

**SRI VENKATESWARA UNIVERSITY, TIRUPATI**  
**B.Sc., (Honours)-ELECTRONICS (MINOR)**  
**FIRST YEAR – II SEMESTER**  
(W.E.F. Academic Year 2023 - 24)  
**Course I: Fundamental of Electricity and Electronics**

Theory

Credits: 3

3 hrs/week

---

### Objectives

#### The students will learn:

- 1) Basics of electrostatics, Gauss theorem and its applications, concept of a capacitor, various types of capacitors and dielectric constant, magnetic effects of current, cells and the measuring instruments like ammeter and voltmeter,
- 2) Basics of p-n junction, rectifying action of a diode, regulated power supplies and wave shaping circuits, and
- 3) Transistor and its three modes of operation, h-parameter model of a transistor and the frequency response of an amplifier.

**UNIT-I: Electrostatics:** Electric charges - Coulomb's law - Electric field - Electric intensity and electric potential - Relation between electric potential and intensity - Electric intensity and potential due to a uniform charged conducting sphere at a point outside, on, and inside the conductor. Electric dipole - Dipole moment - Intensity and potential due to a dipole - Statement and proof of Gauss law - Application of Gauss law to uniformly charged solid sphere.

**UNIT-II: Capacitors:** Definition and unit of capacity - Capacitance of a parallel plate capacitor - Effect of dielectric on capacity - Capacitors in series and parallel – Types of Capacitors. Energy stored in a charged capacitors - Loss of energy on sharing of charges between two capacitors - Force of attraction between plates of charged parallel plate capacitor - Kelvin's attracted disc electrometer - Measurement of potential and dielectric constant.

**UNIT-III: Electrical Measurements:** Determination of specific resistance - Potentiometer - Calibration of low and high range voltmeters - Calibration of Low range ammeter.

Magnetic Effect of Current: Biot-Savart's law [ Force on a conductor carrying current placed in a magnetic field - Principle, construction and theory of a moving coil ballistic galvanometer - Measurement of figure of merit of B.G.

**UNIT-IV: Diode circuits and power Supplies:** Junction diode characteristics, Zener Diode - Characteristics - Half and full wave rectifiers - Expression for efficiency and ripple factor - Construction of low range power peak using diodes - Bridge rectifier - Filter circuits - Regulated power supply using Zener diode - Clipper and Clamper using diodes. Differentiator and integrator using resistor and capacitor.

**UNIT-V: Transistor circuits:** Characteristics of a transistor in CB, CE modes - Relative merits Graphical analysis in CE configuration - Transistor as an amplifier - RC coupled Single stage amplifier - Frequency response - Thevenin's and Norton's theorems - h parameters. Basis logic gates AND, OR, and NOT - Construction of basic logic gates using diodes and transistors.

#### Text Books

1. Electricity and Magnetism - *M. Narayamoorthi and Others*, National Publishing Co., Chennai.

2. Electricity and Magnetism - *R. Murugesan*, S. Chand & Co. Ltd., New Delhi, Revised Edition, 2006.
3. Principles of Electronics - *V.K. Mehta*, S. Chand & Co., 4/e, 2001.
4. Basic Electronics - *B.L. Theraja*, S. Chand & Co., 4/e, 2001.

#### **Reference Books**

1. Electricity and Magnetism - *Brijlal & Subrahmanyam*, Ratan Prakashan Mandir, Agra.
2. Fundamentals of Electricity and Magnetism - *B.D. Duggal & C.L. Chhabra*, Shoban Lal Nagin Chand & Co., Jallundur.
3. Physics, Vol. II - *Resnick, Halliday & Krane*, 5/e, John Wiley & Sons, Inc.,.
4. Basic Electronics - *B. Grob*, McGraw - hill, 6/e, NY, 1989.
5. Elements of Electronics - *Bagde & Singh*, S. Chand

### **SEMESTER-II**

#### **COURSE 3: FUNDAMENTALS OF ELECTRICITY AND ELECTRONICS**

<b>Practical</b>	<b>Credits: 1</b>	<b>2 hrs/week</b>
------------------	-------------------	-------------------

---

#### **List of Experiments:**

1. Determination of dielectric constant of dielectric material
2. Determination of specific resistance of a conductor using Carey Foster Bridge
3. Determination of low resistance using potentiometer
4. Conversion of Galvanometer into ammeter
5. Conversion of Galvanometer to Voltmeter
6. Junction Diode Characteristics
7. Zener Diode Characteristics
8. Transistor Characteristics
9. Verification of Basic Logic gates

Lab experiments are to be done on breadboard and simulation software (using multisim) and output values are to be compared and justified for variation.

\*\*\*@@@\*\*\*