Fundamentals of Electrical & Electronics Engineering

1. Course Code :- El/Et-304

2. Semester :- 3rd

3. Duration of Exam= 3 hrs

4. COURSE OUT COME (CO)

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

➢ Definecurrent, voltage, insulator, conductor etc.

➢ Solve numerical problems using Kirchhoff's law.

➢ Operate motor and generator.

➢ Explain briefly the alternating current and transformer

➢ Explain the use of semiconductor and transistor.

➢ Guide house wiring

➢ Explain the fundamental concept of digital electronics correlated to microprocessor with its applications.

CO s and ILOs

CO s	ILO s
CO -1. define current, voltage, insulator, conductor etc	1. Define conductor, insulator, and semiconductor with examples. 2. Define current, voltage, resistance, capacitance 3. Describe the Ohm's law 4. Solve problems related to Ohm's law
CO-2 Solve numerical problems using Kirchhoff's law	1. Explain DC network. 2. Define and explain the Kirchhoff's current and voltage law 3. Solve of critical problems by using Kirchhoff's current and voltage law 4. Use of Wheatstone bridge 5. Determine of unknown resistance by Wheastone bridge

CO s	ILO s
CO-3 operate motor and generator	1. Define DC generator and motor 2. Explain the construction of DC generator and motor 3. Explain the working principle of DC generator and motor 4. Compare the DC motor and generator 5. Enumerate different types of DC motor and generator 6. Explain use of DC generator and motor
CO -4 Explain briefly the alternating current and transformer	1. Define amplitude, time period, frequency, equation of alternating voltage and current, RMS, average value, instantaneous value, peak factor. 2. Explain RLC circuit 3. Explain inductance of AC circuit 4. Solve numerical problems 5. Explain construction of transformer 6. State operating principle of transformer 7. State type and uses of transformer 8. State step up and step down transformer
CO5- Explain the use of semiconductor and transistor	1. Define semiconductor, energy band, intrinsic and extrinsic semiconductor 2. Doping of semiconductor 3. Explain P-type, N-type semiconductor, 4. Define PN junction diode, forward and reverse biased diode, 5. Explain diode characteristics, application of PN junction diode like Half-wave, Full-Wave rectifier. 6. Explain Transistor: Physical construction of bipolarPNP and NPN transistor. 7. biasing circuit configuration 8. Explain different mode of transistor (CE, CB, CC). 9. State the application of transistor as an amplifier. 10. State elementary ideas of display - LED, LCD, Seven segment display.

CO s	ILO s
CO-6 guide house wiring	1. Define house wiring 2. Explain different methods of house wiring 3. State the safety and precautionary measure to be taken for electrical shock.
CO-7 Microprocessor	1. Explain the various symbolic representation of logic gates, combinational logic, basic operation of flip-flops, counters and registers. 2. State the fundamental concept of microprocessor and its application in instrumentation, 8085 microprocessor and its operation.

5. Teaching Scheme (in hours/week)

Lecture	Tutorial	Practical	Total
3		3	6

6. Examination Scheme :-

Theory			Pass marks (ESE+SS)	Practical		Pass marks (PT+PA)	Total marks (Th+ Pr)	Credit
ESE	Sessional (SS)			PT	PA			
	TA	HA						
70	10	20	33/100	25	25	17/50	150	4

7. Detailed Course Content

Chapter No	Chapter Title	Content	Duration (in hours)
1	**Introduction**	Basics of Electricity: Revision of insulators and conductors and their examples ,Definition and units of voltage, current, resistance, inductance, capacitance, different voltage sources, Ohm's law, series & parallel combination of resistance .	4

Chapter No	Chapter Title	Content	Duration (in hours)
2	DC network	DC network: Kirchhoff's Law, solving network problem to find current and voltage, Wheatstone bridge and Its problem.	5
3	Generator & motor	Faradays laws of electromagnetic induction, Flemings right hand and left hand rule D.C. generator and motor: Construction, operating principle, types, uses.	4
4	AC fundamental	A. C. Fundamentals: Basic terms-cycle, amplitude, time period, frequency, equation of alternating voltage and current, RMS, average value, instantaneous value, peak factor, form factor, simple problem	5
5	AC circuit	R-L-C series circuit: AC through resistance, capacitance, inductance and their combinations, expression for impedance, reactance, current, power factor, simple problem.	4
6	Transformer	Transformer Construction, operating principle, types and uses.	4
7	Semiconductor	Semiconductor: Definition of semiconductor, energy band diagram, intrinsic and extrinsic semiconductor, doping, P-type, N-type semiconductor, PN junction diode, forward and reverse biased diode, diode characteristics, application of PN junction diode like Half-wave, Full-Wave rectifier.	5
8	Transistor	Transistor: Physical construction of bipolar PNP and NPN transistor, biasing circuit configuration (CE, CB, CC). Application of transistor as an amplifier. Elementary ideas of display - LED, LCD, Seven segment display.	5
9	House wiring	9.1 Introduction to house wiring 9.2 Methods of house wiring 9.3 Safety and precautions measures against electrical hazard.	2

Chapter No	Chapter Title	Content	Duration (in hours)
10	Microprocessor	1. Symbolic representation of logic gates, combinational logic, basic operation of flip-flops, counters and registers. 2. Fundamental concept of microprocessor and its application in instrumentation, 8085 microprocessor and its operation.	5
11	Class test	Two class test	2

8. Distribution of Marks/ Table of specifications

Sr. No	Topic (a)	Time allotted in hours (b)	Percentage Weightage (c)	K	C	A	HA
1	Introduction	4	9	3	0	0	
2	DC net work	5	11	3	0	4	
3	Generator & motor	4	9	3	0	5	
4	AC fundamental	5	11	4	3	4	
5	AC circuit	4	9	3	1	4	
6	Transformer	4	9	3	3	1	
7	Semiconductor	5	11	3	1	3	
8	Transistor	5	11	3	2	1	
9	House wiring	2	4	2	0	4	
10	Microprocessor	5	11	4	0	3	

Sr. No	Topic (a)	Time allotted in hours (b)	Percentage Weightage (c)	K	C	A	HA
11	Class test	2	4				
	Total	Σ b=45	100	31	10	29	

K = Knowledge   C = Comprehension A = Application

HA = Higher Than Application (Analysis,Synthesis, Evaluation)

$$C= \frac{b}{\Sigma b} \times 100$$

10. Details Table of Specification for Theory

Sl. no	Topic	OBJECTIVE TYPE				SHORT/ DESCRIPTIVE ANSWER TYPE				
		K	C	A	*T*	K	C	A	HA	*T*
1	Introduction	1			*1*	2				*2*
2	DC net work	1		1	*2*	2		3		*5*
3	Generator & motor	1		2	*3*	2		3		*5*
4	AC fundamental	2	1	1	*4*	2	2	3		*7*
5	AC circuit	1	1	1	*3*	2		3		*5*
6	Transformer	1		1	*2*	2	3			*5*
7	Semiconductor	1	1	1	*3*	2		2		*4*
8	Transistor	1	1	1	*3*	2	1			*3*
9	House wiring	1		1	*2*	1		3		*4*
10	Microprocessor	1		1	*2*	3		2		*5*
	Total				*25*					*45*

K = Knowledge   C = Comprehension A = Application   HA = Higher Than Application

T = Total

N.B.:- 1. The question pattern will be as per the instruction of SCTE or as per existing rules.

2. The objective type questions may be in the form of multiple choice, fill up the blanks, true or false or very

short answer type.

 3. Optional question (if any) may be from the same topic in the form of either or type like below

QNo. Explain the properties of conductor

Or

 Explain the properties of insulator

11. Suggested Implementation Strategies:- Teacher will use Black board, OHP, LCD Projector, Smart board, Video etc for effective teaching learning process .

12. Ref Books:

I. A text book of Electrical Technology Vol – I, B. L. Theraja& A. K. Theraja, S. Chand.
II. Principle of Electronics, V. K. Mehta, S. Chand.
III. Electronic Principle, A.P. Malvino, Tata McGraw-Hill
IV. Electronic Devices & Circuits, Millman&Halkias,   Tata McGraw-Hill