

Course: Skill Enhancement Paper - HPHSE3011T

Semester	III
Paper Number	HPHSE3011T
Paper Title	APPLIED OPTICS
No. of Credits	02 (Theory – 2)
Theory/ Composite	Theory
No. of periods assigned	Th: 2 periods/week
Name of Faculty member(s)	
Course description/ objective	This objectives of this course are 1) To teach students the principle behind optical modulators. 2) To acquaint students with the application of interferometers on inertial navigation. 3) To teach students the basic principles of holography. 4) To acquaint students with the basic principle of LCD displays. 5) To train students with modern methods of describing polarized light. 6) To give an overview of different types of interferometers.
Syllabus	As enclosed
Textss	As enclosed
Reading/ Reference List	As enclosed
Evaluation	Total – 100 CIA – 20 Five 10 marks questions out of eight questions Six 5 mark questions out of nine questions

Syllabus:

APPLIED OPTICS – Credits – 2

[26 lectures]

Stokes parameters: Definitions; Jones vectors, Mueller matrices: elementary examples **[6 lectures]**

Electro-optic and Magneto-optic effects: Faraday effect, Kerr Magneto-optic effect, Stark effect, Kerr electro-optic effect, Pockels electro-optic effect **[5 lectures]**

Interferometers and their applications: Fabry-Perot interferometer, Finesse, Resolving power, Mach-Zender interferometer, Rotating Sagnac interferometer and its application in inertial navigation (elementary idea only) **[7 lectures]**

Holography: Basic principle and theory, coherence, types of holograms, white light reflection holograms **[4 lectures]**

Liquid crystals: elementary idea about nematic liquid crystals, smectic liquid crystals, liquid crystal display **[4 lectures]**

Reference Books

1. Fundamentals of Optics, F.A. Jenkins & H.E. White, Tata McGraw Hill.
2. Optics, E. Hecht, Pearson.
3. Optics, A. Ghatak, Tata McGraw Hill.
4. Liquids, Crystals & Liquid Crystals, Physics Today, 1990.
5. Principles of Optics, Max Born & E. Wolf, Pergamon Press.
6. Optics, H. Lipson, H.G. Lipson & A. Lipson, Cambridge University Press.

Paper Structure

Total 100: Theory - 80

CIA : Theory – 20

End Semester Examination

Five 10 marks questions out of eight questions

Six 5 marks questions out of nine questions