

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		225E4C
Credits: 2	Lecture Hours: 3 per week	
Learning Objectives: <ul style="list-style-type: none"> • 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-rays in 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 β and β – Transistor Characteristics – CE Configuration only – CE amplifier – feedback – Hartley oscillator – Colpitt's oscillator	

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V	<p>Digital Electronics</p> <p>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.</p> <p>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.</p>
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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.