MECH 1200 ENGINEERING DYNAMICS (3 credit hours)

Elmira College

SPRING 2025

Required Text:
R.C. Hibbeler (2022), *Engineering Mechanics: Statics and Dynamics*, 15th edition, Pearson.

Pre-requisites: .
MECH 1100 Introduction to Statics, MATH 2245 Multivariable Calculus

Course Description
This course is designed to provide students with a comprehensive understanding of dynamics, focusing on the motion of particles and rigid bodies. Students will learn to apply fundamental principles such as Newton's laws of motion, work and energy, impulse and momentum, impact, moment of inertia, and rotational axes. The goal is to equip students with the analytical skills necessary to solve real-world engineering problems involving dynamic systems.

Course Objectives and Goals
➢ To utilize vector analysis to understand the kinematics and kinetics of particles and rigid bodies, which is fundamental in various engineering applications.
➢ To grasp and apply Newton's laws of motion to predict and analyze the behavior of objects under different forces.
➢ To perform calculations related to work and energy, essential for assessing the efficiency and performance of mechanical systems.
➢ To comprehend the dynamics of impact and its effects on the motion and structural integrity of materials.
➢ To tackle complex engineering problems involving dynamics principles, preparing students for advanced studies and professional practice.
➢ To enhance critical thinking and problem-solving skills through the analysis of real-world engineering scenarios.

Evaluation of Performance
Your grade will be based upon your performance on exams, assignments, and participation.

6 Assignments	30%
5 Quizzes	30%
Midterm Exam	15%
Final Exam	25%
Total	100%

Grades will be assigned as follows:

A	93% and above	B-	80 - 82%	D+	67 - 69%
A-	90 - 92%	C+	77 - 79%	D	63 - 66%
B+	87 - 89%	C	73 - 76%	D-	60 - 62%
B	83 - 86%	C-	70 - 72%	F	59% or below

Withdrawal Policy: Please see Elmira College Bulletin for information on this policy.

Academic Honesty: Please read the section on Academic Honesty in the **Code of Conduct**. Briefly, academic dishonesty includes: cheating, fabrication, facilitating academic dishonesty, and plagiarism. Ask if you have any questions on whether something constitutes as academic dishonesty. All work must be original and new. Past assignments from current or other courses will not be accepted. Academic dishonesty will not be tolerated. It will result in zero on the assignment, and a report will be filed with the school. Continued practice will result in failure of the class. Institutional penalties may also apply with repeated acts of academic honesty.

Student Responsibility:
- It is your responsibility to keep track of assignments and due dates.
- You should ask questions concerning assignments and lectures, if you need any clarifications.
- If you are struggling in class, have concerns, and/or unsure about expectations, please stop by during office hours or make an appointment for another time.

Tentative Schedule of Topics

Topic	Materials	Tasks & Evaluations
Introduction to Dynamics	Chapter 1	
Kinematics of Particles	Chapter 2	Assignment 1
Kinematics of Rigid Bodies	Chapter 3	Quiz 1
Newton's Laws of Motion	Chapter 4	Assignment 2
Work and Energy	Chapter 5	Quiz 2
Impulse and Momentum	Chapter 6	Assignment 3
Central Force Motion	Chapter 7	
Vibrations and Waves	Chapter 8	Midterm Exam
Planar Kinematics	Chapter 9	
Three-Dimensional Dynamics	Chapter 10	Assignment 4
Static Equilibrium	Chapter 11	Quiz 3
Dynamics of Systems of Particles	Chapter 12	Assignment 5
Rigid Body Dynamics in 3D	Chapter 13	Quiz 4
Vibration Basics	Chapter 14	Assignment 6
Mechanism Kinematics and Dynamics	Chapter 15	Quiz 5
Vibration Analysis	Chapter 16	
Control Systems and Dynamics	Chapter 17	Final Exam