FIRST-YEAR OF BACHELOR OF SCIENCE MAJOR PHYSICS REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE-VECTOR ALGEBRA, MECHANICS, THERMODYNAMICS & OPTICS
SEMESTER-II
W.E.F. 2023-2024

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.Sangmeshwar, Dist. Ratnagiri-415804, Maharashtra, India

Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce and Vid. Dadasaheb Pitre Science College, Devrukh (An Autonomous College Affiliated with University of Mumbai)

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Academic Council Item No: **03 dated 8 July 2023**

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangmeshwar, 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	:	First Year
Semester	:	Second
Paper	:	I
No. of Credits	:	02
Title of the Course	:	Vector algebra, mechanics, thermodynamics & optics
Course Code	:	S106PHT
Name of the Vertical in adherence to NEP 2020	:	Major and Minor
Eligibility for Admission	:	Any 12th Pass seeking Admission to 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	:	60:40
Status	:	NEP-CBCS
Implemented from Academic Year	:	2023-2024
Ordinances /Regulations (if any)		

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Syllabus for First Year of Bachelor of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER-II   **Paper No.– Physics Paper – I**

Course Title: Vector Algebra, Mechanics,   **No. of Credits - 02**

Thermodynamics & Optics

Type of Vertical: Major and Minor   **COURSE CODE: S106PHT**

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	Recall the knowledge of calculus, vectors, vector calculus.
CLO-02	Understand	Understand the principles of elasticity through the study of Young Modulus, Bulk Modulus and modulus of rigidity.
CLO-03	Understand	Understand the real gas equations, Van der Waal equation of state, methods of cooling.
CLO-04	Understand	Understand the spontaneous/stimulated emission of radiation, pumping, population inversion. Various types of LASERs and their applications.
CLO-05	Understand	Describe the concepts of total internal reflection, light propagation through fiber, use of fiber optics in various fields
CLO-06	Apply	Solve numerical problems related to the course content.

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Syllabus for First Year of Bachelor of Science in Physics

(With effect from the academic year 2023-2024)

SEMESTER-II   **Paper No.– Physics Paper – I**

Course Title: Vector Algebra, Mechanics,   **No. of Credits - 02**

            Thermodynamics & Optics

Type of Vertical: Major and Minor   **COURSE CODE: S106PHT**

	COURSE CONTENT		
Module	**Content**	**Credits**	**No. of Lectures**
1	1. Scalars, Vectors, Vector algebra, Magnitude, Rectangular unit vectors, resolution / components of a vector, Unit vector, Problems based on Vector algebra. 2. Scalar, Vector, scalar triple and vector triple products and their properties, Projection of a vector onto another vector, concept of torque, work done, Problems and applications based on Scalar, Vector and Triple products. 3. Elasticity: Review of Elastic constants Y, K, η and σ; Equivalence of shear strain to compression and extension strains. Relations between elastic constants, Couple for twist in cylinder	**01**	**15**
2	1. Behaviour of real gases and real gas equation, Van der Waal equation, Andrew's experiment and isotherm, Relation between critical constants, kinetic theory of gases. 2. LASER: Introduction, transition between Atomic energy states (without derivation), Population Inversion, Pumping, Principle of Laser, Properties of Laser, Applications of Laser 3. Fibre Optics: Total Internal Reflection, Fibre construction, Light propagation through fibres, numerical aperture. Applications of optical fibres.	**01**	**15**
	Total	**02**	**30**

References

Unit-I
1. MS:Murray R Spiegel, Schaum's outline of Theory and problems of Vector Analysis, Asian Student Edition.
2. CH**:** Charlie Harper, Introduction to Mathematical Physics , 2009 (EEE) PHI Learning Pvt. Ltd.
3. H. C. Verma, Concepts of Physics – (Part–I), 2002 Ed. Bharati Bhavan Publishers.

Unit-II
1. Brijlal,Subramanyam and Avadhanulu A Textbook of Optics, 25th revised ed.(2012) S. Chand
2. D S Mathur, Element of Properties of Matter, S Chand & Co.

Access to the Course
      The course is available for all the students admitted for Bachelor of Science.

Methods of Assessment
      The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as

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recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

Pattern of Evaluation

The Examination/Evaluation pattern shall be framed by the Board of Examination with its final approval from the Academic Council of the College.

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