GOVERNMENT POLYTECHNIC, JAJPUR

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Discipline: Math and science	Semester:2nd	Name of the Faculty-Dr. Biswambhar Mohanty
Subject: Applied Physics-II	No of Days/Week Class alloted: 4	From:04/02/2025 To:17/05/2025 No. of week:15

Week	Class Day	Topic
1st	1st	Wave motion, transverse and longitudinal waves with examples.
	2nd	Definitions of wave velocity, frequency and wave length and their relationship.
	3rd	Sound and light waves and their properties.
	4th	Wave equation (y = r sin t) amplitude, phase, phase difference.
2nd	1st	Principle of superposition of waves and beat formation.
	2nd	Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc.
	3rd	Simple harmonic progressive wave and energy transfer.
	4th	Study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.
3rd	1st	Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound.
	2nd	Methods to control reverberation time and their applications.
	3rd	Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic.
	4th	Basic optical laws; reflection and refraction, refractive index.
4th	1st	Images and image formation by mirrors, lens and thin lenses, lens formula.
	2nd	Power of lens, magnification and defects.
	3rd	Total internal reflection, Critical angle and conditions for total internal reflection.
	4th	Applications of total internal reflection in optical fiber.
5th	1st	Optical Instruments; simple and compound microscope.
	2nd	Astronomical telescope in normal adjustment, magnifying power.
	3rd	Resolving power, uses of microscope and telescope.
	4th	Optical projection systems.
6th	1st	Coulombs law, unit of charge, Electric field.
	2nd	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.
7th	1st	Plane charged sheet and charged sphere.
	2nd	Capacitor and its working, Types of capacitors, Capacitance and its units.
	3rd	Capacitance of a parallel plate capacitor, Series and parallel combination of capacitors (related numerical).
	4th	dielectric and its effect on capacitance, dielectric break down.
8th	1st	Electric Current and its units, Direct and alternating current.
	2nd	Resistance and its units, Specific resistance, Conductance, Specific conductance.
	3rd	Series and parallel combination of resistances.
	4th	Factors affecting resistance of a wire, carbon resistances and colour coding.

9th	1st	Ohm's law and its verification, Kirchhoff's laws, Wheatstone bridge and its applications (slide wire bridge only).
	2nd	Concept of terminal potential difference and Electromotive force (EMF).
	3rd	Heating effect of current, Electric power, Electric energy and its units (related numerical problems).
	4th	Advantages of Electric Energy over other forms of energy.
10th	1st	Types of magnetic materials; dia, para and ferromagnetic with their properties.
	2nd	Magnetic field and its units, magnetic intensity, magnetic lines of force.
	3rd	Magnetic flux and units, magnetization.
	4th	Concept of electromagnetic induction, Faraday's Laws.
11th	1st	Lorentz force (force on moving charge in magnetic field). Force on current carrying conductor.
	2nd	Force on rectangular coil placed in magnetic field.
	3rd	Moving coil galvanometer; principle, construction and working.
	4th	Conversion of a galvanometer into ammeter and voltmeter.
12th	1st	Energy bands in solids, Types of materials (insulator, semi-conductor, conductor)
	2nd	Intrinsic and extrinsic semiconductors
	3rd	P-N junction, junction diode and V-I characteristics, types of junction diodes
	4th	Diode as rectifier – half wave and full wave rectifier (centre taped).
13th	1st	Transistor; description and three terminals, Types- pnp and npn.
	2nd	Some electronic applications .
	3rd	Photocells.
	4th	Solar cells; working principle and engineering applications.
14th	1st	Lasers: Energy levels, ionization and excitation potentials.
	2nd	Spontaneous and stimulated emission; population inversion.
	3rd	Pumping methods, optical feedback, Types of lasers; Ruby, He- Ne and semiconductor.
	4th	Laser characteristics, engineering and medical applications of lasers.
15th	1st	Fiber Optics: Introduction to optical fibers, light propagation.
	2nd	Acceptance angle and numerical aperture, fiber types, applications in; telecommunication, medical and sensors.
	3rd	Nanoscience and Nanotechnology: Introduction, nanoparticles and nanomaterials.
	4th	Properties at nanoscale, nanotechnology, nanotechnology based devices and applications.

Books Recommended:

1. Applied Physics-I by Prof. Vinod Kumar Yadav (Download 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. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi.
6. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
7. A Textbook of Optics, N Subramanyam, Brij Lal, MN Avahanulu, S Chand and Company Ltd.
8. Introduction to Fiber Optics, Ajoy Ghatak and K Thyagarajan, Cambridge University Press India Pvt. Ltd, New Delhi.
9.Applied Physics-I & II, Kalyani publication by Dr. Biswambhar Mohanty, K.N Sharma & Debasis Das.

Signature of the Faculty