

**LESSON PLAN - 2025 (S) ; AY : 2024-25**

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| <b>Discipline:<br/>CE/ EE/ EEE/ ME</b>              | <b>Semester: 2ND</b>                                   | <b>Name of the Teaching Faculty: ABAKASH PRADHANI</b>  |
| <b>Subject: APPLIED<br/>PHYSICS - 2<br/>(Th. 2)</b> | <b>No. of days/<br/>per week class<br/>allotted: 4</b> | <b>Semester From Date : 04/02/2025 to Date: 17/05/2024</b> <span style="float: right;"><b>No. of Weeks: 15</b></span>  |
| <b>Week</b>   | <b>Class Day</b>                                       | <b>Theory/ Practical Topics</b>  |
| 1st   | 1st  | <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 |
|   | 2nd  | Sound and light waves and their properties, wave equation ( $y = r \sin t$ ) amplitude, phase, phase difference  |
|   | 3rd  | principle of superposition of waves and beat formation.  |
|   | 4th  | Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. Simple harmonic progressive wave and energy transfer              |
| 2nd   | 1st  | study of vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.   |
|   | 2nd  | Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications                    |
|   | 3rd  | Ultrasonic waves – Introduction and properties, engineering and medical applications of ultrasonic   |
|   | 4th  | <b>Numericals of Unit 1</b>  |
| 3rd   | 1st  | <b>Unit 2: Optics</b> Basic optical laws; reflection and refraction, refractive index  |
|   | 2nd  | Images and image formation by mirrors, lens and thin lenses, lens formula, power of lens, magnification and defects  |
|   | 3rd  | Total internal reflection, Critical angle and conditions for total internal reflection, applications of total internal reflection in optical   |
|   | 4th  | Optical Instruments; simple and compound microscope, astronomical telescope in normal adjustment   |
| 4th   | 1st  | magnifying power, resolving power, uses of microscope and telescope, optical projection systems.   |
|   | 2nd  | <b>Numericals of Unit 2</b>  |
|   | 3rd  | <b>Unit 3: Electrostatics</b> Coulombs law, unit of charge, Electric field, Electric lines of force and their properties   |
|   | 4th  | Electric flux, Electric potential and potential difference   |
| 5th   | 1st  | 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.   |
| 6th   | 1st  | <b>Numericals of Unit 3</b>  |
|   | 2nd  | <b>Unit 4: Current Electricity</b> Electric Current and its units, Direct and alternating current  |
|   | 3rd  | Resistance and its units, Specific resistance, Conductance, Specific conductance   |
|   | 4th  | Series and parallel combination of resistances.  |
| 7th   | 1st  | Factors affecting resistance of a wire, carbon resistances and colour coding.  |
|   | 2nd  | Ohm's law and its verification, Kirchoff's laws  |

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|      | 3rd | Wheatstone bridge and its applications (slide wire bridge only)  |
|      | 4th | Concept of terminal potential difference and Electromotive force (EMF)   |
| 8th  | 1st | Heating effect of current, Electric power, Electric energy and its units (related numerical problems)          |
|      | 2nd | Advantages of Electric Energy over other forms of energy.  |
|      | 3rd | <b>Numericals of Unit 4</b>  |
|      | 4th | <b>Revision of Unit 1 to 4</b>   |
| 9th  | 1st | <b>Unit 5: Electromagnetism</b> 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, Lorentz force (force on moving charge in magnetic field) |
| 10th | 1st | Force on current carrying conductor, force on rectangular coil placed in magnetic field.                       |
|      | 2nd | Moving coil galvanometer; principle, construction and working  |
|      | 3rd | Conversion of a galvanometer into ammeter and voltmeter.   |
|      | 4th | <b>Numericals of Unit 5</b>  |
| 11th | 1st | <b>Unit 6: Semiconductor Physics</b> Energy bands in solids  |
|      | 2nd | Types of materials (insulator, semi-conductor, conductor), 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).   |
| 12th | 1st | Transistor; description and three terminals, Types- pnp and npn, some electronic applications (list only).     |
|      | 2nd | Photocells, Solar cells  |
|      | 3rd | working principle and engineering applications.  |
|      | 4th | <b>Numericals of Unit 6</b>  |
| 13th | 1st | <b>Unit 7: Modern Physics</b> Lasers: Energy levels, ionization and excitation potentials                      |
|      | 2nd | spontaneous and stimulated emission; population inversion  |
|      | 3rd | pumping methods, optical feedback  |
|      | 4th | Types of lasers; Ruby, He-Ne and semiconductor   |
| 14th | 1st | laser characteristics, engineering and medical applications of lasers.   |
|      | 2nd | Fiber Optics: Introduction to optical fibers, light propagation  |
|      | 3rd | acceptance angle and numerical aperture  |
|      | 4th | fiber types, applications in; telecommunication, medical and sensors.  |
| 15th | 1st | Nano science and Nanotechnology: Introduction, nano-particles and nano-materials                               |
|      | 2nd | properties at nano scale, nanotechnology, and nano technology based devices and applications.                  |
|      | 3rd | <b>Numericals of Unit 7</b>  |
|      | 4th | <b>Revision of Unit 5 to 7</b>   |