Gyanmanjari Innovative University

Course Syllabus
Gyanmanjari Science College
Semester-1(B.Sc)

Subject: Physics – BSCPH11307

Type of course: Core Course

Prerequisite: Basic knowledge of vector and scalar quantity, waves, light, and properties of materials

Rationale: This course has been designed to make the students know about basic principles of Physics. The students learn history of physics, provides a foundation for understanding the world around us and developing critical thinking skills. It helps students develop problem-solving abilities and prepares them for careers in science. technology, engineering, and math (STEM).

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				SEE		CCE			
CI	T	P	C	Theory	Practical	MSE	LWA/V	ALA	
3	0	2	4	75	25	30	20	50	200

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voice; CCE-Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.

3 Credits * 25 Marks = 75 Marks (each credit carries 25 Marks) Theory
1 Credits * 25 Marks = 25 Marks (each credit carries 25 Marks) Practical
SEE 100 Marks will be converted in to 50 Marks
CCE 100 Marks will be converted in to 50 Marks
It is compulsory to pass in each individual component.

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Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Report writing** On current Physics affairs in 150 words (as per format) and upload Moodle.	10
2	**Assignment work** Student have to submit chapter wise assignment, questions for assignment will be given by faculty and upload Moodle.	10
3	**Quiz** Faculty will conduct a quiz per unit on Moodle (10 MCQ per Quiz).	10
4	**Analysis** Faculty will assign scientific pictures and students will analyze and prepare a report in 100 words and upload it to Moodle.	10
5	**Attendance**	10
Total		50

Course Content:

Unit No	Course content	Hrs.	% Weightage
1	**Chapter:1 Vector Algebra and Classical Mechanics** Addition of vectors, Equality of vectors, Unit vector, Products of two vectors, Resolution of a vector, Definition of a vector in terms of its components, Vector Algebra in terms of the components, Surface area as a vector, Distribution law for vector product, Dyadic or tensor of rank two, Scalar triple product, Reciprocal vectors, Vector triple product, Rotational quantities as vectors, Rotation of coordinate axes, Questions, Problems. **Chapter: 2 Differentiation of Vector** Formulae of Differentiation of Vector, Gradient of a Scalar field, Divergence of a Vector field, Curl of a Vector field	16	25

2	**Chapter: 3 Elasticity** Elasticity, Stress and Strain, Hooke's law, Relation between Longitudinal Stress and Strain (stress-strain diagram), Modulus of Elasticity, Poission's Ratio, Determination of Young modulus by Searles method.	16	25
3	**Chapter: 4 Wave and Oscillation** Simple Harmonic Motion, Equation for SHM and its Solutions, Terms associated with SHM like (Time Period, Frequency, Amplitude, and Phase), SHM as a Projection of Circular Motion, Energy conservation in simple harmonic motion, Kinetic and Potential Energy, Damped Oscillations, Forced Oscillation and Resonance. Numerical Examples.	16	25
4	**Chapter: 5 Optics** Condition of interference, Interference by thin film, Interference due to transmitted light, Interference by variable thickness (wedge-shaped) film, Types of interference: Wavefront division and Amplitude division, Wavefront division :Fresnel Bi-prism, Amplitude division: Newton's ring, Fresnel's Assumptions, Fresnel Half Period Zones and Rectilinear propagation of light, Positive and Negative Zone plate, Fraunhoffer diffraction at a single slit, Intensity distribution in diffraction pattern of a single slit in Fraunhoffer diffraction, Examples	17	25

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks **(Revised Bloom's Taxonomy)**						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20 %	30%	30%	-	20%	-

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course, the students should be able to:	
CO1	Develop mathematical models to describe physical phenomena related to classical mechanics.
CO2	Understand and solve problems based on the mathematical method of physics.
CO3	Understand and solve problems using the concept of ELASTICITY.
CO4	Understand the concept of simple harmonic motion and solve problems based on it.
CO5	Understand the different phenomena of optics and solve problems based on them.

List of Practical

Sr. No	Descriptions	Unit No	Hrs
1	To determine Young's modulus of a given wire.	2	2
2	To determine the unknown frequency of Tuning Fork by Melde's Experiment	3	3
3	To determine moment of inertia of body with different shapes using bi-filler suspension.	1	4
4	Calibration of spectrometer with help of prism spectra.	4	3
5	To determine wavelength of sodium light using Newton' string.	4	4
6	To determine refractive index of liquid by using liquid lens method.	4	3
7	To determine 'g' by bar pendulum.	3	2
8	To determine the Moment of Inertia & Modulus of rigidity by Torsional pendulum.	2	3
9	To determine the Poisson's ratio of rubber tube.	2	3
10	To Study Dispersive curve, and to determine the dispersive power of the material of a prism for different colors.	4	3
		Total	30

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Mathematical physics by H. K. Das & Dr. Rama Verma
[2] Introduction od classical mechanics by R. G. Takwale & P. S. Puranik
[3] A text book of optics by Dr. N. Subrahmanyam & Brij Lal
[4] Properties of matter by D. S. Mathur
[5] Classical Mechanics & Properties of Matter by A.B.Gupta
[6] Fundamentals of OPTICS by Jenkins and White Publisher: McGraw-Hill
[7] Principle of OPTICS by B.K.Mathur Publisher: Gopal Printing
[8] Concept of physics By H C Verma part 1 Publisher:Bharati Bhawan
[9] Sears and Zemansky's University Physics with modern physics By H D Young Publisher: PEARSON