

CIRCULAR :-

A reference is invited to the Ordinances, Regulations and Syllabi relating to the Bachelor of Engineering degree course vide Pamphlet No.194 and to this office Circular No.UG/209 of 2001 dated 20th June, 2001 and the Principals of the affiliated colleges in Engineering are hereby informed that the recommendation made by the faculty of Technology at its meeting held on 5th April, 2007 has been accepted by the Academic Council at its meeting held on 13th April, 2007 vide item No.4.44 and that in accordance therewith the scheme of F.E. (Sem. I and II) and syllabus for the F.E. (Sem. I) examination is revised as per Appendix and that the same has been brought into force with effect from the academic year 2007-2008.

MUMBAI-400 032
8th June, 2007

for I/c REGISTRAR

To,

The Principals of the affiliated colleges in Engineering.

A.C/4.44/13.04.2007

No.UG/ 263-A of 2007, MUMBAI-400 032 8th June, 2007.

Copy forwarded with compliments for information to :-

- 1) The Dean, Faculty of Technology
- 2) The Chairmen of the various branches in Engineering

for I/c REGISTRAR

Copy to :-

The Director, Board of College and University Development, the Deputy Registrar (Eligibility and Migration Section), the Director of Students Welfare, the Executive Secretary to the Vice-Chancellor, the Pro-Vice-Chancellor, the Registrar and the Assistant Registrar, Administrative sub-center, Ratnagiri for information.

The Officer on Special Duty and Controller of Examinations (10 copies), the Finance and Accounts Officer (2 copies), Record Section (5 copies), Publications Section (5 copies), the Deputy Registrar, Enrolment, Eligibility and Migration Section (3 copies), the Deputy Registrar, Statistical Unit (2 copies), the Deputy Registrar (Accounts Section), Vidyanagari (2 copies), the Deputy Registrar, Affiliation Section (2 copies), the Director, Institute of Distance Education, (10 copies) the Director University Computer Center (IDE Building), Vidyanagari, (2 copies) the Deputy Registrar (Special Cell), the Deputy Registrar.(PRO), the Assistant Registrar, Academic Authorities Unit (2 copies) and the Assistant Registrar, Executive Authorities Unit (2 copies). They are requested to treat this as action taken report on the concerned resolution adopted by the Academic Council referred to in the above Circular and that no separate Action Taken Report will be sent in this connection. the Assistant Registrar Constituent Colleges Unit (2 copies), BUCT(1 copy), the Deputy Account. Unit V(1 copy), the In-charge Director, Centralize Computing Facility (1 copy), the Receptionist (1 copy), the Telephone Operator (1 copy), the Secretary MUASA (1 copy), the Superintendent, Post-Graduate Section (2 copies), the Superintendent, Thesis Section (2 copies)

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UNIVERSITY OF MUMBAI



**Revised Scheme for the
F.E. Sem. I & II and
detail Syllabus for
F.E. Sem. I Examination**

(with effect from the academic year 2007-2008)

First Year Engineering (Semester I & II) (Revised) Course for
Academic Year 2007-08
(Common for all branches)
Revised Scheme for Semester I

Sr. No	Subjects	No. of Periods per week (60 minutes each)			Duration of Theory papers (Hours)	Marks				
		Lecture	Practical	Tutorial		Theory	Term-work	Practical (2 Hrs.)	Oral	Total
1.	Applied Mathematics-I	04	--	01	03	100	25	--	--	125
2.	Applied Physics-I	03	01	--	02	75	25	--	--	100
3.	Applied Chemistry-I	03	01	--	02	75	25	--	--	100
4.	Engineering Mechanics	05	02	--	03	100	25	25	--	150
5.	Basic Electrical & Electronics Engineering	05	02	--	03	100	25	25	--	150
6.	Computer Programming-I	03	02	--	03	100	25	--	--	125
7.	Basic Workshop & Practice-I	--	04	--	--	--	50	--	--	50
Total....		23	12	01	--	550	200	50	--	800

Semester II

Sr. No	Subjects	No. of Periods per week (60 minutes each)			Duration of Theory papers (Hours)	Marks				
		Lecture	Practical	Tutorial		Theory	Term-work	Practical (2 Hrs.)	Oral	Total
1.	Applied Mathematics-II	04	--	01	03	100	25	--	--	125
2.	Applied Physics-II	03	01	--	02	75	25	--	--	100
3.	Applied Chemistry-II	03	01	--	02	75	25	--	--	100
4.	Communication Skills	03	--	02	03	100	25	--	25(@)	150
5.	Engineering Drawing	03	04	--	02	50	25	50	--	125
6.	Computer Programming-II	04	02	--	03	100	25	25	--	150
7.	Basic Workshop Practice-II	--	04	--	--	--	50	--	--	50
Total....		20	12	03	--	500	200	75	25	800

(@) Presentation should be given by students in the subject of communication skill, marks allotted to them on presentation.

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Applied Mathematics-I			
Periods per week (each of 60 min.)	Lecture	04	
	Practical	-	
	Tutorial	01	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical and oral examination	-	-
	Oral Examination	--	--
	Term Work	-	25
	Total		125

Detailed Syllabus		Lectures/Week
1.1	Module 1 Complex numbers. 1.1.1 Review of complex numbers. Cartesian, Polar and Exponential form of a complex number. 1.1.2 De Moivre's Theorem (without proof). Powers and roots of Exponential and Trigonometric functions. 1.1.3 Circular and Hyperbolic functions.	02 03 03 Total: 08
1.2	Module 2 Complex numbers and Successive differentiation. 1.2.1 Inverse circular and Inverse Hyperbolic Functions. Logarithmic functions 1.2.2 Separation of real and imaginary parts of all types of functions. 1.2.3 Successive differentiation-nth derivative of standard functions- e^{ax} , $(ax+b)^{-1}$, $(ax+b)^m$, $(ax+b)^{-m}$, $\log(ax+b)$, $\sin(ax+b)$, $\cos(ax+b)$, $e^{ax} \sin(bx+c)$, $e^{ax} \cos(bx+c)$. 1.2.4 Leibnitz's theorem (without proof) and problems.	03 02 04 03 Total:12
1.3	Module 3 Partial differentiation 1.3.1 Partial derivatives of first and higher order, total differential coefficients, total differentials, differentiation of composite and implicit functions. 1.3.2 Euler's theorem on Homogeneous function with two and three independent Variables (with proof), deductions from Euler's theorem.	05 03 Total:08
1.4	Module 4 Application of partial differentiation, Mean value theorems	

	1.4.1 Errors and approximations, Maxima and Minima of a function of two independent variables. Lagrange's method of undetermined multipliers with one constraint. 1.4.2 Rolle's theorem, Lagrange's mean value theorem, Cauchy's mean value theorem (all theorems without proof). Geometrical interpretation and problems	04 03 Total: 07
1.5	Module 5 Vector algebra & Vector calculus 1.3.1 Vector triple product and product of four vectors. 1.3.2 Differentiation of a vector function of a single scalar variable. Theorems on derivatives (without proof). Curves in space concept of a tangent vector (without problems) 1.3.3 Scalar point function and vector point function. Vector differential operator del. Gradient, Divergence and curl – definitions, Properties and problems. Applications- Normal, Directional derivatives, Solenoidal and Irrotational fields.	01 02 06 Total: 09
1.6	Module 6 Infinite series, Expansion of functions and Indeterminate forms. 1.6.1 Infinite series-Idea of convergence and divergence. D'Alembert's ratio test, Cauchy's root test. 1.6.2 Taylor's theorem (without proof). Taylor's series and Maclaurin's series (without proof), Expansion of standard series such as e^x, $\sin x$, $\cos x$, $\tan x$, $\sinh x$, $\cosh x$, $\tanh x$, $\log(1+x)$, $\sin^{-1}x$, $\tan^{-1}x$, Binomial series, Expansion of functions in power series. 1.6.3 Indeterminate forms - $\frac{0}{0}$, $\frac{\infty}{\infty}$, $0 \times \infty$, $\infty - \infty$, 0^0, ∞^0, 1^∞. L' Hospital's rule- problems involving series also.	02 04 02 Total: 08
	Recommended Books: • A textbook of Applied Mathematics, P.N. and J. N. Wartikar, Volume 1 and 2, Pune Vidyarthi Griha. • Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publications. • Advanced Engineering Mathematics, Erwin Kreyszing, Wiley Eastern Limited, 8th Ed. • Vector analysis – Murray R., Spiegel – Schaum series • Higher Engineering mathematics by B. V. Ramana- Tata McGraw Hill	

Theory Examination:

1. Question paper will be comprising of total 7 questions, each of 20 marks.
2. Only 5 questions need to be solved.
3. Q.1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from 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 will be in the form of Journal which will consists of Minimum ten tutorial assignments covering the entire portion and a written Test paper

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

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Applied Physics I			
Periods per week (each of 60 min.)	Lecture	3	
	Practical	1	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	2	75
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	25
	Total		100

Details of the Syllabus:-

Sr.No.	Details	Hrs
01	Crystallography & X-rays: ➤ Lattice, basis, crystal axes, unit cells, lattice parameters & crystal systems, SC, BCC, FCC, diamond, NaCl, zinc blend and HCP crystal structures, Miller indices, planes & directions, Liquid crystals & phases, LCD display & its specifications. ➤ X-rays – origin of x-rays and x-ray spectra, x-ray diffraction & Bragg's law and determination of crystal structure. ➤ Real crystals – crystal imperfections, point defects and dislocations.	12
02	Physics of Semiconductors: ➤ Classification of solids, Fermi-Dirac statistics, concept of Fermi level & its variation with temperature, impurity and applied voltage. ➤ Intrinsic & extrinsic carrier concentrations, carrier drift, mobility, resistivity and Hall effect, carrier diffusion, Einstein's relations, current density & continuity equations. ➤ Energy band diagrams of p-n junction, formation of depletion region, derivation for depletion layer width.	08
03	Super conductivity: ➤ Critical temperature, Critical magnetic field, Type I Type II super conductors, high T_c super conductors. ➤ Meissner effect, Josephson effect. ➤ SQUIDS, plasma confinement, Maglev.	05

04	Acoustics: ➤ Acoustics of Building, Absorption, Importance of Reverberation Time, Units of Loudness, Decibel, Phon. ➤ Conditions for Good Acoustics methods of Designs for Good Acoustics, Determination of Absorption coefficient, Noise Pollution.	05
05	Ultrasonics: ➤ Principles of production, piezoelectric & magnetostriction effect. ➤ Piezoelectric & magnetostriction oscillator, ultrasonic materials – quartz & ferroelectric materials, cavitation effect. ➤ Applications based on cavitation effect and echo sounding, ultrasonic imaging & medical diagnosis.	05
06	Electron optics: ➤ Electrostatic & Magnetostatic focusing system ➤ Construction & working of CRT, CRO and its applications.	05

Theory Examination:

1. Question paper will be comprising of total 7 questions, each of 15 marks.
2. Only 5 questions need to be solved.
3. Q.1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from 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 and a written test.

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

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

Suggested Experiments	Applied Physics I:
	1) PF of SC, BCC, FCC, Diamond and HCP (Zn) crystal structures.
	2) Crystal lattice planes, Miller indices and interplanar spacing of (100), (110) and (111) set of planes in SC, BCC and FCC.
	3) Hall effect & determination of Hall coefficient.
	4) I-V characteristics of Si and GaAs diodes. (IR LED).
	5) CRO – measurement of frequency & amplitude.

	6) CRO – Lissajous patterns and measurement of phase difference.
	7) Ultrasonic distance meter.
	8) Measurement of wavelength & velocity of ultrasonic waves.

Recommended Books:

1. Solid State Physics – Charles Kittel, EEE Pbl
2. Physics of Semiconductors – S. M. Sze, Wiley Eastern
3. Engineering Physics – Gaur & Gupta, Dhanpat Rai & Co.
4. A Textbook of Engineering Physics – Kshirsagar & Avadhanulu, S Chand.
5. Modern Engineering Physics – Vasudeva S Chand Pbl.
6. Concepts of Modern Physics – Arthur Beiser, Tata McGraw Hill.

University of Mumbai

CLASS: F.E (All Branches of Engineering)

Semester - I

SUBJECT: Applied Chemistry I

Periods per week (each of 60 min.)	Lecture	3	
	Practical	1	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	2	75
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	25
	Total		100

Details of the Syllabus:-

Sr.No.	Details	Hrs
01	Polymers: ➤ Introduction, Classification, Hydrocarbon Molecules, Thermoplastic, Thermosetting Polymers. ➤ Basic Concepts Molecular Weight, Molecular Shape, Polymer Crystallinity. Crystallization, Melting and Glass Transition Phenomena. ➤ Viscoelasticity, Deformation Fracture, Defects in Polymers. ➤ Polymerization, Addition, Polymerization, Copolymerization and Condensation Polymerization. Polymer Additives Plastics, Elastomers, Vulcanization. ➤ Advanced Polymer Material, Conducting Polymers, Electrical Properties of Polymers . Liquid Crystal Properties. Molecular Electronics & Polymers & Supramolecular Chemistry. ➤ Fabrication of Polymers i) Compression Moulding ii) Injection Moulding iii) Transfer Moulding iv) Extrusion Moulding Synthesis Properties & Uses of PE, PMMA Formaldehyde resin,. Polymer Composite Materials .	10
02	Water : ➤ Hardness of water, effect of hard water in the manufacture sector, types of hardness, determination of hardness by EDTA method and Problems. ➤ Softening of water by i) lime soda method with equations in general. Hot-cold lime soda method and problems ii)	08

	zeolite process & problems iii) Ion exchange method iv) reverse osmoses, ultrafiltration & its industrial applications. ➤ Methods to determine extent of water pollution i) BOD ii) COD. ➤ Methods to control water pollution. ➤ Industrialisation – materials cycle & pollution. Recycling issues	
03	Lubricants ➤ Definition, classification, characteristic properties, problems on acid value and saponification value. theories of lubrication. ➤ Additives for lubricants, selection of lubricant.	05
04	Energy: ➤ Classification. Solar energy, hydropower, wind power, Bio-mass energy using bio technology, Hydrogen as a fuel. ➤ Solar energy, Production of electricity using solar energy Rechargeable alkaline storage batteries, Nickel Hydrogen Batteries. Rechargeable Lithium ion batteries	05
05	Phase Rule and steels: ➤ Gibbs Phase Rule, One Component System Water. Two Component System Iron-Carbon Equilibrium Diagram with Microstructures. ➤ Limitations & Application of Phase Rule. ➤ Plain Carbon Steel. Limitations. ➤ Introduction to Alloy Steels, special steels. ➤ Principles of shape memory effect & its applications	06
06	Nano-materials: ➤ Introduction to nano-materials. ➤ Graphite, fullerenes, carbon nanotubes, nanowires, nanocones, Haeckelites. Their electronic and mechanical properties ➤ Production methods for CNTS. ➤ Applications of nano materials in i) Medicine ii) Catalysis iii) Environmental Technologies iv) Electronics & related fields. V) Mechanics.	06

Theory Examination:

1. Question paper will be comprising of total 7 questions, each of 15 marks.
2. Only 5 questions need to be solved.
3. Q.1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from 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 and a written test.

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

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

Suggested Experiments	Applied Chemistry I:
	1) To determine total, temporary and permanent hardness of water sample.
	2) Removal of hardness using ion exchange column.
	3) To determine saponification value of a lubricating oil.
	4) To determine acid value of a lubricating oil.
	5) To determine COD of a effluent sample.
	6) To determine CO ₂ content from air by Orsat's apparatus.
	7) To determine flash point and fire point of a lubricating oil
	8) To determine conductance of polymer.
	9) To determine melting point and/or glass transition temperature of a polymer.
	10) To prepare nano-oxide using combustion method.

Recommended Books:

1. Engineering Chemistry – Jain & Jain, Dhanpat Rai
2. Engineering Chemistry – Dara & Dara, S Chand
3. Materials Science & Engg. – William Callister,
4. Chemistry of advanced materials – CNR Rao, RSC Pbl
5. Polymer Chemistry – Vasanti Gowarikar
6. Membrane Filtration - Gutman, Adam Hilger Bristol.
7. Nano scopic materials – Emil Roduner –RSC Publishing
8. Nano Chemistry – Ozin et. al – RSC publishing
9. Physical Metallurgy – B. K. Agarwal

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Engineering Mechanics			
Periods per week (each of 60 min.)	Lecture	5	
	Practical	2	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical and Oral Examination	2	25
	Oral Examination	--	--
	Term Work	-	25
	Total		150

Details of Syllabus:-

Sr.No.	Topics	Hrs
01	1.1 System of Coplanar Forces :- Resultant of concurrent forces, Parallel forces, & Non concurrent Non parallel system of forces. Moment of Force about any point, Couples, Varignon's Theorem Distributed Forces in plane.	05
	1.2.Introduction to Centroid & Center of Gravity, Introduction to Moment of Inertia & its theorem	05
02	2.1 Equilibrium of system of coplanar forces:- Condition of equilibrium for concurrent forces, Parallel forces, & Non concurrent Non parallel general system of forces & couples.	06
	2.2 Types of supports. loads, Beams. Determination of reactions at supports for various types of loads on beams	04
	2.3 Analysis of plane trusses by using Method of Sections & Method of Joints.	04
03	3.1 Friction: Introduction to Laws of Friction, Cone of friction, Equilibrium of bodies on inclined plane, Application to problems involving wedges, ladders, screw friction.	05
	3.2 Belt Friction: Transmission of power by belts & ropes, centrifugal & initial tension in the belts or ropes. Condition of maximum power transmission. Flat belt & flat pulleys & ropes on grooved pulleys.	05
04	4.1 Kinematics of Particle:- Velocity & acceleration in terms of rectangular co-ordinate system, Rectilinear motion, Motion along plane curved path, Tangential & Normal component of acceleration, Motion Curves (a-t, v-t, s-t Curves), Projectile Motion, Relative velocities.	10

05	5.1. Kinematics of Rigid Bodies:- Introduction to general plane motion. Instantaneous center of rotation for the velocity, velocity diagrams for bodies in plane motion, (up to two linkage mechanism)	06
06	6.1 Kinetics of Particles: Introduction to basic concept, Newton's second law, work energy principles, D'Alembert's principles, equation of dynamic equilibrium, 6.2 Moment of Energy Principles: linear momentum, principles of conservation of momentum, Impact of solid Bodies, Direct & oblique impact, impact of solid bodies, semi elastic impact & plastic impact.	06 04

Theory Examination:

1. Question paper will be comprising of total 7 questions, each of 20 marks.
2. Only 5 questions need to be solved.
3. Q.1 will be compulsory and based on entire syllabus.
4. Remaining questions will be mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from 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.

Practical and oral Examination:

Practical and oral Examination will be based on one experiment performed from the list of experiment given in the syllabus and the oral will be based on the same experiment.

Term work:

Term work shall consist of minimum six experiments, assignments consisting numericals based on above syllabus and a written test.

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

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

List of experiments:

- 1) Polygon law of coplanar forces (concurrent)
- 2) Non-concurrent non-parallel (general)
- 3) Bell crank lever
- 4) Support reaction for beam
- 5) Simple / compound pendulum
- 6) Inclined plane (to determine coefficient of friction)
- 7) Collision of elastic bodies (Law of conservation of momentum)
- 8) Moment of inertia of fly wheel
- 9) Screw friction by using screw jack)

Any other experiment based on above syllabus.

Recommended Books:

- 1) Engineering Mechanics by R.C.Hibblar, Mac Millan
- 2) Engineering Mechanics by B.N.Thadani, Weinell book corporation
- 3) Engineering Mechanics by Beer & Johnson, Tata Mcgrawhill
- 4) Engineering Mechanics by F.L.Singer by Harper & Row Publication
- 5) Engineering Mechanics by Macklin & Nelson, Tata Mcgrawhill
- 6) Engineering Mechanics by Shaum Series
- 7) Engineering Mechanics by Tayal, Umesh Publication
- 8) Engineering Mechanics by Kumar, Tata Mcgrawhill

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Basic Electrical and Electronics Engineering			
Periods per week (each of 60 min.)	Lecture	5	
	Practical	2	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical and oral examination	2	25
	Oral Examination	--	--
	Term Work	-	25
	Total		150

Module	Contents	Hours
Pre-requisite	A. Concepts of e.m.f, potential difference & current, battery. B. capacitors, with uniform & composite medium, energy stored in a capacitor, R-C time constant. C. Magnetic field, magnetic circuit, Faraday's laws of electromagnetic induction, Hysteresis & Eddy current losses, energy stored in an inductor, time constant in R-L circuit.	
1	DC circuits: (only independent sources). Ohm's law, resistance, resistivity, series & parallel connections, star delta transformation, power dissipation in resistance, effect of temperature on resistance, Kirchhoff's laws, Mesh & Nodal analysis, Source transformation, Superposition, Thevenin's, Norton's and Maximum power transfer theorems	12 hours
2	A.C. circuits: Generation of alternating voltage & currents, R.M.S. & Average value, form factor, crest factor, A.C. through resistance, inductance & capacitance, R-L, R-C and R-L-C series & parallel circuits, phasor diagrams, power & power factor, series & parallel resonance. Problems by analytical as well graphical methods.	16 hours

Practical and oral Examination:

Practical and oral Examination will be based on one experiment performed from the list of experiment given in the syllabus and the oral will be based on the same experiment.

Term work:

Term work shall consist of minimum eight experiments and a written test.

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

Laboratory work (Experiments and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

List of laboratory experiments:

1. Mesh and Nodal analysis.
2. Verification of Superposition theorem.
3. Maximum Power Transfer theorem(Thevenin and Norton)
4. Diode characteristics.
5. R-L-C Series & Parallel circuit.
6. Relationships between phase & line currents and voltages in a Three phase System (Star & delta).
7. Power and phase measurement in three phase system by two wattmeter method.
8. Load test on a single phase transformer by direct loading.
9. O.C & S.C. tests on single phase transformer.
10. Half wave & full wave rectifier (with & without filter)
11. Input and output characteristics of CE- BJT configuration.
12. Study of electrical machines.

Books Recommended:

1. Vincent Deltoro: Electrical Engineering Fundamentals, Pearson Education.
2. M. S. Naidu, S. Kamakshiah: Introduction to Electrical Engineering, Tata McGraw Hill (Revised edition).
3. MITTLE & MITTAL, Basic Electrical Engg, 2/e.(New), Tata McGraw Hill
4. Edward Hughes: Electrical Technology, Pearson Education, (Seventh edition).
5. Joseph. A. Edminster: Electrical Circuits, Schaums outline series, Tata McGraw Hill.
6. H. Cotton: Advanced Electrical Technology, Wheeler Publication.
7. I. J. Nagrath & D. P. Kothari: Electrical machines, Tata McGraw Hill. (Second edition).
8. Dr. P. S. Bimbhra: Electric Machinery, Khanna Publishers. (Revised edition).
9. William Hayt, Kemmerly, Durbin: Engineering Circuit Analysis, Tata McGraw Hill. (Sixth edition).
10. Boylestad, Nashelsky: Electronic Devices & Circuit Theory, Pearson Education
11. Bhargava, Kulshreshtha, Gupta: Basic Electronics & Linear Circuits, TTTI, Chandigarh, Tata McGraw Hill.
12. S. K. Bhattacharya, S. Chatterjee: Industrial Electronics & Control, TTTI, Chandigarh, Tata McGraw Hill.

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Computer Programming - I			
Periods per week (each of 60 min.)	Lecture	3	
	Practical	2	
	Tutorial	-	
Evaluation System		Hours	Marks
	Theory Examination	3	100
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	25
	Total		125

Details of the Syllabus:-

Sr.No.	Details	Hrs
01	Structured Programming using C++ 1.1.C++ as a superset of C programming language 1.2.C++ Fundamentals : Character set, Identifiers and keywords, Data Types, Constants, and Variables Declarations, Operators & Expressions, Library functions, statements, Symbolic Constants, Preprocessor directives	05
02	2.1.Data Input and Output : getchar(), putchar(), scanf(), printf(), gets(), puts(), cin, cout, setw(), endl etc 2.2.Control Statements : if-else, while, do-while, go to, for statements, nested control structures, switch, break, continue statements, comma operator	06
03	3.1. Functions : Functions prototypes, passing arguments to a function by value and by reference, recursion, over loading functions, storage classes 3.2. Arrays : Defining- processing array, passing arrays to function, Introduction to Multidimensional arrays, Arrays and strings.	08
04	4.1.Pointers Declarations, Referencing and de- referencing, passing pointers to functions, pointer to functions, pointer to arrays.	07

	Creation and manipulation of linked list 4.2. Structures and Unions : Defining and processing a structure,	
05	5.1. Introduction to Object Oriented Programming in C++ 5.2. Classes, Objects, data encapsulation, access specifiers: private, public and protected, inheritance in details, operator overloading of Unary and Binary arithmetic operators, virtual functions, pure virtual functions.	08
06	6.1. late binding, friend functions, Object as function parameter, overriding functions and over loaded constructors, copy constructor, static class members.	06

Term work:

Each student is to appear for at least one written test (preferably on-line) during the term. Term work shall consist of graded answer paper of the test and at least five assignments as follows:

- 1) Five programs developed under control structures using C++.
- 2) Ten program under arrays, functions and structures using C++.
- 3) Ten debugged program listing demonstrating Object oriented constructs and concepts.

Programs should be debugged (hand written & computer print -out) and should have suitable comments.

Recommended compilers turbo C++/Borland C++ or visual C++

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

Laboratory work (Experiments/Programme and Journal) : 10 marks.

Test (at least one) : 10 marks.

Attendance (Practical and Theory) : 05 marks.

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

Recommended Books:

- Programming in C++, Balagurusamy, Tata McGraw Hill
- Programming in C++, schuam out line series
- Let us C, Yaswant kanetkar, BPB publications
- Practical C++, programming O' Reilly
- Algorithms with C++, O' Reilly

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Workshop Practice I			
Periods per week (each of 60 min.)	Lecture	--	
	Practical	04	
	Tutorial	--	
Evaluation System		Hours	Marks
	Theory Examination	--	--
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	50
	Total		50

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester – II	
SUBJECT: Workshop Practice II			
Periods per week (each of 60 min.)	Lecture	--	
	Practical	04	
	Tutorial	--	
Evaluation System		Hours	Marks
	Theory Examination	--	--
	Practical	--	--
	Oral Examination	--	--
	Term Work	-	50
	Total		50

Detailed Syllabus	Periods per week
Note: The syllabus and the Term-work to be done during Semester I and Semester II are given together. Individual instructor for the course is to design the jobs for practice and demonstration and spread the work over entire two semesters. The objective is to impart training to help the students develop skill sets for creating entities from primitive engineering materials and establishing connections through wires and cables. This exercise also aims in	

	inculcating respect for physical work and hard labor in addition to some amount of value addition by getting exposed to interdisciplinary engineering domains. The two compulsory trades (Sr. No 1 and 2) shall be offered in separate semesters. Select any four trade topics (two per semester) out of the topic at Sr. n. 3 to 10. Demonstrations and hands on experience to be provided during the periods allotted for the same. Report on the demonstration including suitable sketches is also to be included in the term-work.	
1.	Fitting(Compulsory) • Use and setting of fitting of setting of fitting of fitting tools for chipping, cutting, filing, marking, center punching, tapping drilling • Term work to include one job involving following operations: Filing to size one simple male-female joint, drilling and tapping	24
2.	Carpentry(Compulsory) • Use ad setting of hand tools like hacksaws, jack planes, chisels and gauges for construction of various joints, wood turning, and modern wood turning methods. • Term work to include one carpentry job involving a joint and a report on demonstration of a job involving wood turning.	24
3.	Forging(Smithy) • At least one workshop practice job(Lifting hook and handle) is to be demonstrated.	12
4.	Welding • Edge preparation for welding jobs. Arc welding for different job like Lap welding of two plates, butt welding of plates with simple cover, arc welding to join plates at right angles.	12
5.	Machine Shop • At least one turning job is to be demonstrated.	12
6.	Electrical board wiring • House wiring, staircase wiring for fluorescent tube light, go-down wiring and three phase wiring for electrical motors.	12
7.	PCB Laboratory Exercises Layout drawing, Positive and negative film making, PCB etching and drilling, Tinning and soldering techniques.	12

8.	Sheet metal working and Brazing • Use of sheet metal, working hand tools, cutting, bending, spot welding	12
9.	Plumbing • Use of plumbing tools, spanners, wrenches, threading dies, demonstration of preparation of a domestic plumbing line involving fixing of a water tap and using of coupling, elbow, tee, and union etc.	12
10.	Masonry • Use of masons tools like trowels, hammers, spirit level, square, plumb, line and pins etc. Demonstration of mortar making, single and one and half brick masonry, English and Flemish bonds, block masonry, pointing and plastering.	12

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, (per semester)

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 and minimum passing in the term-work.