AMITY UNIVERSITY
UTTAR PRADESH

Course Title: Basic Electrical Engineering

Credit Units:

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	1	2	0	4

Course Level: UG **Course Code: ES103**

Course Objectives:
The aim of this course is to make students aware of basic concepts of Electrical Engineering like: Fundamental Law's & Theorems, analysis of AC & DC Circuits and working principles of Electrical Machines.

Pre-requisites:
Basics Physics & Math at +2

Course Contents/Syllabus:

	Weightage (%)
Module I : DC Circuits and Network Theorems	**25**
Ohm's law, Resistance in series and parallel, Voltage divider and current division rules, types of resistors, Equivalent resistance, Relative Potential Circuit Principles, Kirchhoff's Current Law, Kirchhoff's Voltage Law Network Reduction: Star–Delta Transformation, Source Transformation, Ideal Source, Independent Source and Controlled Source, Nodal Analysis, Loop analysis. Superposition theorem, Thevenin's Theorem, Norton's theorem, Maximum Power transfer theorem.	
Module II : Alternating Current Circuits	**20**
Generation of alternating voltages and currents, Peak, Average and RMS values for alternating currents, Form and Peak factor, Power calculation, reactive power, active power, Complex power, power factor, Ac through resistance, capacitance and inductance and RLC circuit, impedance, reactance, conductance, susceptance Series and Parallel circuits, Resonance: series Resonance, parallel resonance, basic definition of Q factor & Band-width., Power in choking coil.	
Module III : Measuring Instruments	**15**
Types of instruments, Construction and working principles of PMMC and moving iron type voltmeters & ammeters, Single phase dynamometer wattmeter, Use of shunts and multipliers (Simple numerical problems on shunts and multipliers).	

Module IV : Three Phase Circuits	**20**
Generation, Phase sequence, Numbering, Interconnection- star and delta and current and voltages in them, Balanced star to delta and delta to star, Parallel loads, Power measurement in 3 phase circuits by three watt meter, two and one wattmeter method, Unbalanced loads.	
Module V : Electrical Machines	**20**
Single Phase Transformer: Principle of operation, construction, EMF equation, Power Losses, Efficiency (Simple Problems) DC machines: Principle and Construction, Types of DC machines based on excitation, Characteristics and Applications of DC motors (simple numerical problems).	

Course Learning Outcomes:

After completion of this course the students will have

1. An ability to apply fundamental and advance knowledge of mathematics, science and engineering to solve electrical and electronics engineering problem.
2. An ability to design and conduct experiments in electrical and electronics engineering as well as to collect, analyze and interpret data to reach logical conclusions.
3. An appreciation for the need for, and preparedness to engage in lifelong learning.

Pedagogy for Course Delivery:

- Class room Lectures, assignments, Quiz.
- Seminars and discussions
- Practical on the Hard ware and study setups

List of Experiments:

1. To verify KVL & KCL in the given network.
2. To verify Superposition Theorem.
3. To verify Maximum Power Transfer Theorem.
4. To verify Reciprocity Theorem.
5. To determine and verify R_{Th}, V_{Th}, R_N, I_N in a given network.
6. To perform open circuit & short circuit test on a single-phase transformer.
7. To study transient response of a given RLC Circuit.
8. To perform regulation, ratio & polarity test on a single-phase transformer.
9. To measure power & power factor in a three phase circuit by two wattmeter method.
10. To measure power & power factor in a three phase load using three ammeter & three voltmeter method.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total
75	25	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	**Attendance**	**Class Test**	**HA**	**Quiz**	**EE**
Weightage (%)	5	15	10	10	60

Lab/ Practical/ Studio Assessment:

Continuous Assessment/Internal Assessment					End Term Examination		
Components (Drop down	Performance	Lab Record	Viva	Attendance	PR	V	60
Weightage (%)	15	10	10	5	30	30	

Text:

- R.J. Smith, R.C. Dorf: Circuits, devices and Systems
- B.L. Thareja: Electrical Technology: Part -1 & 2V
- Schaum's Series: Electrical Circuits
- Basic Electrical Engineering by V.N Mittle, Arvind Mittle,TMG publication