

Modules of Classes and Examinations, 2019-20

B.Sc. (General) in Physics

Semester-II

➤ **Hiralal Bhakat College, Nalhati**

- **Core Course CC2B ELECTRICITY AND MEGNATISM**
- 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	5 Marks
Number of Questions	5 (FIVE)	1.Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gaussdivergence theorem and Stoke's theorem of vectors (statement only). 2.Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss Theorem-Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an 3.Magnetism: Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil,
Date	21-04-2020	
Time	12:30 PM	
Syllabus	1.Vector Analysis: Review of vector algebra (Scalar and Vector product), gradient, divergence, Curl and their significance, Vector Integration, Line, surface and volume integrals of Vector fields, Gaussdivergence theorem and Stoke's theorem of vectors (statement only). 2.Electrostatics: Electrostatic Field, electric flux, Gauss's theorem of electrostatics. Applications of Gauss Theorem-Electric field due to point charge, infinite line of charge, uniformly charged spherical shell and solid sphere, plane charged sheet, charged conductor. Electric potential as line integral of electric field, potential due to a point charge, electric dipole, uniformly charged spherical shell and solid sphere. Calculation of electric field from potential. Capacitance of an	

	<p>isolated spherical conductor. Parallel plate, spherical and cylindrical condenser. Energy per unit volume in electrostatic field. Dielectric medium, Polarisation, Displacement vector. Gauss's theorem in dielectrics. Parallel plate capacitor completely filled with dielectric.</p>	<p>solenoid carrying current. Divergence and curl of magnetic field. Magnetic vector potential. Ampere's circuital law. Magnetic properties of materials: Magnetic intensity, magnetic induction, permeability, magnetic susceptibility. Brief introduction of dia-, para- and ferro-magnetic materials.</p> <p>4. Electromagnetic Induction: Faraday's laws of electromagnetic induction, Lenz's law, self and mutual inductance, L of single coil, M of two coils. Energy stored in magnetic field. (6 Lectures) Maxwell's equations and Electromagnetic wave propagation: Equation of continuity of current, Displacement current, Maxwell's equations, Poynting vector, energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium, transverse nature of EM waves, polarization.</p>
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Name of Teacher(s)	Md Ashik	Md Ashik
Number of Classes	62 (Tentative)	125(Tentative)
<p>#Component 3 (C₃)</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 2B ➤ 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-IV

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
Number of Questions	5	
Date	21-06-2020	
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-	

	<p>temperature diagrams, Third law of thermodynamics, Unattainability of absolute zero.</p> <p>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.</p>	<p>case), Law of equipartition of energy (no derivation) and its applications to specific heat of gases; mono-atomic and diatomic gases.</p> <p>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.</p> <p>5. Statistical Mechanics: 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.</p>
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Name of Teacher(s)	Md Ashik	Md Ashik
Number of Classes	60 (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 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 2


- 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	
Number of Questions	5	1.Introduction to atmosphere: Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anti cyclones: its characteristics.
Date	21-06-2020	2. Measuring the weather: Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.
Time	12:30pm	3. Weather systems: Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes.
Syllabus	<p>1.Introduction to atmosphere: Elementary idea of atmosphere: physical structure and composition; compositional layering of the atmosphere; variation of pressure and temperature with height; air temperature; requirements to measure air temperature; temperature sensors: types; atmospheric pressure: its measurement; cyclones and anti cyclones: its characteristics.</p> <p>2. Measuring the weather: Wind; forces acting to produce wind; wind speed direction: units, its direction; measuring wind speed and direction; humidity, clouds and rainfall, radiation: absorption, emission and scattering in atmosphere; radiation laws.</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>4.Climate and Climate Change: Climate:its classification; causes of climate change; global warming and its outcomes; air pollution; aerosols, ozone depletion, acid rain, environmental issues related to climate.</p> <p>5.Basics of weather forecasting: Weather forecasting: analysis and its historical background; need of measuring weather; types of weather forecasting; weather forecasting methods; criteria of choosing weather station; basics of choosing site and exposure; satellites observations in weather forecasting; weather maps; uncertainty and predictability; probability forecasts.</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


Coordinator
Science Wing
Hiralal Bhakat College


Head
Department of.....*Physics*
Hiralal Bhakat College
Nalhati, Birbhum


Teacher-in-Charge
Hiralal Bhakat College
Nalhati, Birbhum

