

EEUC101: BASICS OF ELECTRONICS AND ELECTRICAL ENGINEERING

Credit Hours:

Teaching Scheme	Theory	Practical	Total	Credit
Hours/week	4	2	6	
Marks	100	50	150	5

Examination Scheme:

Theory Marks		Practical Marks		Total Marks
Internal	External	Internal	External	
50	50	25	25	150

Outline of the Course:

Sr. No.	Title of Units	Number of Hours
1	Basic Electrical Terms and Units	06
2	Electrical Circuit Analysis	08
3	Electrostatic	08
4	Electromagnetism	08
5	AC and DC Fundamentals	06
6	Single Phase AC Series and Parallel Circuits	07
7	Polyphase Circuits	05
8	Basic of Electronics	12

Total hours (Theory): 60

Total hours (Lab): 30

Total hours: 90

Detailed Syllabus:

1	Basic Electrical Terms and Units	10%	06 Hrs
	Basic terms related to electrical engineering, their definition, units and symbols, equations Ohm's law, resistor and its coding, properties, temperature coefficient of resistance, resistance variation with temperature, examples		
2	Electrical Circuit Analysis	13%	08 Hrs
	Kirchoff's current and voltage law, mesh and nodal analysis, Examples. Series-parallel network, Star-Delta transformations, potential divider		
3	Electrostatic	13%	08 Hrs
	Capacitors, charge and voltage, capacitance, electric fields, electric field strength and electric flux density, relative permittivity, dielectric strength, Examples Capacitors in parallel and series, Calculation of capacitance of parallel plate and multi plate capacitor, examples. Energy stored in capacitors, types of capacitor, charging and discharging of capacitors on DC, examples		
4	Electromagnetism	13%	08 Hrs
	Magnetic field, its direction and characteristics, magnetic flux and flux density, magneto motive force and magnetic field strength, examples Faraday's law of electromagnetic induction, Fleming's left hand and right hand rule, Lenz law, force on a current carrying conductor, examples Self and mutual inductance, coefficient of coupling, series and parallel combination of inductances, rise and decay of current in an inductive circuit in DC, examples Comparison between electrical & magnetic circuits		
5	AC and DC Fundamentals	10%	06 Hrs
	Generation of AC and DC voltage, Waveform and definition of its terms, relation between speed, frequency and pole Average and RMS value and its determination for sinusoidal and non-sinusoidal wave shapes, examples Phasor representation of alternating quantities		
6	Single Phase AC Series and Parallel Circuits	13%	07 Hrs.
	R-L and R-C series circuit, power in ac circuits, examples R-L-C series circuit, resonance in R-L-C series and parallel circuit, Q factor and bandwidth, examples Solution of series and parallel circuits, phasor method, admittance method, complex algebra method, examples.		
7	Polyphase Circuits	08%	05 Hrs.
	Generation of three phase emf, phase sequence, Definitions Star and delta connection of three phase system, voltage and current relations in star and delta connected system, Examples		
8	Basics of Electronics	20%	12 Hrs.
	Electronic Systems: Basic amplifier, voltage, current and power gain, Basic attenuators, CRO Transmission and Signals: Analog and digital signals, bandwidth, modulation and demodulation, Filters Forward and reverse bias of PN junction diode, Zener diode,		

Course Outcomes (Learning Outcomes):

Upon successful completion of this course, a student will be able to

CO1:	Describe resistors, capacitors and inductors properties, readings and calculation
CO2:	State the basic electrical laws and apply these laws to solve electrical network.
CO3:	Identify the property of magnetic materials and understand the laws of emf generation
CO4:	Solve the series and parallel DC circuits and AC circuits for single and poly-phase networks
CO5:	Develop skill and design AC-DC rectification circuits, operate basic electrical and electronics instruments

Mapping of course outcomes with program outcomes

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1:	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2:	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3:	1	3	-	-	-	-	-	-	-	-	-	-	-	-
CO4:	1	2	-	2	-	-	-	-	-	-	-	-	-	-
CO5:	1	2	3	-	3	-	-	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) No correlation “-”

Recommended Study Material:

❖ Text Book:

1. Elements of Electrical Engineering and Electronics by U.A.Patel and R. P. Ajwalia
2. A Text Book of Electrical Technology by B. L. Thareja, S. Chand
3. Principles of Electrical Engineering and Electronics by V. K. Mehta, S. Chand

❖ **Reference Book:**

1. Electrical Technology by Hughes, Pearson Education.
2. Electrical Engineering Fundamentals by Vincent Del Toro, Pearson Education.

❖ **Web Material:**

1. <https://www.electronics-tutorials.ws/>