

Branch Name:	Computer Engineering / Information Technology / Artificial Intelligence and Data Science / Information and Communication Technology / Mechanical Engineering / Civil Engineering/ Electrical Engineering / Robotics & Automation
Program Code:	ET103 / ET105 / ET108 / ET107 / ET101 / ET106 / ET109 / ET113
Course Name:	Elements of Electrical and Electronics Engineering
Course Code:	2ET1000109T
Pre-requisite Course:	Basic fundamentals of physics.

Course Objectives:

1. To understand the working and analysis of D.C circuits and its laws.
2. To identify different concepts about electrostatics and electromagnetics.
3. To make the students aware about different electronics circuit concepts.
4. To introduce the operating and working principles of various electrical and electronic systems.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
03	03	-	-	03	24	60	16	40	-	-	-	-	100

Course Contents:

Sr. No.	Topic	Total Hours	Weightage (%)
1	D. C. Circuits: Introduction of Electrical Current, Voltage, Power and Energy, Sources of Electrical Energy – Independent and Dependent Source, Ideal electrical circuit elements - Resistor, Inductor and Capacitor, Fundamental laws of electric circuits - Ohm's Law and Kirchhoff's Laws, Analysis of series, parallel and series-parallel circuits.	08	20
2	Electrostatics: Electric charge and Laws of electrostatics, Definitions - Electric field, lines of force, electric field intensity, electric flux and flux density, Dielectric strength, Capacitor-Capacitor in series and parallel.	05	10
3	Electromagnetism: Faraday's Laws, Lenz's Law, Fleming's Rules, Effect of magnetic field on current carrying conductor, Magnetic circuits-Statically and dynamically induced EMF, Energy stored in magnetic fields.	05	10
4	A.C. Circuits: Single Phase A.C. Circuits: Generation of sinusoidal voltage, Definition of average value, root mean square value, form factor and peak factor, Analysis of Purely Resistive, Inductive and Capacitive Circuit, Series Circuit Analysis of the R-L, R-C and R-L-C circuits; Concepts of Real power, Reactive power, Apparent power and Power factor, Necessity and Advantages of three phase systems, Generation of three phase power, Relationship between line and phase values of balanced three phase circuit.	10	25
5	Semiconductor Devices: Semiconductors, Diode: p-n junction under bias, Bipolar Junction Transistor: structure and symbols, Field Effect Transistors: classification, symbols, Meters and Measurements: voltmeter, ammeter, oscilloscope.	05	10

6	Analog and Digital Building Blocks: Continuous time signal, continuous state(analog) signal, analog system, the amplifier block: basic amplifier circuit model, voltage gain, current gain, power gain. Discrete time signal, discrete state(digital) signal, digital system, advantages of digital systems over analog systems, Digital Building blocks: number systems & conversions, BCD system, logic blocks, digital logic gates.	10	25
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Text Books:

1. B.L. Theraja (2012), Electrical Technology, Vol – 1, S. Chand Publication.
2. U.A.Patel (2012), Elements of Electrical Engineering, Atul Publication.
3. Introduction to Electrical Engineering by Mulukutla S. Sarma, Oxford University Press.

Reference Books:

1. D.P. Kothari and I.J. Nagrath (2013), Theory and Problems in Basic Electrical Engineering, Prentice Hall, India.
2. V. N. Mittal and A. Mittal (2012), Basic Electrical Engineering, Tata McGraw Hill, Publication.
3. Electronics Principles by Malvino, 6th edition, TMG publication.

Course Learning Outcomes (CLO): On completion of this course, the students will be able to

Course Outcomes	Description	Bloom's Taxonomy Level
CLO1	Know electrical current, potential difference, power and energy, resistance and its behavior with temperature.	Remembering (1)
CLO2	Use the Ohm's Law and the Kirchhoff's Law and star delta transformation for solving series, parallel and series-parallel circuits.	Applying (3)
CLO3	Understand basic concepts of electrostatic and electromagnetic circuits.	Understanding (2)
CLO4	Know A.C Quantities and application of A.C circuits.	Remembering (1)
CLO5	Understand Semiconductor Devices, Circuit concepts and	Understanding (2)
CLO6	Understand Analog Building Blocks and Digital Building Blocks	Understanding (2)

Mapping of CLOs with POs & PSOs:

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1		L		H		M						M				L
CLO2	H				L	H		M		L			L		H	
CLO3				M			L				M		M			L
CLO4		L		H		M						M		M		L
CLO5	M		L	L	M	H		M		L			H		L	
CLO6	L	M	L	L				M			L		H	L		

H: High, M: Medium, L: Low