Module	Chapter	Detailed Content	Syllabus Detailing	Learning Objectives
Module 1	**Chapter 1 DC Circuits(Only Independent Sources)**	Kirchhoff 's laws, Ideal and practical voltage and current source, Mesh and Nodal analysis, Supernode and Supermesh analysis, Source transformation, Star-delta transformation,	**Purpose**: This chapter explain the basic concept of Ohm's law and Kirchhoff's law and their application. **Scope –** **1. Academic Aspects-** Understanding of Mesh and Nodal analysis, Supernode and Supermesh analysis. **2. Technology Aspect-** Applying Supernode and Supermesh analysis to calculate current and voltage in given circuit. **3. Application Aspect-** Use in designing basic Electronic & Electrical circuit. **Students Evaluation** – 1. Theory Questions to be asked on Basic laws. 2. Numericals will be asked on Mesh and Nodal analysis, Supernode and Supermesh analysis. 3. Derivation may be asked on Star-delta transformation.	1. Student shall be able to State Kirchhoff's laws. 2. Student shall be able to describe Ideal and practical voltage and current source. 3. Student shall be able to find the current, voltage and power using different source transformation technique. 4. Student shall be able to find the current, voltage and power using Mesh and Nodal analysis. 5. Student shall be able to find the current, voltage and power using Supernode and Supermesh analysis. 6. Student shall be able to derive formula Star-delta transformation.
Module 2	**Chapter 2- DC Circuits-II**	Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem, (Source transformation not allowed for Superposition theorem, Mesh and Nodal analysis).	**Purpose-** This chapter is focused on various theorem used in DC networks. **Scope –** **1. Academic Aspects-** Understanding theorem application in DC Circuits. **2. Technology Aspect-** Calculate current, voltage & power in complicated circuit. **3. Application Aspect-** Students will be able to apply these theorem in small circuits.	1. Student shall be able to State D.C theorems. 2. Students shall be able to explain procedure for applying theorem in a circuit. 3. Student shall be able to

			Students Evaluation – 1. Theory question will be asked on Theorem's statement. 2. Numerical will asked on theorem application in given circuit. **3.** Theory question will on Maximum power transfer theorem.	find the current, voltage and power using different theorems. 4. Student shall be able to derive relation between Source resistance and load resistance. 5. Student shall be able to calculate value of load resistance for maximum power transfer. 6. Students shall be able to choose correct theorem for finding current or voltage in circuit.
Module 3	**Chapter 3- AC Circuits-I**	Generation of alternating voltage and currents, RMS and Average value, form factor, crest factor, AC through resistance, inductance and capacitance	**Purpose –** This chapter introduces concept of Generation of alternating voltage and currents, RMS and Average value, form factor, crest factor. **Scope –** **1. Academic Aspects-** Student will study concept of Generation of alternating voltage and currents, RMS and Average value, form factor, crest factor. **2. Technology Aspect- Student will** **3. Application Aspect-** Find state variable model for given motor control system **Student Evaluation -** 1.Define concept of state variable 2. Find state variable model for given system 3. Simulate state variable model of system to find output response.	1. Students shall be able to understand the generation of Single phase AC. 2. Students shall be able to understand the basic term used in AC fundamentals. 3. Students shall be able to find vector representation of alternating quantities. 4. Students shall be able to calculate RMS, AVG value for AC waveform. 5. Students shall be able to define Impedance & reactance. 6. Students shall be able to find response of R,L,C elements to AC supply.

Module 4	**Chapter 4 AC Circuits-II**	R-L, R-C and R-L-C series and parallel circuits, phasor diagrams, power and power factor, series and parallel resonance, Q factor and bandwidth. Three phase voltage and current generation, star and delta connections(balanced load only), relationship between phase and line currents and voltages, Phasor diagrams, Basic principle of wattmeter, measurement of power by one and two wattmeter methods.	**Purpose –** This chapter explain student behavior of R-L, R-C and R-L-C series and parallel circuits. **Scope –** **1. Academic Aspects- Students** will able to define power factor, series and parallel resonance, Q factor and bandwidth. Student understand the generation of three phase power. **2. Technology Aspect-** Calculation of voltage, current & power in R-L, R-C and R-L-C series and parallel circuits. **3. Application Aspect-** Single phase & three phase supply are used in all industry, and student will know their behavior with R-L, R-C and R-L-C series and parallel circuits **Student Evaluation -** 1. Define power factor, series and parallel resonance, Q factor and bandwidth. 2. Explain the generation of three phase power. 3. Calculation of voltage, current & power in R-L, R-C and R-L-C series and parallel circuits. 4. Derive resonance frequency for series and parallel resonance, Q factor and bandwidth. 5. Explain measurement of power by one and two wattmeter methods. **6.** Derive relation between line value & phase value for star and delta connections.	1. Students shall be able to understand the behaviour of AC through parallel and series RLC circuits 2. Students will be able to understand circuit concept of series and parallel resonance in A.C. 3. Student shall be able to explain generation of three phase A.C. voltage and current. 4. Student shall be able to define terms such as phase voltage, phase current, line voltage and line current. 5. Explain relationship between phase and line currents and voltages for star/delta connection. 6. Student will able to calculate power using two watt meter method.
Module	**Chapter 5**	Construction, working principle,	**Purpose –**	1. Student shall be able to

5	**Single Phase Transformer**	emf equation, ideal and practical transformer, transformer on no load and on load, phasor diagrams, equivalent circuit, OC and SC test, regulation and efficiency. .	This chapter introduces construction and working of Single phase transformer. **Scope –** **1. Academic Aspects-** Students will knowconstruction, working principle of transformer. **2. Technology Aspect-** Transformer is use in various project. **3. Application Aspect-** Single phase transformers are used in all industry, and student will understand its behavior with R,L, C load. **Student Evaluation –** 1. Explain Construction, working principle of Transformer. 2. Derive EMF equation for Transformer 3. Differentiate between ideal and practical transformer. 4. Explain behavior of transformer on no load and on load & draw phasor diagrams. 5. Draw equivalent circuit of transformer **6.** Explain OC and SC test, regulation and efficiency.	explain the construction and working of transformers. 2. Student shall be able to list the formula for EMF equation, define efficiency, list the different losses in transformers. 3. Student shall be able to differentiate between ideal and practical transformers. 4. Student shall be able to explain and draw the equivalent circuit for transformers. 5. Student shall be able to calculate the efficiency of transformers, equivalent resistance at primary side or secondary side using S.C and O.C test. 6. Student shall be able to calculate voltage regulation for transformer.
Module 6	**Chapter 6 DC Machines**	Principle of operation of DC motors and DC generators, construction and classification of DC machines, emf equation.	**Purpose –** Introduction to DC motors and DC generators **Scope –** **1. Academic Aspects-** Introduction to DC motors and DC generators. **2. Technology Aspect-** Use of DC motor/ generator in projects. **3. Application Aspect-** DC motor& DC generatorhave many application in	1. To understand the principle of operation of DC motors & DC generators. 2. To understand the principle of operation of DC generators. 3. To learn about the

			industry. **Student Evaluation –** Explain Principle of DC Motors & DC Generator. Explain construction of DC machines. Derive EMF equation for DC Machines.	construction of DC machinesand to classify the types of DC machines. 4. To derive formula for generated EMF in DC generator and DC Motor. 5. To derive Voltage equation for various type of DC machines. **6.** To understand the application of DC Machines.