

**Curriculum and Credit Framework**  
**For**  
**SEM IV**  
**As per UGC Guideline**  
**(According to NATIONAL EDUCATION POLICY (NEP) – 2020)**

**New Syllabus PHYSICS**

**With effect from June 2024**

**B.Sc. Semesters IV Exit Option**

**Submitted on 21<sup>th</sup> MARCH 2024**

# HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

## B. Sc. PHYSICS - SEMESTER – IV

TYPE OF COURSE: MINOR DISCIPLINE SPECIFIC COURSE

PROGRAMME CODE: SCIUG101

COURSE CODE: SC23MIDSCPHY402

COURSE NAME: NUCLEAR PHYSICS AND PLASMA PHYSICS

(Effective from June 2024 Under NEP – 2020)

Total Credits: 02	THEORY	External Marks -25
Teaching Hours per Week: 02	MINOR	Internal Marks - 25
Teaching Hours per Semester: 30		

### Course Objective:

- To get comprehensive knowledge of radioactivity.
- To Understands various equilibrium.
- To understand the Plasma and its behaviour.
- To get knowledge of plasma diagnostics and space plasma.

### Course Outcome:

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

- Get comprehensive knowledge of radioactivity.
- Understands various equilibrium in radioactivity.
- Understand the Plasma and its behaviour.
- will. Get sufficient knowledge of plasma diagnostics and space plasma.

### Syllabus

Unit No.	Content	Credit	Lect. Hrs 30
Unit-1	<p><b>NUCLEAR PHYSICS - Radioactivity:</b>                      Introduction (2.1), Properties of Radioactive rays(2.2), The law of Radioactive Decay(2.3) Statistical Nature of Radioactivity(2.4), The Statistical Errors of Nuclear Physics(2.5), Radioactive growth and decay(2.6), Ideal equilibrium(2.7), Transient equilibrium and secular equilibrium(2.8) Radioactive series(2.9) Determination of the age of the Earth(2.12), Carbon Dating-Archaeological Time Scale(2.13) <i>(Related Examples, Problems, MCQ &amp; SQs)</i></p> <p><b>Basic reference:</b>  <i>Nuclear Physics by S. B. Patel (New age International (p) Ltd. Publishers)</i></p>	1	15
Unit 2	<p><b>PLASMA PHYSICS:</b>                      The Basic concepts of Plasma: Introduction (1.1), Composition and Characteristics of a Plasma (1.2), Collisions (1.3), Elastic collisions (1.3.1), Inelastic collisions (1.3.2), Surface Phenomena (1.4), Transport Phenomena (1.5), Diffusion and Mobility(1.6), Viscosity, Conductivity(1.7), Recombination(1.8), Ohm's law (1.9), Gas Discharge (1.10), Composition of various natural and Man-made Plasma (1.11), Plasma Diagnostics (1.12), Plasma waves and Instabilities Confinement of Plasma (1.13), Space Plasma (1.14). <i>(Related Examples, Problems, MCQ &amp; SQs)</i></p> <p><b>Basic Reference:</b>  <i>Elements of Plasma physics by S.N. Goswami New Central book Agency (p) Ltd., Calcutta.</i></p>	1	15

# HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

## B. Sc. PHYSICS - SEMESTER – IV (PRACTICAL COURSE)

PROGRAMME CODE: SCIUG101  
(Effective from June 2024 Under NEP – 2020)

### LABORATORY EXPERIMENTS: MINOR COURSE 2 Credit

COURSE CODE: SC23PMIDSCPHY402

TYPE OF COURSE	CREDIT	Marks	COURSE CODE
Minor Discipline Core Course Practical (MIDSCP)	2	25 CCE + 25 SEE = 50	SC23PMIDSCPHY402
<b>Teaching Hours</b> Teaching Hours per Week: 04 Hours for 2 Credit practical (60 Hours per Semester)			

### LABORATORY EXPERIMENT :: MINORCOURSE

1. To determine wavelength of bright lines of Mercury light using Grating.
2. To Find out of Resolving Power of Telescope.
3. Study of X –ray diffraction using Powder pattern.
4. To study elliptically polarized light using Photocell and quarter wave plate.
5. To find out Activation energy of a Semiconductor. .
6. To Determine Low Value of ‘C’ using Schering Bridge.
7. Study of Characteristics of a Photodiode and Draw the Graph of  $I_D \rightarrow V_D$ .
8. Comparison of Capacity (C1/C2) by De-Sauty Method
9. Low Resistance by Method of Projection.
10. Lagrange’s forward Formula and Backward Formula (Interpolation)