

Course Code	18EES101J	Course Name	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	Course Category	S	Engineering Sciences	L	T	P	C
							3	1	2	5

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Electrical & Electronics Engineering			Data Book / Codes/Standards	Nil

Course Learning Rationale (CLR):		The purpose of learning this course is to:			Learning			Program Learning Outcomes (PLO)														
CLR-1 :	Analyze given electric circuits consisting of active and passive components				Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2 :	Identify the parts, functions and working of motors, generators and transformers that function in AC and DC							Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLR-3 :	Utilize the basic electronic devices and circuits							H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CLR-4 :	Utilize transducers for measuring displacement, pressure, flow, sound, light, temperature, chemical changes etc.,							H	M	L	L	M	-	M	M	M	M	-	M	-	-	-
CLR-5 :	Build simple logical circuits using Boolean expressions. Identify elements in a communication system							H	-	L	M	M	-	M	M	M	M	-	M	-	-	-
CLR-6 :	Utilize the basic electrical circuits, machines, electronic devices, transducers and digital system principles and operations							H	M	M	M	M	-	M	M	M	M	-	M	-	-	-
Course Learning Outcomes (CLO):		At the end of this course, learners will be able to:																				
CLO-1 :	Analyze basic theory utilized in electrical circuits and its circuits				3	75	70															
CLO-2 :	Identify working principle of direct current and alternative current machines such as transformers, motors and generators				2	75	70															
CLO-3 :	Operate the basic electronic devices. Identify their uses and construction features				3	75	70															
CLO-4 :	Identify the different types of transducers used in measurement of various physical parameters				3	75	70															
CLO-5 :	Apply binary logic and Boolean expressions for digital circuit design, Identify elements in a communication Systems				3	75	70															
CLO-6 :	Identify the basic electrical circuits, machines, electronic devices, transducers and digital system principles and operations				3	75	70															

	Electrical Circuits		D.C Machines & A.C Machines		Electronic Devices		Transducers		Digital Systems	
Duration (hour)	18		18		18		18		18	
S-1	SLO-1	Introduction to DC and AC circuits	SLO-2	Sinusoids, Generation of AC, Average, RMS values, Form and peak factors	SLO-1	Safety measures in electrical systems	SLO-2	Transducer function and requirements	SLO-1	Number systems, binary codes
	SLO-2	Active and Passive two terminal elements		Analysis of single phase AC circuit, Real, Reactive, Apparent power, Power factor		Types of wiring, wiring accessories		Classification: Active and Passive		Binary arithmetic
S-2	SLO-1	Ohms law, Voltage-Current relation, Power, Energy	SLO-2	Magnetic materials, B-H Characteristics Simple magnetic circuits	SLO-1	House wiring for staircase, fluorescent lamp, LED lamp & corridor wiring	SLO-2	Displacement: Capacitive, Inductive, Variable Inductance	SLO-1	Boolean algebra, laws and theorems
	SLO-2	R,L,C Circuits, Voltage and Current Sources		Faraday's laws, induced emfs and inductances.		Basic principles of earthing, Types of earthing. Grounding in DC circuits		Linear Variable Differential Transformer		Simplification of Boolean expression
S-3	SLO-1	Kirchoff's current law	SLO-2	1 - phase transformers: Construction, types, ideal, practical transformer	SLO-1	Basic principles and classification of instruments	SLO-2	Electromechanical: Pressure, Flow, Accelerometer, Potentiometer etc.	SLO-1	Logic Gates and Operations
	SLO-2	Kirchoff's voltage law		EMF equation, Regulation, Efficiency		Moving coil and moving iron instruments		Strain Gauge		Simplification of Boolean expression
S-4	SLO-1	Problem Solving Session	SLO-2	Problem Solving Session	SLO-1	Problem Solving Session	SLO-2	Problem Solving Session	SLO-1	Problem Solving Session
	SLO-2	Lab 1: Verification of Kirchoff's Law		Lab 4: Transformer Operation, Efficiency		Lab 7: Types of wiring (fluorescent lamp wiring, staircase wiring, godown wiring)		Lab 10: Measurement using LVDT and Strain Gauge		Lab 13: Verification of Boolean expression using logic gates
S-7	SLO-1	Mesh Current Analysis	SLO-2	Construction, working of DC Generators	SLO-1	Overview of Semiconductors	SLO-2	Chemical: pH probes, Electro galvanic Sensor etc.,	SLO-1	SOP and POS Expressions
	SLO-2	Nodal Voltage Analysis		Types of DC generators		PN junction diode		Electroacoustic: Mic, Speaker, Piezoelectric, Sonar, Ultrasonic		Standard forms of Boolean expression
S-8	SLO-1	Thevenin's Theorem	SLO-2	Characteristics of Generators	SLO-1	Zener diode	SLO-2	Tactile, Geophones, Hydrophone	SLO-1	Simplify using Boolean Expressions
	SLO-2	Norton's Theorem		Armature reaction, Losses		Diode circuits: rectifiers, half and full wave		Electrooptical: LED, Laser, Photodiode, Photoresistor, Phototransistor		Minterm and Maxterm
S-9	SLO-1	Maximum Power Transfer Theorem		Power stages of DC generators		Bridge type rectifier, filter circuit		Photoconductive cell, photovoltaic cell, solar cell		K-Map Simple Reduction Technique

	SLO-2	Star- Delta Transformation	Working and types of DC motors, Characteristics, Starters	Clippers and clampers	LED, infrared emitters, LCD, optocouplers	Two, Three and Four Variable K-Map
S-10	SLO-1	Problem Solving Session	Problem Solving Session	Problem Solving Session	Problem Solving Session	Problem Solving Session
S	SLO-2	Lab 2: Verification of all Theorems	Lab 5: Demo of DC Machine & Parts	Lab 8: Characteristics of semiconductor devices	Lab 11: Measurement using Electro acoustic and Electrooptical transducers	Lab 14: Reduction using Digital Logic Gates
11-12	SLO-1	Resistive Circuit Analysis	Construction, working of AC Generators	BJT construction, operation	Thermoelectric: Resistance Temperature Detectors	Principles of Communication
S-13	SLO-2	Superposition, Convolution	Types of AC generators	BJT characteristics (CB, CE and CC configurations) and uses	Thermocouple	Block diagram of a Communication System
S-14	SLO-1	RL Circuit Transient Analysis	Characteristics of AC Generators, Losses	JFET construction, operation	Thermister	Amplitude Modulation
	SLO-2	RC & RLC Transient Analysis	Single Phase and Three Phase Machines	JFET characteristics (CS configuration) and uses.	Electrostatic: Electrometer	Frequency Modulation
S-15	SLO-1	Three Phase Systems, Connections	Working and types of AC motors	MOSFET construction, operation	Electromagnetic: Antenna, Hall effect, Magnetic Cartridge etc.,	Phase Modulation
	SLO-2	Relation between Line and Phase	Induction, Squirrel Cage, Synchronous	MOSFET characteristics (CS configuration) and uses	Radioacoustic: Geiger Muller Tubes, Radio receiver, Radio transmitter	Demodulation
S-16	SLO-1	Problem Solving Session	Problem Solving Session	Problem Solving Session	Problem Solving Session	Problem Solving Session
S	SLO-2	Lab 3: Time Domain Analysis (RL, RC)	Lab 6: Demo of AC Machine & Parts	Lab 9: Wave shaping circuits	Lab 12: Measurement using Thermoelectric and Electromagnetic	Lab 15: Demo of Transmission and Reception using MODEM
17-18	SLO-1					

Learning Resources	1. Dash.S.S, Subramani.C, Vijayakumar.K, Basic Electrical Engineering, 1st ed., Vijay Nicole, 2013 2. Jegatheesan .R, Analysis of Electric Circuits, Tata McGraw-Hill, 2014 3. P. S. Bimbhra, ElectricalMachinery, 7 th ed., Khanna Publishers, 2011	4. R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering, Tata McGraw-Hill, 2012 5. Moris M. Mano, Digital Design, 3 rd ed., Pearson, 2011
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Learning Assessment											
	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
	Understand										
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
	Analyze										
Level 3	Evaluate	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
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