

DEPARTMENT OF EEE

**NAME OF THE SUBJECT: BASIC ELECTRICAL AND ELECTRONICS
ENGINEERING (JOINT COURSE)**

SUBJECT CODE : 18EES101J

SEM/YEAR : 1/1

REGULATION

: 2018

LESSON PLAN

Session	Description of topic	Contact hours	CLRs	CLOs	Learning Resources	Prediction
	Unit-I : Electrical circuits	12	-	-	-	Week 1
1	Introduction to ac and dc circuit	1	1	1	2,1	
2	Active and passive two terminal elements, Ohms law, voltage- current relation, power, energy	1	1	1	3,2,1	
3	R,L,C elements, voltage and current sources	1	1	1	3,2,1	
4	Kirchoff's current Law, Kirchoff's voltage law	1	1	1	3,2,1	Week 2
5	Problem solving session (KCL, KVL)	1	1	1	3,2,1	
6	Mesh current analysis, Node voltage analysis	1	1	1	3,2,1	
7	Thevenin's theorem, Maximum power transfer theorem	1	1	1	2,3	
8	Norton's theorem, Star delta transformation, Super position,	1	1	1	2,3	Week 3
9	Problem solving session (Mesh analysis and Nodal Analysis)	1	1	1	2,3	
10	RL-circuit transient analysis, RC-RLC transient analysis-(qualitative analysis)	1	1	1	1,2,3	
11	Three phase systems- Star and delta-connections , Relation between line and phase	1	1	1	1,2	
12	Problem solving session (Thevenin's theorem, Norton's theorem, Superposition and Maximum power point)	1	1	1	1,2	Week 4
	Unit-2: D.C Machines & A.C Machines	12				
13	Sinusoids, Generation of AC, Average, RMS values, Form and peak factors	1	2	2	2,3	

14	Analysis of single phase AC circuit, Real, Reactive, Apparent power, Power factor (RL and RC series circuits-Numerical problem)	1	2	2	2,3	
15	Magnetic materials, B-H Characteristics Simple magnetic circuits	1	2	2	1,3	Week 5
16	Faraday's laws, induced emfs and inductances.	1	2	2	1,3	
17	Single phase transformers: Construction, types, ideal, practical transformer	1	2	2	2,3	
18	EMF equation, Regulation, Efficiency	1	2	2	1,3	
19	Problem Solving Session (Finding the Flux, Flux density, mag.field intensity, reluctance, Permeance, self-inductance, mutual inductance, Transformer-induced EMF)	1	2	2	2,3	Week 6
20	Construction, working of DC Generators, Types of DC generators, Characteristics of Generators, Armature reaction, Losses, Power stages of DC generators,	1	2	2	1,3	
21	<i>Working and types of DC motors, Characteristics, Starters</i> Construction, working of AC Generators, Types of AC generators, Characteristics of AC Generators, Losses	1	2	2	2,3	
22	Single Phase- Resistance start, capacitor start, capacitor start and run.	1	2	2	1,2,3	
23	Working and types of Induction motor -Squirrel Cage and slip ring IM	1	2	2	1,2	Week 7
24	Synchronous generator-Working principle-Induced emf equation	1	2	2	1,2	
	Unit-3: Electronic Devices	12				
25	Safety measures in electrical systems	1	3	3	4,5	
26	Types of wiring, wiring accessories, House wiring for staircase, fluorescent lamp, LED lamp & corridor wiring	1	3	3	4,5	
27	Basic principles of earthing, Types of earthing. Grounding in DC circuits	1	3	3	4,5	

28	Basic principles and classification of instruments, Moving coil and moving iron instruments	1	3	3	4,5	Week 8
29	Problem Solving Session	1	3	3	4,5	
30	Overview of Semiconductors, PN junction diode, Zener diode	1	3	3	4,5	
31	Diode circuits: rectifiers, half and full wave, Bridge type rectifier, filter circuit	1	3	3	4,5	Week 9
32	Clippers and clampers	1	3	3	4,5	
33	Problem Solving Session	1	3	3	4,5	
34	BJT construction, operation, BJT characteristics (CB, CE and CC configurations) and uses	1	3	3	4,5	
35	JFET construction, operation, JFET characteristics (CS configuration) and uses. MOSFET construction, operation, MOSFET characteristics (CS configuration) and uses- (qualitative analysis)	1	3	3	4,5	Week 10
36	Problem Solving Session	1	3	3		
	Unit-4: Transducers	12			4,5	
37	Transducer function and requirements, Classification: Active and Passive	1	4	4	4,5	
38	Displacement: Capacitive, Inductive, Variable Inductance, Linear Variable Differential Transformer	1	4	4	4,5	
39	Electromechanical: Pressure, Flow, Accelerometer	1	4	4	4,5	Week 11
40	, Potentiometer etc. Strain Gauge	1	4	4	4,5	
41	Chemical: pH probes, Electro galvanic Sensor etc., Electroacoustic: Mic, Speaker, Piezoelectric, Sonar, Ultrasonic, Tactile, Geophones, Hydrophone	1	4	4	4,5	
42	Electrooptical: LED, Laser, Photodiode, Photoresistor, Phototransistor	1	4	4	4,5	
43	Photoconductive cell, photovoltaic cell,	1	4	4	4,5	Week 12
44	solar cell, LED, infrared emitters, LCD, optocouplers	1	4	4	4,5	

45	Thermoelectric: Resistance Temperature Detectors, Thermocouple, Thermistor	1	4	4	4,5	
46	Electrostatic: Electrometer, Electromagnetic: Antenna, Hall effect, Magnetic Cartridge etc.,	1	4	4	4,5	
47	Radio-acoustic: Geiger Muller Tubes,	1	4	4	4,5	
48	Radio receiver, Radio transmitter	1	4	4		Week 13
	Unit-5: Digital Systems	12			2,4,5	
49	Number systems, binary codes, Binary arithmetic	1	5,6	5,6	2,4,5	
50	Boolean algebra, laws and theorems, Simplification of Boolean expression	1	5,6	5,6	2,4,5	Week 14
51	Logic Gates and Operations, Simplification of Boolean expression	1	5,6	5,6	2,4,5	
52	Simplification of Boolean expression	1	5,6	5,6	2,4,5	
53	SOP and POS Expressions, Standard forms of Boolean expression	1	5,6	5,6	2,4,5	
54	Simplify using Boolean Expressions, Minterm and Maxterm, K-Map Simple Reduction Technique, Two, Three and Four Variable K-Map	1	5,6	5,6	2,4,5	Week 15
55	Problem Solving Session (Minterm and Maxterm, K-Map Simple Reduction Technique, Two, Three and Four Variable K-Map)	1	5,6	5,6	2,4,5	
56	Principles of Communication, Block diagram of a Communication System	1	5,6	5,6	2,4,5	
57	Amplitude Modulation, Frequency Modulation	1	5,6	5,6	2,4,5	
58	Phase Modulation	1	5,6	5,6	2,4,5	
59	Demodulation	1	5,6	5,6	2,4,5	
60	Problem Solving Session	1	5,6	5,6		

Course Learning Rationale (CLR):	At the end of this course, learners will be able to:	Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLO-1 :	Analyze basic theory utilized in electrical circuits and its circuits	CLR-1 :	Analyze given electric circuits consisting of active and passive components
CLO-2 :	Identify working principle of direct current and alternative	CLR-2 :	Identify the parts, functions and working of motors,

	current machines such as transformers, motors and generators		generators and transformers that function in AC and DC
CLO-3 :	Operate the basic electronic devices. Identify their uses and construction features	CLR-3 :	Utilize the basic electronic devices and circuits
CLO-4 :	Identify the different types of transducers used in measurement of various physical parameters	CLR-4 :	Utilize transducers for measuring displacement, pressure, flow, sound, light, temperature, chemical changes etc.,
CLO-5 :	Apply binary logic and Boolean expressions for digital circuit design, Identify elements in a communication Systems	CLR-5 :	Build simple logical circuits using Boolean expressions. Identify elements in a communication system
CLO-6 :	Identify the basic electrical circuits, machines, electronic devices, transducers and digital system principles and operations	CLR-6 :	Utilize the basic electrical circuits, machines, electronic devices, transducers and digital system principles and operations

Sl.No	Learning Resources
1	R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering, Tata McGraw-Hill, 2012
2	S.K. Bhattacharya, Basic Electrical and Electronics Engineering, Pearson publishers, 2017.
3	Dash.S.S, Subramani.C, Vijayakumar.K, Basic Electrical Engineering, 1st ed., Vijay Nicole, 2013
4	Jegatheesan .R, Analysis of Electric Circuits, Tata McGraw-Hill, 2014
5	P. S. Bimbhra, Electrical Machinery, 7th ed., Khanna Publishers, 2011
6	Moris M. Mano, Digital Design, 3rd ed., Pearson, 2011

Laboratory Plan

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's laws
2. Verification of All Theorems (Thevenin's theorem, Norton's theorem, Maximum power transfer theorem)
3. Study on Transient analysis of RL and RC series circuits
4. Load test on single phase transformer
5. Demo of DC/AC machines & Parts
6. Types of wiring (fluorescent lamp wiring, staircase wiring)
7. Characteristics of semiconductor devices (PN junction, Zener diode, BJT)
8. Wave shaping circuits (Half and full wave rectifier, clipper)
9. Displacement measurement using LVDT and pressure measurement using Strain gauge
10. Verification and interpretation of Logic Gates.
11. Reduction of Boolean expression using K-map
12. Study of modulation and demodulation techniques.

S. No	Name of the Experiment	Schedule
1.	Introduction	Week 1
2.	Verification of Kirchhoff's laws	Week 2
3.	Verification of Thevenin's theorem,	Week 3
4.	Verification of Maximum power transfer theorem	Week 4
5.	Types of wiring (fluorescent lamp wiring, staircase wiring)	Week 5
6.	Characteristics of semiconductor devices (PN junction, Zener diode, BJT)	Week 6
	Characteristics of semiconductor devices (PN junction, Zener diode, BJT)	Week 7
7.	Wave shaping circuits (Half and full wave rectifier, clipper)	Week 8
	Wave shaping circuits (Half and full wave rectifier, clipper)	Week 9
8.	Displacement measurement using LVDT and pressure measurement using Strain gauge	Week 10
9.	Verification and interpretation of Logic Gates.	Week 11
10.	Reduction of Boolean expression using K-map	Week 12
11.	Load test on single phase transformer	Week 13
12.	Demo of DC/AC machines & Parts	Week 14

	Study on Transient analysis of RL an RC series circuits Study of modulation and demodulation techniques	
13.	Model Exam	Week 15