ELECTRICAL TECHNOLOGY

III Semester: ECE								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
AEE017	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**		**Practical Classes: Nil**			**Total Classes: 60**		

OBJECTIVES:

The course should enable the students to:

I.   Analyze the transient response of RL, RC and RLC circuits for DC excitation.
II. Discuss the configurations of two port networks and evaluate two port network parameters..
III. Understand the classification and design principles of filters and symmetrical attenuators.
     Describe the principle of operation and testing methods of DC machines and single phase Transformers.

COURSE LEARNING OUTCOMES (CLOs)

At the end of the course, the student will have the ability to:

1. Understand the transient response of series RL and RC circuits by differential and Laplace transform approach.
2. Understand the transient response of series RLC circuit by differential and Laplace transform approach.
3. Explain impedance parameters in two port networks and conversion of impedance parameters into all other parameters.
4. Explain admittance parameters in two port networks and conversion of admittance parameters into all other parameters.
5. Explain ABCD parameters in two port networks and conversion of ABCD parameters into all other parameters.
6. Explain H-parameters in two port networks and conversion of Hybrid parameters into all other parameters.
7. Describe the classification of different types of filters and advantages
8. Describe the classification of pass band and stop band filters and their characteristic impedance.
9. Understand the design of constant 'k' low pass filter and high pass filter and applications
10. Understand the m-derived t-section, band pass filter and band elimination filter and applications.
11. Understand the T-type attenuator, pi- type attenuator, bridged 'T' type attenuator, lattice attenuator.
12. Understand the working principle of DC generator, types of generators and their characteristics.
13. Understand the working principle of DC motor, development of torque and their characteristics to find losses and efficiency.
14. Understand the principle of operation of single phase transformer types and their construction.
15. Determine the losses and efficiency of transformer using open circuit and short circuit test data.
16. Apply the concept of network theorems, DC machines and AC machines to solve real time applications.
17. Process the knowledge and skills for employability and to succeed national and international level competitive examinations.

UNIT - I	TRANSIENT ANALYSIS (FIRST AND SECOND ORDER CIRCUITS)	Classes: 09
Transient response of RL, RC, and RLC Series circuits DC excitations, initial conditions, solution using differential equations approach and Laplace transform method.	
UNIT - II	TWO PORT NETWORKS	Classes: 09
Equivalent circuit model: No load test and blocked rotor test, circuit model, starting methods, speed control of induction motors, induction generator, principle of operation, isolated induction generator, circle diagram, determination of induction motor parameters from circle diagram, problems.	
UNIT - III	FILTERS AND SYMMETRICAL ATTENUATORS	Classes: 09
Filters: Classification of Filters, Filter Networks, Classification of Pass Band and Stop Band, Characteristics Impedance in the Pass and Stop Bands, Constant-k Low Pass Filter, High Pass Filter, m- derived T-Section, Band Pass filter and Band Elimination filter. Symmetrical Attenuators: T-Type Attenuator, pi- Type Attenuator, Bridged T type Attenuator, Lattice Attenuator.	
UNIT - IV	D.C. MACHINES	Classes: 09
D.C Generators: Principle of operation of DC Machines, EMF equation, types of generators, voltage build up, critical resistance, magnetization and load characteristics of DC generators. D.C. Motors: Types of DC motors, back EMF, torque equation, characteristics, losses and efficiency, Swinburne's test, brake test on DC shunt motor, Speed control of DC shunt motor, three point starter, applications, numerical problems.	
UNIT - V	SINGLE PHASE TRANSFORMERS	Classes: 09
Principle of operation of single phase transformer, types, constructional features, phasor diagram on no load and load, equivalent circuit, losses and efficiency of transformer and regulation, OC and SC tests, (Simple problems)	

Text book

1. J B Gupta, "Theory and Performance of Electrical Machines", S K Kataria & Sons publications, 14th edition, 2010.
2. A Sudhakar, Shyammohan S Palli, "Circuits and Networks", Tata McGraw-Hill, 4th Edition 2010.
3. A Chakrabarhty, ─Electric Circuits‖, Dhanipat Rai & Sons Publication 6th Edition, 2010.
4. I J Nagrath, D P Kothari, ─Electrical Machines‖, Tata Mc Graw Hill Publication, New Delhi, 2 nd Edition, 2010.

References

1. V K Mehta, ─Principles of Electrical Engineering‖, S Chand Publications, Re print, 2005
2. I J Nagarath, D P Kothari, ─Theory and Problems of basic electrical engineering‖, PHI Publications, 1st Edition, 2013.
3. N C Jagan, C Lakhminaraya, ─Network Analysis‖, BS Publications 2nd Edition, 2011.
4. Sudhakar, Shyam Mohan, ─Electrical Circuits‖, Mc Graw Hill Publication, 3rd Edition, 2015.