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, Synchros, 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.