İzmir Institute of Technology - Department of Civil Engineering
CE 222 Engineering Mechanics II : Dynamics - Fall 2025/2026 Course Outline

Course Instructor	Dr. İzzet Özdemir Department of Civil Engineering Office Hour: TBA	*Office: C-206* *E-mail:* izzetozdemir@iyte.edu.tr
Course Assistants	M.Sc. S. Üveys Gözün Department of Civil Engineering Office Hour: TBA	*Office: E-108* *E-mail:* uveysgozun@iyte.edu.tr

Course Schedule	Monday	10:45 - 12:30 Room: B-211
	Wednesday	13:30 - 14:15 Room: B-211

Course Conduct Attendance to lectures is normally compulsory as stated by the regulations of İzmir Institute of Technology. However attendance policy is going to be a bit flexible. At the end of the semester, if your attendance is less than 70 % and you are failing (your exam marks are not good enough to pass this course) you will get NA (You will not get FF or FD). If your attendance is less than 70 % and you are passing the course (your letter grade is at least DD or better) you will pass.
Teams page is going to be activated soon and used throughout the semester. There will be regular in-class recitation sessions. It is not compulsory to attend these recitation sessions but it is highly recommended.

Textbook/References

- Vector Mechanics for Engineers - Dynamics, F.P. Beer & E.R. Johnston, Jr., P.J. Cornwell, 9^{th} Edition, McGraw Hill, 2010 (**Textbook**).
- Engineering Mechanics : Dynamics, R.C. Hibbeler, SI Edition, Prentice Hall

Objectives

The objective is to learn the fundamental principles of dynamics and their use for analysis (kinematics and kinetics) of rigid bodies under the action of external forces.

Course Content

- Review of Kinematics of a Particle
  - Dependent Motion
  - Curvilinear Motion : Rectangular Components
  - Curvilinear Motion : Normal and Tangential Components
  - Relative Motion of Two Particles
- Review of Kinetics of Particles
  - Newton's Second Law and Equation of Motion (Rectangular coords., Normal & Tangential coords.)
- Kinetics of Particles: Work & Energy
  - Work of a Force
  - Principle of Work & Energy for a Particle

- Power & Efficiency
- Conservative Forces and Potential Energy
- Conservation of Energy
- Principle of Impulse & Momentum

- Vibrations
  - Undamped Free Vibrations
  - Damped Vibrations

- Kinematics of a Rigid Body
  - Translation
  - Rotation about a Fixed Axis
  - Relative Motion Analysis of General Plane Motion: Velocity
  - Instantaneous Center of Zero Velocity
  - Relative Motion Analysis of General Plane Motion: Acceleration

- Kinetics of a Rigid Body: Forces and Accelerations
  - Moment of Inertia
  - Plane Motion of a Rigid Body: D'Alembert's Principle
  - Equation of Motion: Translation
  - Equation of Motion: Rotation about a Fixed Axis
  - Equation of Motion: General Plane Motion

- Kinetics of a Rigid Body: Work & Energy
  - Kinetic Energy
  - Work of a Force
  - Work of a Couple
  - Principle of Work & Energy
  - Conservation of Energy

Grading

The tentative overall grade constitution is as follows:

- Mid-term I : 30 %
- Mid-term II : 30 %
- Final : 40 %