SCHEME OF COURSE WORK

Course Title	BASIC ELECTRICAL ENGINEERING		
Course Code	15EE1153	L T P C	3 0 0 3
Program	B.Tech		
Branch	COMPUTER SCIENCE ENGINEERING & INFORMATION TECHNOLOGY		
Semester	1		
Prerequisites	Basic Electrical Laws		
Course to which it is prerequisite	All advanced courses in Electrical Engineering		

Course Outcomes (COs):

CO 1: Analyze the properties of basic electrical elements and apply network theorems to electrical circuits.
CO 2: Analyze magnetic field circuits and solve AC networks
CO 3: Explain the working of DC machines and transformers
CO 4: Explain the working of synchronous and induction machines.
CO 5: Use basic measuring instruments based on their working principles

Program Outcomes (POs):

A graduate of Computer Science Engineering will be able to

PO-1	Graduates will be able to apply the knowledge of mathematics, science, engineering fundamentals and principles of Computer Science & Engineering to solve complex problems in different domains
PO-2	Graduates can identify, formulate, study contemporary domain literature and analyze real life problems and make effective conclusions using the basic principles of science and engineering
PO-3	Graduates will be in a position to design solutions for Engineering problems requiring in depth knowledge of Computer Science and design system components and processes as per standards with emphasis on privacy, security, public health and safety
PO-4	Graduates will be able to conduct experiments, perform analysis and interpret data as per the prevailing research methods and to provide valid conclusions
PO-5	Graduates will be able to select and apply appropriate techniques and use modern software design and development tools. They will be able to predict and model complex engineering activities with the awareness of the practical limitations
PO-6	Graduates will be able to carry out their professional practice in Computer Science & Engineering by appropriately considering and weighing the issues related to society and culture and the consequent responsibilities
PO-7	Graduates would understand the impact of the professional engineering solutions on environmental safety and legal issues
PO-8	Graduates will transform into responsible citizens by adhering to professional ethics
PO-9	Graduates will be able to function effectively in a large team of multidisciplinary streams consisting of persons of diverse cultures without forgetting the significance of each individual's contribution
PO-10	Graduates will be able to communicate effectively about complex engineering activities with

	the engineering community as well as the general society, and will be able to prepare reports
PO-11	Graduates will be able to demonstrate knowledge and understanding of the engineering and management principles and apply the same while managing projects in multidisciplinary environments
PO- 12	Graduates will engage themselves in self and life-long learning in the context of rapid technological changes happening in Computer Science and other domains

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO-1	3	2	2	2	2	2			3						
CO-2	3	2	2	2	2	2			3						
CO-3	2	2	2	2	2	2			3						
CO-4	2	2	2	2	2	2			3						
CO-5	2	2	2	2	2	2			3						

S - Strongly correlated, M - Moderately correlated, Blank - No correlation

Assessment Methods	Assignment / Quiz / Seminar / Case Study / Mid-Test / End Exam

Teaching-Learning and Evaluation

Week	TOPIC / CONTENTS	Course Outcomes	Sample questions	Teaching-learning strategy	Assessment Method & Schedule
1.	Introduction to Electrical System, Network Model, Network Variables	CO-1	a) Define charge, current, potential difference, EMF	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
2.	Sign Conventions,Network Elements- Independent and dependent Sources, Ideal and Practical Sources, Passive elements	CO-1	a) What are the types of dependent sources and how are they represented?	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
3.	Ohm's Law, Kirchhoff's Voltage law, Kirchhoff's Current Law, Various Resistive Networks	CO-1	a) State KCL, KVL b) Problems on voltage and current division in resistive networks	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
4.	Source Transformation, Network Theorems	CO-1	a) Applying theorems calculate the	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz

			voltages and currents in a given network. (Problem)		(Week 6) Mid-Test 1 (Week 7)
5.	Introductory concepts of Electro Magnetics, Electromagnetic Induction, Faraday's laws, Inductances	CO-2	a) Explain the Faraday's Laws of electromagnetic induction with examples.	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
6.	Introduction to AC analysis, Sinusoid, Phasor Representation of Sinusoids, V-I relationships in R,L,C elements, Impedance, Admittance, Average & RMS values, Series AC Circuits	CO-2	a) Solve for voltage and current for a given AC network and draw its phasor diagram	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
7.	Types of Machines & Basic Electro Mechanical Energy Conversion, Construction & Principle of operation of DC Motor, EMF Equation of a DC Machine, Types of DC machines (based on Excitation)	CO-3	a) Explain the principle of operation of a DC motor	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7)
8.	Torque equation, Characteristics of DC motors, Speed control of DC motor	CO-3	a) What are the various methods of speed control of a DC machine?	▪ Lecture ▪ Problem solving	Assignment (Week 5) Quiz (Week 6) Mid-Test 1 (Week 7))
9.	**MID TEST - 1**				
10.	Losses in a DC Machines and efficiency , Problems Transformers Introduction, Principle of Operation	CO-3	a. Explain the various losses in a DC machine	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
11.	EMF equation, Phasor diagram on No Load and Load conditions Efficiency	CO-3	a. Draw the phasor diagram of a Transformer at no load	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2

					(Week 15)
12.	Voltage regulation, problems,Autotransformer	CO-4	a. Explain the working of Auto Transformer	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
13.	Construction of Alternator, Principle of operation- EMF induction Voltage Regulation by Synchronous Impedance Method,	CO-4	a) Explain the Synchronous Impedance Method to predetermine the regulation of an alternator	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
14.	Problems, Induction Motor Construction, Principle of Operation, Slip	CO-4	b) Describe the construction of Induction motor and explain its working principle.	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
15.	Rotor frequency Torque Equation, Simple Problems	CO-4	a) Derive the expression for Torque equation in an induction motor	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
16.	Introduction, classification of Instruments, operating Principles, Basic requirements for measurement, Moving Coil Permanent Magnet (PMMC) instruments	CO-5	Explain different types of torques involved in measuring instruments.	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
17.	Moving Iron of Ammeters and Voltmeters (basics), Fuses, Circuit Breakers, Earthing, Electric Shock	CO-5	Sketch and describe the construction of a Moving Iron Ammeter and give the principle of operation. Also discuss its advantages and disadvantages	▪ Lecture ▪ Problem solving	Assignment-2 (Week 13) Quiz-2 (Week 14) Mid-Test 2 (Week 15)
18.	**MID TEST - 2**				
19.	**SEMESTER END EXAM**				