

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, Kirchoff'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.