Course Title	**Dynamics**				
Course Code	**MME 225**				
Course Type	Compulsory				
Level	Undergraduate				
Year / Semester	2nd Year / 3rd Semester				
Teacher's Name	Eftychios Christoforou				
ECTS	5	Lectures / week	3+1 hours	Laboratories / week	5 hours total
Course Purpose and Objectives	The purpose of the course is to introduce the fundamental principles of engineering dynamics and their application to motion analysis of particles and rigid bodies in two and three dimensions. Develop relevant problem-solving skills applied to practical engineering problems.				
Learning Outcomes	• Apply vector analysis for obtaining relationships between displacement, velocity, and acceleration for a particle, a system of particles and rigid bodies in two- or three-dimensions. • Use free-body diagrams and apply Newton's second law of motion to analyze the motion of a particle, a system of particles or a rigid body. • Understand the concepts of work, energy, power and mechanical efficiency. • Apply energy and momentum methods for analyzing the dynamic behavior of mechanical systems. • Solve practical problems regarding direct and oblique central impact. • Analyze planar as well as three-dimensional kinematics and dynamics of rigid bodies • Develop analytical skills required to systematically deal with practical dynamics problems involving mechanical systems.				
Prerequisites	MME 125	Required	None		
Course Content	The course introduces the student to the fundamental principles of dynamics and their application in the analysis of motion of particles and rigid bodies in two and three dimensions. Topics covered: (a) kinematics of particles, (b) kinetics of particles (Newton's second law, D'Alembert's principle and dynamic equilibrium, methods of energy and momentum), (c) impact: direct central impact; oblique central impact, (d) kinematics of rigid bodies, (e) planar kinetics of rigid bodies (forces and acceleration, planar motion, energy and momentum methods), and (f) introduction to the dynamics of rigid bodies in three dimensions. **Laboratory Exercises** • Study of mass moment of inertia and angular acceleration • Study of centrifugal force on rotating masses • Study of Coriolis force in rotating reference systems				

Teaching Methodology	• 2 weekly lectures • 1 weekly tutorial • Weekly homework problems • Laboratory exercises • During the first week of the semester the students receive the course syllabus, which includes the course content, bibliography, learning outcomes, assessment and office hours.
Bibliography	• Beer, F.P., R. Johnston and P. Cornwell, *Vector Mechanics for Engineers: Dynamics*. McGraw-Hill. • Bedford, A. and W. Fowler, *Engineering Mechanics: Dynamics*. Pearson.
Assessment	• Laboratory 10% • Midterm exam 40% • Final exam (comprehensive) 50%
Language	Greek