Modules of Classes and Examinations, 2020-21

B.Sc. (General) in Physics

Semester-II

- ➢ Total 75 Marks

- ➢ **Core Course CC2B** ELECTRICITY AND MAGNETISM
- ➢ 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 Attendence
    - Attendence: 50% & above but below 60% - 2 Marks
    - Attendence: 60% & above but below 75% - 3 Marks
    - Attendence: 75% & above but below 90% - 4 Marks
    - Attendence: 90% & Above - 5 Marks

Internal Assessment	Component 1 (C$_1$)	Component 2 (C$_2$)
Weightage	5 Marks	
Number of Questions	5	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).
Date	06-04-2021	
Time	2PM-3PM	
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	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 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. 3.Magnetism: Magnetostatics: Biot-Savart's law & its applications- straight conductor, circular coil,

	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.	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. 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 dielectricmedium, transverse nature of EM waves, polarization.

Name of Teacher(s)	Md Ashik	Md Ashik
Number of Classes	62 (Tentative)	125 (Tentative)

Component 2(C$_3$)
- ➢ 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 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, 2020-21

B.Sc. (GENERAL) IN PHYSICS

Semester-IV

Core Course 2D : WAVE AND OPTICS

- 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 Attendence
    - Attendence: 50% & above but below 60% - 2 Marks
    - Attendence: 60% & above but below 75% - 3 Marks
    - Attendence: 75% & above but below 90% - 4 Marks
    - Attendence: 90% & Above - 5 Marks

Internal Assessment	Component 1 (C_1)	Component 2 (C_2)
Weightage	5 Marks	1. Superposition of Two Collinear Harmonic oscillations: Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats)
Number of Questions	5	
Date	06-04-2021	2. Superposition of Two Perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses. 3.Waves Motion-General: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves.Spherical waves, Wave intensity.
Time	2PM-3PM	
Syllabus	1.Superposition of Two Collinear Harmonic oscillations: Linearity and Superposition Principle. (1) Oscillations having equal frequencies and (2) Oscillations having different frequencies (Beats) 2. Superposition of Two Perpendicular Harmonic Oscillations: Graphical and Analytical Methods. Lissajous Figures with equal an unequal frequency and their uses. 3.Waves Motion-General: Transverse waves on a string. Travelling and standing waves on a string. Normal Modes of a string. Group velocity, Phase velocity. Plane waves.Spherical waves, Wave intensity. 4. Fluids: Surface Tension: Synclastic and anticlastic surface - Excess of pressure – Application to spherical and cylindrical drops and bubbles-variation of surface	4. Fluids: Surface Tension: Synclastic and anticlastic surface - Excess of pressure – Application to spherical and cylindrical drops and bubbles-variation of surface tension with temperature - Jaegar's method. Viscosity: Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula - Determination of coefficient of viscosity of a liquid - Variations of viscosity of a liquid with temperature lubrication. Physics of low pressure - production and measurement of low pressure- Rotary pump- Diffusion pump - Molecular pump - Knudsen absolute gauge - penning and pirani gauge – Detection of leakage. Sound: Simple harmonic motion - forced vibrations and resonance - Fourier's Theorem - Application to saw tooth wave and square wave - Intensity and loudness of sound - Decibels - Intensity levels - musical notes - musical scale. Acoustics of buildings: Reverberation and time of reverberation - Absorption coefficient - Sabine's formula – measurement of reverberation time- Acoustic aspects of halls and auditoria. (6 Lectures) Wave

	tension with temperature - Jaegar's method. Viscosity: Viscosity - Rate flow of liquid in a capillary tube - Poiseuille's formula - Determination of coefficient of viscosity of a liquid - Variations of viscosity of a liquid with temperature lubrication. Physics of low pressure - production and measurement of low pressure- Rotary pump- Diffusion pump - Molecular pump - Knudsen absolute gauge - penning and pirani gauge – Detection of leakage	Optics: Electromagnetic nature of light. Definition and Properties of wavefront. Huygens Principle. 5. Interference: Interference: Division of amplitude and division of wavefront. Young's Double Slit experiment. Lloyd's Mirror and Fresnel's Biprism. Phase change on reflection: Stokes' treatment. Interference in Thin Films: parallel and wedge-shaped films. Fringes of equal inclination (Haidinger Fringes); Fringes of equal thickness (Fizeau Fringes). Newton's Rings: measurement of wavelength and refractive index. 6. Michelson'sInterferometer: Idea of form of fringes (no theory needed), Determination of wavelength, Wavelength difference, Refractive index and Visibility offringes. 7. Diffraction: Fraunhofer diffraction: Single slit; Double Slit.Multiple slits & Diffraction grating. Fresnel Diffraction: Half-period zones. Zone plate. Fresnel Diffraction pattern of a straight edge, a slit and a wire using half-period zone analysis. (14Lectures) Polarization: Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization.

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 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.

Coordinator
Science Wing
Hiralal Bhakat College

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

Teacher- in- Charge
Hiralal Bhakat College
Nalhati, Birbhum