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Item No. 4.76

UNIVERSITY OF MUMBAI



Bachelor of Engineering

First Year Engineering (Semester I & II), Revised course
(REV- 2012) from Academic Year 2012 -13,
(Common for All Branches of Engineering)

(As per Credit Based Semester and Grading System with
effect from the academic year 2012–2013)

**First Year Engineering (Semester I & II), Revised course from
Academic Year 2012 -13, (REV- 2012), (Common for all branches)**

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

Scheme for Semester - II

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory marks				End sem. exam	Term Work	Pract .		Oral
		Internal Assessment			Av. of Test 1 & 2					
		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

Sub. Code	Subject Name	Examination Scheme							Total
		Theory Marks				TW	Prat	Oral	
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 and Test 2					
FEC201	Applied Mathematics-II	20	20	20	80	25	-	-	125

Detailed Syllabus:

Sr.No.	Topic	Hrs
1	<p>Prerequisite: Idea of Curve tracing in cartesian, parametric and polar forms. Straight lines, Circles, Parabolas, Hyperbola, Catenary, Cissoid, Astroid, Cycloid, Lemniscate of Bernoulli, Cardioid. Concept of Solid Geometry -Planes, Spheres, Cones, Cylinders, Paraboloids (Tracing of curves by using SciLab).</p> <p>Module-1: Beta and Gamma functions, Differentiation under Integral sign and exact differential equation:</p> <p>1.1: Beta and Gamma functions and its properties. Differentiation under integral sign with constant limits of integration.</p>	<p>2 hrs</p> <p>5 hrs</p>

	<p>1.2: Rectification of plane curves.</p> <p>1.3: Differential Equation of first order and first degree-Exact differential equations, Equations reducible to exact equations by integrating factors.</p>	<p>4hrs</p> <p>4 hrs</p>
2	<p>Module-2: Differential Calculus</p> <p>2.1: Linear differential equations(Review), equation reducible to linear form, Bernoulli's equation.</p> <p>2.2: Linear Differential Equation with constant coefficient- Complimentary 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.</p> <p>2.3: Cauchy's homogeneous linear differential equation and Legendre's differential equation, Method of variation of parameters.</p> <p>2.4: Simple application of differential equation of first order and second order to electrical and Mechanical Engineering problem (no formulation of differential equation)</p>	<p>2 hrs</p> <p>6 hrs</p> <p>4 hrs</p> <p>3 hrs</p>
3	<p>Module-3: Numerical solution of ordinary differential equations of first order and first degree and Multiple Integrals-</p> <p>3.1 :(a)Taylor's series method (b)Euler's method (c) Modified Euler method (d) Runge-Kutta fourth order formula (SciLab programming is to be taught during lecture hours)</p> <p>3.2:Multiple Integrals-Double integration-definition, Evaluation of Double Integrals, Change of order of integration, Evaluation of double integrals by changing the order of integration and changing to polar form (Examples on change of variables by using Jacobians only).</p>	<p>5 hrs</p> <p>10 hrs</p>

4	<p>Module -4:Multiple Integrals with Application and Numerical Integration:-</p> <p>4.1: Triple integration –definition and evaluation (Cartesian, cylindrical and spherical polar coordinates).</p> <p>4.2: Application to double integrals to compute Area, Mass, Volume. Application of triple integral to compute volume.</p> <p>4.3: Numerical integration-Different type of operators such as shift, forward, backward difference and their relation. Interpolation, Newton interpolation, Newton-Cotes formula(with proof). Integration by (a) Trapezoidal (b) Simpson’s $1/3^{rd}$ (c) Simpson’s $3/8^{th}$ rule (all with proof). (Scilab programming on (a) (b) (c) (d) is to be taught during lecture hours)</p>	<p>3 hrs</p> <p>5 hrs</p> <p>7 hrs</p>
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Recommended Books:

- 1: A text book of Applied Mathematics, P. N. Wartikar and J. N. Wartikar, Vol –I and II by Pune Vidyarthi Graha.
- 2: Higher Engineering Mathematics, Dr.B. S. Grewal, Khanna Publication
- 3: Advanced Engineering Mathematics, Erwin Kreyszig, Wiley Eastern Limited,9th Ed.
- 4: Numerical Analysis by S.S.Sastry, Prentice Hall
- 5: Differential Equations, Sheply Ross, Wiley India.

Theory Examination:

1. Question paper will comprise of 6questions, each carrying 20 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 should 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 practicals.
- (2) Students must be encouraged to write Scilab Programs during the tutorials. Each student has to write **at least 5 Scilab tutorials (including print out) and at least 5 class tutorials on entire syllabus.**
- (3) SciLab Tutorials will be based on (1) Curve Tracing (2) from module 3 on (a) Taylor's series method (b) Euler's method (c) Modified Euler method (d) Runge-Kutta fourth order formula (4) ordinary differential equation and (5) Trapezoidal, Simpson's $1/3^{\text{rd}}$ and Simpson's $3/8^{\text{th}}$ rule.

The distribution of marks for term work will be as follows,

Attendance (Theory and Tutorial) : 05 marks

Class Tutorials on entire syllabus : 10 marks

SciLab Tutorials : 10

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	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC202	Applied Physics - II	03	01	-	03	0.5	-	3.5

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory					Term Work	Prat.		Oral
		Internal Assessment			End sem. exam					
		Test 1	Test 2	Average of Test 1 and Test 2						
FEC202	Applied Physics - II	15	15	15	60	25	-	-	100	

1. INTERFERENCE AND DIFFRACTION OF LIGHT

(15)

Interference in thin film - Introduction, interference due to reflected and transmitted light by thin transparent parallel film; origin of colours in thin film; Wedge shaped thin film; 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, non-reflecting films, Highly reflecting film

Diffraction of Light – Introduction; Fraunhofer diffraction at single slit; Fraunhofer diffraction at double slit; diffraction due to N- slits (Diffraction Grating), missing orders, Highest possible orders; determination of wavelength of light with a plane transmission grating; resolving power of a grating; dispersive power of a grating.

2. FIBRE OPTICS AND LASERS:

(09)

Fibre optics : Introduction, total internal reflection, basic construction, optical fibre as light guide and types of optical fibre; Numerical Aperture and maximum angle of acceptance, Numerical Aperture for graded index fibre; V-number, Maximum number of possible orders; Losses in optical fibre; Merits of optical fibre; Applications.

Lasers : Quantum processes as absorption, spontaneous emission and stimulated emission; metastable states, 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 other applications.

3. QUANTUM MECHANICS:

(08)

Introduction, Wave particle duality, de Broglie wavelength; experimental verification of de Broglie theory; properties of matter waves; wave packet, group velocity and phase velocity; Wave function, Physical interpretation of wave function; Heisenberg's uncertainty principle; Electron diffraction experiment and Gamma ray microscope experiment; Applications of uncertainty principle; Schrodinger's time dependent wave equation, time independent wave equation, - Motion of free particle, Particle trapped in one dimensional infinite potential well.

4. MOTION OF CHARGED PARTICLE IN ELECTRIC AND MAGNETIC FIELDS - (03)

Electrostatic focusing; Magnetostatic focusing; Cathode ray tube (CRT); Cathod ray Oscilloscope (CRO); Application of of CRO,

5. SUPERCONDUCTIVITY:

(03)

Introduction, Meissner Effect; Type I and Type II superconductors; BCS Theory(concept of Cooper pair); Josephson effect; Applications of superconductors- SQUID, MAGLEV

6. NANOSCIENCE AND NANOTECHNOLOGY

(07)

Introduction to nano-science and nanotechnology; Two main approaches in nanotechnology - Bottom up technique and top down technique; Tools used in nanotechnology such as Scanning electron microscope, Scanning Tunneling Microscope, Atomic Force Microscope.

Nano materials: Methods to produce nanomaterials; Applications of nanomaterials; Different forms of carbon nanoparticles, carbon nanotubes, properties and applications.

Books Recommended:

1. A Textbook of Engineering physics - Avadhanulu & Kshirsagar, S.Chand
2. Engineering Physics- Uma Mukherji (third edition), Narosa
3. Engineering Physics - R.K.Gaur & S.L. Gupta, Dhanpat Rai publications
4. Modern Engineering Physics – Vasudeva, S.Chand
5. Concepts of Modern Physics- Arther Beiser, Tata Mcgraw Hill
6. A textbook of Optics - N. Subramanyam and Brijlal, S.Chand
7. Optics - Ajay Ghatak, Tata Mc Graw Hill
8. Intoduction to Nanotechnology- Charles P. Poole, Jr., Frank J. Owens,Wiley India edition
9. 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 Diffraction grating.(Hg/ Na source)
4. Determination of number of lines on the grating surface using Diffraction grating.
5. Determination of Numerical Aperture of an optical fibre.
6. Determination of wavelength using Diffraction 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) : 15 marks
2. Assignments : 05 marks
2. Attendance (Practical and Theory): 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 Module.

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC203	Applied Chemistry -II	03	01	-	03	0.5		3.5

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory Marks					TW	Prat		Oral
		Internal Assessment			End sem. exam					
		Test 1	Test 2	Average of Test 1 and Test 2						
FEC203	Applied Chemistry -II	15	15	15	60	25	-	-	100	

Details of the syllabus:-

Details	Hrs
<p>Module 1:</p> <p>Corrosion :</p> <ul style="list-style-type: none"> 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 Electro-Chemical Corrosion – Galvanic cell corrosion, Concentration cell corrosion (differential aeration), pitting corrosion, Intergranular corrosion, Stress Corrosion , Polarization. Factors affecting the rate of corrosion :- Nature of metal, position in galvanic series, potential difference, overvoltage, relative area of the anodic and cathodic parts, purity of metal, nature of the corrosion product, temperature, moisture, influence of PH, concentrations of the electrolytes. 	10

<ul style="list-style-type: none"> • Methods to Decrease the rate of Corrosion :- Proper designing, using pure metal, using metal alloys, Cathodic protection – i) Sacrificial anodic protection, ii) Impressed current method, Anodic protection method, Metallic coatings, hot dipping , galvanizing, tinning, metal cladding, metal spraying, Electroplating, Cementation, Organic Coatings ,Paints only constituents and their functions. 	
<p>Module 2 :</p> <p>Alloys :</p> <ul style="list-style-type: none"> • 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, Mg, Mo, W, and V. • Non-Ferrous Alloys- Alloys of Al – i) Duralumin ii) Magnalumin. Alloys of Cu-Brasses – i) Commercial brass ii) German Silver. Bronzes – i) Gun metal ii) High – phosphorus bronze. Alloys of pb – i) Wood’s metal. ii) Tinman’s solders. Their composition (Reference 1 by Jain & Jain), properties & uses. • Powder Metallurgy :- Introduction, methods of metal powder formation (1) (a) Mechanical pulverization (b) Atomization (c) Chemical reduction (d) Electrolytic process (e) Decomposition. (2) Mixing & blending (3) Sintering. (4) Compacting :- Various methods such as i) cold pressing. ii) Powder injection moulding. iii) Hot compaction. • Applications of powder metallurgy. • Manufacture of oxide & non-oxide ceramic powders only i) Alumina ii) Silicon Carbide 	09
<p>Module 3 :</p> <p>Fuels</p> <ul style="list-style-type: none"> • Definition, Classification of fuels – solid, Liquid & Gaseous. Calorific value – def. Gross or Higher C.V. & Net or lower C.V. units of heat (no conversions). Dulong’s formula & numericals for calculations of Gross & Net C.V. Analysis of coal – i) Proximate Analysis with numericals and its importance ii) Ultimate Analysis with numericals and its importance, Characteristic properties of the good fuel. • Liquid Fuels – Crude petroleum oil; its composition & classification & mining (in brief). Refining of crude oil i) separation of water ii) Separation of ‘S’ & iii) Fractional distillation with diagram & composition table. • Cracking – Definition; Types of cracking – I) Thermal Cracking– (a) Liquid phase thermal cracking b) Vapour phase thermal cracking. II) Catalytic Cracking – (a) Fixed – bed catalytic cracking (b) Moving – bed catalytic cracking. Advantages of Catalytic 	12

<p>Cracking.</p> <ul style="list-style-type: none"> • Petrol : Refining of petrol, unleaded petrol (MTBE use of catalytic converter), power alcohol. Knocking, Octane number (antiknocking agents), Cetane number • Combustion: calculations for requirement of only oxygen & air (by weight & by volume only) for given solid, liquid & gaseous fuels. • Bio-diesel, Method to obtain Biodiesel from vegetable oils (Trans-esterification), advantages and disadvantages of Biodiesel. • Propellants: Definition, Characteristics of a good propellant, classification of propellants, Two examples each. 	
<p>Module 4 :</p> <p>Composite Materials and Adhesives :</p> <ul style="list-style-type: none"> • Introduction, Constitution i) Matrix phase ii) Dispersed phase. Characteristic properties of composite materials Classification – A) Particle – reinforced composites i) Large – particle composites ii) Dispersion – strengthened Composites. B) Fiber – Reinforced Composites (i) Continuous aligned (ii) Discontinuous (short) (a) aligned (b) Randomly oriented. (C) Structural Composites – (i) Laminates (ii) Sandwich Panels. <p>Adhesives :</p> <ul style="list-style-type: none"> • Introduction, Adhesive action, Physical Factors Influencing Adhesive action, Chemical Factors Influencing, Adhesive action, Bonding Processes by adhesives. 	10
<p>Module 5 :</p> <p>Green Chemistry:</p> <ul style="list-style-type: none"> • Introduction, Twelve Principles of Green chemistry, numericals on atom economy, synthesis , adipic acid and indigo. • Green solvents (ionic liquid supercritical CO₂), and products from natural materials. 	04

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 2 to 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 : 10 marks

Total : 25marks

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

Suggested Experiments	Applied Chemistry-II
Estimation of Zn Complexometric titration.	
Estimation of Ni complexometric titration.	
Estimation of Al complexometric titration.	
Calorific value of solid or liquid fuel using Bomb Calorimeter.	
Preparation of membranes for filter any one Demon.	
CO ₂ from air by Orsats method.	
Estimation of Fe from plain C steel.	
Estimation of Ni by gravimetric method.	
Estimation of Sn iodometrically.	
Preparation of Bio diesel from edible oil.	
Synthesis of simple layered materials and their characterization.	
Preparing simple composites and their characterization.	
Estimation of Cu iodometrically.	
Estimate % of Moisture from coal.	
To determine the E cell of Cu-Zn system by potentiometry.	

Recommended Books:

1. Engineering Chemistry – Jain & Jain, Dhanpat Rai
2. Engineering Chemistry – Dara & Dara, S Chand
3. Engineering Chemistry – Wiley India (ISBN-9788126519880)
4. A Text Book of Engineering Chemistry – Shashi Chawla (Dhanpat Rai)

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC204	Engineering Drawing	03	04	-	03	02	-	05

Sub. Code	Subject Name	Examination Scheme							Total
		Theory Marks				Term Work	Pract	Oral	
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 and Test 2					
FEC204	Engineering Drawing	15	15	15	60	25	50	-	150

Preamble

Considering the recent practices in industries and easy availability of software this conventional drawing may be totally converted in to AutoCAD from the next revision.

Objective of the course

- 1) Students should be able to visualize the objects.
- 2) They should be able to understand and read drawing.
- 3) They should be able to present the same.

Module	Details	Hrs
1	Introduction to Engineering Drawing. Types of Lines, Dimensioning Systems as per IS conventions. Engineering Curves: Basic construction of Cycloid, Involute 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). @Projection of Planes: Triangular, Square, Rectangular, Pentagonal, Hexagonal and Circular planes inclined to either HP or VP only. (Exclude composite planes)	6

3	<p>Projection of Solids: - (Prism, Pyramid, Cylinder, Cone only) Solid projection with the axis inclined to HP and VP. (Exclude Spheres , Composite and Hollow solids).. Use change of position or Auxiliary plane method</p> <p>Section of solids:- section of Prism, Pyramid, Cylinder, &Cone , cut by plane perpendicular to at least one reference plane.(Exclude Curved section Plane). Use change of position or Auxiliary plane method</p> <p>Development of Surfaces:- Lateral surface development of Prism, Pyramid, Cylinder, Cone with section plane inclined to HP or VP only. (Exclude Reverse Development)</p>	14
4	<p>Orthographic projections:-</p> <ul style="list-style-type: none"> • 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. • **Drawing of orthographic projections using Auto CAD. 	12
5	<p>Isometric Projections: Isometric projection/Drawing of blocks (plain and cylindrical excluding spheres).</p> <ul style="list-style-type: none"> • **Drawing of Isometric projections using Auto CAD. • @Reading of orthographic projections. (Only for TW) • *Orthographic Reading using Auto CAD. <p>**Introduction to 3D in AutoCAD</p> <p>Working in 3-dimensions, Viewing 3D Objects, Basic wireframe models, Extruding, simple revolved objects. Boolean operations.</p> <p>Generation of orthographic projections from 3D drawing.</p>	10

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

@ only in Term Work.(i.e:-Questions will not be asked for the examination.)

Term Work:

Component-1

Sheet-1: Projection of Solids (2 problems) + Section and Development of solid surfaces (2 problem)

Sheet -2: Orthographic projection without section (2 problems).

Sheet -3: Orthographic projection with section (2 problems).

Sheet- 4: Isometric Projections (3 problems).

Component -2

One A-3 size sketch book consisting of:-

- 1) 3 problems each from Projection of Curves, Lines, Planes and Solids.
- 2) 3 problems from Section and Development of Solids.
- 3) 2 problems each from the Orthographic Projections (with Section), Reading of orthographic projections and Isometric projections.

Component-3

Printouts of minimum 2 problems (**preferably in A3 size sheet**) each from:

- 1) Simple Orthographic Projections.
- 2) Orthographic Projections – Section.
- 3) Isometric projections.
- 4) Reading of Orthographic Projections

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

AutoCAD Examination: (2hrs):

- 1) Minimum 1 problem from 1 or 2 or 4 of component-3 **and**
- 2) Minimum 1 problem from 3 of component-3.
- 3) Print out of the Answers have to be taken **preferably in A3 size sheets** and should be assessed by External examiner. Knowledge of concepts and accuracy of drawing should be considered during evaluation.

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 15 marks.
2. Only 4 questions need to be solved.
- 3: Q.1 will be compulsory, based on entire syllabus.
- 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 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) & Gaurav Verma, “(CAD Soft Technologies) : Auto CAD 2012 (For engineers and Designers)”, Dreamtech Press NewDelhi.

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC205	Structured Programming Approach	04	02	-	04	01	-	05

Sub. Code	Subject Name	Examination Scheme							Total	
		Theory Marks					TW	Prat		Oral
		Internal Assessment			End sem. exam					
		Test 1	Test 2	Av. of Test 1 & Test 2						
FEC205	Structured Programming Approach	20	20	20	80	25	25	-	150	

Primary Objectives of this subject

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.

Program Education Objectives

After completing this course, students will be able to:

- Understand classical problem solving strategies and use them in solving problems that can be implemented using a programming language.
- Identify a problem that requires a programmed solution.
- Use structured approach to describe the solution concept.
- Understand concept of data types and variables using C.
- Use common operators in C to solve a problem.
- Implement conditional statements in C .
- Implement looping constructs in C.
- Implement functions in C.
- Use simple and structured data types in C to solve given problem
- Implement simple problems using files and pointers

Detail Syllabus

Unit No	Unit	Number of Hours
1	Problem definition	02
2	Algorithms	
2.1	Developing Algorithms	05
2.2	Efficiency of Algorithms	01
3	Expressing Algorithm – Sequence	
3.1	Expressions in C; Arithmetic and Boolean expressions	03
3.2	Use of Standard functions	01
3.3	Assignment statement	01
3.4	Input and output	02
4	Concept of scalar Data Types	04
4.1	scalar data types in C , Scope and life time, type conversion	
5	Expressing Algorithms – Iteration	
5.1	Ordering a solution in a loop	02
5.2	C- Control structures for Iteration	06
6	Expressing Algorithms – Selection	01
6.1	C-Control structures for selection	02
7	Decomposition of solution	01
7.1	Defining Functions in C	02
7.2	Functions and parameters	02
7.3	Introduction to recursive functions	02
8	Additional C data types	
8.1	Arrays – single and multi dimensional	03
8.2	Strings	02
8.3	Structures	02
8.3	Files	02
8.4	Pointers	02

Books:

Text:

1. programming in C ; second edition; Pradeep Day and Manas Gosh ;Oxford University Press 2011
2. C Programming with Problem solving ; Jacqueline A. Jones & Keith Harrow – Dreamtech India– Scott Jones California USA

Reference

1. Introduction to Engineering programming – James Paul Hollowat – John Wiley ISBN 9812-53-022-3
2. Introduction to programming and problem solving ; G. Michael Schneider ; Wiley India edition;

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 or flow chart and source code in C (preferably hand written) for all the 20 problems.

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 20 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 Module.

Subject Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC206	Communication Skills	02	02	-	02	01	-	03

Sub. Code	Subject Name	Examination Scheme							Total
		Theory				TW	Prat	Oral	
		Internal Assessment			End sem. exam				
		Test 1	Test 2	Average of Test 1 & 2					
FEC206	Communication Skills	10	10	10	40	25	-	-	75

S.No	Topic	No. of lectures
1.	Communication Theory: The communication process, objectives, barriers to communication, methods of communication, formal and informal channels of communication in a business organization, techniques to improve communication (Listening, speaking, reading, writing)	12
2.	Grammar and Vocabulary: Pairs of confused words, common errors, use of articles, prepositions, apostrophes, agreement of the verb with the subject, one-word substitution, synonyms and antonyms	3

3.	Business Correspondence: Principles of business correspondence, parts of a business letter, formats (Full-block/Complete block, Modified block, Semi-block), types of letters: Enquiry letters and replies to enquiry (enquiry about a product, service or information, asking for a quotation, placing an order and replies to the same) letters of Claim and Adjustment.	9
4.	Summarization and Comprehension: Technical and industry-oriented passages (not less than 400 words)	3
5.	Technical writing : Framing definitions, writing instructions, language exercises based on types of expositions (description of an object, explanation of a process)	3

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 marks

Assignments: 20 marks

Attendance: 05 marks

List of assignments:

Summarization & Comprehension

Grammar practice

Communication theory: Application exercises

Barriers to Communication

Principles of Business Correspondence

Formats of business letters

Types of letters

Technical writing

Recommended reference books for Communication Skills:

Business Communication by Urmila Rai & S.M. Rai, Himalaya Publishing House

Communication Skills by Meenakshi Raman & Sangeeta Sharma, Oxford University 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 by Thomas N.Huckin & Leslie A.Olsen, McGraw-Hill

Mastering Communication by Nicky Stanton, Palgrave Master Series

Paper pattern

Total Marks: 40, Duration : 2 hours

Distribution of marks and weightage:

The paper will comprise 6 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							Total	
		Theory				End sem. exam	Term Work	Pract.		Oral
		Internal Assessment			Average of Test 1 & Test 2					
		Test 1	Test 2							
FEL201	Basic Workshop Practice-II	-	-	-	-	-	50	-	-	50

Detailed Syllabus is given in Basic Workshop Practice-I

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.