

B.Sc. (Physics) Syllabus, Kakatiya University, Warangal CBCS pattern in Semester System (w. e. from 2016-2017)

B.Sc. (Physics)- I Year Semester – II Paper II:: Waves and Oscillations

Total: 48 hrs
(4 Hrs / week)

Unit – I

Fundamentals of Vibrations (12)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum, - measurements of rigidity modulus , compound pendulum, measurement of 'g', combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures

Unit – II

Damped and forced oscillations (12)

Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, comparison with undamped harmonic oscillator, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance. Coupled Oscillators.

Unit – III

Vibrating Strings (12)

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, energy transport, transverse impedance

Unit – IV

Vibrations of bars (12)

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the mid point iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

Note: Problems should be solved at the end of every chapter of all units.

Suggested Books

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
2. **Fundamentals of Physics.** Halliday/Resnick/Walker *Wiley India Edition 2007.*
3. **First Year Physics - Telugu Academy.**
4. **Introduction to Physics for Scientists and Engineers.** F.J. Ruche. *McGraw Hill.*
5. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company Edition, 2008.*
6. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005.*



Dr. B. Venkatram Reddy
Chairman, Board of Studies in Physics, KU, Wgl
Date: 24th Aug., 2016 & 5th June, 2017

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7. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition.*
8. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies.*
9. **Mechanics.** Hans & Puri. *TMH Publications.*
10. **Engineering Physics.** R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications.*
11. **The Feynman Lectures in Physics, Vol.-1,** R P Feynman, RB Lighton and M Sands, BI Publications,
12. **Mechanics-P.K.** Srivastava - New Age International.

B.Sc. (Physics Practicals) – I year

Semester - II

Paper – II ::Waves and Oscillations Practicals

1. Study of damping of an oscillating disc in Air and Water logarithmic decrement.
2. Study of Oscillations under Bifilar suspension-Verification of axis theorems
3. Study of oscillations of a mass under different combination of springs-Series and parallel.
4. Verification of Laws of a stretched string (Three Laws).
5. Determination of frequency of a bar-Melde's experiment.
6. Observation of Lissajous figures from CRO-Frequency ratio.Amlitude and phase difference of two waves.
7. Volume Resonator –determination of frequency of a tuning fork.
8. Velocity of Transverse wave along a stretched string.
9. Study of damping of a bar pendulum-damping factor
10. Study of coupled oscillator-resonance

Note: Minimum of eight experiments should be performed .Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastav.



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