COURSE TITLE   **: ELECTRICAL TECHNOLOGY**
COURSE CODE   **: 3043**
COURSE CATEGORY   **: B**
PERIODS/WEEK   **: 4**
PERIODS/SEMESTER   **: 60**
CREDITS   **: 4**

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TIME SCHEDULE

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MODULE	TOPIC	PERIODS
1	AC fundamentals and earthing	15
2	Network theorems and transformers	15
3	DC generators and DC motors	15
4	Alternators and AC motors	15
	TOTAL	60

Course General Outcome:

Module	GO	On completion of the study of this course the student will be able :
1	1	To understand about AC fundamentals
	2	To understand the need for earthing and protection of equipments
2	1	To study the network theorems
	2	To know the operations and uses of transformers
3	1	To understand DC generators
	2	To understand DC motors
4	1	To understand alternators
	2	To understand AC motors

GO - General Outcome

On completion of the study of this course the student will be able:

MODULE I AC FUNDAMENTALS   AND EARTHING

 To Understand about AC fundamentals.

       1.1.1   To explain the concept of alternating voltage and current.
       1.1.2   To Illustrate complex waveforms and representation of alternating quantities.
       1.1.3   To define the terms, cycle, time period, frequency, amplitude, phase, rms value, form

factor. To describe AC through resistance, inductance, and capacitance and solve simple problems.

1.1.4   To define power factor and calculation of power in an RLC circuit.
1.1.5   To illustrate series AC circuits and solve simple problems.
1.1.6   To illustrate parallel AC circuits and solve simple problems.

1.2.0   To understand the need for earthing and protection of equipments.

1.2.1   To State the necessity of earthing of equipments and lightning protection of installation.
1.2.2   To test insulation resistance using megger.

MODULE II NETWORK THEOREMS AND TRANSFORMERS

2.1.0   To study the network theorems.

2.1.1   To state and explain Ohm's law, Kirchoff's laws.
2.1.2   To state Superposition theorem, Thevenin's theorem, Maximum power transfer theorem (Solve simple problems).

2.2.0   To know the operations and uses of transformers.

2.2.1   To explain the working principle of transformer.
2.2.2   To illustrate the construction of transformer.
2.2.3   To illustrate the elementary theory of an ideal transformer.
2.2.4   To state voltage transformation ratio and rating of a transformer.
2.2.5   To derive the emf equation of transformer.
2.2.6   To explain types of losses in transformer.
2.2.7   To identify the different types and applications transformers.

MODULE III DC GENERATORS AND D C MOTORS

3.1.0   To understand DC generators.

3.1.1   To explain the working principle of DC generator.
3.1.2   To compare output waveforms of a DC generator and a pure DC waveforms.
3.1.3   To list different types of DC generator.
3.1.4   To derive emf equation of a DC generator.
3.1.5   To explain the armature reaction and it's effects.
3.1.6   To explain the no load characteristics of a DC generator.

3.2.0   To understand DC motors.

3.2.1   To list the types of DC generators.
3.2.2   To explain the working principle of DC motor.
3.2.3   To illustrate the significance of back emf in DC motor.
3.2.4   To explain the necessity of starter in a DC motor.
3.2.5   To compare different types of DC motors with characteristics and speed.

MODULE IV   ALTERNATORS AND AC MOTORS.

4.1.0   To understand alternators.

4.1.1   To explain the working principle of an alternator.
4.1.2   To derive the emf equation of an alternator.
4.1.3   To explain synchronous speed and the determination of frequency (Solve simple problems).

4.1.4   To illustrate the open circuit characteristics of an alternator.

4.2.0   To understand AC motors.

4.2.1   To explain the working principle and classification of AC motors.
4.2.2   To explain the working principle of stepper motor and its applications.
4.2.3   To explain the working principle universal motor and its applications.
4.2.4   To explain the working principle servo motor and its applications.
4.2.5   To explain the working principle of single phase and three phase induction motor and their applications.

CONTENT DETAILS

MODULE   I AC FUNDAMENTALS & TRANSFORMERS

Concept of alternating voltage and current - complex waveforms - representation of alternating quantities - define the terms cycle, time period, frequency, amplitude, phase, rms value, form factor - AC through resistance, inductance, and capacitance (Solve simple problems) - power factor definition - calculation of power in an RLC circuit - series and parallel AC circuits (simple problems) - earthing of equipments and lightning protection of installation - megger

MODULE II NETWORK THEOREMS AND TRANSFORMERS

Ohm's law - Kirchoff's law- Superposition theorem - Thevenin's theorem - Maximum power transfer theorem (Solve simple problems) - working principle of transformer - construction of transformer - elementary theory of an ideal transformer - voltage transformation ratio and rating of a transformer - emf equation derivation - losses in transformer - types, applications of transformers.

MODULE III DC GENERATORS AND MOTORS

Working principle of DC generator - different types of DC generators - emf equation of a DC generator - armature reaction - no load characteristics - types of DC motors - working principle of DC motor - significance of back emf in DC motor - starters - necessity of starter in DC motor - 3 point starter - comparison of DC motors with characteristics and speed.

MODULE IV ALTERNATORS AND AC MOTORS

Alternators - working principle of an alternator- emf equation of an alternator - synchronous speed and frequency - the open circuit characteristics of an alternator - AC motors - working principle and classification of AC motors - working principle and applications of stepper motor, universal motor, servo motor - working principle and applications of single phase and three phase induction motor.

TEXT BOOKS.

1. Electrical Technology   (Vol 1 and 2) - B L Theraja.

2. Basic Electrical Engineering - D C Kulshreshtha.

REFERENCE BOOKS.

1. Electrical Machines - J B Gupta.

2. Objective Electrical Engineering - V K Metha.

3. Induction and Synchronous Machines - K Murugesh Kumar.

4. Basic Electrical Engineering - V N Mital, Aravind Mital.