

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	--	
		Hours	Marks
Evaluation System	Theory examination	3	100
	Practical and oral examination	2	25
	Oral examination	--	--
	Term work	-	25
	Total		150

Module	Contents	Hours
Pre-requisite	<p>A. Concept of emf, potential difference and current, battery.</p> <p>B. Capacitors, with uniform and composite medium, energy stored in capacitor, R-C time constant.</p> <p>C. Magnetic field , magnetic circuit , Faraday's laws of Electromagnetic induction, Hysteries and eddy current losses , energy stored in an inductor, time constant in R-L circuit.</p>	
1	<p>DC circuits: (only independent sources).</p> <p>Ohm's law, resistance, resistivity, series and parallel connections, star delta transformations, power dissipation in resistance, effect of temperature on resistance, Kirchhoff's laws, Mesh and Nodal analysis , Source transformation, Superposition, Thevenin's, Norton's and Maximum power transfer Theorem.</p>	12 hours
2	<p>A.C Circuits :</p> <p>Generation of alternating voltage and currents, RMS and Average value, form factor , crest factor, AC through resistance, inductance and capacitance, R-L , R-C and R-L-C series and parallel circuits, phasor diagrams , power and power factor, series and parallel resonance .</p> <p>Problems by analytical as well as graphical methods.</p>	16 hours
3	<p>Three phase circuits :</p> <p>Three phase voltage and current generation, star and delta connections (balanced loads), relationship between phase and line currents and voltages, phasor diagrams, measurement of power by two wattmeter method.</p> <p>Problems by analytical as well as graphical methods.</p>	08 hours

4	Single phase transformer : Construction, working principle, emf equation, ideal and practical transformer, phasor diagrams, equivalent circuit, O.C.and S.C tests, efficiency and regulation. All day efficiency.	08 hours
5	Electrical Machines : (No numerical is expected) <ul style="list-style-type: none"> • D. C. Generators and Motors: Construction, working principle, e.m.f. equation, classification & applications. • Three Phase Induction Motors: Construction, working principle, Squirrel Cage rotor and Phase wound rotor, Production of rotating magnetic field, slip. • Single Phase Induction Motor: Construction, working principle, double field revolving theory, split phase, capacitor start and shaded pole motor. 	09 hours
6	A. Semiconductor devices : (No numerical is expected) P- N junction diode, Zener diode, their construction, working and characteristics. BJT its construction, characteristics and applications (only CE configuration) B. Rectifiers : (No numerical is expected) Analysis of half wave and full wave rectifier with resistive load and its parameters, ripple factor, rectification efficiency, regulation. Rectifier circuit with capacitive filter only.	04 hours 04 hours

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.
6. No question should be asked from **pre-requisite module**.

Practical and Oral Examination:

Practical and Oral Examination will be based on one experiment performed from the list of experiments 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 written test.

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

Laboratory Work (Experiments & Journal) :10 Marks.

Test (at least one) :10 Marks.

Attendance (Practical & 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 and parallel circuit.
6. Relationship between phase and line currents and voltages in 3 – phase system(star & delta)
7. Power and phase measurement in three phase system by two wattmeter method.
8. Load test on single phase transformer by direct loading.
9. O.C. and S.C. test on single phase transformer.
10. half wave and full wave rectifier(with and 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.Kamakshaiyah: Introduction to Electrical Engineering, Tata McGraw Hill (Revised edition)
3. MITTLE & MITTLE, Basic Electrical Engg, 2/e (New), Tata McGraw Hill
4. Edward Hughes: Electrical Technology, Pearson Education (Seventh edition)
5. Joseph. A. Edminster: Electrical Circuits, Shaums 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 Electrical Machinery, Khanna publishers (Revised edition).
9. William Hayt , Kemmerly, Durbin: Engineering Circuit analysis, Tata McGraw Hill (Sixth Edition)
10. Boylestad, Nashelsky:Electronic Devices and Circuit Theory , Pearson Education
11. Bhargava, Kulshreshtha, Gupta: Basic Electronics and Linear Circuits. TTTI, Chandigarh, Tata McGraw Hill.
12. S.K.Bhattacharya , S. Chatterjee: Industrial electronics and control, TTTI,Chandigarh, Tata McGraw Hill