S.K.R. & S.K.R. Govt. College for Women (Autonomous), Kadapa.
Reaccredited with 'B' Grade by NAAC
Y.S.R.Kadapa District – 516001, Andhra Pradesh

DEPARTMENT OF PHYSICS

B.Sc. 1st Year 1st Semester Physics Syllabus

Paper I: Mechanics, Waves and Oscillations

Work load: 60 hrs per semester **4 hrs/week**

UNIT-I:

1. Mechanics of Particles **(5 hrs)**

Review of Newton's Laws of Motion, Motion of variable mass system, Motion of a rocket,
Multistage rocket, Concept of impact parameter, scattering cross-section, Rutherford scattering-Derivation.

2. Mechanics of Rigid bodies **(7 hrs)**

Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular
momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Gyroscope.

UNIT-II:

3. Motion in a Central Force Field **(12hrs)**

Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion Proofs, Motion of satellites.

UNIT-III:

4. Relativistic Mechanics **(12hrs)**

Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Michelson-Morley experiment, negative result, Postulates of Special theory of relativity, Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation

UNIT-IV:

5. Undamped, Damped and Forced oscillations: **(07 hrs)**

Simple harmonic oscillator and solution of the differential equation, Damped harmonic oscillator, Forced harmonic oscillator – Their differential equations and solutions, Resonance, Logarithmic decrement, Relaxation time and Quality factor.

UNIT-V:

6. Vibrating Strings: **(07 hrs)**

Transverse wave propagation along a stretched string, General solution of wave equation and its significance, Modes of vibration of stretched string clamped at ends, Overtones

and
Harmonics.

7. Ultrasonics: (05 hrs)

Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves, SONAR.

Reference Books:

1. B. Sc. Physics, Vol.1, Telugu Academy, Hyderabad
2. Fundamentals of Physics Vol. I - Resnick, Halliday, Krane ,Wiley India 2007
3. College Physics-I. T. Bhimasankaram and G. Prasad. Himalaya Publishing House.
4. University Physics-FW Sears, MW Zemansky& HD Young,Narosa Publications, Delhi
5. Mechanics, S.G.Venkatachalapathy, Margham Publication, 2003.
6. Waves and Oscillations. N. Subramanyam and Brijlal, VikasPulications.
7. Unified Physics - Waves and Oscillations, Jai PrakashNath&Co.Ltd.
8. Waves & Oscillations. S.Badami, V. Balasubramanian and K.R. Reddy, Orient Longman.
9. The Physics of Waves and Oscillations, N.K.Bajaj, Tata McGraw Hill
10. Science and Technology of Ultrasonics- Baldevraj, Narosa, New Delhi, 2004.

B.Sc I Sem. - Physics

Practical paper 1: Mechanics, Waves and Oscillations

Work load: 30 hrs per semester **2 hrs/week**

Minimum of 6 experiments to be done and recorded:

1. Young's modulus of the material of a bar (scale) by uniform bending

2. Young's modulus of the material a bar (scale) by non- uniform bending

3. Surface tension of a liquid by capillary rise method

4. Viscosity of liquid by the flow method (Poiseuille's method)

5. Bifilar suspension –Moment of inertia of a regular rectangular body.

6. Fly-wheel -Determination of moment of inertia

7. Rigidity modulus of material of a wire-Dynamic method (Torsional pendulum)

8. Volume resonator experiment

9. Determination of 'g' by compound/bar pendulum

10. Simple pendulum- normal distribution of errors-estimation of time period and the error of the mean by statistical analysis

11. Determination of the force constant of a spring by static and dynamic method.

12. Verification of laws of vibrations of stretched string –Sonometer

13. Study of a damped oscillation using the torsional pendulum immersed in liquid-decay Constant and damping correction of the amplitude.