

Modules of Classes and Examinations, 2019-20

B.Sc. (General) in Physics

Semester-I

➤ Total 75 Marks

➤ **Hiralal Bhakat College, Nalhati**

➤ **Core Course CC2A Mechanics**

➤ 40 Marks for Semester-end-Examination[#] (will be organized by University)

➤ 20 Marks for practical (will be organized by College in general and Department in Particular)

➤ 10+5=15 Marks for Internal Assessment (will be organized by College in general and Department in Particular)

➤ 10 Marks for Class Test/ Assignment/ Seminar

➤ 5 Marks for Attendance

Attendance: 50% & above but below 60% - 2 Marks

Attendance: 60% & above but below 75% - 3 Marks

Attendance: 75% & above but below 90% - 4 Marks

Attendance: 90% & Above - 5 Marks

Internal Assessment	Component 1	Component 2
Weightage	5 Marks	
Number of Questions	5	1.Vectors: Vector algebra, Scalar and vector products, Derivatives of a vector with respect to a parameter.
Date	03-12-2019	2. Ordinary Differential Equations: 1st order homogeneous differential equations. 2 nd order homogeneous differential equations with constant coefficients.
Time	12pm	3.Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass.
Syllabus	1.Vectors: Vector algebra, Scalar and vector products, Derivatives of a vector with respect to a parameter. 2. Ordinary Differential Equations: 1st order homogeneous differential equations. 2 nd order homogeneous differential equations with constant coefficients. 3.Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass. 4. Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets. 5.Rotational Motion:	4. Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets. 5.Rotational Motion: Angular velocity and angular momentum. Torque. Conservation of angular momentum. .Gravitation: 6. Newton's Law of Gravitation. Motion of a particle in a central force field (motion is in a plane, angular momentum is conserved, areal velocity is constant). Kepler's Laws (statement only). Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. Basic idea of global positioning system (GPS). 7. Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped

	Angular velocity and angular momentum. Torque. Conservation of angular momentum.	oscillations. 8. Elasticity: Hooke's law - Stress-strain diagram - Elastic moduli-Relation between elastic constants - Poisson's Ratio-Expression for Poisson's ratio in terms of elastic constants-Work done in stretching and work done in twisting a wire-Twisting couple on a cylinder - Determination of Rigidity modulus by static torsion - Torsional pendulum- Determination of Rigidity modulus and moment of inertia . 9. Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocities
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Name of Teacher(s)	Md Ashik	Md Ashik
Number of Classes	62 (Tentative)	125(Tentative)

Component 2 :

- 40Marks for Semester-end-Examination (will be organized by University)
- Answer 5 questions out of 8 carrying 02 marks each = $5 \times 02 = 10$ marks
- Answer 5 questions out of 7 carrying 03 marks each = $5 \times 03 = 15$ marks
- Answer 03 questions out of 05 carrying 5 marks each = $03 \times 5 = 15$ marks

- Whole Syllabus of CC 2A

- Practical (Mechanics) = 20 Marks
Laboratory Note Book: 05 Marks
Viva- voce: 05 Marks
Experiment: 40 Marks (This 40 marks will be transformed into 10 Marks)

- A project File (Laboratory Note Book), comprising one exercise each is to be submitted.

Modules of Classes and Examinations, 2019-20

B.Sc. (GENERAL) IN PHYSICS

Semester-III

Hiralal Bhakat College, Nalhati

Core Course 2C : Thermal physics and Statistical physics

- Total 75 Marks
- 40 Marks for Semester-end-Examination[#] (will be organized by University)
- 20 Marks for practical (will be organized by College in general and Department in Particular)
- 10+5=15 Marks for Internal Assessment (will be organized by College in general and Department in Particular)
- 10 Marks for Class Test/ Assignment/ Seminar
- 5 Marks for Attendance
 - Attendance: 50% & above but below 60% - 2 Marks
 - Attendance: 60% & above but below 75% - 3 Marks
 - Attendance: 75% & above but below 90% - 4 Marks
 - Attendance: 90% & Above - 5 Marks

Internal Assessment	Component 1 (C ₁)	Component 2 (C ₂)
Weightage	5 Marks	1.Laws of Thermodynamics: Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between CP & CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero. 2. Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Joule-Thompson Effect, Clausius-Clapeyron Equation, Expression for (CP – CV), CP/CV, TdS equations. 3.Kinetic Theory of Gases: Derivation of Maxwell's law of distribution of velocities and its experimental verification, Mean free path (Zeroth Order), Transport Phenomena: Viscosity, Conduction and Diffusion (for vertical case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases. 4. Theory of Radiation: Blackbody radiation, Spectral distribution, Concept of Energy Density, Derivation of Planck's law, Deduction of Wien's distribution law, Rayleigh-Jeans Law, Stefan Boltzmann Law and Wien's displacement law from Planck's law. 5. Statistical Mechanics:
Number of Questions	5	
Date	16-12-2019	
Time	12:30pm	
Syllabus	1.Laws of Thermodynamics: Thermodynamic Description of system: Zeroth Law of thermodynamics and temperature. First law and internal energy, conversion of heat into work, Various Thermodynamical Processes, Applications of First Law: General Relation between CP & CV, Work Done during Isothermal and Adiabatic Processes, Compressibility & Expansion Coefficient, Reversible & irreversible processes, Second law & Entropy, Carnot's cycle & theorem, Entropy changes in reversible & irreversible processes, Entropy-temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero. 2. Thermodynamic Potentials: Enthalpy, Gibbs, Helmholtz and Internal Energy functions, Maxwell's relations & applications - Joule-Thompson Effect, Clausius-Clapeyron	

	Equation, Expression for (CP – CV), CP/CV, TdS equations.	Phase space, Macro state and Micro state, Entropy and Thermodynamic probability, Maxwell-Boltzmann law - distribution of velocity - Quantum statistics - Fermi-Dirac distribution law - electron gas - Bose-Einstein Distribution law - photon gas - comparison of three statistics.
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Name of Teacher(s)	Md Ashik	Md Ashik
Number of Classes	60 (Tentative)	125 (Tentative)
<p>Component 2 :</p> <ul style="list-style-type: none"> ➤ 40Marks for Semester-end-Examination (will be organized by University) ➤ Answer 5 questions out of 8 carrying 02 marks each = 5 x 02 = 10 marks ➤ Answer 5 questions out of 7 carrying 03 marks each = 5 x 03 = 15 marks ➤ Answer 03 questions out of 05 carrying 5 marks each = 03x 5 = 15 marks ➤ Whole Syllabus of CC 2C ➤ Practical (Statistical Methods in Geography) = 20 Marks Laboratory Note Book: 05 Marks Viva- voce: 05 Marks Experiment: 40 Marks (This 40 marks will be transformed into 10 Marks) ➤ A project File (Laboratory Note Book), comprising one exercise each is to be submitted. 		

Skill Enhancement Course – SEC 1

- Total 50 Marks
- 40 Marks(written exam) for Semester-end-Examination[#] (will be organized by University)
- 10 Marks for Class Test/ Assignment (will be organized by College in general and Department in Particular)

Internal Assessment	Component 1 (C ₁)	Component 2 (C ₂)
Weightage	5 Marks	1.Fossil fuels and Alternate Sources of energy: Fossil fuels and Nuclear Energy, their imitation, need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar
Number of Questions	To be announced	
Date	16-12-2019	
Time	12:30pm	
Syllabus		

	<p>1. Fossil fuels and Alternate Sources of energy: Fossil fuels and Nuclear Energy, their imitation, need of renewable energy, non-conventional energy sources. An overview of developments in Offshore Wind Energy, Tidal Energy, Wave energy systems, Ocean Thermal Energy Conversion, solar energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydro electricity.</p> <p>2. Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.</p> <p>3. Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies</p>	<p>energy, biomass, biochemical conversion, biogas generation, geothermal energy tidal energy, Hydro electricity.</p> <p>2. Solar energy: Solar energy, its importance, storage of solar energy, solar pond, non convective solar pond, applications of solar pond and solar energy, solar water heater, flat plate collector, solar distillation, solar cooker, solar green houses, solar cell, absorption air conditioning. Need and characteristics of photovoltaic (PV) systems, PV models and equivalent circuits, and sun tracking systems.</p> <p>3. Wind Energy harvesting: Fundamentals of Wind energy, Wind Turbines and different electrical machines in wind turbines, Power electronic interfaces, and grid interconnection topologies.</p> <p>2. Ocean Energy: Ocean Energy Potential against Wind and Solar, Wave Characteristics and Statistics, Wave Energy Devices.</p> <p>3. Tide characteristics and Statistics, Tide Energy Technologies, Ocean Thermal Energy, Osmotic Power, Ocean Bio-mass. (2Lectures) Geothermal Energy: Geothermal Resources, Geothermal Technologies.</p> <p>4. Hydro Energy: Hydro power resources, hydro power technologies, environmental impact of hydro power sources.</p> <p>5. Piezoelectric Energy harvesting: Introduction, Physics and characteristics of piezoelectric effect, materials and mathematical description of piezoelectricity, Piezoelectric parameters and modeling piezoelectric generators, Piezoelectric energy harvesting applications. Electromagnetic Energy Harvesting: Linear generators, physics mathematical models, recent applications .</p> <p>6. Carbon captured technologies, cell, batteries, power consumption .</p> <p>7. Environmental issues and Renewable sources of energy, sustainability</p>
Name of Teacher(s)	Md Ashik Mondal	Md Ashik Mondal
Number of Classes	60 (Tentative)	120 (Tentative)

#Component 2:

- 40Marks for Semester-end-Examination (will be organized by University)
- Answer 5 questions out of 8 carrying 02 marks each = $5 \times 02 = 10$ marks
- Answer 5 questions out of 7 carrying 03 marks each = $5 \times 03 = 15$ marks
- Answer 03 questions out of 05 carrying 5 marks each = $03 \times 5 = 15$ marks
- Internal assessment 10

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