

Branch Name:	Mechanical Engineering
Program Code:	ET402
Course Title:	Basic Electrical Engineering
Course Code:	2ET4020305
Pre-requisite Course:	-----

Course Objectives:

1. Know the importance of A.C circuit and D.C circuit.
2. Understand the working principle, construction and applications of transformer.
3. Understand the working principle, construction and application of electrical machines.
4. Select and use appropriate materials for electrical installation.
5. Appreciate the importance of various protective devices applied for the machines.
6. Know the use of measuring instruments.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
2	0	2	3	60	40	-	50	150

Course Contents:

Unit No	Topic	Total Hours	Weightage (%)
1	D.C CIRCUITS • Terms related to electrical circuit: Emf, current, resistance, resistivity, conductance, conductivity, potential difference, electric field, work, power, energy. • Explain ideal electrical circuit Element: Resistor, Inductor, Capacitor • Ohm's Law & its limitations • state and explain the Kirchhoff's current and voltage laws. • Explain series and parallel combination of resistor	04	15
2	A.C. CIRCUITS • Equation for generation of alternating induce EMF. • Terms related to a.c waveform: waveform, cycle, Instantaneous value, Amplitude, Average value, RMS value, Frequency, Time period, Power factor, Active power, Reactive power, Apparent power, Peak factor, Form factor Phase difference. • Generation of three phase EMF. • Definitions: Phase Voltage, Line voltage, Phase current, Line current. • Comparison between single phase and three phase	04	15
3	TRANSFORMER: • Single Phase & Three Phase • Requirement of transformer • Explain construction and working of single-phase transformer. • Explain construction and working of three phase transformers. • Three phase supply connections –star and delta connection-diagrams/circuit, • Applications and Losses in transformer • Auto transformer and its application	04	15

4	ELECTRICAL MACHINES: • Introduction to Induction Motor (A.C motor) • Construction of Induction Motor • Working Principal of induction motor • Introduction and Construction of d.c motor • Working Principle of d.c motor • Types of d.c motor • Synchronous Generator (A.C Generator & D.C Generator) a. Introduction and Construction of a.c generator b. Working Principle of a.c generator c. Applications of a.c generator d. Introduction and Construction of d.c generator e. Working Principle of d.c generator f. Types of d.c generator • Construction and applications of BLDC motor. • Application of all AC Machine and DC Machine in industries and other	08	25
5	ELECTRICAL INSTALLATION • Introduction to fuse and its characteristic • H.R.C fuse • About MCB, MCCB, ELCB • Comparison between FUSE, MCB and ELCB • Explain types of wire • Explain types of Cable • Explain Earthing System • Basic introduction of Battery • Classification and requirements of Battery • Various Electrical tools used for wiring. • Application of meters • Explain Motor starter and its need.	08	30

List of Practicals:

1. Wiring of tube light / lamp point and testing.
2. Use multimeter & megger for testing.
3. Overhauling of ceiling / table fan or any other domestic appliance.
4. Measure power and power factor in R.L.C series circuit.
5. Open circuit & short circuit test on single phase transformer.
6. Connect the single-phase electric motor to start them.
7. Connect the three-phase electric motor to start them.
8. Demonstrate wires and cables.
9. Use fuse, MCBs and ELCBs for attending repair tasks.
10. Study A.C. Motor starters.

Text Books:

1. Elements of Electrical Engineering, U.A.Patel, ATUL Publication

Reference Books:

1. Elements of Electrical Engineering, B.R.Gupta, S.Chand
2. Elements of Electrical Engineering, J.B.Gupta, Katson
3. A text book of Electrical Technology, Theraja, B.L., S.Chand Publication

List of Open-Source Software/learning website:

1. <https://www.google.com>
2. <https://www.youtube.com>

Course Learning Outcomes (CLO):

1. Analyze basic AC and D.C circuits.
2. Understand the working principles of transformers and electrical machines.
3. Know the importance of various protective devices.
4. Use of wires and cable.
5. Identify the tools used for wirings, Knowledge of Starter used for motor.

Mapping of CLO with PO and PSO

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	M				M			L		L			H	M	L	
CLO2	L				H								M	L	L	
CLO3	M										L		L		M	
CLO4					L			L					H		M	
CLO5					L								M			

H: High, M: Medium, L: Low