

CHOICE BASED CREDIT SYSTEM

B. SC. PHYSICS (Regular Course) **Syllabus** **(Reduced Syllabus for the session 2020-21 only)**



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Bodoland University
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Department of Physics
Bodoland University
Curriculum Structures for UG syllabus for B.Sc. (Regular Course)
No. of papers =12+12=24, Total Credits= 120
Total Marks=2100

SEM-I						
Paper Code	Course	Credit	Credit Distribution (L+T+P)	End Sem Marks	Internal Marks	Total Marks
PHY-101R	DSC-1A: Mechanics	6	4+0+2	60(Theo)+20(Pract)	20	100
Paper-102R	DSC-2A	6	4+0+2	60(Theo)+20(Pract)	20	100
Paper-103R	DSC-3A	6	4+0+2	60(Theo)+20(Pract)	20	100
COMM-104HR	AEC: AECC-1: English/Hind/MIL (Communication)	2	2+0+0	50	-	50
Total		20	20	290	60	350

B. Sc. Physics (Regular course) syllabus under CBCS

Semester	CORE COURSE (12)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (4)	Discipline Specific Elective (DSE) (6)
I	DSC-1A: Mechanics (4+2)	(English/Hindi/MIL Communication)		
	DSC-2 A (Chemistry)			
	DSC-3 A (Mathematics)			

Physics Core papers (Credit: 06 each):

1. Mechanics (4) + Lab(2)
2. Electricity, Magnetism and EMT (4) + Lab(2)
3. Thermal Physics and Statistical Mechanics (4) + Lab (2)
4. Waves and Optics (4) + Lab(2)

Discipline Specific Elective papers (Credit: 06 each):

1. Mathematical Physics (4) + Lab(2)
2. Elements of Modern Physics (4) + Lab(2)

Skill Enhancement Course (Credit: 02 each):

1. Physics WorkshopSkills
2. Computational PhysicsSkills
3. Electrical circuits and NetworkSkills
4. Basic Instrumentation Skills

Semester I

PHYSICS-DSC 1 A: MECHANICS **(Credits: Theory-04, Practicals-02)**

Theory: 60 Lectures

Vectors: Vector algebra. Scalar and vector products. **(4Lectures)**

Ordinary Differential Equations: 1st order homogeneous differential equations. 2nd order homogeneous differential equations with constant coefficients. **(6Lectures)**

Laws of Motion: Frames of reference. Newton's Laws of motion. **(10Lectures)**

Momentum and Energy: Conservation of momentum. Work and energy. Conservation of energy. **(6Lectures)**

Rotational Motion: Angular velocity and angular momentum. Torque. **(5Lectures)**

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). **(8Lectures)**

Oscillations: Simple harmonic motion. Differential equation of SHM and its solutions. Kinetic and Potential Energy, Total Energy and their time averages. **(6Lectures)**

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. **(8Lectures)**

Special Theory of Relativity: Constancy of speed of light. Postulates of Special Theory of Relativity. Length contraction. Time dilation. **(7Lectures)**

Reference Books:

- University Physics. F.W.Sears, M.W.Zemansky and H.D.Young 13/e, 1986. Addison-Wesley
 - Mechanics Berkeley Physics course, v.1: Charles Kittel, et. Al. 2007, Tata McGraw-Hill.
 - Physics – Resnick, Halliday & Walker 9/e, 2010, Wiley
 - Engineering Mechanics, Basudeb Bhattacharya, 2nd edn., 2015, Oxford University Press
 - University Physics, Ronald Lane Reese, 2003, Thomson Brooks/Cole.
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PHYSICS LAB: DSC 1A LAB: MECHANICS

60 Lectures

1. Measurements of length (or diameter) using vernier caliper, screw gauge and travelling microscope.
2. To determine the Height of a Building using a Sextant.
3. To determine the Moment of Inertia of a Flywheel.
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.
6. To determine the Elastic Constants of a Wire by Searle's method.
7. To determine g by Bar Pendulum.
8. To determine g by Kater's Pendulum.
9. To determine g and velocity for a freely falling body using Digital Timing Technique
10. To study the Motion of a Spring and calculate (a) Spring Constant (b) Value of g

Reference Books:

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