

**1/4 B.Tech. FIRST SEMESTER
INTRODUCTION TO ELECTRICAL ENGINEERING
(Only for EEE during I B.Tech., I Semester)**

EE1T6**Credits: 3****Lecture: 3 periods/week****Internal assessment: 30 marks****Tutorial: 1 period /week****Semester end examination: 70 marks****Course Objectives:**

- To impart the basic knowledge about the Electric and Magnetic circuits
- To inculcate the understanding about the electrical fundamentals
- To inculcate the understanding about the Relationship between thermal, mechanical and electrical units
- To know about various types of cells and methods of induced EMF, Construction and Characteristics

Course Outcomes:

At the end of the course the students will have:

1. Basic knowledge about the Electric and Magnetic circuits
2. Understanding about the Relationship between thermal, mechanical and electrical units
3. Understanding about various types of cells
4. Understanding about the principle of electrical machines

UNIT I**Fundamentals of Electricity**

Introduction – Electric current – Electric Potential difference – Concept of EMF and potential difference – Resistance – Factors upon which Resistance depends – Specific Resistance – Effect of Temperature on Resistance – Temperature coefficient of Resistance– Ohm’s law – Resistances in Series – Resistances in Parallel – Series parallel circuit – Kirchhoff’s laws – Illustration of Kirchhoff’s Laws – Numerical problems on series and parallel circuits & Kirchhoff’s laws

UNIT II**Work, Power and Energy**

Introduction –S.I Units for unit of power, work and energy – Mechanical work or energy – Electrical power & Electrical energy – Thermal energy – Units of power – Expression for power – Heating Effect of electric current –Relationship between thermal, mechanical and electrical units – Numerical problems.

UNIT III**Electrostatics**

Introduction – Coulomb’s Law – Absolute and relative permittivity - Electric field – electric flux – Electric Intensity or Field strength(E) – Electric Flux Density – Electric Potential – Electric Potential Difference –Potential Gradient. Capacitor – Capacitance – Dielectric constant – Parallel Plate Capacitor with uniform Medium – Capacitors in Series – Capacitors in Parallel – Energy stored in a capacitor

UNIT IV**Magnetic circuits**

Introduction – Magnetic field – Magnetic flux – Magnetic flux density – Magnetizing force – Absolute and relative permeability – Relation between B and H – B H curve - Magnetic

circuit – Comparison between magnetic and electric circuits — Magnetic Hysteresis – Importance of Hysteresis Loop-Faraday's Laws of Electromagnetic Induction – Lenz law – Dynamically induced EMF – Statically induced EMF – Self Inductance – Mutual Inductance - Coefficient of coupling – Inductances in Series – Inductances in parallel – Energy stored in a magnetic field.

UNIT V

Methods of induced EMF

- (a) Introduction to secondary cell – Lead acid cell – Construction of a Lead acid cell – Chemical changes during charging and discharging –Characteristics of a lead acid cell – construction of Nickel iron Cell – Construction and Characteristics of nickel cadmium cell-Lithium ion battery-construction and principle-ampere hour & watt hour efficiency of battery
- (b) Methods of production of dynamically induced EMF – DC machine principle – production of single phase AC supply - production of three phase supply – Advantages of AC over DC – Advantages of three phase over single phase AC

Learning Resources

Text Books:

1. Principles of Electrical Engineering by V.K Mehta, S.Chand Publications.
2. Elec., Technology by Edward Hughes

Reference Books:

1. Theory and Problems of Basic Electrical Engineering by D.P.Kothari & I.J. Nagrath PHI.
2. Basic Electrical Engineering by Fitzgerald and Higginbotham
3. Electrical Engineering fundamentals by Vincent Del Toro – PHI, New Delhi

Web Resources:

1. <http://nptel.ac.in/courses.php>
2. <http://jntuk-coeerd.in/>