Program : **Diploma in Computer Engineering & allied programs / Electrical & Electronics Engineering / Electronics Engineering & allied programs / Instrumentation Engineering / Polymer Technology / Printing Technology / Textile Technology**	
Course Code : **2031**	Course Title: **Fundamentals of Electrical and Electronics Engineering**
Semester : **2**	Credits: **3**
Course Category: **Engineering Science**	
Periods per week: **3 (L:2 T:1 P:0)**	Periods per semester: **45**

Course Objectives:

- To provide basic knowledge of the different elements and concepts of electrical engineering
- To imbibe basic concepts of various active and passive electronic components.

Course Prerequisites:

Topic	Course Code	Course name	Semester
Basic knowledge in Physics		Applied Physics I	1
Basic knowledge in Mathematics		Engineering Mathematics I	1

Course Outcomes:

On completion of the course, the student will be able to:

COn	Description	Duration (Hours)	Cognitive Level
CO1	Identify various combinations of resistors and basic terms in ac systems	12	Applying
CO2	Solve various powers in ac circuits and calculate the monthly electricity bill.	10	Applying
CO3	Identify various types of passive components, their colour coding and applications.	10	Applying

CO4	Summarize the working and applications of diodes, transistors and logic gates	11	Understanding
	Series Test	2	

CO – PO Mapping

Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	3						
CO2	3						
CO3	3						
CO4	2						

3-Strongly mapped, 2-Moderately mapped, 1-Weakly mapped

Course Outline

Module Outcomes	Description	Duration (Hours)	Cognitive Level
CO1	**Identify various combinations of resistors and basic terms in ac systems**		
M1.01	Apply Ohm's law to solve electrical circuits	3	Applying
M1.02	Solve various combinations of resistor circuits.	4	Applying
M1.03	Summarize electromagnetic induction and generation of ac voltage.	2	Understanding
M1.04	Illustrate basic terms in ac systems and solve problems.	3	Applying

Contents:

Brief history of electricity-definitions and units -current- voltage- resistance-power-ohm's law (statement and equation only)-laws of resistance (statement only)-problems

Types of circuits- basic concept- dc circuit-ac circuit -combination of resistances -series, parallel, series- parallel (derivation of equivalent resistance and problems)- comparison between series and parallel circuits.

Fundamentals of ac systems- electromagnetic induction (basic idea only)-Faraday's

laws of electromagnetic induction(statement only)-generation of ac voltage (basic concept only)

Basic terms in ac systems - equation of ac voltage - important terms-definition, equation and units -cycle-frequency-time period-angular velocity-amplitude-instantaneous value-maximum value-reactance- impedance-problems

CO2	**Solve various powers in ac circuits and calculate the monthly electricity bill.**		
M2.01	Outline the basic requirements for electrical wiring in residential building	2	Understanding
M2.02	Identify various powers in an ac circuit	4	Applying
M2.03	Solve problems to calculate monthly electricity bill	3	Applying
M2.04	Summarize various safety precautions in electrical systems	1	Understanding
	Series Test – I	1	

Contents :

Wiring in residential buildings- types and basic idea - conduit wiring (open and concealed) -important wiring materials (listing only)- definition of service connection - basic requirements for electric connection (state the purpose only)- cut out fuses - energy meter-main switch- miniature circuit breaker - earth leakage circuit breaker - neutral link

Power in ac circuits - power factor (definition and equation only), types of powers, active power, reactive power, apparent power, single phase and three phase powers (equations and units only), problems

Electrical Energy - definition-basic and commercial units, calculation of monthly electricity bill, problems

Electrical safety- purpose , basic safety precautions(listing only)

CO3	**Identify various types of passive components, their colour coding and applications.**		
M3.01	Identify various types of resistors and their colour coding.	3	Applying
M3.02	Identify the working of capacitors and their various combinations.	3	Applying
M3.03	Explain the concept of inductance and applications of inductors.	2	Understanding

M3.04	Explain the working and applications of transformers in electronic circuits.	2	Understanding

Contents :

Electronic components - concept of active and passive components , resistors, definition, specifications, importance, types, fixed resistors, variable resistors, carbon composition resistors and wire wound resistors, applications of resistors, basic idea of colour coding

Capacitors – definition, specifications, importance, charging and discharging, types, fixed capacitance, variable capacitance, electrolytic capacitor, uses of capacitors, combination of capacitors, equation of effective capacitance of series and parallel circuits, problems, standard representation of capacitors, basic idea of colour coding.

Inductors-definition of self and mutual inductances, types of inductors, applications, specifications, standard representation of inductors, basic idea of colour coding

Transformer -working principle ,turns ratio and applications of of transformers

CO4	**Summarize the working and applications of diodes, transistors and logic gates**		
M4.01	Illustrate the working and applications of rectifier circuits	4	Understanding
M4.02	Explain the working and applications of zener diode	1	Understanding
M4.03	Summarize the operation of transistor as an amplifier	3	Understanding
M4.04	Outline various logic gates and applications	3	Understanding
	Series Test – II	1	

Contents :

PN junction Diode- symbol, working and applications - rectifier circuits- working and waveforms of half wave, full wave centre tapped and full wave bridge rectifiers. Zener diode-symbol , working and applications, Transistors- symbol , working and applications of PNP and NPN transistors, working of transistor as an amplifier. Logic gates, definition, symbols and truth table of AND,OR, NOT ,NAND,NOR & XOR gates, list the applications of logic gates

Text / Reference

T/R	Book Title/Author
T1	B. L. Thereja and A. K. Thereja, “Textbook of Electrical Technology: Part 1 - Basic Electrical Engineering in S. I. Units”, S. Chand Publication, 2012

T2	N.N. Bhargava , D.C. Kulshreshtha S.C. Gupta, “Basic Electronics and Linear Circuits”, Tata McGraw Hill Education, 1983
R1	A. Anand Kumar, “Fundamentals of Digital Circuits”, Prentice Hall India Pvt. Ltd., 2014

Online Resources

Sl.No	Website Link
1	www.electrical4u.com
2	https://www.digimat.in/nptel/courses/video/108101091/L01.html
3	https://www.digimat.in/nptel/courses/video/108105112/L01.html