

ANDHRA KESARI UNIVERSITY



MINOR

Subject: Electronics

w.e.f. AY 2023-24

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Fundamental of Electricity and Electronics	3	3
			Fundamental of Electricity and Electronics Practical Course	2	1

SEMESTER-II
COURSE 1: FUNDAMENTALS 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 - Energy stored in a charged capacitor - 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.

Type of capacitors - Mica capacitor, Electrolytic capacitors, Variable air capacitor - Uses of capacitors.

UNIT-III

Electrical Measurements: Carey-Foster bridge - Determination of specific resistance - Potentiometer - Calibration of low and high range voltmeters - Calibration of Low range ammeter.

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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. - Comparison of capacitors using B.G.

UNIT-IV

Diode circuits and power Supplies: Junction 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 - Zener Diode - Characteristics - 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.

Basic logic gates AND, OR, and NOT - Construction of basic logic gates using diodes and transistors.

Text Books

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

Electricity and Magnetism - *R. Murugesan*, S. Chand & Co. Ltd., New Delhi, Revised Edition, 2006.

Principles of Electronics - *V.K. Mehta*, S. Chand & Co., 4/e, 2001.

Basic Electronics - *B.L. Theraja*, S. Chand & Co., 4/e, 2001.

Reference Books

Electricity and Magnetism - *Brijlal & Subrahmanyam*, Ratan Prakashan Mandir, Agra.

Fundamentals of Electricity and Magnetism - *B.D. Duggal & C.L. Chhabra*, Shoban Lal Nagin Chand & Co., Jallundur.

Physics, Vol. II - *Resnick, Halliday & Krane*, 5/e, John Wiley & Sons, Inc.,

Basic Electronics - *B. Grob*, McGraw-Hill, 6/e, NY, 1989.

Elements of Electronics - *Bagde & Singh*, S. Chand

ANDHRA KESARI UNIVERSITY-ONGOLE, PRAKASAM DISTRICT
Minor Programme from the Year 2023-24 Onwards
Programme-B.Sc. Electronics -Question Paper model,
First Year-Semester-II
Course1 – **Fundamental of Electricity and Electronics**

Time: 3 Hours

Total Marks: 75

PART –A

Answer any Five of the following

5X10=50 Marks

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10

PART –B

Answer any Five of the following

5X5=25 Marks

- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.