

Semester	IV
Course	Physics (Major)
Paper Code	C3PH230541P
Paper Title	OPTICS and DIGITAL Electronics Lab
No. of Credits	4
Theory / Practical / Composite	Practical
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	Group A <u>List of Experiments</u> 1. Measurement of angle of prism and determination of refractive index of the material of the given prism. 2. To draw the (μ-λ) curve of a prism and to verify Cauchy's dispersion relation. 3. To draw the calibration curves ($\sin\theta - \lambda$) of optical sources using a plane transmission grating. 4. To find the number of lines/cm of a plane transmission grating and hence to measure an unknown wavelength. To measure the separation between the $D_1 - D_2$ lines of sodium. 5. To study the diffraction and interference patterns of a double-slit. 6. To determine an unknown wavelength using a Fresnel's biprism. 7. To verify Fresnel's equations. 8. To determine wavelength of light using Newton's rings. 9. To calibrate a polarimeter and hence to determine the concentration of an unknown solution. Group B 1. To design OR, AND, NOT gates using diodes and transistors. 2. To verify and design AND, OR, NOT and XOR gates using NAND gates. 3. To design the following combinational circuits using NAND gates:

	a. 4:1 MUX b. Half adder c. 2:4 decoder 4. To build Flip-Flop (RS, Clocked RS, D and JK) circuits using NAND gates. 5. To build JK Master-slave flip-flop using Flip-Flop ICs. 6. To build a 4-bit ripple Counter using JK Flip-Flop ICs and study timing diagram. 7. To design an astable multivibrator of a given time period using 555 Timer.	
Learning Outcomes	Group A 1. Learning to handle the spectrometer through experiments 2. To validate a fundamental relation in EM Wave theory 3. To understand interference and diffraction phenomena 4. Understanding the phenomenon of optical polarization 5. Learning to handle the biprism through experiments Group B 1. Implementation of basic gate logic using discrete Components. 2. Familiarity with Digital I.C. through applications 3. Understanding combinational and sequential modes of operation by construction of digital circuits. 4. Construction of multivibrator based timing circuits.	
Reading/Reference Lists	Group A & B 1. Advanced Practical Physics, Vol 1 and 2 by B. Ghosh 2. Laboratory Manual of Physics, Vol 1 and 2, Madhusudan Jana, Books and Allied Pvt Ltd. 3. Experiments for Electronic Principles by A. Malvino, D. Bates, P.Hoppe, McGraw Hill	
Evaluation	CA 95, Attn. 5	
Paper Structure for Theory Semester Exam		