SECOND-YEAR OF BACHELOR OF SCIENCE Physics (MAJOR AND MINOR) REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: **Physics-I**

SEMESTER-III

W.E.F. 2024-2025

RECOMMENDED BY THE BOARD OF STUDIES IN PHYSICS
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No:

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Bachelor of Science
Name of the Department	:	Physics
Name of the Class	:	Second Year
Semester	:	Third
No. of Credits	:	02
Title of the Course	:	Physics-I
Course Code	:	S201PHT
Name of the Vertical in adherence to NEP 2020	:	Major and Minor
Eligibility for Admission	:	Any student admitted to Second Year of B.Sc. Degree Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative and Summative
Level	:	UG
Pattern of Marks Distribution for SEE and CIA	:	40:60
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2024-2025
Ordinances /Regulations (if any)		

Syllabus for Second Year of Bachelor of Science in Physics

(With effect from the academic year 2024-2025)

SEMESTER-III **Paper No.– 1**

Course Title: Physics-I **No. of Credits - 02**

Type of Vertical: Major and Minor **COURSE CODE: S201PHT**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Apply the techniques of derivatives and integration.
CLO-02	Understand	Apply the techniques of solving 1st order DEs
CLO-03	Apply	Describe the various types of polarization and how to identify them
CLO-04	Analyze	Describe the conversion of heat into work, second law of thermodynamics and working of petrol / diesel engines
CLO-05	Evaluate	Identify different types of nuclear reactions and differentiate between nuclear fission and fusion

Syllabus for Second Year of Bachelor of Science in Physics

(With effect from the academic year 2024-2025)

SEMESTER-III **Paper No.– 1**

Course Title: Physics-I **No. of Credits - 02**

Type of Vertical: Major and Minor **COURSE CODE: S201PHT**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Hours**
I	**Vector Calculus** The ∇ operator, Definitions and physical significance of Gradient, Divergence and Curl, Problems based on Gradient, Divergence and Curl. **DG:1.2.1 to 1.2.5** **Differential equations** Introduction, order and degree, Ordinary differential equations, First order homogeneous and non −homogeneous equations with variable coefficients, Exact differentials, General first order Linear Differential Equation **CH: 5.1, 5.2, 5.2.1 –A, B, C (Theory)** **Nuclear Reactions** Types of Reactions and Conservation Laws. Concept of Compound and Direct Reaction, Q value equation and solution of the Q equation, problems. Fusion and fission definitions and qualitative discussion with examples. **SBP: 3.1 to 3.5**	**01**	**15**
II	**Polarization** Concept and types of polarization, Polarization by reflection and Brewster's law, Wire Grid Polarizer, Polarization by scattering, Polarization by selective Absorption, Polarization by double refraction, Polarizer and Analyzer, Malus 'Law, Anisotropic crystal, Optic Axis, Retarders (without derivation), Quarter wave plate, Half wave plate, Production of linearly polarized light, Production of elliptically /circularly polarized light (Concept only), Analysis and applications of polarized light. **BSA: 20.1, 20.3, 20.5.1, 20.5.1.1, 20.5.3 to 20.5.5, 20.6, 20.6.3, 20.7, 20.17, 20.17.1, 20.17.2, 20.18 to 20.20** **Thermodynamics** Conversion of heat into work, heat engine, Carnot's cycle: its efficiency. Second law of thermodynamics, Statements, Equivalence of Kelvin and Plank statement, Carnot's theorem, Reversible and irreversible process, Absolute scale of temperature. Otto engine, Efficiency of Otto cycle, Diesel cycle, Efficiency of Diesel cycle, Otto and diesel comparison. **BSH:4.1, 4.3, 4.4, 4.10.2, 4.10.4, 4.12, 4.20 to 4.24, 4.28 to 4.33**	**01**	**15**
	Total	**02**	**30**

Access to the Course

The course is available for all the students admitted for Second Year Bachelor of Science.

Methods of Assessment

The assessment pattern would be 40:60, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

References:

1. **DG:** Introduction to Electrodynamics, David J. Griffiths (3rd Ed) Prentice Hall of India.
2. **CH**: Charlie Harper, Introduction to Mathematical Physics , 2009（EEE） PHI Learning Pvt. Ltd.
3. **MS**: Murray R Spiegel, Schaum's outline of Theory and problems of Vector Analysis, Asian Student Edition.
4. **SBP**: Dr. S. B. Patel, Nuclear Physics Reprint 2009, New Age International
5. **BSA**: A Text Book Of Optics By: Brijlal, Dr.N.Subrahmanyam, Dr M.N. Avadhaanulu（S.Chand, 25th Revised edition2012 Reprint 2013）.
6. **BSH**: Heat thermodynamics and Statistical Physics, Brijlal, N.Subramanyam, P. S. Hemne, S. Chand, edition 2007.
7. Thermal Physics, AB Gupta and H. Roy, Book and Allied（P） Ltd, R