

**ACADEMIC LESSON PLAN OF ENGG.PHYSICS-2026 (SUMMER)****Subject:- Engg. APPLIED PHYSICS - II (Th 2)****Department: Math & Sc.**

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| <b>Discipline:<br/>All Branches</b>     | <b>Name of the teaching faculty:<br/>Sumansudha Rout</b>                      |                                                                                                                            |
| <b>Subject-<br/>Applied Physics -II</b> | <b>Semester from :- 09.01.2026 to 08. 05.2026<br/>No. of weeks:- 15 weeks</b> |                                                                                                                            |
| <b>WEEK</b>                             | <b>No.of days/per<br/>week class allotted.<br/>(4p/week.)</b>                 | <b>Theory Topics</b>                                                                                                       |
| 1 <sup>st</sup> week                    | 1 <sup>st</sup>                                                               | UNIT 1 - Wave motion and its applications. Wave motion, transverse and longitudinal waves with examples.                   |
|                                         | 2 <sup>nd</sup>                                                               | Definition of wave velocity, frequency and wave length and their relationship                                              |
|                                         | 3 <sup>rd</sup>                                                               | Sound and light waves and their properties, wave equation ( $y = r \sin t$ ) amplitude, phase, phase difference            |
|                                         | 4 <sup>th</sup>                                                               | Principle of superposition of waves and beat formation.                                                                    |
| 2 <sup>nd</sup> week                    | 1 <sup>st</sup>                                                               | Simple Harmonic Motion (SHM): definition, expression for displacement, velocity, acceleration, time period, frequency etc. |
|                                         | 2 <sup>nd</sup>                                                               | Simple harmonic progressive wave and energy transfer.                                                                      |
|                                         | 3 <sup>rd</sup>                                                               | Study vibration of cantilever and determination of its time period, Free, forced and resonant vibrations with examples.    |
|                                         | 4 <sup>th</sup>                                                               | Acoustics of buildings – reverberation, reverberation time, echo, noise                                                    |
| 3 <sup>rd</sup> week                    | 1 <sup>st</sup>                                                               | Coefficient of absorption of sound, methods to control reverberation time and their applications                           |
|                                         | 2 <sup>nd</sup>                                                               | Ultrasonic waves - Introduction and properties, engineering and medical applications of ultrasonic.                        |
|                                         | 3 <sup>rd</sup>                                                               | Basic optical laws; reflection and refraction.                                                                             |
|                                         | 4 <sup>th</sup>                                                               | Refractive index Image index formation by mirrors.                                                                         |

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| 4th week | 1st | Lens and thin lenses Lens formula, power of lens, magnification and defects.                          |
|          | 2nd | Total internal reflection, critical angle and conditions for total internal reflection.               |
|          | 3rd | Application of total internal reflection in optical fiber.                                            |
|          | 4th | Optical instruments, simple and Compound microscope.                                                  |
| 5th week | 1st | Astronomical telescope in normal adjustment Magnifying power, resolving power.                        |
|          | 2nd | Uses of microscope and telescope, optical projection system.                                          |
|          | 3rd | Coulomb's law, Unit of charge.                                                                        |
|          | 4th | Electric field , electric lines of force and their properties.                                        |
| 6th week | 1st | Electric Flux , electric potential and potential difference                                           |
|          | 2nd | Gauss law : Application of Gauss law to find electric field intensity and straight charged conductor. |
|          | 3rd | Plane charged sheet and charged sphere.                                                               |
|          | 4th | Capacitor and it's working .                                                                          |
| 7th week | 1st | Types of capacitor Capacitance and it's units.                                                        |
|          | 2nd | Capacitance of q parallel plate capacitor.                                                            |
|          | 3rd | Series and parallel combination of capacitor ( related numerical )                                    |
|          | 4th | Dielectric and it's effect on capacitance, dielectric break down.                                     |
| 8th week | 1st | Class test.                                                                                           |
|          | 2nd | Electric currents and it's unit , direct and alternating current.                                     |
|          | 3rd | Resistance and its unit.                                                                              |
|          | 4th | Specific resistance Conductance, specific conductance.                                                |

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| 9th week  | 1st | Series and parallel combination of resistance.                                                              |
|           | 2nd | Factor affecting resistance of a wire , carbon resistances and colour coding.                               |
|           | 3rd | Ohm's law and its verification                                                                              |
|           | 4th | Kirchhoff's law wheatstone bridge and it's application.                                                     |
| 10th week | 1st | Slide wire bridge only                                                                                      |
|           | 2nd | Concept of terminal potential difference and electromotive force (EMF).                                     |
|           | 3rd | Heating effect of current Electric power, electric energy and it's units related numerical problems.        |
|           | 4th | Advantages of Electric energy over other forms of energy.                                                   |
| 11th week | 1st | Types of magnetic materials,dia,para and ferromagnetic with their properties, magnetic field and it's unit. |
|           | 2nd | Magnetic intensity, magnetic line of force, magnetic Flux and units,magnetization.                          |
|           | 3rd | Concept of electromagnetic induction.                                                                       |
|           | 4th | Faraday's law,Lorentz force                                                                                 |
| 12th week | 1st | Force on current carrying conductor, Force on rectangular coil placed on magnetic field.                    |
|           | 2nd | Moving coil galvanometer, principle, construction and working.                                              |
|           | 3rd | Conversion of a galvanometer in to ammeter and voltmeter .                                                  |
|           | 4th | Energy bands in solid, Types of material.                                                                   |

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| 13th week | 1st | Intrinsic and extrinsic semiconductor, p-n junction.                                                      |
|           | 2nd | Function diode and V-I characteristics, types of junction diodes.                                         |
|           | 3rd | Diode as rectifier, half wave and full wave rectifier.                                                    |
|           | 4th | Transistor, description and three terminals, types -pnp and npn, some electronic applications.            |
| 14th week | 1st | Photocells Solarcells, working principle and engineering applications.                                    |
|           | 2nd | Lasers, energy level, ionization and excitation potential.                                                |
|           | 3rd | Spontaneous and stimulated emission Population inversion, pumping methods, optical feedback.              |
|           | 4th | Types of laser, Ruby, semiconductor, laser characteristics, engineering and medical application of laser. |
| 15th week | 1st | Fiber Optics, introduction of optical fibers, light propagation                                           |
|           | 2nd | Nano science and nano technology; introduction, nanoparticles, properties and application.                |
|           | 3rd | Doubt Clear Class                                                                                         |
|           | 4th | Doubt Clear Class                                                                                         |