

ELECTRICAL TECHNOLOGY

(Engineering Science Elective)

Course Code: 15EE1155

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Pre requisites:

Mathematics and Network Analysis-I.

Course Outcomes:

At the end of the course the student will be able to:

- CO 1** Describe the operation and constructional features of DC Machines and analyze its characteristics.
- CO 2** Describe the operation and constructional features of Transformer with phasor diagram.
- CO 3** Describe the operation and constructional features of Induction motor and stepper Motor.
- CO 4** Explain the operation of Synchronous Machines and Analyze the Synchronous Impedance method.
- CO 5** Explain the working principle and operation of various Measuring Instruments.

UNIT-I

(10 Lectures)

DC MACHINES

Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators. DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT-II**(10 Lectures)****TRANSFORMERS**

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 – Predetermination of efficiency and regulation (Simple Problems).

UNIT-III**(10 Lectures)****INDUCTION MOTORS**

3-Phase: Principle of operation of Three-phase Induction motors – Slip ring and Squirrel cage motors – Torque equation-Slip-Torque characteristics – Efficiency calculation – Starting methods. Single Phase: Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchronos, Stepper Motors – Characteristics.

UNIT-IV**(10 Lectures)****SYNCHRONOUS MACHINES**

Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Armature parameters- armature resistance-synchronous reactance-phasor diagram-unity power factor-lagging power factor –leading power factor- Predetermination of regulation by Synchronous Impedance Method – OC and SC tests-principle of operation of synchronous motors.

UNIT-V**(10 Lectures)****ELECTRICAL INSTRUMENTS**

Types of instruments (Indicating, integrating, Recording) - Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters) wattmeters and energy meters.

TEXT BOOKS:

1. M.S Naidu and S. Kamakshaiah, “*Introduction to Electrical Engineering*”, 4th Edition, Tata McGraw Hill Publication, 2011.

2. Vincent Del Toro, "*Electrical Engineering Fundamentals*", 5th Edition, PHI Publishers 2009.

REFERENCE BOOKS:

1. V.K Mehta "*Principles of Electrical Engineering*" 5th Edition, Scand Publications, 2005.
2. I.J. Nagrath and D.P Kothari "*Theory and Problems of Basic Electrical Engineering*" 4th Edition, PHI Publications, 2009.
3. David V. Kerns, JR. J. David Irwin, "*Essentials of Electrical and Computer Engineering*", 3rd Edition TMH Education Pvt. Ltd, 2008.