UNIVERSITY OF MADRAS

B.Sc. DEGREE PROGRAMME IN COMPUTER SCIENCE

SYLLABUS WITH EFFECT FROM 2023-2024

Elective Course:Physics-II (Theory) Common for B.Sc.-SA, B.Sc.-CSc , B.Sc.-CSc-wAI	**125E2C**
Credits: 2	**Lecture Hours: 3 per week**

Learning Objectives:

- This paper introduces the student to the basic concepts of current electricity, electronics and digital electronics

Course Outcomes:

CO1: Acquire knowledge on elementary ideas of electricity and magnetism
CO2: Emphasize the significance of laws involved in electric circuits
CO3: Understand the basics of operational amplifier
CO4: Apply the principles of electronics in day to life
CO5: Apply the characteristics of electronic devices in practical.

Units	Contents
I	**Current Electricity** Ohm's law – Law of resistance in series and parallel – Specific resistance – capacitors – capacitors in serial and parallel – Kirchoff's laws – Wheatstone's network – condition for balance Carey-Foster's bridge – measurement of resistance – measurement of specific resistance – determination of temperature coefficient of resistance – Potentiometer – calibration of Voltmeter.
II	**Electromagnetism** Electromagnetic Induction – Faraday's laws – Lenz law – Self Inductance – Mutual Inductance – Experimental Determination-Coefficient of Coupling A.C. Circuits – Mean value – RMS value – Peak value – LCR in series circuit – impedance – resonant frequency – sharpness of resonance.
III	**Atomic and Nuclear Physics** Bohr's atom model – radius energy – Atomic excitation – Ionization potential – Frank and Hertz Method – Nucleus – Nuclear properties – Mass defect – Binding energy. Radio isotopes – Uses of radio isotopes – Nuclear fusion and Nuclear fission – X-rays – Production – properties –Derivation of Bragg's law – uses of X-raysin industrial and medical fields.
IV	**Analog Electronics** Semiconductor – PN junction diode – Bridge rectifier – Zener diode – Regulated power supply. Transistor – Working of a transistor – Transistor characteristics: CE Configuration – current gain relationship between □ and □ – Transistor Characteristics – CE Configuration only – CE amplifier – feedback – Hartley oscillator – Colpitt's oscillator

V	**Digital Electronics** Number system – Decimal – Binary – Octal and Hexadecimal system – Double Dabble method – Binary addition, subtraction and multiplication– conversion of binary number to octal and hexadecimal numbers and vice versa. Logic gates – OR, AND, NOT, XOR, NAND and NOR gates – truth tables – Half adder and Full adder circuits – Laws and theorems of Boolean's algebra – De Morgan's theorems.

Learning Resources:

Recommended Texts

1. Electricity and Magnetism – R. Murugesan, S. Chand & co, 2001.
2. Modern Physics – R. Murugesan, S. Chand & co, 1998.
3. Basic Electronics – B.L. Theraja, S. Chand & co, 2003.