LESSON PLAN

Discipline **:** **ELECTRICAL ENGG.**	Semester : **2nd**	Name of the Teaching Faculty: **SOVAKARA SING & ABINASH NANDI**
Subject: **APPLIED PHYSICS-II**	No. of days/per week class allotted: **04**	Semester from date 09.01.2026 to 08.05.2026 No. of Weeks: 15

Week	Class day	Theory/ Practical Topics
1st	1st	Wave motion, transverse and longitudinal waves with examples
	2nd	definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties
	3rd	wave equation amplitude, phase, phase difference, principle of superposition of waves and beat formation.
	4th	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity
2nd	1st	expression for acceleration, time period, frequency etc. Simple harmonic progressive wave and energy transfer
	2nd	study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.
	3rd	Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound
	4th	methods to control reverberation time and their applications
3rd	1st	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
	2nd	Basic optical laws; reflection and refraction, refractive index
	3rd	Images and image formation by mirrors, lens and thin lenses
	4th	lens formula, power of lens, magnification and defects.

Week	Class day	Theory/ Practical Topics
4th	1st	Total internal reflection, Critical angle and conditions for total internal reflection
	2nd	applications of total internal reflection in optical fiber
	3rd	Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment
	4th	magnifying power, resolving power, uses of microscope and telescope, optical projection systems
5th	1st	Coulombs law, unit of charge
	2nd	Electric field, Electric lines of force and their properties
	3rd	Electric flux, Electric potential and potential difference
	4th	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor, plane charged sheet and charged sphere.
6th	1st	Capacitor and its working, Types of capacitors, Capacitance and its units.
	2nd	Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical)
	3rd	dielectric and its effect on capacitance, dielectric break down.
	4th	Electric Current and its units, Direct and alternating current, Resistance and its units,
7th	1st	Specific resistance, Conductance, Specific conductance
	2nd	Series and parallel combination of resistances
	3rd	Factors affecting resistance of a wire, carbon resistances and colour coding
	4th	Ohm's law and its verification
8th	1st	Kirchhoff's laws
	2nd	Wheatstone bridge and its applications (slide wire bridge only)
	3rd	Concept of terminal potential difference and Electromotive force (EMF) Heating effect of current
	4th	Electric power, Electric energy and its units (related numerical problems)

Week	Class day	Theory/ Practical Topics
9th	1st	Advantages of Electric Energy over other forms of energy
	2nd	Types of magnetic materials; dia, para and ferromagnetic with their properties
	3rd	Magnetic field and its units, magnetic intensity
	4th	magnetic lines of force, magnetic flux and units, magnetization.
10th	1st	Concept of electromagnetic induction
	2nd	Faraday's Laws, Lorentz force (force on moving charge in magnetic field).
	3rd	Force on current carrying conductor
	4th	force on rectangular coil placed in magnetic field
11th	1st	Moving coil galvanometer; principle, construction and working
	2nd	Conversion of a galvanometer into ammeter and voltmeter.
	3rd	Energy bands in solids, Types of materials (insulator, semi-conductor, conductor)
	4th	intrinsic and extrinsic semiconductors, p-n junction
12^{th}	1st	junction diode and V-I characteristics
	2nd	types of junction diodes
	3rd	Diode as rectifier – half wave and full wave rectifier (centre taped)
	4th	Transistor; description and three terminals
13th	1st	Types- pnp and npn, some electronic applications (list only)
	2nd	Photocells, Solar cells; working principle and engineering applications.
	3rd	Lasers: Energy levels, ionization and excitation potentials
	4th	spontaneous and stimulated emission.
14th	1st	population inversion, pumping methods
	2nd	optical feedback, Types of lasers; Ruby, He Ne and semiconductor
	3rd	laser characteristics, engineering and medical applications of lasers

	4th	Fiber Optics: Introduction to optical fibers, light propagation
15th	1st	acceptance angle and numerical aperture, fiber types
	2nd	applications in; telecommunication, medical and sensors
	3rd	Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale
	4th	nanotechnology, nanotechnology-based devices and applications

REFERENCES

1. Hussain Jeevakhan "Applied physics-II (with Lab Manual)", Khanna Book Publishing Co. (P) LTD.
2. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
3. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
4. Concepts in Physics by H. C. Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Richard Feynman et al "The Feynman lectures on Physics", 6th ed. vol1
6. Addison-Wesley, 1963. R K Gaur and S L Gupta "Engineering Physics", 8th ed., Dhanpat Rai, 2011
7. Resnick Halliday and Krane, "Physics" 5th ed. vol1, Wiley, 2014.