Semester Lecture Plan

Name of the college: Government College of Arts, Science & Commerce, Sanquelim-Goa

Name of Faculty: Aga D. A.	**Subject:** Physics (THEORY) and (PRACTICALS)	
Paper code:PHY- 200 Properties of Matter & Sound	**Program/Course: S.Y. B.Sc.**	**Division: A**
Academic year: 2024 – 2025	**Semester: III**	**Total Lectures: 45 Lectures and Practicals**

Course Objectives: This course aims to provide the students with a foundation in basic knowledge of Properties of Matter & Sound

Course Learning Outcome: The student after undergoing this course will be able to: 1. Describe and explain the elastic behavior of solids,Relation between stress ,strain, Young's Modulus , Bulk Modulus (K), Modulus of rigidity and Poisson's ratio. 2) Explain parameters involved in Fluid Flow 3) ELUCIDATE Simple Harmonic Motion and its applications.4)Discuss different types of waves in terms of its velocity and energy. 5) Illustrate about the velocity of sound waves in fluids and air.

Month	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
JUNE & JULY	28/06/2024	06/07/2024	03	Hook's law, Stress Strain diagram, Elastic behaviours of solids in general (Elastic after effect, Elastic hysteresis, Elastic	**The student will be able to: 1. Describe and explain Hook's law, Stress Strain diagram, Elastic**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons

				fatigue),	**behaviours of solids in general (Elastic after effect, Elastic hysteresis, Elastic fatigue),**		
JULY	08/07/2024	13/07/2024	03	Working stress factor of safety, factors affecting elasticity (effect of hammering, rolling and annealing, effect of impurities, effect of change of temperature) Moduli of Elasticity,	**The student will be able to: . Describe and explain** working stress **factor of safety, factors affecting elasticity (effect of hammering, rolling and annealing, effect of impurities, effect of change of temperature) Moduli of Elasticity,**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons
JULY	15/07/2024	20/07/2024	03	, Equivalence of shear to compression and extension at right angles, Deformation of cube (Bulk modulus),	**The student will be able to: 1) Describe and explain , Equivalence of shear to compression and extension at right angles, Deformation of**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons

					cube (Bulk modulus),		
			02	**PRACTICAL**	**Velocity of sound in air using Helmholtz resonator**		
JULY	22/07/2024	27/07/2024	03	modulus of rigidity, Young's modulus) Relation connecting elastic constants, Poisson's ratio and its relation with bulk modulus and modulus of rigidity	**The student will be able to: 1. Describe and explain modulus of rigidity, Young's modulus) Relation connecting elastic constants, Poisson's ratio and its relation with bulk modulus and modulus of rigidity**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons
			02	**PRACTICAL**	**Modulus of rigidity by torsional pendulum .**		
JULY & August	29/07/2024	03/08/2024	03	limiting values of Poisson's ratio.	**The student will be able to:**	White board and marker	D. S. Mathur, Elements of

				Twisting couple on a cylinder, Beams, Bending of beams, flexural rigidity. Cantilever (rectangular bar), depression in a beam supported at ends and loaded in the middle.	**1. Describe and explain limiting values of Poisson's ratio. Twisting couple on a cylinder, Beams, Bending of beams, flexural rigidity. Cantilever (rectangular bar), depression in a beam supported at ends and loaded in the middle.**		Properties of Matter, S. Chand and Sons
			02	**PRACTICAL**	**REVISION**		
August	05/08/2024	10/08/2024	03	Fluid Flow Streamline flow, turbulent flow, Equation of continuity of flow, energy of a liquid in flow, Bernoulli's theorem, Bernoulli's equation	**The student will be able to: . Describe and explain Fluid Flow Streamline flow, turbulent flow, Equation of continuity of flow, energy of a liquid in flow, Bernoulli's theorem, Bernoulli's**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons . R K Bansal, Fluid Mechanics, Firewall Media, (2005).

					equation		
			02	**PRACTICAL**	**Determination of Y using Flat spiral spring.**		
AUGUST	12/08/2024	17/08/2024	03	applications of Bernoulli's theorem: Torricelli's theorem and Venturimeter, Viscosity, coefficient of viscosity, Critical velocity,	**The student will be able to: Explin Torricelli's theorem and Venturimeter, Viscosity, coefficient of viscosity, Critical velocity,**	White board and marker	R K Bansal, Fluid Mechanics, Firewall Media, (2005).
			02	**PRACTICAL**	**Determination of η using Flat spiral spring.**		
AUGUST	19/08/2024	24/08/2024	03	Reynold's number and its significance, Poiseuille's equation for flow of a liquid through a horizontal tube and its corrections	**The student will be able to: Explain Reynold's number and its significance, Poiseuille's equation for flow of a liquid through a horizontal tube and its corrections**	White board and marker	1. Malvino and Leach, Digital Principles and Applications, TMH (1986). 2. R. P. Jain, Modern Digital Electronics, TMH (2003).
			02	**PRACTICAL**	**REVISION**		
AUGUST	26/08/2024	31/08/2024	03	fluid flow, Stokes law, Ostwald viscometer, viscosity of gases:	**The student will be able to: Explain fluid flow, Stokes**	White board and marker	R K Bansal, Fluid Mechanics, Firewall Media, (2005).

				Mayer's formula	**law, Ostwald viscometer, viscosity of gases: Mayer's formula,**		
			02	**PRACTICAL**	**Bending of beams-double cantilever: determination of Young's modulus.**		
September	02/09/2024	05/09/2024	03	Sound: Simple Harmonic Motion Simple harmonic motion, differential equation for simple harmonic motion and its solution,	**The student will be able to: Explain Sound: Simple Harmonic Motion Simple harmonic motion, differential equation for simple harmonic motion and its solution,**	White board and marker	D. R. Khanna and R. S. Bedi, Text book of Sound Atma Ram, New Delhi, 1969
			02	**PRACTICAL**	**Superposition of two mutually perpendicular simple harmonic oscillations - Lissajous figures using CRO**		1.
September	13/09/2024	21/09/2024	03		**The student**	White board	D. R. Khanna and

				relation of velocity and acceleration to displacement, superposition of SHM in a straight line: Two SH vibrations of equal periods but different amplitudes, any number of SH vibrations of same period but different amplitudes	**will be able to: Explain relation of velocity and acceleration to displacement, superposition of SHM in a straight line: Two SH vibrations of equal periods but different amplitudes, any number of SH vibrations of same period but different amplitudes,**	and marker	R. S. Bedi, Text book of Sound Atma Ram, New Delhi, 1969
			02	**PRACTICAL**	**Revision**		
September	22/09/2024	28/09/2024	03	Lissajous figures (concept only). Beats, applications of beats, distinction between stationary interference and beats. Wave motion Transverse and longitudinal waves, mechanical analogy of longitudinal	**The student will be able to: Explain Lissajous figures (concept only). Beats, applications of beats, distinction between stationary interference and beats. Wave motion Transverse**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013)

				waves	**and longitudinal waves, mechanical analogy of longitudinal waves ,**		
			02	**PRACTICAL**	**Velocity of sound by forming stationary wave using CRO**		
September & October	30/09/24	05/10/24	03	progressive wave and its general equation, particle velocity and acceleration, relation between wave velocity and particle velocity, differential equation of wave motion, energy of a plane progressive wave. Velocity of sound waves Velocity of longitudinal waves in fluids, Newtons formula for velocity of sound waves in air.	**The student will be able to: Explain progressive wave and its general equation, particle velocity and acceleration, relation between wave velocity and particle velocity, differential equation of wave motion, energy of a plane progressive wave. Velocity of sound waves**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013)

					Velocity of longitudinal waves in fluids, Newtons formula for velocity of sound waves in air.		
			02	**PRACTICAL**	**To determine the viscosity of fluids by viscometer**		
October	07/10/2024	12/10/2024	03	Laplace's correction, effect of pressure, density and temperature, Velocity of longitudinal wave in a rod. Kundt's tube experiment to find velocity of sound in a gas or a solid rod. Doppler's effect	**The student will be able to: Explain Laplace's correction, effect of pressure, density and temperature, Velocity of longitudinal wave in a rod. Kundt's tube experiment to find velocity of sound in a gas or a solid rod.**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013)
			02	**PRACTICAL**	Revision		
October	14/10/24	19/10/24	03	Source in motion and listener and medium at rest, Listener in motion and	**The student will be able to: Explain Source in motion and listener and**	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013).

				source and medium at rest, Source and listener both in motion and medium at rest.	**medium at rest, Listener in motion and source and medium at rest, Source and listener both in motion and medium at rest.**		
			02	**PRACTICAL**	**Practical Exam**		
October	21/10/24	22/10/24	03	Effect of wind on the pitch of sound Indirect approach of source and listener	The student will be able to: Explain Effect of wind on the pitch of sound Indirect approach of source and listener	White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013)
			02	**PRACTICAL**	Practical Exam		
October	21/10/24	22/10/24		**Revision**		White board and marker	D. S. Mathur, Elements of Properties of Matter, S. Chand and Sons, (2013)

*Note: Data filled in the above form is sample data.