



**BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK**

**DEPARTMENT: HUMANITIES AND SCIENCES**

## **LESSON PLAN**

**SUBJECT: - APPLIED PHYSICS-I (THEORY)**

**ACADEMIC SESSION:-2025-26**

**SEMESTER: - 1<sup>ST</sup> SEM (WINTER-2025)**

**SECTION: - A BRANCH:- CIVIL**

**Prepared by Dr. Biswambhar Mohanty**

**(Sr. Lecturer in Physics)**

# Lesson Plan

| Discipline : Civil<br>Sec A     |                                                                    | Semester : 1st | Name of Faculty : Dr. Biswambhar Mohanty                                                                                                                  |
|---------------------------------|--------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject:<br>Applied Physics - I | No. of days per week<br>Class allotted: 4P<br>(Mon, Wed, Thu, Fri) |                | Semester From<br>Date: 06-08-2025 to 04-12-2025                                                                                                           |
| Week                            | Class Day                                                          | Dates          | Theory Topics                                                                                                                                             |
| 1st                             | 1                                                                  | 06-08-2025     | Introduction to the Subject, Syllabus and Course Outcomes                                                                                                 |
|                                 | 2                                                                  | 07-08-2025     | <b>Unit 1: Physical world, Units and Measurements</b><br>Physical quantities; fundamental and derived, Units and systems of units (FPS, CGS and SI units) |
|                                 | 3                                                                  | 08-08-2025     | Dimensions and dimensional formulae of physical quantities<br>Principle of homogeneity of dimensions                                                      |
|                                 | 4                                                                  | 11-08-2025     | Dimensional equations and their applications - conversion from one system of units to other                                                               |
| 2nd                             | 5                                                                  | 13-08-2025     | Checking of dimensional correctness of equations                                                                                                          |
|                                 | 6                                                                  | 14-08-2025     | Derivation of simple equations, Limitations of dimensional analysis.                                                                                      |
|                                 | 7                                                                  | 18-08-2025     | Measurements: Need, measuring instruments, least count, types of measurement (direct, indirect)                                                           |
|                                 | 8                                                                  | 20-08-2025     | Error propagation, Error estimation                                                                                                                       |
| 3rd                             | 9                                                                  | 21-08-2025     | Significant figures                                                                                                                                       |
|                                 | 10                                                                 | 22-08-2025     | <b>Unit 2: Force and Motion</b><br>Scalar and Vector quantities – examples, representation of vector, types of vectors.                                   |
|                                 | 11                                                                 | 25-08-2025     | types of vectors (Continue), Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only)                                         |
|                                 | 12                                                                 | 01-09-2025     | Scalar Product,                                                                                                                                           |
| 4th                             | 13                                                                 | 03-09-2025     | Vector Product,                                                                                                                                           |
|                                 | 14                                                                 | 04-09-2025     | Resolution of a Vector and its application to inclined plane and lawn roller.                                                                             |
|                                 | 15                                                                 | 08-09-2025     | Force, Momentum, Statement and derivation of conservation of linear momentum,                                                                             |
|                                 | 16                                                                 | 10-09-2025     | Its applications such as recoil of gun, rockets, Impulse and its applications.                                                                            |
| 5th                             | 17                                                                 | 11-09-2025     | Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period                                       |
|                                 | 18                                                                 | 12-09-2025     | Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical)                                            |
|                                 | 19                                                                 | 15-09-2025     | Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.                       |
|                                 | 20                                                                 | 17-09-2025     | Doubt Clear Class                                                                                                                                         |
| 6th                             | 21                                                                 | 18-09-2025     | <b>Unit 3: Work, Power and Energy</b><br>Work: Concept and units, examples of zero work, positive work and negative work                                  |
|                                 | 22                                                                 | 19-09-2025     | Friction: concept, types,                                                                                                                                 |
|                                 | 23                                                                 | 22-09-2025     | Laws of limiting friction, coefficient of friction                                                                                                        |
|                                 | 24                                                                 | 24-09-2025     | Reducing friction and its engineering applications,                                                                                                       |
| 7th                             | 25                                                                 | 25-09-2025     | Work done in moving an object on horizontal and inclined plane for rough and plane surfaces and related applications.                                     |
|                                 | 26                                                                 | 26-09-2025     | Energy and its units, kinetic energy, gravitational potential energy with examples Derivation of gravitational potential energy                           |
|                                 | 27                                                                 | 06-10-2025     | Mechanical energy, conservation of mechanical energy for freely falling bodies, trans- formation of energy (examples).                                    |
|                                 | 28                                                                 | 08-10-2025     | Power and its units, power and work relationship, calculation of power (numerical problems).                                                              |

| Week | Class Day | Dates      | Theory Topics                                                                                                                                        |
|------|-----------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8th  | 29        | 09-10-2025 | Doubt Clear Class                                                                                                                                    |
|      | 30        | 10-10-2025 | <b>Unit 4: Rotational Motion</b><br>Translational and rotational motions with examples, Definition of torque and angular momentum and their examples |
|      | 31        | 13-10-2025 | Conservation of angular momentum (quantitative) and its applications.                                                                                |
|      | 32        | 15-10-2025 | Moment of inertia and its physical significance,                                                                                                     |
| 9th  | 33        | 16-10-2025 | Radius of gyration for rigid body, Theorem of parallel axes (statements only),                                                                       |
|      | 34        | 17-10-2025 | Theorem of perpendicular axes (statements only),                                                                                                     |
|      | 35        | 20-10-2025 | Moment of inertia of rod, disc, ring and sphere (hollow and solid); (Formulae only).                                                                 |
|      | 36        | 22-10-2025 | Doubt Clear Class                                                                                                                                    |
| 10th | 37        | 23-10-2025 | <b>Unit 5: Properties of Matter</b><br><b>Elasticity: definition of stress and strain</b>                                                            |
|      | 38        | 24-10-2025 | Moduli of elasticity, Hooke's law, significance of stress-strain curve.                                                                              |
|      | 39        | 27-10-2025 | Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure                                                                 |
|      | 40        | 29-10-2025 | Fortin's Barometer and its applications.                                                                                                             |
| 11th | 41        | 30-10-2025 | Surface tension: concept, units, cohesive and adhesive forces                                                                                        |
|      | 42        | 31-10-2025 | angle of contact, Ascent Formula (No derivation)                                                                                                     |
|      | 43        | 03-11-2025 | applications of surface tension, effect of temperature and impurity on surface tension.                                                              |
|      | 44        | 06-11-2025 | Viscosity and coefficient of viscosity:                                                                                                              |
| 12th | 45        | 07-11-2025 | Terminal velocity                                                                                                                                    |
|      | 46        | 10-11-2025 | Stoke's law and effect of temperature on viscosity, application in hydraulic systems.                                                                |
|      | 47        | 12-11-2025 | Hydrodynamics: Fluid motion, stream line and turbulent flow                                                                                          |
|      | 48        | 13-11-2025 | Reynold's number Equation of continuity                                                                                                              |
| 13th | 49        | 14-11-2025 | Bernoulli's Theorem (only formula and numericals) and its applications.                                                                              |
|      | 50        | 17-11-2025 | Doubt Clear Class                                                                                                                                    |
|      | 51        | 19-11-2025 | <b>Unit 6: Heat and Thermometry</b><br>Concept of heat and temperature, modes of heat transfer (conduction, convection and radiation with examples), |
|      | 52        | 20-11-2025 | Scales of temperature and their relationship                                                                                                         |
| 14th | 53        | 21-11-2025 | Specific heats                                                                                                                                       |
|      | 54        | 24-11-2025 | Types of Thermometer (Mercury thermometer, Bimetallic thermometer and their uses.                                                                    |
|      | 55        | 26-11-2025 | Platinum resistance thermometer, Pyrometer and their uses.                                                                                           |
|      | 56        | 27-11-2025 | Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions                                                        |
| 15th | 57        | 28-11-2025 | Relation amongst them                                                                                                                                |
|      | 58        | 01-12-2025 | Co-efficient of thermal conductivity, engineering applications                                                                                       |
|      | 59        | 03-12-2025 | Very Similar Test                                                                                                                                    |
|      | 60        | 04-12-2025 | Discussion on VST                                                                                                                                    |

Concerned faculty:  
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