2019-2020

Title	Syllabus Distribution
Session	2019-2020 (Even Semester)
Department	B.Sc General in PHYSICS
Institution Name	Hiralal Bhakat College, Nalhati, Birbhum, W.B.
Coordinator	Md Ashik Mondal , SACT in PHYSICS

Details of Courses of B.Sc. General under CBCS

Sl.	Course	Credit		Marks
1.	Core Course (12 Papers) 4 core papers each in 3 disciplines of choice	Theory+Practical $12\times(4+2)=72$	Theory+Tuitorial $12\times(5+1)=72$	$12\times75=900$
2.	Elective Course DSE (6 Papers)	$6\times(4+2)=36$	$6\times(5+1)=36$	$6\times75=450$
3	Ability Enhancement Core Course (AECC) AECC-1 (ENVS) AECC-2 (English/MIL)	$4\times1=4$ $2\times1=2$	$4\times1=4$ $2\times1=2$	100 50
4.	SEC (4 Papers)	$4\times2=8$	$4\times2=8$	$4\times50=200$
	Total Credit:	122	122	1700

B.Sc. PHYSICS General Course Structure

Semester	Course Course (CC)	Discipline Specific Elective (DSE)	Ability Enhancement Course	
			AECC (2)	SEC(4)
I	CC1A (Mathematics) CC2A (Physics) CC3A (Computer Sc.)		AECC-1	
II	CC1B (Mathematics) CC2B (Physics) CC3B (Computer Sc.)		AECC-2	
III	CC1C (Mathematics) CC2C (Physics) CC3C (Computer Sc.)			SEC-1 (Mathematics) or SEC-1 (Computer Sc.)
IV	CC1D (Mathematics) CC2D (Physics) CC3D (Computer Sc.)			SEC-2 (Mathematics) or SEC-2 (Computer Sc.)
V		DSE1A (Mathematics) DSE2A (Physics) DSE3A (Computer Sc.)		SEC-3 (Computer Science) or SEC-3 (Physics)
VI		DSE1B (Mathematics) DSE2B (Physics) DSE3B (Computer Sc.)		SEC-4 (Computer Science) or SEC-4 (Physics)

Semester-II

Syllabus	Number of Lecture	Course	Name of Teacher
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).	**12L**		
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.	**22 L**	CC	**Md Ashik Mondal**
Magnetism: Magnetostatics: Biot-Savart's law & its applications-straight conductor, circular coil, 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. (	**10 L**		
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. .	**6L**		
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.	**10L**		

Practical:
 1. To use a Multimeter for measuring (a)Resistances, (b)AC and DC Voltages, (c) DC Current, and (d) checking electrical 2. Ballistic Galvanometer: (i) Measurement of charge and current sensitivity (ii) Measurement of CDR
 3. To compare capacitances using De'Sauty's bridge.
 4. To study the Characteristics of a Series RC Circuit.
 5. To study the a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
 6. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor Q
 7. To determine a Low Resistance by Carey Foster's Bridge.

Semester-IV

CoreCourse (CC 2D)	WAVES AND OPTICS

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.	**22 L**		
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.	**10 L**	**CC**	**Md Ashik Mondal**
Wave Optics: Electromagnetic nature of light. Definition and Properties of wavefront. Huygens Principle. 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);	**6L**		
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. Polarization: Transverse nature of light waves. Plane polarized light – production and analysis. Circular and elliptical polarization.	**19L**		

Skill Enhancement Course (SEC)

SEC :   WEATHER FORECASTING

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.	9L		
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.	7L		
3. Weather systems: Global wind systems; air masses and fronts: classifications; jet streams; local thunderstorms; tropical cyclones: classification; tornadoes; hurricanes. 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.	6L	SEC	Md Ashik Mondal
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	8L		

Book Recommended:

1. Aviation Meteorology, I.C. Joshi, 3rd edition 2014, Himalayan Books
2. The weather Observers Handbook, Stephen Burt, 2012, Cambridge University Press.
 3. Meteorology, S.R.Ghadekar, 2001, Agromet Publishers, Nagpur.
4. Text Book of Agrometeorology,S.R.Ghadekar, 2005, Agromet Publishers, Nagpur.
5. Why the weather, Charls Franklin Brooks, 1924, Chpraman & Hall, London.
6. Atmosphere and Ocean, John G.Harvey, 1995, The Artemis Press

Signature,

Teacher-in-Charge

**Coordinator
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Head
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Estd-1986
W.B