

## LESSON PLAN (APPLIED PHYSICS-II)

Discipline :ELECTRICAL/ MECHANICAL/MECHATRONICS ENGG.		Semester:2ND Sem (S-2025)	Name of the Teaching Faculty : Suraj S J Hembram
Subject : TH 2A		No. of Days / per week class allotted : 04	Semester From date : 04.02.2025      To Date : 17.05.2025
MONTH	Week	Day	Topics
FEBRUARY	2ND	2	UNIT-1: Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship
		3	Sound and light waves and their properties, wave equation ( $y = r \sin t$ ) amplitude, phase, phase difference
		5	principle of superposition of waves and beat formation
	3RD	1	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc
		2	Simple harmonic progressive wave and energy transfer, study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.
		3	Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications
		5	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
	4TH	1	UNIT-2: Basic optical laws; reflection and refraction, refractive index, Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects.

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

	<b>5TH</b>	1	UNIT-5: 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
		2	Concept of electromagnetic induction, Faraday's Laws, Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor, force on rectangular coil placed in magnetic field.
		3	Moving coil galvanometer; principle, construction and working, Conversion of a galvanometer into ammeter and voltmeter.
		5	UNIT-6: Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors
<b>APRIL</b>	<b>1ST</b>	3	p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped).
		5	Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only).
	<b>2ND</b>	1	Photocells, Solar cells; working principle and engineering applications.
		2	REVISION
		3	CLASS TEST
		5	UNIT-7: Lasers: Energy levels, ionization and excitation potentials; spontaneous and stimulated emission
	<b>3RD</b>	2	population inversion, pumping methods, optical feedback,
		3	Types of lasers; Ruby, HeNe and semiconductor, laser characteristics, engineering and medical applications of lasers.
	<b>4TH</b>	1	Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture,
		2	fiber types, applications in; telecommunication, medical and sensors.
		3	Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials, properties at nanoscale, nanotechnology
		5	nanotechnology based devices and applications

	<b>5TH</b>	1	REVISION
		2	CLASS TEST
		3	REVISION
<b>MAY</b>	<b>1ST</b>	5	REVISION
	<b>2ND</b>	1	REVISION
		2	REVISION
		3	REVISION
		5	CLASS TEST
	<b>3RD</b>	2	CLASS TEST
		3	CLASS TEST
		5	CLASS TEST