AC 14/7/2016, Item No. 4.64

UNIVERSITY OF MUMBAI

Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course (REV-2016)from Academic Year 2061 -17,(Common for All Branches of Engineering)

(As per Choice Based Credit and Grading System with effect from the A. Y. 2016 - 17)

From Co-ordinator's Desk:-

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited. In line with this Faculty of Technology of University of Mumbai has taken a lead in incorporating philosophy of outcome based education in the process of curriculum development.

Faculty of Technology, University of Mumbai, in one of its meeting unanimously resolved that, each Board of Studies shall prepare some Program Educational Objectives (PEO's) give freedom to affiliated Institutes to add few (PEO's) course objectives course outcomes to be clearly defined for each course, so that all faculty members in affiliated institutes understand the depth approach of course to be taught, which will enhance learner's learning process. It was also resolved that, maximum senior faculty from colleges experts from industry to be involved while revising the curriculum. I am happy to state that, each Board of studies has adhered to the resolutions passed by Faculty of Technology, developed curriculum accordingly. In addition to outcome based education, **Choice Based Credit and Grading System** is also introduced to ensure quality of engineering education.

Choice Based Credit and Grading System enables a much-required shift in focus from teacher-centric to learner-centric education since the workload estimated is based on the investment of time in learning not in teaching. It also focuses on continuous evaluation which will enhance the quality of education. University of Mumbai has taken a lead in implementing the system through its affiliated Institutes Faculty of Technology has devised a transparent credit assignment policy adopted ten points scale to grade learner's performance. Credit grading based system was implemented for First Year of Engineering from the academic year 2016-2017. Subsequently this system will be carried forward for Second Year Engineering in the academic year 2017-2018, for Third Year Final Year Engineering in the academic years 2018-2019, 2019-2020, respectively.

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Co-ordinator,
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First Year Engineering (Semester I & II), Revised course from Academic Year 2016 -17, (REV- 2016) (Common for all Branches of Engineering)

Scheme for FE - Semester – II

Sub. Code	Subject Name	Examination Scheme							
		Theory marks				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 & Test 2					
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125
FEC202	Applied Physics-II	15	15	15	60	25	-	-	100
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150
FEC206	Communication Skills	10	10	10	40	25	-	-	75
FEL201	Basic Workshop Practice-II	-	-	-	-	50	-	-	50
				95	380	200	75		750

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC201	Applied Mathematics-II	04	-	01	04		01	05
FEC202	Applied Physics-II	03	01	-	03	0.5	-	3.5
FEC203	Applied Chemistry -II	03	01	-	03	0.5		3.5
FEC204	Engineering Drawing	03	04	-	03	02	-	05
FEC205	Structured Programming Approach	04	02	-	04	01	-	05
FEC206	Communication Skills	02	02	-	02	01	-	03
FEL201	Basic Workshop Practice -II	-	04	-	-	02	-	02
		19	14	01	19	07	01	27

ode	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut	Total
FEC201	**Applied Mathematics-II**	04	-	01	04	-	01	05

Sub Code	Subject Name	Examination Scheme							
		Theory				Term Work	Practical exam	Oral exam	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Av. of Test 1 & 2					
FEC201	**Applied Mathematics-II**	20	20	20	80	25	--	--	125

Course Objectives: The course is aimed to develop the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subjects. The topics introduced will serve as basic tools for specialized studies in many fields of engineering and technology.

Learning objectives:

1) To use Gamma function to solve different type of Integrals and to understand Gamma function as generalize factorial function.
2) To understand the Beta function and its application
3) To understand First order first degree Differential equations and its applications in in basic electrical circuits and motion of a particle.
4) To find the Area of a Bounded Region and calculating mass of lamina using double integral.
5) To solve triple integral and understand their applications in physics like to compute total volume of a solid.
6) To build ability to solve differential equations numerically. To provide an overview of the experimental aspect of applied mathematics.

Course outcomes:

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

1. Apply this knowledge to solve the problems.
2. Apply and analyse various types of numerical methods for solving differential equations.
3. Solve and analyse the Differential equations and its application in related field of engineering.
4. Solve the model by selecting and applying a suitable mathematical method like Trapezoidal rule, Simpson's $(1/3)^{rd}$ rule etc.
5. Interpreting the mathematical results practically.
6. Find and analyse area, mass of lamina and volume of solid by using double and triple integration,
7. Find length of arc of a given curve.
8. Inculcate the habit of Mathematical Thinking.

Detailed Syllabus

Sr. No.	Topics	Hours
	Prerequisite: Idea of Curve tracing in cartesian, parametric and polar forms. Straight lines, Circles, Parabolas, Hyperbola, Astroid, Cycloid, Lemniscate of Bernoulli, Cardiode. Concept of Solid Geometry -Planes, Spheres, Cones, Cylinders, Paraboloids (Tracing of curves by using SciLab).	
1	**Module-1**: **Differential Equations of First Order and First Degree** 1.1 Exact differential Equations , Equations reducible to exact form by using integrating factors. 1.2 Linear differential equations(Review), equation reducible to linear form, Bernoulli's equation. 1.3: Simple application of differential equation of first order and first degree to electrical and Mechanical Engineering problem (no formulation of differential equation)	4 hrs 3 hrs 2 hrs
2	**Module-2**: **Linear Differential Equations With Constant Coefficients and Variable Coefficients Of Higher Order** 2.1. Linear Differential Equation with constant coefficient- complementary function, particular integrals of differential equation of the type f(D)y = X where X is e^{ax}, sin(ax+b), cos (ax+b), x^n, e^{ax}V, xV. 2.2. Cauchy's homogeneous linear differential equation and Legendre's differential equation, Method of variation of parameters.	6 hrs. 3 hrs
3	**Module-3: Numerical solution of ordinary differential equations of first order and first degree, Beta and Gamma Function** 3.1. (a)Taylor's series method (b)Euler's method (c) Modified Euler method (d) Runga-Kutta fourth order formula (SciLab programming is to be taught during lecture hours) 3.2 . Beta and Gamma functions and its properties.	4 hrs 4 hrs
4	**Module -4: Differentiation under Integral sign, Numerical Integration and Rectification** 4.1. Differentiation under integral sign with constant limits of integration. 4.2. Numerical integration- by (a) Trapezoidal (b) Simpson's 1/3rd (c) Simpson's 3/8th rule (all with proof). (Scilab programming on (a) (b) (c) (d) is to be taught during lecture hours) 4.3. Rectification of plane curves.	2 hrs 3 hrs 3 hrs

5.	**Module-5: Double Integration** 5.1. Double integration-definition, Evaluation of Double Integrals. 5.2. Change the order of integration, Evaluation of double integrals by changing the order of integration and changing to polar form.	2 hrs 7 hrs
6.	**Module-5: Triple Integration and Applications of Multiple Integrals.** 6.1. Triple integration definition and evaluation (Cartesian, cylindrical and spherical polar coordinates). 6.2. Application of double integrals to compute Area, Mass, Volume. Application of triple integral to compute volume.	3 hrs 6 hrs

Recommended Books:

4. A text book of Applied Mathematics, P.N.Wartikar and J.N.Wartikar, Vol – I and –II by Pune VidyarthiGraha.
5. Higher Engineering Mathematics, Dr.B.S.Grewal, Khanna Publication
6. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley EasternLimited, 9thEd.
7. Numerical methods by Dr. P. Kandasamy ,S.Chand Publications

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.

3. Question No.1 will be compulsory and based on entire syllabus wherein sub questions of 3 to 4 marks will be asked.

4: Remaining questions will be randomly selected from all the modules.

5: Weightage of marks should be proportional to number of hours assigned to each Module.

Term Work:

General Instructions:

(1) Batch wise tutorials are to be conducted. The number of students per batch should be as per University pattern for practical.

(2) Students must be encouraged to write Scilab Programs in tutorial class only. Each Student has to write at least 4 Scilab tutorials (including print out) and at least 6 class tutorials on entire syllabus.

(3) SciLab Tutorials will be based on (i)Curve Tracing (ii) Taylor's series method, Euler's method Modified Euler method, Runga- Kutta fourth order formula (iii) Ordinary Differential Equation and (iv) Trapezoidal ,Simpson's 1/3rd and Simpson's 3/8th rule.

The distribution of Term Work marks will be as follows -

Attendance (Theory and Tutorial): 05 marks

Class Tutorials on entire syllabus : 10 marks

SciLab Tutorials : 10 marks

The final certification and acceptance of Term- Work ensures the satisfactory Performance of laboratory work and minimum passing in the Term Work.

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Term Work/ Practical	Tutorial	Total
FEC202	**Applied Physics-II**	03	01	-	03	0.5	-	3.5

Subject Code	Subject Name	Examination Scheme							
		Theory				Term Work	Practical	Oral	Total
		Internal Assessment			End SEM. Exam.				
		Test 1	Test 2	Average of Test 1 & 2					
FEC202	**Applied Physics-II**	15	15	15	60	25	-	-	100

COURSE OBJECTIVES

Identify and understand the fundamental physical principals underlying engineering devices and processes—a prerequisite to become successful engineers.

To provide inclusive knowledge of fundamental physical principles encouraging engineering students to venture into the research field.

COURSE OUTCOME

1) Ability to demonstrate competency & understanding of basic concepts of Physics like - Optics, Lasers, Fibre optics, Electrodynamics, Nanotechnology, etc.

2) Comprehend the concepts of interference and diffraction and their applications

3) Apply the working principles of Optical fibre, LASER and their applications in emerging technology

4) Understand electrodynamics, Maxwell's equations and their applications

5) Assimilate knowledge of the Nanotechnology and tools used SEM, TEM, AFM

Module 1	**INTERFERENCE AND DIFFRACTION OF LIGHT** Interference by division of amplitude and by division of wavefront; Interference in thin film of constant thickness due to reflected and transmitted light; origin of colours in thin film; Wedge shaped film(angle of wedge and thickness measurement); Newton's rings Applications of interference - Determination of thickness of very thin wire or foil; determination of refractive index of liquid; wavelength of incident light; radius of curvature of lens; testing of surface flatness; Anti-reflecting films and Highly reflecting film. Diffraction of Light –Fraunhoffer diffraction at single slit, Fraunhoffer diffraction at	**14 hrs**

	double slit, Diffraction Grating, Resolving power of a grating, dispersive power of a grating Application of Diffraction - Determination of wavelength of light with a plane transmission grating	
Module 2	**LASERS** Quantum processes as absorption, spontaneous emission and stimulated emission; metastablestates, population inversion, pumping, resonance cavity, Einsteins's equations; Helium Neon laser; Nd:YAG laser; Semiconductor laser, Applications of laser- Holography (construction and reconstruction of holograms) and industrial applications(cutting, welding etc), Applications in medical field	**04hrs**
Module 3	**FIBRE OPTICS** Total internal reflection; Numerical Aperture; critical angle; angle of acceptance; Vnumber; number of modes of propagation; types of optical fiber; Losses in optical fibre(Attenuation and dispersion) Applications of optical fibre - Fibre optic communication system; sensors (Pressure, temperature, smoke, water level), applications in medical field	**04 hrs**
Module 4	**ELECTRODYNAMICS** Cartesian, Cylindrical and Spherical Coordinate system, Scaler and Vector field, Physical significance of gradient, curl and divergence, Determination of Maxwell's four equations. Applications-design of antenna, wave guide, satellite communication etc.	**08 hrs**
Module 5	**CHARGE PARTICLE IN ELECTRIC AND MAGNETIC FIELDS** Fundamentals of Electromagnetism, Motion of electron in electric field (parallel ,perpendicular, with some angle); Motion of electron in magnetic field (Longitudinal and Transverse); Magnetic deflection; Motion of electron in crossed field; Velocity Selector; Velocity Filter, Electron refraction; Bethe's law; Electrostatic focusing; Magnetostatic focusing; Cathode ray tube (CRT);Cathod ray Oscilloscope (CRO) Application of CRO: Voltage (dc,ac), frequency, phase measurement.	**05 hrs**
Module 6	**NANOSCIENCE AND NANOTECHNOLOGY** Introduction to nano-science and nanotechnology, Surface to volume ratio, Two main approaches in nanotechnology -Bottom up technique and top down technique; Important tools in nanotechnology such as Scanning Electron Microscope, Transmission Electron Microscope, Atomic Force Microscope. Nano materials: Methods to synthesize nanomaterials (Ball milling, Sputtering, Vapour deposition, solgel), properties and applications of nanomaterials.	**04 hrs**

Books Recommended:

1. A text book of Engineering Physics-Avadhanulu & Kshirsagar, S.Chand
2. Fundamentals of Optics by Jenkins and White, McGraw-Hill
3. Optics - Ajay Ghatak, Tata McGraw Hill
4. Concepts of Modern Physics- ArtherBeiser, Tata Mcgraw Hill
5. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
6. Engineering Physics-D. K. Bhattacharya, Oxford
7. Concepts of Modern Physics- ArtherBeiser, Tata Mcgraw Hill
8. Classical Electodyamics – J. D. Jackson, Wiley

9. Introduction to Electrodynamics- D. J. Griffiths, Pearson publication
10. Intoduction to Nanotechnology- Charles P. Poole, Jr., Frank J. Owens, Wiley India edition
11. Nano: The Essential – T. Pradeep, Mcgraw-Hill Education

Suggested Experiments: (Any five)

1. Determination of radius of curvature of a lens using Newton's ring set up
2. Determination of diameter of wire/hair or thickness of paper using Wedge shape film method.
3. Determination of wavelength using Diffracion grating. (Hg/ Ne source)
4. Determination of number of lines on the grating surface using LASER Sourse.
5. Determination of Numerical Aperture of an optical fibre.
6. Determination of wavelength using Diffracion grating. (Laser source)
7. Use of CRO for measurement of frequency and amplitude.
8. Use of CRO for measurement of phase angle.
9. Study of divergence of laser beam
10. Determination of width of a slit using single slit diffraction experiment (laser source)

Note: Distribution of marks for term work

1. Laboratory work (Experiments and Journal) : 10 marks
2. Two Assignments: 10 marks
2. Attendance (Practical): 05marks

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 15 marks.
2. Total 4 questions need to be solved.
3: Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
4: Remaining question will be randomly selected from all the modules.
5: Weightage of marks should be proportional to number of hours assigned to each

ct Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Term Work/ Practical	Tutorial	Total
FEC203	**Applied Chemistry-II**	03	01	-	03	0.5	-	3.5

Subject Code	Subject Name	Examination Scheme							
		Theory							
		Internal Assessment			End SEM. Exam.	Term Work	Practical	Oral	Total
		Test 1	Test 2	Average of Test 1 & 2					
FEC203	**Applied Chemistry-II**	15	15	15	60	25	-	-	100

Course Objectives

1) To make the students understand the principles of corrosion & Green chemistry.
2) To understand the chemistry of fuels, alloys and composite materials.

Course Outcomes

Students will be able to:
1) Calculate the quantity of air and oxygen required for the complete combustion of fuels and carry out analysis of fuels.
2) Understand the mechanisms of corrosion, methods of preventing corrosion.
3) Understand the properties and uses of various alloys.
4) Calculate atom economy by various methods of synthesis. Incorporate the knowledge of green synthesis of various chemicals.
5) Understand the chemistry of composite materials.

Module 1	**Corrosion:** Introduction: Types of Corrosion- (I) Dry or Chemical Corrosion-i) Due to oxygen ii) Due to other gases (II) Wet or Electrochemical corrosion- Mechanism i) Evolution of hydrogen type ii) Absorption of oxygen. Types of Electrochemical Corrosion- Galvanic cell corrosion, Concentration cell corrosion (differential aeration), Pitting corrosion, Intergranular corrosion, Stress corrosion. Factors affecting the rate of corrosion- Nature of metal, position of metal in galvanic series, potential difference, overvoltage, relative area of anodic and cathodic parts, purity of metal, nature of the corrosion product, temperature, moisture, influence of pH, concentration of the electrolytes. Methods to decrease the rate of corrosion- Material selection, Proper designing, Use of inhibitors, Cathodic protection- i) Sacrificial anodic protection ii) Impressed current method, Anodic protection method, Metallic coatings- hot dipping- galvanizing and tinning, metal cladding, metal spraying, Electroplating, Cementation. Organic coatings – Paints (only constituents and their functions).	**11 hrs**

Module 2	**Alloys** Introduction, purpose of making alloys, Ferrous alloys, plain carbon steel, heat resisting steels, stainless steels (corrosion resistant steels), effect of the alloying element- Ni, Cr, Co, Mn, Mo,W and V; Non-Ferrous alloys- Composition, properties and uses of- Alloys of Aluminium- i) Duralumin ii) Magnalium. Alloys of Cu- (I) Brasses-i) Commercial brass ii) German silver, (II) Bronzes- i) Gun metal ii) High phosphorous bronze. Alloys of Pb- i) Wood's metal ii) Tinmann's solder. Powder Metallurgy- Introduction, (1)Methods of powder metal formation- i) Mechanical pulverization ii) Atomization iii) Chemical reduction iv) Electrolytic process v) Decomposition (2) Mixing and blending. (3) Sintering (4) Compacting- i) Cold pressing ii) Powder injection moulding (iii) Hot compaction. Applications of powder metallurgy. Shape Memory Alloys- Definition, properties and Uses.	**07 hrs**
Module 3	**Fuels** Definition, classification of fuels-solid, liquid and gaseous. Calorific value- Definition, Gross or Higher calorific value & Net or lower calorific value, units of heat (no conversions), Dulong's formula & numerical for calculations of Gross and Net calorific values. Characteristics of a good fuel. Solid fuels- Analysis of coal- Proximate and Ultimate Analysis with Significance and numericals. Liquid fuels- Crude petroleum oil, its composition and classification and mining (in brief). Refining of crude oil- i) Separation of water ii) Separation of 'S' & iii) Fractional Distillation with diagram and composition and uses table. Cracking- Definition, Types of cracking- I) Thermal cracking – (i) Liquid phase thermal cracking (ii) Vapour phase thermal cracking. II) Catalytic cracking- (i) Fixed-bed catalytic cracking (ii) Moving-bed catalytic cracking. Advantages of Catalytic cracking. Petrol- Refining of petrol, unleaded petrol (use of MTBE), Catalytic converter, Power alcohol, Knocking, Octane number, Cetane number, Antiknocking agents. Combustion- Calculations for requirement of only oxygen and air (by weight and by volume only) for given solid & gaseous fuels. Biodiesel- Method to obtain Biodiesel from vegetable oils (Trans-esterification), advantage and disadvantages of biodiesel. Fuel cell- Definition, types and applications.	**12 hrs**
Module 4	**Composite Materials** Introduction, Constitution- i) Matrix phase ii) Dispersed phase. Characteristic properties of composite materials. Classification- (A) Particle - reinforced composites- i) Large – particle reinforced composites ii) Dispersion – strengthened composites. (B) Fiber – reinforced composites- i) Continuous – aligned ii) Discontinuous – aligned (short)- (a) aligned (b) randomly oriented (C) Structural Composites- i) Laminates (ii) Sandwich Panels.	**04 hrs**
Module 5	**Green Chemistry** Introduction, Twelve Principles of Green chemistry, numerical on atom economy, Conventional and green synthesis of Adipic acid, Indigo, Ibuprofen and Carbaryl. Green solvents (ionic liquid supercritical CO_2) and products from natural materials.	**06 hrs**

Theory Examination :

1. Question paper will comprise of total 6 questions, each of 15 marks.
2. Total four questions need to be solved.
3. Question – 1 will be compulsory and based on entire syllabus wherein sub questions of 3 marks will be asked.
4. Remaining questions will be mixed in nature (for example suppose Q.2 has part (a) from Module 3 then part (b) will be form any module other than module 3).
5. In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Term work

Term Work shall consist of minimum five experiments. The distribution of marks for term work shall be as follows :

Laboratory Work (Experiments and journal)	: 10 marks
Attendance (Practical and Theory)	: 05 marks
Assignments and Viva on practicals	: 10 marks
Total	: 25 marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

Suggested Experiments

1) Estimation of Zn- Complexometric titration.
2) Estimation of Ni- Complexometric titration.
3) Estimation of Al- Complexometic titration.
4) Flue gas analysis using Orsat's apparatus.
5) Estimation of Fe from plain carbon steel
6) Estimation of Ni by gravimetric method.
7) Estimation of Sniodometrically.
8) Preparation of Biodiesel from edible oil.
9) Estimation of Cu- Iodometrically.
10) Estimation of percentage moisture in coal.
11) Estimation of percentage ash in coal.
12) To estimate the emf of Cu-Zn system by potentiometry.
13) Demonstration of Electroplating.

Recommended Books :

1. Engineering Chemistry - Jain &Jain (DhanpatRai)
2. Engineering Chemistry – Dara & Dara (S Chand)
3. Engineering Chemistry - Wiley India (ISBN – 9788126519880)
4. A Text Book of Engineering Chemistry - ShashiChawla (DhanpatRai)
5.A Text Book of Green Chemistry – V.K. Ahluwalia (Springer)

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/Practical	Tutorial	Total
FEC204	Engineering Drawing	03	04	--	03	02	--	05

Subject Code	Subject Name	Examination Scheme							Total
		Theory Marks				Term Work	Practical	Oral	
		Internal Assessment			End Semester Exam				
		Test-1	Test-2	Average of Test-1 and Test-2					
FEC204	Engineering Drawing	15	15	15	60	25	50	--	150

Course Objective

1) To impart and inculcate proper understanding of the theory of projection.
2) To impart the knowledge of reading a drawing.
3) To improve the visualization skill.
4) To teach basic utility of computer aided drafting (CAD) tool.

Course Outcomes

Learner will be able to..

1) Apply the basic principles of projections in 2D drawings.
2) Apply the basic principles of projections in converting 3D view to 2D drawings.
3) Read a given drawing.
4) Visualize an object from the given two views.
5) Use CAD tool to draw different views of an object.

Module	Details	Hrs
1	**Introduction to Engineering Drawing:-** Types of Lines, Dimensioning Systems as per IS conventions. Engineering Curves: Basic construction of Cycloid, Involutes and Helix (of cylinder) only. ** **Introduction to Auto CAD:-** Basic Drawing and Editing Commands. Knowledge of setting up layers, Dimensioning, Hatching, plotting and Printing.	3

2	**Projection of Points and Lines**:- Lines inclined to both the Reference Planes (Excluding Traces of lines) and simple application based problems on Projection of lines. **@Projection of Planes:-** Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to either HP or VP only. (Exclude composite planes)	6
3	**Projection of Solids:** - (Prism, Pyramid, Cylinder, Tetrahedron, Hexahedron and Cone only) Solid projection with the axis inclined to HP and VP. (Exclude Spheres, Composite, Hollow solids and frustum of solids). Use change of position or Auxiliary plane method **Section of solids:-** Section of Prism, Pyramid, Cylinder, Tetrahedron, Hexahedron & Cone	
4	**Orthographic projections:-** • Different views of a simple machine part as per the first angle projection method recommended by I.S. • Full or Half Sectional views of the Simple Machine parts	12
	Isometric Views: Isometric View/Drawing of blocks of plain and cylindrical surfaces using plain/natural scale only. (Exclude Spherical surfaces). • ****Drawing of Isometric views using Auto CAD.** • **@Reading of Orthographic Projections. [Only for Practical Exam (AutoCAD) and TW]**	

6) Use CAD tool to draw an isometric view.

****Should be covered during Auto CAD practical sessions.**

@ Should be covered only in Term work. (i.e. Questions will not be asked for the End semester Examination).

Term Work:

Component – 1

Drawing Sheet – 1: Projection of Solids (3 Problems)

Drawing Sheet – 2: Section of Solids and Development of lateral surfaces (2 Problems)

Drawing Sheet – 3: Orthographic Projection without section (2 Problems)

Drawing Sheet – 4: Orthographic Projection with section (2 Problems)

Drawing Sheet – 5: Isometric Views (3 Problems)

Component -2

One A-3 size sketch book consisting of:-

1) 2 problems each from Engineering Curves, Projection of Lines, Planes and Solids.

2) 2 problem from Section of solids and 1 problem from section of solids with Development of lateral surface of that sectioned Solid.

3) 2 problems from the Orthographic Projections (with Section), 1 problem on Reading of Orthographic projections and 2 problems on Isometric views.

Component-3

Printouts **(preferably on A3 size sheet)** of each from:

1) Orthographic Projections with section – 3 problems.
2 Isometric Views – 4 problems.
3) Reading of Orthographic Projections – 1 problem.

Note:- 2 hrs /week Auto CAD Practical is essential for completing the Auto CAD Drawings and take required printouts.

AutoCAD Examination: (2hrs – 50 marks):

1) Minimum 1 problem from **1 OR 3** of **Component-3for 30 marks.**
AND
2) Minimum 1 problem from 2 of **Component-3 for 20 marks.**

Note:- Print out of the Answers have to be taken **preferably in A3 size sheets** and should be **Assessed byExternal examiner only**. Knowledge of concepts and accuracy of drawing should be considered during evaluation.

Internal Assessment Test: (1 hr - 15 marks)

Out of the two tests, one test must be conducted by **conventional way** and another test must be **Practical Exam** (using Auto CAD software). Average of the two tests must be considered for Internal Assessment.

End Semester Examination: (3 hrs – 60 marks)

1. Question paper will comprise of 6 questions, each carrying 15 marks.
2. Any 4 questions need to be solved.
3. Marks of each topic should be proportional to number of hours assigned to each Module.

Text Books.

1) N.D. Bhatt, "Engineering Drawing (Plane and solid geometry)", Charotar Publishing House Pvt. Ltd.

2) N.D. Bhatt & V.M. Panchal, "Machine Drawing", Charotar Publishing House Pvt. Ltd.

References.

1) M.B Shah & B.C Rana, "Engineering Drawing", Pearson Publications.
2) P.J. Shah, "Engineering Graphics", S Chand Publications.
3) Dhananjay A Jolhe, "Engineering Drawing" Tata McGraw Hill.
4) Prof. Sham Tickoo (Purdue University) &GauravVerma, "(CAD Soft Technologies) : Auto CAD 2012 (For engineers and Designers)", Dreamtech Press NewDelhi.

Subject Code	Subject Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract	Tut.	Theory	Pract.	Tut	Total
FEC205	Structured Programming Approach	04	02	--	04	01	--	05
		Examination Scheme						
		Theory Examination				Term Work	Pract.	Oral	Total
		Internal Assessment			End Sem. Exam				
		Test 1	Test 2	Avg.					
		20	20	20	80	25	25	---	150

Objective:

This subject aims to provide students with an understanding of the role computation can play in solving problems. The Course will be taught using C-Programming Language.

Outcome:

Learner will able to

1. Understand the basic terminology used in computer programming.
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Describe the dynamics of memory by the use of pointers.
6. Use different data structures and create/update basic data files.

Sr. No.	Module	Detailed Content	Hours
1	**Introduction to Computer, Algorithm And Flowchart**	**1.1 Basics of Computer:** Turing Model, Von Neumann Model, Basics of Positional Number System, Introduction to Operating System and component of an Operating System. **1.2 Algorithm & Flowchart :** Three construct of Algorithm and flowchart: Sequence, Decision (Selection) and Repetition	**06**
2	**Fundamentals of C-Programming**	**2.1** Character Set, Identifiers and keywords, Data types, Constants, Variables. **2.2 Operators**-Arithmetic, Relational and logical, Assignment, Unary, Conditional, Bitwise, Comma, other operators. Expression, statements, Library Functions, Preprocessor. **2.3 Data Input and Output** – getchar( ), putchar( ), scanf( ), printf( ), gets( ), puts( ), Structure of C program .	**06**

3	**Control Structures**	**3.1 Branching** - If statement, If-else Statement, Multiway decision. **3.2 Looping** – while , do-while, for **3.3 Nested control structure**- Switch statement, Continue statement Break statement, Goto statement.	**12**
4	**Functions and Parameter**	**4.1Function** -Introduction of Function, Function Main, Defining a Function, Accessing a Function, Function Prototype, Passing Arguments to a Function, Recursion. **4.2 Storage Classes** –Auto , Extern , Static, Register	**06**
5	**Arrays , String Structure and Union**	**5.1 Array**-Concepts, Declaration, Definition, Accessing array element, One-dimensional and Multidimensional array. **5.2 String**- Basic of String, Array of String , Functions in String.h **5.3 Structure**- Declaration, Initialization, structure within structure, Operation on structures, Array of Structure. **5.4 Union** - Definition , Difference between structure and union , Operations on a union	**14**
6	**Pointer and Files**	**6.1 Pointer** :Introduction, Definition and uses of Pointers, Address Operator, Pointer Variables, Dereferencing Pointer, Void Pointer, Pointer Arithmetic, Pointers to Pointers, Pointers and Array, Passing Arrays to Function, Pointers and Function, Pointers and two dimensional Array, Array of Pointers, Dynamic Memory Allocation. **6.2 File**s: Types of File, File operation- Opening, Closing, Creating, Reading, Processing File.	**08**

Text Books:

1. "MASTERING C" by K.R.Venugopal and SudeepR.Prasad , Tata McGraw-Hill Publications.
2. "A Computer Science –Structure Programming Approaches using C ", by BehrouzForouzan , Cengage Learning .
3. Schaum's outlines "Programming with C", by Byron S. Gottfried, Tata McGraw-Hill Publications.

Reference Books:

1. "Basics of Computer Science", by BehrouzForouzan , Cengage Learning .
2. "Programming Techniques through C", by M. G. Venkateshmurthy, Pearson Publication.
3. "Programming in ANSI C", by E. Balaguruswamy, Tata McGraw-Hill Education.
4. "Programming in C", by Pradeep Day and Manas Gosh, Oxford University Press.
5. "Let Us C", by Yashwant Kanetkar, BPB Publication.

Laboratory Assignments:

1. Students are expected to solve and execute at least 20 programming problems based on above Syllabus.
2. Journal work should comprise of writing the problem definition, solution of problem either as algorithm and flow chart and source code in C (Advisable hand written) for all the 20 problems.

Assessment:

Internal Assessment :

Assessment consists of two tests, First test should be conducted after 40% syllabus and Second test should be conducted after 70% Syllabus.

End Semester Theory Examination:

1. Question paper will comprise of total six question
2. All question carry equal marks and Q.1 will be compulsory, based on entire syllabus
3. Questions will be mixed in nature (for example supposed Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3)
4. Only Four question need to be solved.

In question paper weightage of each module will be proportional to number of respective lecture hours as mention in the syllabus.

<table>
<tr><td rowspan="2">Subject Code</td><td rowspan="2">Subject Name</td><td colspan="3">Teaching Scheme (Contact Hours)</td><td colspan="4">Credits Assigned</td></tr>
<tr><td>Theory</td><td>Pract</td><td>Tut.</td><td>Theory</td><td>Pract.</td><td>Tut</td><td>Total</td></tr>
<tr><td rowspan="6">FEC206</td><td rowspan="6">Communication Skills</td><td>02</td><td>02</td><td></td><td>02</td><td>02</td><td>01</td><td>03</td></tr>
<tr><td colspan="7">Examination Scheme</td></tr>
<tr><td colspan="4">Theory Examination</td><td rowspan="3">Term Work</td><td rowspan="3">Pract.</td><td rowspan="3">Oral</td><td rowspan="3">Total</td></tr>
<tr><td colspan="3">Internal Assessment</td><td rowspan="2">End Sem. Exam</td></tr>
<tr><td>Test 1</td><td>Test 2</td><td>Avg.</td></tr>
<tr><td>10</td><td>10</td><td>10</td><td>40</td><td>25</td><td></td><td></td><td>75</td></tr>
</table>

COURSE OBJECTIVES:

- ☐ To acquaint the students with basic concepts, theories and barriers to communication.
- ☐ To enhance communication skills by giving adequate exposure in LSRW skills.
- ☐ To develop an overall language and communication skills for better technical writing.
- ☐ To know the essential features and mechanics of comprehension and summarization.
- ☐ To deploy technology to communicate effectively in various situations.

COURSE OUTCOMES:

The students will be able to-

- ☐ Identify, interpret and construct appropriate messages for a variety of contexts.
- ☐ Display oral and written skills in the English language in different scenarios of business communication.
- ☐ Enhance the proficiency to use appropriate language for technical writing.
- ☐ Demonstrate good comprehension, inference making, vocabulary building, paraphrasing and summarizing.

Sr. No	Module	No. of lectures
1	Communication Theory: Concept and Meaning, Communication cycle, Objectives, Barriers to communication (linguistic and semantic, psychological, physical, mechanical, cultural), Methods of communication (verbal and non-verbal), Networks of communication (formal and informal), Language skills (listening, speaking, reading, writing), Corporate communication: Digital Content Creation.	13
2	Business Correspondence: Principles of Business Correspondence, Parts of a business letter, Formats (Complete block and Modified block), Types of letters: Enquiry, Reply to enquiry, Claim, Adjustment and Sales letter.	5

3	Grammar and Vocabulary: Common errors, Concord (subject- verb agreement), Pairs of confused words, Lexicon (Enriching vocabulary through one-word substitutes, synonyms, antonyms, etc.)	2
4	Summarization and Comprehension: Passages to test the analytical skills and expression	2
5	Technical writing : Techniques to define an object, writing instructions, language exercises based on types of expositions (description of an object, explanation of a process)	2
6	Information Communication Technology (ICT) enabled communication media: E-mail, Blog and Website.	2

Note: Two tests are prescribed for internal assessment. The first test should be conducted in the form of a three-minute public speech. The second test should be based on theory and application exercises based on the syllabus.

Term work: 25 marksAssignments: 20 marks Attendance: 05 marks

List of assignments:
Communication theory: 02
Business Correspondence: 02
Grammar and vocabulary: 01
Summarization & Comprehension: 01
Technical writing: 01
ICT enabled communication media: 01

Recommended reference books, websites and journals for Communication Skills:

- ☐ ***Communication in Organizations*** **by Dalmar Fisher, Jaico Publishing House**
- ☐ ***Communication Skills*** **by Meenakshi Raman &Sangeeta Sharma, OxfordUniversity Press**
- ☐ ***Business Correspondence & Report-writing*** **by R.C.Sharma& Krishna Mohan,Tata McGraw-Hill Education**
- ☐ ***Effective Technical Communication*** **by Ashraf Rizvi, Tata McGraw-Hill**
- ☐ ***Technical Writing & Professional Communication for non-native speakers of English*** **byThomas N.Huckin& Leslie A.Olsen, McGraw -Hill**
- ☐ **Mastering Communication** ***by Nicky Stanton, Palgrave Master Series***
- ☐ **www.buisnesscommunicationskills.com**
- ☐ **www.kcitraing.com**
- ☐ **www.mindtools.com**
- ☐ **Journal of Business Communication**

Paper pattern

Total Marks: 40, Duration: 2 hours Distribution of marks and weightage:

- ☐ The paper will comprise of6 questions of 10 marks each out of which 4 need to be attempted.
- ☐ The first question is compulsory and will be a combination of all modules.
- ☐ Students can attempt any 3 out of the remaining 5 questions.
- ☐ The first module (Communication Theory) will carry 40 % weightage.
- ☐ Questions 2, 3, 4, 5 and 6 will be based on combinations of two or more modules.

Sub Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEL201	**Basic Workshop Practice-II**	-	04	-	-	02	-	02

Sub. Code	Subject Name	Examination Scheme							
		Theory				Term Work	Pract.	Oral	Total
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 & Test 2					
FEL201	**Basic Workshop Practice-II**	-	-	-	-	50	-	-	50

<u>Detailed Syllabus is given in Basic Workshop Practice-I</u>

Term work:

Term work shall consist of respective reports and jobs of the trades selected the distribution of marks for term work shall be as follows:

Laboratory work (Job and Journal) : 40 marks

Attendance (Practical and Theory) : 10 marks

The final certification and acceptance of term – work ensures the satisfactory performance of laboratory work.