2019-2020

Title	Syllabus Distribution
Session	2019-20 (Odd 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×(4+2)=72	Theory+Tuitorial 12×(5+1)=72	12×75=900
2.	Elective Course DSE (6 Papers)	6×(4+2)=36	6×(5+1)=36	6×75=450
3	Ability Enhancement Core Course (AECC) AECC-1 (ENVS) AECC-2 (English/MIL)	 4×1=4 2×1=2	 4×1=4 2×1=2	 100 50
4.	SEC (4 Papers)	4×2=8	4×2=8	4×50=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-I

CoreCourse (CC 2A): MECHANICS

Syllabus	Number of Lecture	Course	Name of Teacher
Vectors: Vector algebra, Scalar and vector products, Derivatives of a vector with respect to a parameter.	4L	CC	Md Ashik Mondal
Ordinary Differential Equations: 1 storder homogeneous differential equations. 2 nd order homogeneous differential equations with constant coefficients.	6L		
Laws of Motion: Frames of reference. Newton's Laws of motion. Dynamics of a system of particles. Centre of Mass.	10L		
Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. Motion of rockets.	6L		
Gravitation: 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)	8L		
RotationalMotion: Angular velocity and angular momentum. Torque. Conservation of angular momentum.	5L		
Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. Damped oscillations.	6L		
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 - by Searles methodσq, η and	8L		
Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. Relativistic addition of velocities.	7L		
1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope. 2. To determine the Moment of Inertia of a Flywheel/ regular shaped objects. 3. To determine Young's Modulus by flexure method. 4. To determine the Young's Modulus of a Wire by Optical Lever Method. 5. To determine the Modulus of Rigidity of a wire by Maxwell's needle / dynamical method. 6. To determine the Elastic Constants of a Wire by Searle's method. 7. To determine g by Bar/Kater's Pendulum. 8. To determine the coefficient of viscosity by Poiseuille's method.		Practical	Md Ashik Mondal

Reference Books:

1. Advanced Practical Physics for students, B.L.Flint and H.T.Worsnop,1971, Asia Publishing House.
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4thEdition, reprinted 1985, Heinemann Educational Publishers.
3. Engineering Practical Physics, S.Panigrahi & B.Mallick, 2015, Cengage Learning India Pvt. Ltd.
4. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11thEdition, 2011, Kitab Mahal, New Delhi.

Semester - II

Semester-III

CoreCourse (CC 2C) THERMAL PHYSICS AND STATISTICAL MECHANICS

Syllabus	Number of Lecture	Course	Name of Teacher
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	**22 L**	**CC**	**Md Ashik mondal**
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. .	**10 L**		
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.	**10L**		
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.	**6L**		
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.	**12L**		
1. Measurement of Planck's constant using black body radiation. 2. To determine Stefan's Constant. 3. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton's disc method. 4. To determine the temperature co-efficient of resistance by Platinum resistance thermometer. 5. To study the variation of thermo emf across two junctions of a thermocouple with temperature. 6. To determine the coefficient of linear expansion by optical lever method. 7. To determine the pressure coefficient of air by constant volume method. 8. To determine the coefficient of linear expansion by travelling microscope.		**Practical**	**Md Ashik Mondal**

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