

Course Syllabi: UES009 Mechanics (L : T : P :: 2 : 1 : 0)

1. **Course number and name:** UES009 Mechanics
2. **Credits and contact hours:** 2.5 and 3
3. **Text book, title, author, and year**

Text Books / Reference Books

- *Shames, I. H. Engineering Mechanics: Dynamics, Pearson Education India (2002).*
 - *Beer, Johnston, Clausen and Staab, Vector Mechanics for Engineers, Dynamics, McGraw-Hill Higher Education (2003).*
 - *Hibler, T.A., Engineering Mechanics: Statics and Dynamics, Prentice Hall (2012).*
 - *Timoshenko and Young, Engineering Mechanics, Tata McGraw Hill Education Private Limited (2000).*
- a. Other supplemental materials
- Nil

4. **Specific course information**

- a. Brief description of the content of the course (catalog description)

Review of Newton's law of motion and vector algebra

Equilibrium of bodies: Free-body diagrams, conditions of equilibrium, torque due to a force, statical determinacy.

Plane trusses: Forces in members of a truss by method of joints and method of sections.

Friction: Sliding, belt, screw and rolling.

Properties of plane surfaces: First moment of area, centroid, second moment of area etc.

Virtual work: Principle of virtual work, calculation of virtual displacement and virtual work.

Work and energy: Work and energy, work-energy theorem, principle of conservation of energy, collisions, principles of momentum etc.

Dynamics of Rigid Bodies: Newton's Laws, D'Alembert's Principle, Energy Principles.

Experimental project assignment/ Micro project: Students in groups of 4/5 will do project on

Model Bridge Experiment: This will involve construction of a model bridge using steel wire and wood.

5. **Specific goals for the course**

After the completion of the course, the students will be able to:

- Determine resultants in plane force systems.
- Identify and quantify all forces associated with a static framework.
- Solve problems in kinematic and dynamic systems.

6. **Brief list of topics to be covered**

- Plane trusses
- Friction
- Virtual work
- Work and energy

- Dynamics of rigid bodies