

SCHOOL OF ENGINEERING

SWARNIM STARTUP & INNOVATION UNIVERSITY

Course	Diploma Engineering (60 Seats)
Duration	3 Years
Aim	Our aim is to promote the education and applied research and development of knowledge in the field of engineering.
Objectives	<ul style="list-style-type: none">• To maintain a high standard of education through outstanding teaching, innovative curriculum and research training.• To provide opportunities for students to work as part of teams on multidisciplinary projects.• To develop and promote quality and market driven academic and professional peruses.
Course Outcome	Electrical engineering, the broadest of all Engineering disciplines. It includes Basic knowledge of Electrical and Electronics equipments. It deals with design and protection of electric supply starting from generation to distribution, machines and all other electrical equipment used in any industry. Electrical engineers use the principles of mathematics, control system, circuit theory, Power system, and Power electronics to design, manufacture and maintain all the electrical equipments. Electrical engineering is concerned with power electronics including design and development, production, installation, operation and maintenance; such as locomotives, Electric Drives, Renewable and alternate energy, solar energy, Hybrid Electric vehicles. We not only design and create new products, but also develop protection scheme for them.

SWARNIM STARTUP & INOVATION UNIVERSITY

SCHOOL OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF CE/EE/EEE

FUNDAMENTALS OF ELECTRICAL ENGINEERING

D.E. 1st Year

Teaching and Examination Scheme:

Teaching Scheme				Credits	Evaluation Scheme				
Th	Tu	P	Total		Internal		External		Total
					Th	Pr	Th	Pr	
3	0	2	5	5	30	50	70	-	150

Objectives: - Use of basic of electrical engineering principles occurs in different occupations. It is therefore necessary for diploma engineering students of almost all the branches to know some of the fundamentals of electrical engineering concepts. Therefore, this course has been designed to take care of this need.

Prerequisites: - N.A.

Contents:

Unit No.	Topics	Teaching Hours
1	Fundamentals of Electric And Magnetic Circuits	8
	Ohm's law. Definitions of EMF, Current, Potential Difference, Power and Energy. Study of terms: - M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor etc. Comparison of magnetic and electric circuit.	
2	AC Fundamentals and Electromagnetic Induction	9

	State Faraday's law of electromagnetic induction. Dynamically induced emf. Statically induced emf.-Self induced emf; Mutually induced emf. Definitions and equations of self and mutual inductance. Define cycle, frequency, periodic time, amplitude, RMS value, maximum value, instantaneous value, angular velocity or Frequency with reference to alternating emf and current. A.C. through pure a) resistors, b) inductors and c) capacitors.	
3	Electrical Measuring Instruments and Basic Electronics	9
	Voltmeter, Ammeter, Wattmeter, Megger, Clip-on meter, Energy meter, Luxmeter and Multimeter. Met Methods of connecting various indicating instruments. Conductors, insulators and semi conductors; P & N type semi conductor. Basic function and identification of diode, Transistor and SCR, Photo diode, Photo transistor, Solar cell, LED, LCD, LDR, 555 Timer IC and OPAMP.	
4	Transformer and protective devices	8
	General construction and principle of transformers. Emf equation and transformation ratio of transformers. List various losses in transformers and equation of efficiency. Applications of Transformers. Construction and uses of auto transformers. Different protective devices such as fuse, M.C.B. and ELCB. HRC fuses, Uninterruptible Power Supplies (UPS), Earthing principles and pipe earthing.	
5	Electrical Machines	8
	DC generator and alternator, Classification of induction motors. Construction, working principle Squirrel cage and wound rotor induction motor.	

Learning Outcomes:-

After learning the course the students should be able to Understand fundamental of electric current and voltage, Basics of AC Quantities, the mathematical operation on AC waveforms, Draw phasor diagram and waveforms for purely resistive, purely inductive and purely capacitive as well as series and parallel R-L-C circuits. Also Different types of Electrical machines and protective devices.

Teaching & Learning Methodology:-

Direct Instruction, Formal Authority, Expert talk, Personal Model.

Books Recommended:

1. B.L. Theraja (2012), Electrical Technology, Vol – 1, S. Chand.
2. D.P. Kothari and I.J. Nagrath (2013), Theory and Problems in Basic Electrical Engineering, Prentice Hall, India.
3. John Bird (2012), Electrical Circuit Theory and Technology, Forth edition, Routledge,

Taylor and Francis Group.

4. Parker Smith (2003), Problems in Electrical Engineering, CBS Publishers.
5. Surinder P Bali (2013), Electrical Technology, Vol – I, Pearson
6. V. N. Mittal and A. Mittal (2012), Basic Electrical Engineering, Tata McGraw Hill.

E-Resources:

- 1) <http://www.animations.physics.unsw.edu.au//jw/AC.html>
- 2) <http://en.wikipedia.org/wiki/Transformer>
- 3) <http://www.alpharubicon.com/altenergy/understandingAC.htm>

Practical List:-

SR.NO	TITLE
1.	Measure voltage ,current and power in 1-phase circuit.(with resistive load)
2.	Measure voltage, current and power in R-L series circuit.
3.	Measure transformation ratio K of 1-phase transformer.
4.	Connect single phase transformer and measure input & output quantities.
5.	Make Star & Delta connection in induction motor starters and measure the line and phase values.
6.	Identify switches, switch fuse and fuse switch units, MCB, MCCB & ELCB.
7.	Measure voltage, current and power using analog and digital instruments.
8.	To study different parts of Uninterruptible Power Supplies.
9.	To study different parts of DC machine.
10.	To study different parts of Induction machine.