

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. PHYSICS-SEMESTER – III
TYPE OF COURSE: MULTI DISCIPLINE SPECIFIC COURSE

PROGRAM CODE: SCIUG101 COURSE CODE: SC23MDCPHY303

COURSE NAME: THERMODYNAMICS & OPTICS

(Effective from June 2024 under NEP 2020)

Total Credit : 02	THEORY	External Marks : 25
Teaching Hours per Week : 02	MDC	Internal Marks : 25
Teaching Hours Per Semester : 30		

Course Objective:

- To understand the principles of Heat and Thermodynamics, Mathematical Theorems, Liquification of Gases.
- To develop knowledge about Maxwell's equation, Heat capacity, Thermal Expansivity and Compressibility
- To get sufficient knowledge of Polarization and learn basic concepts of Retarders.
- To develop sufficient knowledge about Fermat's principle and laws for it.

Course Outcome:

After the successful completion of the course students will be able to

- Understand the principles of Heat and Thermodynamics, Mathematical Theorems, Liquification of Gases.
- Developed knowledge about Maxwell's equation, Heat capacity, Thermal Expansivity and Compressibility
- Get sufficient knowledge of Polarization and learn basic concepts of Retarders.
- Develop sufficient knowledge about Fermat's principle and laws for it.

Syllabus

Unit-1	<p>Thermodynamics: Heat and Thermodynamics: Characteristic functions, Enthalpy(11.1), The Helmholtz and Gibb's function(11.2), Two Mathematical Theorems(11.3), Maxwell's equation(11.4), The T-dS equations(11.5), Internal Energy equation(11.6), Heat capacity equation, The Thermal Expansivity (11.9), Compressibility(11.10), Joule-Kelvin effect (Porous plug Experiment) (12.1) Liquification of Gases by Joule-Kelvin Effect (12.2) <i>(Related Examples, Problems, MCQ & Short Questions)</i></p> <p>Basic Reference: <i>Heat and Thermodynamics by Mark W. Zemansky (5th Edition)</i></p>	1	15
Unit-2	<p>OPTICS: Fermat's Principle : Fermat's principle (2.1), Fermat's principle of least time(2.2), law of reflection and law of refraction(2.3)</p> <p>Polarization: Introduction(20.1), Polarization by double refraction(20.5.5), Double refraction(20.8.3), Huygens' explanation of double refraction(20.9 & 20.9.1), Types of Polarized light(20.15), Retarders or Wave plate (Quarter wave plate) (20.17.1), (Half wave plate)(20.17.2), Production of Elliptically polarized light(20.18), Detection of Elliptically polarized light(20.18.1). <i>(Related Examples & Problem, MCQ, SQ)</i></p> <p>Basic Reference: <i>A text book of OPTICS by Dr. N.Subrahmanyam, Brijlal, Dr. M. N. Avadhanulu - S Chand</i></p>	1	15

: Further Reading – Other References :

- (1) Heat and Thermodynamics by Zeemansky
- (2) University Physics by Sears, Zeemankky and young (6th Edition Narosa Publishing)
- (3) Heat and Thermodynamics by Richard H. Dittmon & Mark W. Zemansky (TMH)
- (4) Heat and Thermodynamics by A.B. Gupta and H. P. Roy
- (5) Thermodynamics and Statistical Physics by Singhal -Agarwal-Prakash, Pragati Prakashan, Meerut.
- (6) Optics by Ajoy Ghatak Tata McGraw Hill Book Co. Ltd
- (7) Principles of Optics by B.K. Mathur
- (8) A Text book of light by D.N.Vasudev – Atmaram & sons, New Delhi .
- (9) Fundamentals of Optics by F A Jenkin and H E White Tata McGraw Hill Book Co. Ltd.
- (10) Optics by Ajoy Ghatak Tata McGraw Hill Book Co. Ltd
- (11) Principles of Optics by B.K. Mathur