

ST. JOSEPH'S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

V SEMESTER

PHYSICS

TIME:3Hrs/week

PH-E3-5403 (3)

APPLICATIONS OF ELECTRICITY & ELECTRONICS

Max.Marks:100

w.e.f. 20AH Batch

SYLLABUS

COURSE OBJECTIVES:

- ❖ *Identify various components present in Electricity & Electronics Laboratory.*
- ❖ *Acquire a critical knowledge of each component and its utility (like resistors, capacitors, inductors, power sources etc.).*
- ❖ *Demonstrate skills of constructing simple electronic circuits consisting of basic circuit elements.*

COURSE OUTCOMES:

- ❖ Understand the need & Functionality of various DC & AC Power sources.
- ❖ Comprehend the design, applications and practices of various electrical & Electronic devices and also their trouble shooting.

UNIT – I: INTRODUCTION TO PASSIVE ELEMENTS:

(10 hrs.)

Passive and Active elements-Examples, **Resistor** - Types of Resistors, Color coding - Applications of a Resistor as a heating element in heaters and as a fuse element. **Capacitor** - Types of Capacitors, Color coding, Energy stored in a capacitor, Applications of Capacitor in power supplies, motors (Fans) etc., **Inductor** -Types of Inductors, EMF induced in an Inductor, Applications of Inductor, and application of choke in a fan and in a radio tuning circuit, Series resonance circuit as a Radio tuning circuit.

UNIT – II: POWER SOURCES (BATTERIES):

(10 hrs.)

Types of power sources-DC & AC sources, Different types of batteries, Rechargeable batteries –Lead acid batteries, Ni-MH batteries, Li-ion batteries- Li-PO batteries, Series, Parallel & Series-Parallel configuration of batteries, Constant Voltage source- Constant Current Source-Applications of Current sources & Voltage sources, SMPS used in computers.

UNIT – III: ALTERNATING CURRENTS:

(10 hrs.)

A.C Power source-Generator, Construction and its working principle, Transformers- Construction and its working principle, Types of Transformers-Step-down and Step-up Transformers, Relation between primary turns and secondary turns of the transformer with emf., Use of a Transformer in a regulated Power supplies, Single phase motor – working principle, Applications of motors (like water pump, fan etc.).

UNIT – IV: POWER SUPPLIES (SKILL BASED):

(10 hrs.)

Working of a DC regulated power supply, Construction of a 5 volts regulated power supply, Design of a step-down (ex: 220-12V) and step-up (ex: 120-240V) transformers- Simple Design of FM Radio circuit using LCR series resonance (tuning) circuit, Checking the output voltage of a battery eliminator using a MultiMate.(Trouble shooting), Design of a simple 5 volts DC charger, Power supply for computers (SMPS).

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UNIT – V: APPLICATIONS OF ELECTROMAGNETIC INDUCTION:

(10 hrs.)

DC motor –Construction and operating principle, Calculation of power, voltage and current in a DC motor, Design of a simple Motor (for example Fan) with suitable turns of coil-DC generator-Construction, operating principle and EMF equation, Construction of a simple DC generator, Difference between DC and AC generators

REFERENCE BOOKS:

1. Grob's Basic Electronics by Mitchel Schultz, TMH or McGraw Hill
2. Electronic and Electrical Servicing by Ian Robertson Sinclair, John Dunton, Elsevier Publications
3. Troubleshooting Electronic Equipment by R.S.Khandapur , TMH
4. Web sources suggested by the teacher concerned and the college librarian including reading material.

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