Name of Faculty	:	Faculty of Science
Name of Program	:	Bachelor of Science
Course Code	:	1BSB04
Course Title	:	Physics - I
Type of Course	:	Basic Science
Year of Introduction	:	2023-24

Prerequisite	:	To have basic knowledge of Physics
Course Objective	:	In physics students learn about vectors, velocity and acceleration. Also learn about waves like travelling, sound, Doppler, ultrasonic by different type of methods. Student also learns on optical activity by optical fiber and how to work leaser by x-rays or other activity.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Analysis of operate leaser.
	CO2	Application and evaluate of velocity and acceleration Application of Leaser.
	CO3	Remember about Waves
	CO4	Application of Travelling waves, Sound Waves, Doppler Waves, Ultrasonic Waves
	CO5	Understand about Optical and Gravitation and how to work satellites.
	CO6	Understand about Newton's Gravitation law and Kepler's Laws of Planetary Motion

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**SEE**	**CIA**	**SEE**	**CIA**	
3	0	2	4	50	25	50	25	150

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P**– Practical, **C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping With COs
1	**Vector Algebra** - Introduction - Product of Two Vectors, - Triple Scalar Product, - Triple Vector Product, - Differentiation of Vectors,	11	24.44%	CO1 CO2

	- Differentiation with respect to time, Velocity &Acceleration - Integration of Vectors, - Partial Differentiation, - Gradient, - Divergence of a Vector, - Curl of a Vector, - Multiple Operations involving ∇, - Gauss' Theorem - Stokes' theorem			
2	**Waves** **1. Travelling waves** -Speed of propagation of waves in a stretched string -longitudinal waves in a bar -plane waves in fluid -Transmission of energy by a travelling wave **2. Sound waves** - Introduction -Intensity and Intensity level -Loudness and Pitch -Radiation from a piston -Diffraction -Radiation efficiency of a sound source **3. Doppler effect** -Definition -Stationary source, Observer in motion -The source is in motion, Observer is stationary - limitations of Doppler principle -Verification of Doppler's principle **4. Ultrasonic** -Magnetostriction method - Piezoelectric oscillator -Piezoelectric detectors -Measurement of velocity of ultrasonic waves -Diffraction effect and it's application to determine the velocity of ultrasonic waves -The Ultrasonic waves & it's Uses	11	24.44%	CO3 CO4
3	**Optics & Gravitation** **1. Fermat's principle and its applications**: Fermat's principle of least time, laws at Reflection, laws of refraction. **2. Interference in thin films**: Thin film, Plane parallel film, Interference due to transmitted light, Heidegger fringes, variable thickness (wedge-shaped) film, Newton's ring. **Gravitation**	11	24.44%	CO5 CO6

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	- Newton's Law of Gravitation - Gravitational Field - Gravitational Potential - Escape Velocity - Kepler's Laws of Planetary Motion (all three) - Proof of Kepler's Laws (all three) - Satellites - Time Period of satellite - State of weightlessness - Gravity - Determination of 'g' by Bar Pendulum.			
4	**Introduction to LASER** **1: Fundamentals of LASERS** - Introduction - Attenuation of light in an optical medium - Thermal equilibrium - Interaction of light with matter - Absorption - Spontaneous emission - Stimulated emission - Einstein co-efficient and their relations - Einstein co-efficient - Einstein Relations - Meeting the three requirements - Population inversion - Mata-stable states - Confining Radiation within the medium - Components of LASER - Active medium - Pumping - Optical resonant cavity **2: Production and Applications** - Lasing action - Principal pumping schemes - Three - level pumping scheme - Four - level pumping scheme - Types of LASERS - Ruby LASER - Helium –Neon LASER - LASER beam characteristics - Application	12	26.68%	CO1 CO2

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	**14.28**	**28.58**	**28.58**	**14.28**	**14.28**	**-**

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

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Melde's Experiment. To prove P/L constant.	02
2	Melde's Experiment. To prove T/L 2 constant	02
3	Moment of Inertia of Fly wheel	02
4	Cauchy's Constant To determine Cauchy's	02
5	constant A and B graphically	02
6	find the wavelength of unknown line of a mercury spectrum.	02
7	'g' by Bar pendulum To obtain the value of 'g' by bar pendulum.	02
8	Resonator To test the accuracy of relation n 2 (V + Kv) = constant	02
9	To Determine Wave length of LASER light	02
10	Diagonalization of given matrix (2x2).	02
11	Evaluate trace of a matrix	02
12	Value of capacitance for given two capacitors determines the value of capacitance for each of them. by connecting them in series.	02
13	Value of inductance for given two inductors determine the value of inductance for each of them by connecting them in series	02
14	Study of Transformer To determine turn ratio	02
15	Study of Transformer To determine percentage efficiency	02
16	Study of Transformer To determine energy loss due to copper, for a given transformer.	02
17	Decay Constant To verify the exponential law for the decay of a charged capacitor and determine the decay constant of the capacitor.	02
18	Value of inductance for given two inductors determines the value of inductance for each of them by connecting them parallel.	02
19	Series Resonance: To determine the frequency of a.c. emf by series resonance circuit varying capacitor.	02
20	Parallel Resonance: To determine the frequency of a.c. emf by series resonance circuit by varying capacitor.	02
21	How to use MultiMate Measuring Resistance R, AC & DC Voltage and Current, checking electrical fuse.	02
22	Value of capacitance for given two capacitors, determine the value of capacitance for each of them by connecting them parallel.	02

Major Equipment/Instruments and Software required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Capacitors,
2	Resistance
3	Multimeter

Suggested Learning Websites

Sr. No.	Name of Website
1	http://nptel.ac.in/courses/115102124
2	http://nptel.ac.in/courses/115101132

Reference Books

Sr. No.	Name of Reference Books
1	Mathematical Methods in Physical Sciences by M. L. Boas Chapter 6 (John Wiley & Sons)
2	Mechanics by H S Hans & S P Puri. (Tata McGraw Hill Education Private Limited
3	Principles of Physics by Halliday, Resnick, Jearl Walker (9th Addition) Wiley India Pvt. Ltd.
4	University Physics by Hugh D. Young, Roger A. Freedman, A. Lewis Ford (Pearson)
5	Mechanics and Electrodynamics by Brijlal, N. Subramanyam, Jeevan Seshan (S.Chand)
6	Physics Galaxy (Vol. I to IV) by Ashish Arora. (G. K. Publications)
7	Fiber optics and optoelectronics by R.P.Khare,Oxford university press
8	An introduction to LASERS – Theory and Applications by M. N.Avadhanulu, S.Chand& Company Ltd.
9	Optics– Ajay Ghatak, TMH Edition
10	Introduction to Classical Mechanics by R. G. Takwalw and P. S. Puranik (Tata McGrawHill Pub. Com. Ltd.)
11	A text book on Oscillations, Waves and Acoustics By - M.GHOSH, D. BHATTACHARYA By PUB - S. CHAND
12	A text book of Optics by N. Subrahmanyam, Brijlal and M. N. Avadhnulu, S. Chand Publication
13	Mechanics, Wavemotion & Heat By - Francis Wetson Sears Pub.- Addison Wesley pub.