

Mechanics & Properties of Matter

2nd Semester

Mechanics & Properties of Matter

- Total Hours: 45 Hours
- Course Code: Ph-----
- Credits: 3
- Workload: 75 hours

Mechanics- Vibration Motion

- **Simple Harmonic Motion (SHM)**
- energy of a particle executing SHM, Laws of transverse vibration- velocity of transverse wave along a stretched string – frequency determination ,
- **Ultrasonics and Architectural Acoustics**
- Ultrasonics – definition - Production of ultrasonic waves – piezo – electric method -
- Applications of ultrasonics.
- Doppler Effect: Definition

Properties of Matter Elasticity

- **Elasticity**

- Introduction- Hooke's law - Elastic constants - relation connecting elastic constants - Poisson's ratio – Torsion: twisting couple on a cylinder – work done in twisting – torsional oscillations – Rigidity modulus and moment of inertia by torsion pendulum

- **Bending of beams**

- Bending of beams – expression for bending moment – depression at the free end of a cantilever– Uniform bending – theory and experiment

Properties of Matter Elasticity

- **Fluids**

- **Viscosity of liquids:** Poiseuille's Formula – correction to the pressure head – determination of viscosity by capillary flow method – lubrication.
- **Surface tension:** Molecular theory of surface tension – surface energy - formation of drops - relation between curvature, pressure and surface tension – its application to spherical and cylindrical drops and bubbles – determination of surface tension and interfacial tension by drop weight method.
- **Density**

RECOMMENDED TEXTBOOKS

- 1. R. Murugesan, Properties of Matter and Acoustics, 2nd Edition, S.Chand & Co. Ltd. Reprint 2017.
- 2. R. K. Gaur and S. L. Gupta, Engineering Physics, Dhanpat Rai Publications, 8th Edition, New Delhi, 2012.

JOURNALS

- 1. Journal of Elasticity (International)
- 2. International Journal of Mechanical Engineering and Applications
- 3. International Journal of Fluid Mechanics & Thermal Sciences
- 4. Applied Acoustics (International)
- 5. Journal of Vibration and Acoustics (International)
- 6. Indian Journal of Public Health Research & Development

E-LEARNING RESOURCES

- 1. <http://farside.ph.utexas.edu/teaching/301/lectures/node139.html>
- 2. . https://www.tf.uni-kiel.de/matwis/amat/iss/kap_c/illustr/sc_2_3.html
- 3. <http://www.dataphysics.de/2/start/understanding-interfaces/basics/>
- 4. <http://hyperphysics.phy-astr.gsu.edu/hbase/Sound/dopp.html>
- 5. <https://www.techglads.com/cse/sem1/production-of-ultrasonics-by-piezoelectricmethods/>