Lecture Plan

Name of the college: Government College of Arts, Science and Commerce, Sanquelim – Goa.

Name of Faculty: Ms. Anushka Panjikar	**Subject:** Physics	
Paper code: PHY-100 : Foundations of Physics	**Program:** FY BSc	**Division: -**
Academic year: 2024- 2025	**Semester: II**	**Total Lectures: 45L + 30P**

Course Objectives: This course aims at providing the fundamental concepts of Physics and correlating them to solve the real-world problems.

Expected Course Outcome: Student will be able to 1. Recall the fundamental concepts of Physics for critical thinking & problem solving. 2. Understand the fundamental concepts to comprehend the physical phenomena happening around us. 3. Apply fundamental concepts of Physics to solve these problems. 4. Analyse the concepts in different scenarios.

Student Learning Outcome: The course will enable students to understand fundamental principles of mechanics, properties of matter, heat, light, sound, electrostatics, magnetism, and modern physics, while applying these concepts to solve real-world problems and develop a strong foundation for advanced studies in physics.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
December	16-12-24	21-12-24	3L+2P	Introduction to Physics **Practicals** : Introduction to Physics laboratory	Group discussion	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015.
December	23/12/24	31/12/24	0	Christmas vacation			
January	02/01/25	04/01/25	1L + 2P	1. Introduction, Standards and units **Practicals** :1 Introduction to measurement techniques: a) Use of	Group discussion	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015.

				Vernier callipers b) Use of micrometre screw gauge			
January	06/01/25	11/01/25	3L + 2P	1. vectors: vector addition, vector subtraction, components of vector, Force 2. Motion with constant acceleration, freely falling body 3. Newton's First law of motion, Newtons SECOND law of motion, mass and weight. **Practicals** : 2.Introduction to travelling microscope and finding diameter of capillary tube	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.

January	13/01/25	18/01/25	3L + 2P	1. Newtons Third law, Frictional force. 2. Newtons law of Gravitation, Work done by constant and varying force. 3. Work and kinetic energy, gravitational potential energy, conservative and dissipative forces **Practicals :** **3.**Introduction to Spectrometer and finding angle of prism	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
January	20/01/25	25/01/25	2L + 2P	1. Impulse and momentum, F= dp/dt, Conservation of momentum. Collisions ISA 1 2. Rotation: Angular velocity, angular acceleration,	Powerpoint presentation	Powerpoint presentation	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987.

				moment of inertia, Angular momentum, Torque, conservation of angular momentum. **Practicals :** **4.**Moment of Inertia of a flywheel			Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
January/February	27/01/25	01/02/25	3L + 2P	1. Properties of Matter: Elasticity: stress, strain, elasticity and plasticity, elastic modulus, the force constant. 2. Surface tension: Surface tension, surface energy, pressure difference across a surface film, contact angle and capillarity. 3. Viscosity: Equation of Continuity, Bernoulli's equation	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.

				Practicals : 5. Youngs modulus by cantilever method			
February	03/02/25	08/02/25	3L + 2P	1. Viscosity, Poiseuille's law, Stokes law, Reynolds number. 2. Heat: Concept of temperature, thermometers, defining of a temperature scale, The Celsius, Rankine and Fahrenheit scales 3. Thermal expansion, thermal stresses, heat transfer, Quantity of heat **Practicals: 6.**Surface tension by capillary rise	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
February	10/02/25	15/02/25	3L + 2P	1. Heat capacity, experimental values of heat capacities, change of phase 2. conduction, convection,	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals

				radiation, Stefan's Boltzmann law. 3. Light: The nature of light, Sources of light, speed of light, electromagnetic spectrum, waves, wavefronts and rays, reflection and refraction **Practicals : 7.**Viscosity by Stokes method			of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
February	17/02/25	22/02/25	3L + 2P	1. Total internal reflection, Huygens' principle, dispersion 2. Interference and coherent sources, interference fringe, Young's double slit experiment 3. Interference in thin films - Newtons rings, Diffraction: Fresnel diffraction,	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa

				Fraunhofer diffraction by single slit **Practicals : 8.**Plotting of graph: slope and intercept for linear and non linear curves.			Publishing House, 1997.
February/March	24/02/25	01/03/25	3L + 2P	1. the plane diffraction grating. resolving power of an optical instrument, ISA 2 2. Polarisation-Malus law, polarisers, Brewster's law 3. Double refraction, optical activity. **Practicals: 9.**Verification of Stefan's law	MCQ Quiz Written Test	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
March	03/03/25	08/03/25	3L + 2P	1. Sound and Acoustics Noises and Musical sounds, Loudness,	MCQ Quiz	Powerpoint presentation Google classroom	D. R. Khanna and R. S. Bedi, A Textbook of Sound, Atma Ram and Sons, 1992

				how loudness is measured, Decibel, intensity of a sound. 2. Acoustics- acoustic powers of different sources of sound, pitch, quality of sound 3. Architectural acoustics, reverberation, acoustical demands on an auditorium, reverberation time and absorption coefficient **Practicals : 10.**P-N junction diode characteristics			N. Subramanyam, Brij Lal, A textbook of Sound, Second Edition, Vikas Publishing House Pvt. Ltd., 2016.
March	10/03/25	15/03/25	3L + 2P	1. Sabine's law, problems 2. Electrostatics and Magnetism : Electric charge, Coulomb's law, conductors and insulators, electric field, electric field lines	MCQ Quiz	Powerpoint presentation Google classroom	N. Subramanyam, Brij Lal, A textbook of Sound, Second Edition, Vikas Publishing House Pvt. Ltd., 2016. P. G. Hewitt, Conceptual physics,

				3. Gauss's law **Practicals :** Revision			12th ed., Pearson, 2015.
March	17/03/25	22/03/25	3L + 2P	1. Electric field potential, current, resistance. ISA 3 2. electromotive force. magnetic f ield, magnetic field lines 3. magnetic dipoles **Practicals :** Revision	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended Fifth edition, Wiley publication,1987. Fracis W. Sears and Mark W. Zemansky, Hugh D. Young, University Physics, 6th ed., Narosa Publishing House, 1997.
March	24/03/25	29/03/25	3L + 2P	1. Electromagnetic induction, Faradays' law, Lenzs' law. 2. Modern physics: Dual nature of light, de Broglie waves	MCQ Quiz	Powerpoint presentation Google classroom	P. G. Hewitt, Conceptual physics, 12th ed., Pearson, 2015. David Halliday, Robert Resnick, Jearl Walker, Fundamentals of Physics, Extended

				3. uncertainty principle **Practicals :** Revision			Fifth edition, Wiley publication,1987.
March/April	31/03/25	05/04/25	3L + 2P	1. Bohr atom, Bohr's postulates 2. Semiconductors: Intrinsic semiconductors, doping a semiconductor, p-type and n- type semiconductor, 3. Unbiased diode, depletion layer, Forward bias, and reverse bias. **Practicals:** Exam	MCQ Quiz	Powerpoint presentation Google classroom	A. Beiser, Concepts of Modern Physics, 6th ed., McGraw-Hill, 2003
April	07/04/25	11/04/25	3L	1. Revision 2. Revision 3. Revision	Test		

Assessment Rubrics

Component	Max Marks
ISA 1 Assignment	7.5
ISA 2 Written Test	7.5
ISA 3 Presentation	7.5
Practical	25
Semester End Exam	60