ACADEMIC PLAN

DEPARTMENT: MATHEMATICS AND SCIENCE,

BHUBANANANDA ORISSA SCHOOL OF ENGINEERING, CUTTACK

ACADEMIC SESSION:-2021-22

SEMESTER: - 1ST SEM

SUBJECT: - PHYSICS

SECTION: - B BRANCH:- CIVIL

Discipline: (CIVIL) B	Semester: 1st Semester	Name of the Teaching Faculty: Dr.Biswamber Mohanty Pradosh Kumar Gajendra
Subject: ENGG PHYSICS	**No. of Days/ per week class allotted (Mon,Thurs,Fri,Sat)**	**Semester From: -** Date: 25 / 10 / 2021 to 31/ 01/2022 **No of Weeks: - 15**
Week	**Class days & Dates**	**Theory Topics**
1	25.10.21 28.10.21 29.10.21 30.10.21	**UNIT 1 - UNITS AND DIMENSIONS** 1.1 Physical quantities - (Definition) 1.2 Definition of fundamental and derived units, systems of units (FPS, CGS, MKS and SI units). 1.3 Definition of dimension and Dimensional formulae of physical quantities. 1.4 Dimensional equations and Principle of homogeneity. 1.5 Checking the dimensional correctness of Physical relations.
2	1.11.21 4.11.21 5.11.21 6.11.21	**UNIT 2 - SCALARS AND VECTORS** 2.1 Scalar and Vector quantities (definition and concept), Representation of a Vector – examples, types of vectors. 2.2 Triangle and Parallelogram law of vector Addition (Statement only). Simple Numerical. 2.3 Resolution of Vectors – Simple Numerical on Horizontal and Vertical components. 2.4 Vector multiplication (scalar product and vector product of vectors).
3	8.11.21 11.11.21 12.11.21 13.11.21	**UNIT 3 – KINEMATICS** 3.1 Concept of Rest and Motion. 3.2 Displacement, Speed, Velocity, Acceleration & FORCE (Definition, formula, dimension & SI units). 3.3 Equations of Motion under Gravity (upward and downward motion) - no derivation. 3.4 Circular motion: Angular displacement, Angular velocity and Angular acceleration (definition, formula & SI units).

4	15.11.21 18.11.21 20.11.21	**UNIT 3 – KINEMATICS** 3.5 Relation between –(i) Linear & Angular velocity, (ii) Linear & Angular acceleration). 3.6 Define Projectile, Examples of Projectile. 3.7 Expression for Equation of Trajectory, Time of Flight, Maximum Height and Horizontal Range for a projectile fired at an angle, Condition for maximum Horizontal Range
5	22.11.21 25.11.21 26.11.21 27.11.21	**UNIT 4 – WORK AND FRICTION** 4.1 Work – Definition, Formula & SI units. 4.2 Friction – Definition & Concept. 4.3 Types of friction (static, dynamic), Limiting Friction (Definition with Concept) 4.4 Laws of Limiting Friction (Only statement, No Experimental Verification). 4.5 Coefficient of Friction – Definition & Formula, Simple Numericals 4.6 Methods to reduce friction
6	29.11.21 2.11.21 3.12.21 4.12.21	**UNIT 5 – GRAVITATION** 5.1 Newton's Laws of Gravitation – Statement and Explanation. 5.2 Universal Gravitational Constant (G)- Definition, Unit and Dimension. 5.3 Acceleration due to gravity (g)- Definition and Concept. 5.4 Definition of mass and weight. 5.5 Relation between g and G. 5.6 Variation of g with altitude and depth (No derivation – Only Explanation). 5.7 Kepler's Laws of Planetary Motion (Statement only).
7	6.12.21 9.12.21 10.12.21 11.12.21	**UNIT 6 - OSCILLATIONS AND WAVES** 6.1 Simple Harmonic Motion (SHM) - Definition & Examples. 6.2 Expression (Formula/Equation) for displacement, velocity, acceleration of a body/ particle in SHM 6.3. Wave motion – Definition & Concept. 6.4 Transverse and Longitudinal wave motion – Definition, Examples & Comparison. 6.5 Definition of different wave parameters (Amplitude, Wavelength, Frequency, Time Period. 6.6 Derivation of Relation between Velocity, Frequency and Wavelength of a wave 6.7 Ultrasonics – Definition, Properties & Applications
8	13.12.21 16.21.21	**UNIT 7 - HEAT AND THERMODYNAMICS** 7.1 Heat and Temperature – Definition & Difference 7.2 Units of Heat (FPS, CGS, MKS & SI). 7.3 Specific Heat (concept, definition, unit, dimension and simple numerical)

	17.12.21 18.12.21	 7.4 Change of state (concept), Latent Heat (concept, definition, unit, dimension and simple numerical
9	20.12.21 23.12.21 24.12.21	**UNIT 7 - HEAT AND THERMODYNAMICS** 7.5 Thermal Expansion – Definition & Concept 7.6 Expansion of Solids (Concept) 7.7 Coefficient of linear, superficial and cubical expansions of Solids – Definition & Units. 7.8 Relation between α, β & ϒ 7.9 Work and Heat - Concept & Relation. 7.10 Joule's Mechanical Equivalent of Heat (Definition, Unit) 7.11 First Law of Thermodynamics (Statement and concept only)
10	27.12.21 30.12.21 31.12.21	**UNIT 8 – OPTICS** 8.1 Reflection & Refraction – Definition. 8.2 Laws of reflection and refraction (Statement only) 8.3 Refractive index – Definition, Formula &Simple numerical. 8.4 Critical Angle and Total internal reflection – Concept, Definition & Explanation 8.5 Refraction through Prism (Ray Diagram & Formula only – NO derivation). 8.6 Fiber Optics – Definition, Properties & Applications
11	3.1.22 6.1.22 7.1.22 8.1.21	**UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS** 9.1 Electrostatics – Definition & Concept. 9.2 Statement & Explanation of Coulombs laws, Definition of Unit charge. 9.3 Absolute & Relative Permittivity (ε) – Definition, Relation & Unit. 9.4 Electric potential and Electric Potential difference (Definition, Formula & SI Units). 9.5 Electric field, Electric field intensity (E) – Definition, Formula & Unit. 9.6 Capacitance - Definition, Formula & Unit
12	10.1.22 13.1.22 15.1.22	**UNIT 9 – ELECTROSTATICS & MAGNETOSTATICS** 9.7 Series and Parallel combination of Capacitors (No derivation, Formula for effective/Combined/total capacitance & Simple numerical). 9.8 Magnet, Properties of a magnet. 9.9 Coulomb's Laws in Magnetism – Statement & Explanation, Unit Pole (Definition). 9.10 Magnetic field, Magnetic Field intensity (H) - (Definition, Formula & SI Unit). 9.11 Magnetic lines of force (Definition and Properties) 9.12 Magnetic Flux (Φ) & Magnetic Flux Density (B) – Definition, Formula & Unit.

13	17.1.22 20.1.21 21.1.22 22.1.22	**UNIT 10 – CURRENT ELECTRICITY** 10.1 Electric Current – Definition, Formula & SI Units. 10.2 Ohm's law and its applications. 10.3 Series and Parallel combination of resistors (No derivation, Formula for effective/ Combined/ total resistance & Simple numerical). 10.4 Kirchhoff's laws (Statement & Explanation with diagram). 10.5 Application of Kirchhoff's laws to Wheatstone bridge - Balanced condition of Wheatstone's Bridge – Condition of Balance (Equation).
14	24.1.22 27.1.22 28.1.22 29.1.22	**UNIT 11 – ELECTROMAGNETISM & ELECTROMAGNETIC INDUCTION** 11.1 Electromagnetism – Definition & Concept. 11.2 Force acting on a current carrying conductor placed in a uniform magnetic field, Fleming's Left Hand Rule 11.3 Faraday's Laws of Electromagnetic Induction (Statement only) 11.4 Lenz's Law (Statement) 11.5 Fleming's Right Hand Rule 11.6 Comparison between Fleming's Right Hand Rule and Fleming's Left Hand Rule.
15	31.1.22	**UNIT 12 - MODERN PHYSICS** 12.1 LASER & laser beam (Concept and Definition) 12.2 Principle of LASER (Population Inversion & Optical Pumping) 12.3 Properties & Applications of LASER 12.4 Wireless Transmission – Ground Waves, Sky Waves, Space Waves