GOVERNMENT POLYTECHNIC, KENDRAPARA

DEPARTMENT OF HUMANITIES & SCIENCE

LESSON PLAN
APPLIED PHYSICS – II (THEORY-2)
FOR
2ND SEMESTER

BRANCH: CIVIL, ELECTRICAL, ETC, MECHANICAL & CSE

(SESSION: 2025– 26)

Prepared by
MANASWINEE PATNAIK
Lecturer (Stage-II) in PHYSICS
&
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GUEST FACULTY, PHYSICS

GOVERNMENT POLYTECHNIC, KENDRAPARA,
DEPARTMENT OF HUMANITIES AND SCIENCE

Discipline:	Semester: **2ND COMMON**	Name of the Teaching Faculty: **MANASWINEE PATNAIK (Lecturer)** **SUSHREE SANGITA BEHERA (GF)**
Subject: **APPLIED PHYSICS–II (Th-2)**	No. ofdays/per week class allotted: **04**	Semester From date: **09.01.2026** to Date:**08.05.2026** No. of Weeks: **15**
PRE-REQUISITES	Basic knowledge of Science and Mathematics.	

COURSE OUTCOMES	**CO1**	Explain various parameters of longitudinal & transverse wave motion, derive expression for various parameters of SHM and explain methods of control of sound wave for acoustics of building and uses of ultrasonic wave in various medical and Engineering application.
	CO2	Explain basic optical laws , various optical phenomena and uses of optical instruments.
	CO3	Apply the fundamental electrostatic laws to calculate electric field intensity, electric potential & potential difference of straight charged conductor.
	CO4	Classify magnetic materials (Dia, Para, Ferro) & calculate magnetic field intensity, Magnetic force produced by current carrying conductor.
	CO5	Distinguish solid materials based on conductivity & Energy band gap and explain various engineering and medical application of LASERs, Fiber optics and Nano Technology.

Week	Class Day	Theory/Practical Topics	DELIVERY METHOD
1ST	1ST	Introduction to syllabus	PPT
	2ND	Wave motion, transverse and longitudinal waves with examples, Sound and light waves and their properties, definitions of amplitude, wave velocity, frequency and wave length and their relationship, phase &phase difference	CHALK & TALK
	3RD	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc	CHALK & TALK
	4TH	Simple harmonic progressive wave and energy transfer, Wave equation, Principle of superposition of waves and beat formation	CHALK & TALK
2ND	1ST	Study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples, Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic	VIDEO, CHALK & TALK
	2ND	Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, Methods to control reverberation time and their applications	VIDEO, CHALK & TALK
	3RD	Numericals, Assignment	CHALK & TALK
	4TH	Monthly Test – 1, Assignment checking	CHALK & TALK
3RD	1ST	Basic optical laws; reflection and refraction, refractive index, Total internal reflection, Critical angle and conditions for total internal reflection, Applications of total internal reflection in optical fiber	CHALK & TALK

	2ND	Images and image formation by mirrors, Images and image formation by lens and thin lenses	CHALK & TALK
	3RD	Images and image formation by lens and thin lenses, Lens formula, power of lens, magnification and defects	CHALK & TALK
	4TH	Optical Instruments; simple and compound microscope	CHALK & TALK
4TH	1ST	Astronomical telescope in normal adjustment, magnifying power, resolving power, Uses of microscope and telescope, optical projection systems	CHALK & TALK
	2ND	Numericals, Assignment	CHALK & TALK
	3RD	Monthly Test – 2, Assignment checking	CHALK & TALK
	4TH	Coulombs law, unit of charge, Electric field, Electric lines of force and their properties, Electric flux, Electric potential and potential difference, Gauss law	CHALK & TALK
5TH	1ST	Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet, charged sphere	CHALK & TALK
	2ND	Capacitor and its working, Types of capacitors, Capacitance and its units, Capacitance of a parallel plate capacitor	CHALK & TALK
	3RD	Series and parallel combination of capacitors (related numerical), Dielectric and its effect on capacitance, dielectric break down	CHALK & TALK
	4TH	Numericals, Assignment	CHALK & TALK
6TH	1ST	Electric Current and its units, Direct and alternating current, Resistance and its units, Specific resistance, Conductance, Specific conductance	CHALK & TALK
	2ND	Series and parallel combination of resistances & Numericals, Factors affecting resistance of a wire, carbon resistances and colour coding	CHALK & TALK
	3RD	Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only)	CHALK & TALK
	4TH	Concept of terminal potential difference and Electromotive force (EMF), Heating effect of current,	CHALK & TALK
7TH	1ST	Electric power, Electric energy and its units, Advantages of Electric Energy over other forms of energy, Numerical problems, Assignments	CHALK & TALK
	2ND	Practice Test in Group	CHALK & TALK
	3RD	Discussion of Unit – 3 & 4 from Question bank	CHALK & TALK
	4TH	Types of magnetic materials; dia, para and ferromagnetic with their properties, Magnetic field and its units, magnetic intensity, Magnetic lines of force, magnetic flux and units, magnetization	CHALK & TALK
8TH	1ST	Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field), Force on current carrying conductor,	CHALK & TALK
	2ND	force on rectangular coil placed in magnetic field, Moving coil galvanometer; principle, construction and working	CHALK & TALK
	3RD	Conversion of a galvanometer into ammeter and voltmeter, Numerical Problems, Assignment	CHALK & TALK
	4TH	Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), Intrinsic and extrinsic	CHALK & TALK

		semiconductors, p-n junction, junction diode and V-I characteristics	
9TH	1ST	Types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped)	CHALK & TALK
	2ND	Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only), Photocells, Solar cells; working principle and engineering applications	CHALK & TALK
	3RD	Discussion of Unit – 5 & 6 from Question bank, Assignment	CHALK & TALK
	4TH	Practice Test in Group	CHALK & TALK
10TH	1ST	Lasers: Energy levels, ionization and excitation potentials, Spontaneous and stimulated emission; population inversion, pumping methods, optical feedback	CHALK & TALK
	2ND	Types of lasers; Ruby, He-Ne and semiconductor, Laser characteristics, engineering and medical applications of lasers	CHALK & TALK
	3RD	Fiber Optics: Introduction to optical fibers, light propagation, Acceptance angle and numerical aperture, fiber types	CHALK & TALK
	4TH	Fiber applications in telecommunication, medical and sensors, Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials	CHALK & TALK
11TH	1ST	Properties at nanoscale, nanotechnology, Nanotechnology based devices and applications	CHALK & TALK
	2ND	Question Answer discussion of unit -7	CHALK & TALK
	3RD	Monthly Test - 3	CHALK & TALK
	4TH	Revision of Unit -1	CHALK & TALK
12TH	1ST	Revision of Unit -1	PPT
	2ND	Revision of Unit -2	CHALK & TALK
	3RD	Revision of Unit -2	PPT
	4TH	Revision of Unit -3	CHALK & TALK
13TH	1ST	Revision of Unit -3	PPT
	2ND	Revision of Unit -4	CHALK & TALK
	3RD	Revision of Unit -4	PPT
	4TH	Revision of Unit -5	CHALK & TALK
14TH	1ST	Revision of Unit -5	PPT
	2ND	Revision of Unit -6	CHALK & TALK
	3RD	Revision of Unit -6	PPT
	4TH	Revision of Unit -7	CHALK & TALK
15TH	1ST	Previous Year Question Paper Discussion	CHALK & TALK
	2ND	Previous Year Question Paper Discussion	CHALK & TALK
	3RD	Practice Test (Semester Pattern)	
	4TH	Practice Test (Semester Pattern)	

LEARNING RESOUCES:

1. Applied Physics-I by Prof. Vinod Kumar Yadav_ (down load from https://ekumbh.aicte-india.org/dbook.php)
2. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi

08/01/2026 — MANASWINEE PATNAIK

08/01/26 — SUSHREE SANGITA BEHERA

Signature of Faculty concerned

G .P. KENDRADA

08.01.26 — HOD

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08/01/26 — Principal

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