Course Ni.	Title of the Course	Credits	Course Structure	Pre-Requisite
FC****	Fundamentals of Electrical Engineering	4	3L-0T-2P	None

Course Outcomes:

CO 1 : To Learn the standards of fundamental circuit's elements
CO 2 : To understand the basics of AC and DC circuit
CO 3 : To analyze the transformer circuit theory
CO 4 : To discuss DC and AC machine and its applications
CO 5 : To get familiarize with electric power system structures

Unit No.	Topics
Unit-I	Basics of Measurements: Accuracy, Precision, resolution, reliability, repeatability, validity, Errors and their analysis. Classification and principles of measuring instruments, Introduction to PMMC and Moving Iron type measuring instruments.
Unit-II	D. C. Circuits: Mesh and nodal analysis, Maximum Power Transfer Theorem, Thevenin Theorem, Norton theorem for independent sources. A.C circuits: Single Phase: Phasor representation of alternating quantities; Analysis with phasor diagrams of RLC circuits; complex power and power factor, resonance. Three Phase: balanced supply and balanced load; star and delta connections; Measurement of power by two wattmeter method.
Unit-III	Transformers: Introduction to self-inductance and mutual inductance. Principle of operation and construction of single-phase transformers. EMF equation, losses, efficiency, and voltage regulation.
Unit-IV	DC Machines: working principle and its types, AC machines: working principle and its types, Introduction to stepper and BLDC motors
Unit-V	Introduction to Power Systems: Block diagram of electric power system, Load demand, load duration curve and relevant definitions; plant load factor; Introduction to Conventional and Renewable Sources: thermal, hydro, wind and solar.

Suggested Reading:

1. Electrical Measurements and Measuring Instruments, E.W Golding, F.C Widdis
2. Sawhney A.K, "A course in Electrical and electronic Measurement and Instrumentation", Dhanpat Rai & Sons, New Delhi.
3. Alexander, Charles K. Fundamentals of electric circuits. McGraw-Hill,, 2013.
4. Nagrath I.J. and D. P. Kothari (2001), Basic Electrical Engineering, Tata McGraw Hill.
5. Hayt and Kimberly, Engineering Circuit Analysis, Tata McGraw Hill.
6. Kulshreshtha D.C. (2009), Basic Electrical Engineering, Tata McGraw Hill.
7. D.P. Kothari, I.J. Nagrath, Electric Machines, Tata McGraw Hill.
8. M. V. Deshpande, "Elements of Electric Power Station Design", Wheeler Publishing Co.

2. LESSON PLAN for THEORY LECTURE

Lecture No.	Topic to be covered	Unit
1	Course Introduction	1
2	Basics of Measurements: Accuracy, Precision, resolution	
3	Basics of Measurements: Reliability, repeatability, validity, Errors and their analysis	
4	Classification of measuring instruments	
5	Working principles of measuring instruments	
6	Introduction to PMMC measuring instruments	
7	Introduction to Moving Iron type measuring instruments	
8	D. C. Circuits: Mesh and nodal analysis	2
9	Maximum Power Transfer Theorem	
10	Thevenin Theorem for independent sources	
11	Norton theorem for independent sources	
12	Phasor representation of alternating quantities; Analysis with phasor diagrams of RLC circuits	
13	Complex power and power factor, resonance	
14	Three Phase: balanced supply and balanced load	
15	Three Phase star and delta connections	
16	Measurement of power by two wattmeter method	
17	Transformers: Introduction to self-inductance	3
18	Introduction to mutual inductance	
19	Transformer: Principle of operation	
20	Construction of single-phase transformers	
MID SEMESTER EVALUATION		
21	Transformer EMF equation	3
22	Transformer losses	
23	Transformer efficiency	
24	Voltage regulation	
25	DC Machines: working principle	4
26	Types of DC Machines	
27	Types of DC Machines	
28	AC Machines: working principle	
28	Types of AC Machines	
29	Types of AC Machines	
30	Brief about special motors	
31	Introduction to stepper motor	
32	Introduction to BLDC motor	
33	Introduction to Power Systems: Block diagram of electric power system	5
34	Load demand, load duration curve and relevant definitions	
35	Plant load factor	
36	Introduction to Conventional and Renewable Sources	
37	Introduction to thermal energy source	
38	Introduction to hydro energy source	
39	Introduction to solar energy source	
40	Introduction to wind energy source	
END SEMESTER EVALUATION		

3. LESSON PLAN for LAB

Lab Class No.	Name of the Experiment
1	Study of errors in measuring instruments
2	Verification of Nodal voltage analysis.
3	Verification of Thevenin's theorem
4	Verification of Norton's theorem
5	Verification of maximum power transfer theorem
MID SEMESTER EVALUATION	
6	Study of Series RL and RC circuits
7	Study of single-phase transformer.
8	Implementation of Star –Star connection of Three Phase Transformation with Inductive/lamp load.
9	Study of DC machine
10	Study of three phase induction motors.
END SEMESTER EVALUATION	