Curriculum and Credit Framework
For

B.Sc. Semester III

As per UGC Guideline
(According to NATIONAL EDUCATION POLICY (NEP) – 2020)

New Syllabus PHYSICS

With effect from June 2024

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. PHYSICS-SEMESTER – III
TYPE OF COURSE: <u>MULTI</u> 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 develpoe knowledge about Maxwell's equation, Heat capacity, Thermal Exapansivity and Compressibility
- To get sufficient knowledge of Polarization and learns basic concepts of Retarders.
- To develop sufficient knowledge about Farmat'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.
- Develpoed knowledge about Maxwell's equation, Heat capacity, Thermal Exapansivity and Compressibility
- Get sufficient knowledge of Polarization and learns basic concepts of Retarders.
- Develope sufficient knowledge about Farmat's principle and laws for it.

Syllabus

Unit-1	**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 Exapansivity (11.9), Compressibility(11.10), Joule-Kelvin effect (Porous plug Experiment) (12.1) Liquification of Gases by Joule-Kelvin Effect (12.2) (*Related Examples, Problems, MCQ & Short Questions*) **Basic Reference:** *Heat and Thermodynamics by Mark W. Zeemansky (5th Edition)*	1	15
Unit-2	**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) **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). *(Related Examples & Problem, MCQ, SQ)* **Basic Reference:** *A text book of OPTICS by Dr. N.Subrahmanyam, Brijlal, Dr. M. N. Avadhanulu - S Chand*	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 Jenkine 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

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B. Sc. PHYSICS - SEMESTER – III (PRACTICAL COURSE)
PROGRAMME CODE: SCIUG101
(Effective from June 2024 Under NEP – 2020)

COURSE NAME: <u>MDC</u> (MULTIDISCIPLINARY COURSE PRACTICAL)
COURSE CODE: SC23PMDCPHY303   CREDIT: 2

TYPE OF COURSE	CREDIT	Marks	COURSE CODE
Multi Discipline Core Course (MDSCP)	2	25 CCE + 25 SEE =50	SC23PMDCPHY303
Teaching Hours Teaching Hours per Week: 04 Hours for 2 Credit practical (60 Hours per Semester)			

::LABORATORY EXPERIMENTS::

1. To Find out Viscosity co- efficient of liquid using co-axial viscometer.

2. To find out the value of e/k using power transistor (PNP →CK 100 or NPN→SL -100).

3. To Determine Self Inductance of inductor by Anderson Bridge.

4. To Find out The Wave Length of Light using Newton's Rings.

5. Stirling's formula (Numerical Interpolation).

6. Obtain the Characteristics of UJT and Determination of R_{BB}, V_d & η

7. Absorption Co-Efficient of Liquid using Photocell.

8. Obtain the Characteristics of PNP Common Base Transistor.

9. Construction of AND, OR, NOT Gates Using NAND & NOR Universal Gates.

10. Numerical Ana l   ysis (Minimum Class Method)