ELEMENTS OF EE & ME

(Engineering Science Elective)

Course Code: 15EM1101

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Prerequisites:

Physics

Course Outcomes:

After completion of this subject, the students shall have knowledge about electrical circuits and equipments.

CO 1 Solve different topologies of networks.

CO 2 Analyze the performance characteristics of transformers on different loading conditions.

CO 3 Describe and analyze the constructional features of Induction machine, Synchronous machine with their characteristics.

CO 4 Identify various machine tools and welding operations.

CO 5 Differentiate various I.C. Engines and power transmissions drives.

UNIT-I: **(10 Lectures)**

FUNDAMENTALS OF ELECTRICAL ENGINEERING

Basic circuit elements - Resistance, Inductance and capacitance - Ohm's law, Kirchhoff's laws - Faraday's law of Electromagnetic Induction. AC fundamentals- Average and effective value-Series RL and RC circuits - Active power, Reactive power, Apparent power, Power Factor - Simple problems.

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

TRANSFORMERS

Single phase and Three phase transformers – Operation and construction, EMF equation, losses and efficiency - Simple Problems.

UNIT-III: (10 Lectures)

AC MACHINES

Construction and Principle of operation of three phase and single phase induction motors - Torque slip characteristics - Applications. Principle of operation of Alternators - Types of Alternators

UNIT-IV: (10 Lectures)

MACHINE TOOLS

General purpose machine tools – lathe, drilling machine, shaping machine, planing machine, milling machine.

WELDING

Principles of welding, fundamentals of arc welding and arc cutting, gas welding and gas cutting.

UNIT-V: (10 Lectures)

I.C.ENGINES

Introduction, classification of I.C. engines, I.C. engine-parts and terminology, four stroke cycle engines –petrol and diesel, two stroke cycle engines – petrol and diesel, comparison between four stroke and two stroke cycle engines, comparison between petrol engine and diesel engine.

POWER TRANSMISSION:

Types of drives – belt drives – flat and V belts, Rope and Chain drives.

TEXT BOOKS:

1. V.K.Mehta and Rohit Mehta, *"Principles of Electrical Engineering"*, S.Chand Publications, Jan-2008.
2. M.S Naidu and S.Kamakshaiah, *"Electrical Technology"*, TMH Publishers, 2006.
3. K.VenuGopal & V.PrabhuRaja, *"Basic Mechanical Engineering"*, 10th Edition, Anuradha Agencies, 2011. (UNIT IV and UNIT V).
4. R.K. Rajput, *"Basic Mechanical Engineering"*, 3rd Edition, University Science Press, 2012. (UNIT-IV).

REFERENCES:

1. I.J. Nagrath and D.P Kothari, *"Theory and Problems of Basic Electrical Engineering"*, PHI Publications.
2. David V. Kerns, JR. J. David Irwin, *"Essentials of Electrical and Computer Engineering"*.
3. Vincent Del Toro, *"Electrical Engineering Fundamentals"*, 2nd Edition, PHI Publishers.