

ACHARYA NAGARJUNA UNIVERSITY :: NAGARJUNANAGAR-522 510

B.Sc. (Physics) (Maths Combinations)

Scheme of instruction and examination to be followed w.e.f. 2015-2016

S.No	Semester	Title of the paper	Instruction Hrs/week	Duration of exam (hrs)	Max Marks (external)
Theory					
1	First	Paper I : Mechanics & Properties of Matter			75
Practical					
1	First	Practical 1			75

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Model question Paper for all theory papers

Time : 3 hrs

Max marks : 75

Section A

Answer any five out of 8 questions

Marks: 5 x3 = 15

Section B

Answer All questions with internal choice from all units (I to V) Marks : 5 x 12 =60

****** At least three problems must be included each with a weightage of 5 marks**

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**SEMESTER PATTERN UNDER CHOICE BASED CREDIT SYSTEM
COMMON CORE SYLLUBUS**

**B.Sc. 1st Semester Physics
Paper I: Mechanics & Properties of Matter
(For Maths Combinations)**

Work load:60hrs per semester

4 hrs/week

UNIT I (16 hrs)

1. Vector Analysis : 8hrs

Scalar and vector fields, gradient of a scalar field and its physical significance. Divergence and curl of a vector field with derivations and physical interpretation. Vector integration (line, surface and volume), State and proof of Gauss and Stokes theorem.

UNIT II

2. Mechanics of particles :10hrs

Laws of motion, motion of variable mass system, motion of a rocket. Conservation of energy and momentum. Collisions in two and three dimensions. Concept of impact parameter, scattering cross-section. Rutherford scattering-derivation.

UNIT III (16 hrs)

3. Mechanics of Rigid bodies : 10 hrs

Definition of rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum. Euler equation, precession of a top. Gyroscope, precession of the equinoxes.

4. Mechanics of continuous media :6hrs

Elastic constants of isotropic solids and their relation, Poisson's ratio and expression for Poisson's ratio in terms of γ , n , k . Classification of beams, types of bending, point load, distributed load, shearing force and bending moment, sign conventions.

UNIT IV (10Hrs)

5. Central forces : 12hrs

Central forces, definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force. Derivation of Kepler's laws. Motion of satellites.

UNIT V (12 hrs)

6. Special theory of relativity : 12hrs

Galilean relativity, absolute frames. Michelson-Morley experiment, negative result. Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four-vector formalism.

Reference Books:

1. BSc Physics -Telugu Akademy, Hyderabad
2. Mechanics - D.S. Mathur, *Sulthan Chand & Co, New Delhi*
3. Mechanics - J.C. Upadhyaya, *Ramprasad & Co., Agra*
4. Properties of Matter - D.S. Mathur, *S.Chand & Co, New Delhi ,11thEdn., 2000*
5. Physics Vol. I - Resnick-Halliday-Krane, *Wiley, 2001*
6. Properties of Matter - Brijlal & Subramanyam, *S.Chand & Co. 1982*
7. Dynamics of Particles and Rigid bodies – Anil Rao, *Cambridge Univ Press, 2006*
8. Mechanics-EM Purcell, *McGraw Hill*
9. University Physics-FW Sears, MW Zemansky & HD Young, *Narosa Publications, Delhi*
10. College Physics-I. T. Bhimasankaram and G. Prasad. *Himalaya Publishing House.*
11. S.G.Venkatachalapathy, Mechanics, *Margham Publication, 2003.*

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Practical paper 1: Mechanics

Work load: 30hrs per semester

3 hrs/week

Minimum of 8 experiments to be done and recorded

1. Volume resonator
2. Viscosity of liquid by the flow method (Poiseuille's method)
3. Young's modulus material a rod by uniform bending
4. Young's modulus material a rod by non- uniform bending
5. Surface tension of a liquid by the method of drops
6. Surface tension of a liquid by capillary rise method
7. Determination of radius of capillary tube by Hg thread method
8. Viscosity of liquid by logarithmic decrement method
9. Bifilar suspension –moment of inertia.
10. Rigidity modulus of material of a wire-dynamic method (torsional pendulum)
11. Fly-wheel
12. Determination of Y of bar –cantilever.

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B.Sc. (Physics) (Non-Mathematics Combinations)

Scheme of instruction and examination to be followed w.e.f. 2015-2016

S.No	Semester	Title of the paper	Instruction Hrs/week	Duration of exam (hrs)	Max Marks (external)
Theory					
1	First	Paper I: Mechanics & Properties of Matter			75
Practical					
1	First	Practical 1			75

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SEMESTER PATTERN UNDER CHOICE BASED CREDIT SYSTEM

COMMON CORE SYLLUBUS

B.Sc. 1st Semester Physics

**Paper I: Mechanics & Properties of Matter
(For Non-Mathematics Combinations)**

Work load:60hrs per semester

4 hrs/week

UNIT -I

1. Mathematical Background: 8 hours

Scalars and vectors –vector addition-scalar and vector products of vector and their physical significance-vector calculus-gradient of a scalar point function-divergence and curl of vector-statements of stokes and Gauss theorems -examples (no derivations).

2.Motion of system : 8 hours

Collisions- Elastic and inelastic collisions-Collisions in one and two dimension-Rocket propulsion-Center of mass-Motion of the centre of mass-Impact parameter-Scattering cross-section, Rutherford scattering (No derivation-Qualitative ideas only)

UNIT II

3. Mechanics of Rigid body: 12 hours

Rotational kinetic energy and moment of inertia -Calculating the moment of inertia in simple cases (Rod, disc, sphere and cylinder)-parallel & Perpendicular axes theorems-Torque-relation between torque and angular momentum.

Angular momentum of a particle-Torque and angular momentum for a system of particles-conservation of angular momentum-Translation and rotational motion of system-Elementary ideas about gyroscopic motion (No derivation –discussion of results)-precession of the equinoxes

UNIT-III

4.Central forces :10 hours

Central force- Def& examples- General properties of central forces-Conservative nature of central forces, Planetary motion-Kepler's laws (Statements & Explanation), Newton's law of gravitation from Kepler's law, Geostationary Satellite Motion.

UNIT-IV

5. Fluid Flow :10 hours

The flow of ideal fluids-Equation of continuity –Bernoulli’s equation-Torricelli’s theorem-The venture meter-Pitot’s tube-Viscosity and the flow of real fluids-Poisellious equation.

UNIT V

6. Relativistic effects :12 hours

Moving reference frames-Inertial reference frames-Galilean relativity (Elementary treatment only, application to be covered)–Special theory of relativity-Statements of the two basic postulates-Lorentz transformation equations-length contraction-time dilation-addition of velocities-Momentum andrelativistic mass-Mass –Energy equation, rest mass & momentum of a particle.

Reference Books :

1. BSc Physics -Telugu Akademy, Hyderabad
2. Properties of Matter - D.S. Mathur, *S.Chand& Co, New Delhi ,11thEdn., 2000*
3. Properties of Matter - Brijlal&Subrmanyam ,*S.Chand&Co. 1982*
4. Physics for Biology and Premedical Students –D.N. Burns & SGG Mac Donald
5. Unified Physics Vol.IMechanics,Waves and Oscillations – *Jai PrakashNath&Co.Ltd., Meerut.*

