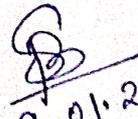


Discipline: Mechanical/Electrical	Semester: 2 <sup>nd</sup>	Name Of The Teaching Faculty: SUSHRIMAYEE BEHERA Lecturer Stage II Physics
Subject: Applied Physics - II	No. Of Days/Week Class Allotted: 4	No. Of Weeks:15 From – 09.01.2026 to 08.05.2026
Week	Class Day	Theory Topics
1	1	<b>UNIT - 1: Wave motion and its applications:</b> Wave motion, transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship
	2	Sound and light waves and their properties, wave equation ( $y = r \sin t$ ) amplitude, phase, phase difference
	3	principle of superposition of waves and beat formation
	4	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc.
2	1	Simple harmonic progressive wave and energy transfer
	2	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
	4	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
3	1	<b>UNIT - 2: Optics:</b> Basic optical laws; reflection and refraction, refractive index
	2	Images and image formation by mirrors, lens and thin lenses
	3	lens formula, power of lens, magnification
	4	defects
4	1	Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical fiber
	2	Optical Instruments; simple and compound microscope,
	3	astronomical telescope in normal adjustment, magnifying power, resolving power
	4	uses of microscope and telescope, optical projection systems.
5	1	<b>UNIT - 3: Electrostatics:</b> Coulombs law, unit of charge, Electric field, Electric lines of force and their properties
	2	Electric flux, Electric potential and potential difference
	3	Gauss law: Application of Gauss law to find electric field intensity of straight charged conductor
	4	plane charged sheet and charged sphere.
6	1	Capacitor and its working, Types of capacitors
	2	Capacitance and its units. Capacitance of a parallel plate capacitor
	3	Series and parallel combination of capacitors (related numerical),
	4	dielectric and its effect on capacitance, dielectric break down
7	1	<b>UNIT - 4: Current Electricity:</b> Electric Current and its units, Direct and alternating current, Resistance and its units
	2	Specific resistance, Conductance, Specific conductance
	3	Series and parallel combination of resistances
	4	Factors affecting resistance of a wire, carbon resistances and colour coding

8	1	Ohm's law and its verification, Kirchhoff's laws
	2	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)
	4	Advantages of Electric Energy over other forms of energy
9		<b>UNIT - 5: Electromagnetism:</b> Types of magnetic materials; dia, para and ferromagnetic with their properties
	1	Magnetic field and its units, magnetic intensity, magnetic lines of force
	2	magnetic flux and units, magnetization
	3	Concept of electromagnetic induction, Faraday's Laws
10	1	Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor
	2	force on rectangular coil placed in magnetic field.
	3	Moving coil galvanometer; principle, construction and working
	4	Conversion of a galvanometer into ammeter and voltmeter
11		<b>UNIT - 6: Semiconductor Physics:</b> Energy bands in solids, Types of materials (insulator, semi-conductor, conductor
	1	intrinsic and extrinsic semiconductors
	2	p-n junction, junction diode and V-I characteristics
	3	types of junction diode
12	1	Diode as rectifier – half wave and full wave rectifier (centre taped)
	2	Transistor; description and three terminals
	3	Types- pnp and npn, some electronic applications (list only)
	4	Photocells, Solar cells; working principle and engineering applications.
13		<b>UNIT - 7: Modern Physics:</b> Lasers: Energy levels, ionization and excitation potentials
	1	spontaneous and stimulated emission; population inversion
	2	pumping methods, optical feedback
	3	Types of lasers; Ruby, HeNe
14	1	Semiconductor
	2	laser characteristics, engineering and medical applications of lasers
	3	Fiber Optics: Introduction to optical fibers, light propagation, acceptance angle and numerical aperture
	4	fiber types
15	1	applications in; telecommunication, medical and sensors.
	2	Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials
	3	properties at nanoscale
	4	nanotechnology, nanotechnology based devices and applications

  
 09.01.26  
 Lecturer Stage II Physics  
 Govt. Polytechnic Nagajugan