaluated at institute level

- **In Semester Continuous Assessment (ICA):**

  *ICA shall be based on minimum **six** experiments out of below list. First two experiments are mandatory*

  1. Identification, testing and measurement of electronic components – resistors, capacitors, inductors.
  2. Identification and testing of toggle switches and relays.
  3. V-I characteristics of PN junction diode.
  4. Half and full wave rectifier.
  5. Controlling relay using transistor as a switch.
  6. Measurement of distance using LVDT.
  7. Measurement of temperature using any temperature transducer.
  8. Verification of truth table of basic gates and universal gates using IC's.
  9. Implementation of Boolean expression using basic gates.

- **Text Books:**

  1. Electronic Instrumentation, H. S. Kalsi , Tata McGraw Hills Publication
  2. Digital Principles and Applications, Albert Malvino , Donald Leach, Tata McGraw Hills Publication
  3. Principles of Electronic Devices and Circuits (Analog and Digital),B. L. Theraja , R. S. Sedha , S. Chand publication
  4. Basic Electronics Engineering, V. Baru , R. Kaduskar, S.Gaikwad , Dreamtech Publication

- **Reference Books:**

  1. Electronic Devices and Circuits, K. Maini , VarshaAgarwal , Wiley publication
  2. Electronic Devices, Floyd, Pearson Education publication
  3. Electronic Components and Materials, M. A. Joshi, Wheeler Publication

Solapur University, Solapur

F.E. (All Branches) Semester-II

C127 PROFESSIONAL COMMUNICATION

Teaching Scheme	**Examination Scheme**
Theory – 1 Hrs. /Week	**ICA –** 25 Marks
Laboratory– 2 Hrs. /Week	**ISE -** 25 Marks

- **Course Objectives :**

C127.O1	To nurture student's effective presentations skills
C127.O2	To equip student with skills for participating effectively in group discussion and personal interview
C127.O3	To enhance the writing skills of the students with special reference to resume and report writing.
C127.O4	To inculcate soft skills in students for personal and professional success.

- **Course Outcomes :**

At the end of this course, student will able to

C127.1	Prepare good quality presentation and deliver it effectively.
C127.2	Participate dynamically in group discussion and can face mock personal interview successfully
C127.3	Prepare good quality resume and various other reports.
C127.4	Exhibit various soft skills like team working and leadership in different situations.

- **Course Curriculum**

Unit No 01: Presentation Skills		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
1.0	Presentation- effective planning, preparing & delivering	02	Preparing and delivering presentations	Organizing, characterizing

Unit No 02: Group Discussion		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
2.0	Group Discussion- introduction, traits evaluated, types, tips for successful participation, individual Traits	02	Mock group discussion	Receiving, responding, organizing, characterizing

Unit No 03: Personal Interview		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
3.0	Introduction, types of interviews, preparatory steps for employment interviews, skill tips, frequently asked questions during interviews	02	Mock personal interview	Receiving, responding, organizing, characterizing

Unit No 04: Higher Writing Skills		**Hours : 02**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
4.1	Resume preparation	01	Writing resume for various purposes	Receiving, responding, organizing, characterizing
2.2	Technical report writing- types, structures, data collection, content, form	01	Write a report on event / industrial visit / project	Receiving, responding, organizing, characterizing

Unit No 05: Induction to Soft Skills		**Hours : 07**		
Sr.	*Subunit*	*Hours*	*Assessment*	*Bloom's Level*
5.1	Personal SWOC analysis	07	Assessment through presentation, exercise, case study, role play, skit and group activity	Organizing, valuing, characterizing
5.2	Goal setting			
5.3	Motivation			
5.4	Leadership and team working			
5.5	Ethical values			
5.6	Stress management			
5.7	Emotional intelligence			
5.8	Positive thinking and attitude			
5.9	Decision making			
5.10	Creativity			

- **In Semester Evaluation (ISE) –**
  ISE shall be based on three theory examination conducted at institute level covering above curriculum. Examinations shall include sufficient questions covering all topics / subtopics

- **Internal Continuous Assessment (ICA) -**
  ICA shall be based on performance of the student during the laboratory sessions in language Lab covering minimum12 exercises out of the following exercises:

  1. Power point presentation and a delivery
  2. Writing views on a topic for group discussion in about 180 words
  3. Participation in a group discussion
  4. Writing responses to the frequently asked questions in personal interview
  5. Mock personal interview.
  6. Resume writing for various purposes
  7. Industrial visit report writing
  8. Other technical report writing
  9. Self SWOC analysis
  10. Oral presentation on self short term and long term goals
  11. Writing self short term and long term goals
  12. Role play on leadership and team working
  13. Writing an essay (300 words) on positive thinking and attitude, emotional intelligence

14. Case study on decision making, stress management, positive thinking, ethics, creativity, success stories, business decisions, entrepreneurship etc

✓ *Note – Students shall be encouraged to use internet and ICT tools for compilation, analysis, report writing and presentation.*

- **Text Books:**

1. Soft Skills: An Integrated Approach to Maximize Personality, Gajendra Singh Chauhan & Sangeeta Sharma- Willy Indian Pvt. Ltd.
2. Soft Skills for Mangers, Dr. T. Kalyana Chakravarthi & Dr. T. Latha Chakravarthi , Biztantra Publication
3. Technical English, Dr. M. Hemamalini, Willy Indian Pvt. Ltd
4. Professional Speaking Skills, Aruna Koneru, Oxford University Press

- **References Books:**

1. Soft Skills, K. Alex, S. Chand Publications New Delhi
2. Soft Skills – A Text book for Undergraduates, Ajay R Tengse, Orient Black Swan
3. Communication Skills, Sanjay Kumar, Pushpa Lata, Oxford University Press
4. Managing Soft Skills for Personality Development, B N Ghosh, McGraw Hill Publication
5. Soft Skills for Everyone, Jeff Butterfield, Cengage Learning
6. Communication Skills (Revised), Bretag, Crossman, Bordia, Tata McGraw Hill

Solapur University, Solapur
F.E. (All Branches) Semester-II
C128 AUDIT COURSE
WORKSHOP FOR SKILL DEVELOPMENT

Teaching Scheme
Laboratory – 2 Hrs / week %

Examination Scheme
Audit Course

- **Course Objectives :**

C128.O1	To nurture amongst student technical skills related any one engineering discipline
C128.O2	To nurture amongst student team working and leadership skills
C128.O3	To nurture amongst student basic technical report writing skills

- **Course Outcomes :**

At the end of this course,

C128.1	Student exhibit specified technical skills
C128.2	Student can complete a small project in a group
C128.3	Student can write a brief technical report related to project

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This audit course intends to foster few basic technical skills amongst student related to any one engineering discipline of student's choice (irrespective of his discipline of admission). This course is also beneficial in developing inter personal skills. This course shall consists of laboratory assignments aiming technical skills as well as a small 'Mini Project' carried in a group of not more than three students. Student shall write a brief technical report capturing various stages of Mini Project.

This course shall be delivered by an appropriate faculty. Below are few of the suggestive skills. However, the institute is at liberty to choose any other suitable skills & mini projects.

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1. **Electronics & allied –**

- Soldering & de-soldering, use of multi-meter, equipment energy meter, CRO, signal generator, acquaintance to various electronic components and ICs, data sheets etc
- Inverter battery charging, replacement
- Replacement of capacitor of ump/fan
- Mini project based on discrete components / ICs like transistor amplifier, full wave rectifier, 555 timer, energy consumption/audit etc
- Creation of new single phase point from available electrical wiring at house and fuse replacement.
- Replacement of capacitor of fan and 1-phase AC motor
- Inverter/UPS/two wheeler/car battery checking, fitting and understanding the present condition.
- Soldering practice, use of multi-meter for measurement of various electrical parameters.
- Personal computer (PC) assembly and operating system loading
- PC troubleshooting- problems like no beep, CMOS battery replacement, memory related problems (SATA cable replacement)
- Mini project based on simple input output control using Arduino board.
- Developing small programs in 'C' language to solve typical problems in electronic circuits
- Developing MS Excel application for electronic application purpose
- Developing and presenting a Power Point presentation on any topic of interest in electronics / telecommunication with special focus on commercial aspects / specifications.

2. **Computer & allied**

- Acquaintance to OS- Ubuntu, Windows, acquaintance to other software – Word, Power Point, Excel etc
- Acquaintance to LAN, DNS, proxy, router, hub, switch, server, client, website, web-server
- Use of basic networking commands, applications and services: ssh, telnet, ftp, winscp, ping, http, https, various search services
- System administration
- Mini project based on – Application development in C, networking, application development using Excel etc

3. **Mechanical and allied**

- Mechanisms: types, basic theory, selection and applications
- Operating skills for machines such as drill, lathe, grinder

- Domain knowledge of subjects such as engines, industrial machinery, refrigeration, air conditioning, automobiles, aircraft
- Fundamentals of fluid machinery (pipes, hose, hydraulics/pneumatics applications)
- Introduction to Engineering materials such as steels, CI their types, brass, bronze, aluminum alloys, plastics
- Mini project based on
  - Mechanism design/selection for motion generation
  - Identifying and replacing components of engines such as spark plug, cables, brake shoe etc
  - Use of pneumatic actuator/cylinder

4. Civil and allied

- Arrangements of bricks as per different bonds such as English bond, Flemish Bond in laboratory and preparation of report.
- Finding tensile strength of steel bar using universal testing machine and preparation of report.
- Finding compressive strength of concrete cubes using compression testing machine and preparation of report.
- Taking measurements of a small building and preparing 'measured drawing'.
- Surveying of a small area and preparation of a contour map.
- Finding carpet area and built up area of a house and finding F.S.I. consumed.
- Drawing a plan of small building using AutoCAD application software
- Use of Microsoft Excel for calculations of 'leveling problem in surveying'
- Developing small programs in 'C' language to solve typical problems in applied mechanics
- Drawing a 'longitudinal section' of a road using Microsoft Excel by knowing 'reduced levels' along center line of a road.
- Developing and presenting a Power Point presentation on any topic of interest in Civil Engineering
- Drawing a labeled poster/chart explaining any building/ roads/railway/bridge/dam/docks/harbor components
- Crafting a model of any Civil Engineering structure by using a card board and suitable adhesive
- Performing tests related to air pollution in National Ambient Air Pollution Monitoring laboratory