

Subject Code: 1ET4020305	Subject Title: Elements of Electrical Engineering
Pre-Requisite	--

RATIONALE:

In the era of technology integration, it has become unavoidable to possess the basic knowledge of various engineering disciplines. The advancement in technology is the best on multi technology integration and hence in performance too. The motive of this subject is to enhance the knowledge & skill level in electrical field to strengthen the present practices.

This course is specially designed with a view to impart basic knowledge of electrical engineering

COURSE OBJECTIVE:

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 EVALUATION SCHEME:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)			
Lecture	Tutorial	Practical	Credit	Theory		Practical	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment
2	-	2	5	60	40	-	50

DETAILS OF COURSE CONTENTS:

Sr No	Topics and Sub-topics	Total Hours	% Weightage
1	D.C CIRCUITS 1.1 Terms related to electrical circuit: Emf,current,resistance,resistivity,conductance,conductivity,pote ntial difference, electric field, work, power, energy 1.2 Explain ideal electrical circuit element: Resistor, Inductor, capacitor 1.3 Ohm's Law & its limitations	4	15

	1.4 state and explain the kirchhoff's current and voltage laws 1.5 Explain series and parallel combination of resistor		
2	A.C. CIRCUITS 2.1 Equation for generation of alternating induce EMF 2.2 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 2.3 Generation of three phase EMF 2.4 Definitions: Phase Voltage, Line voltage, Phase current, Line current 2.5 Comparison between single phase and three phase	4	15
3	TRANSFORMER : Single Phase & Three Phase 3.1 Requirement of transformer 3.2 Explain construction and working of single phase transformer. 3.3 Explain construction and working of three phase transformer. 3.4 Types of connection of three phase transformer. 3.5 Losses in transformer 3.6 Auto transformer and its application	4	15
4	ELECTRICAL MACHINES: A.C Machines & D.C Machines 4.1 Introduction to Induction Motor (A.C motor) 4.2 Construction of Induction Motor 4.3 Working Principal of induction motor 4.4 Applications of Induction motors 4.5 Introduction and Construction of d.c motor 4.6 Working Principle of d.c motor 4.7 Types of d.c motor 4.8 Synchronous Generator (A.C Generator & D.C Generator) 4.8.1 Introduction and Construction of a.c generator 4.8.2 Working Principle of a.c generator 4.8.3 Applications of a.c generator 4.8.4 Introduction and Construction of d.c generator 4.8.5 Working Principle of d.c generator 4.8.6 Types of d.c generator	8	25
5	ELECTRICAL INSTALLATION 5.1 Introduction to fuse and its characteristic 5.2 H.R.C fuse 5.3 About MCB,MCCB,ELCB 5.4 Comparison between FUSE , MCB and ELCB 5.5 Explain types of wire 5.6 Explain types of Cable 5.7 Explain Earthing System 5.8 Basic introduction of Battery 5.9 Classification and requirements of Battery 5.10 Various Electrical tools used for wiring.	8	30

5.11 Application of meters		
5.12 Explain Motor starter and its need		

COURSE OUTCOME:

The course content should be taught and with the aim to develop different types of skills so that students are able to acquire following competencies

1. Identify the major parts of electrical and electronic equipment being used in mechanical engineering applications with respect to their working and major faults that could occur.
2. Use electrical and electronic elements/systems to actuate simple mechanical mechanism.
3. Attend normal electrical faults and use electrical tools and instruments for normal applications effectively.

LIST OF PRACTICAL:

SR NO	PRACTICALS/EXPERIMENTS
1	Wiring of tubelight / 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.

LIST OF REFERENCES:

SR. No.	Title of Books	Author	Publication
1	Elements of Electrical Engineering	B.R.Gupta	S.Chand
2	Elements of Electrical Engineering	J.B.Gupta	Katson
3	Elements of Electrical Engineering	U.A.Patel	Atul
4	Elements of Electrical Engineering	U.A.Bakshi V.U.Bakshi	Technical Publication,pune
5	A text book of ElectricalTechnology	Theraja, B.L.	S.Chand Publication

LIST OF LEARNING WEBSITES



Faculty of Engineering and Technology
Second Year Diploma Engineering
In Effect from Academic Year 2021-22

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