Identification	**Subject**	ME 262 Dynamics - 6 ECTS	
	Department	Mechanical Engineering	
	Program	Undergraduate	
	Term	Spring 2024	
	Instructor	Dr. Mehdi Kiyasatfar	
	E-mail:	mkiyasatfar@khazar.org	
	Phone:		
	Classroom/hours		
	Office hours		
Prerequisites	Engineering mechanics		
Language	English		
Compulsory/Elective	Compulsory		
Required textbooks and course materials	Engineering Mechanics: Dynamic by Meriam, Kraige, and Bolton, 9th edition, Wiley 2019		
Course website			
Course outline	Dynamics is subdivision of mechanics that is concerned with motion of bodies considering the factors which cause motion. The study of dynamics in engineering usually follows the study of statics. Dynamics has two distinct parts: kinematics, which is the study of motion without reference to the forces which cause the motion, and kinetics, which relates the action of forces on bodies to their resulting motions. Understanding of dynamics will provide one of the most useful and powerful tools for analysis in engineering.		
Course objectives	This course is designed to give students a broad understanding basic laws and principles of plane kinematics and kinetics of particle and rigid body.		
Learning outcomes	On successful completion of this course students will be able to: 1. define basic kinematic quantities of rectilinear and curvilinear motion of particle such as: position, displacement, velocity, and acceleration. 2. describe and understand plane kinematics of rigid bodies. 3. explain basic terms in kinetics of particles: Newton's second law, work and kinetic energy, impulse, and momentum, gravitational and elastic potential energy. 4. discuss direct and oblique central impact. 5. determine moments and products of inertia of a mass. 6. explain plane kinetics of rigid bodies.		
Teaching methods	**Lecture**		x
	Group discussion		x
	Experiential exercise		--
	Tutorials once a month on weekends		--
	Case analysis and assignments		x
	Course paper		--
	Others		--
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		25
	Class Participation	At each lesson	5
	Quiz	During the semester	10
	Assignment	During the semester	20
	Final Exam		40
	Total		100
Policy	▪ **Ethics** Copying other students' work is highly discouraged. All assignments must be handled by the student himself. This is a university policy and violators will be reprimanded accordingly.		

	▪ **Preparation for class** The structure of this course demands your individual effort outside the classroom for extra practice of many problems within the textbook. After each session, every student needs to put sufficient time to practice and finish the assignments by the predetermined date. • **Withdrawal (pass/fail)** This course strictly follows the grading policy of the School of Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. ▪ **Cheating/plagiarism** Cheating or other plagiarism in handling the assignments, Mid-term and Final Examinations will lead to course failure. In this case, the student will automatically get zero (0), without any considerations. ▪ **Professional behavior guidelines** The students shall behave in a way to create a favorable academic and professional environment during the class hours. ▪ **Attendance** Students who attend the sessions will get 5 marks. For three absence student loses 1 mark. ▪ **Quiz** There will be quizzes for checking understanding of content during class. We are not going to give make up for a missing Quiz due to any reason other than medical report. ▪ **Assignment** There will be a homework assignment for every chapter composed of problems.

Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/Assignments
1		Syllabus & Introduction. Basic concepts of dynamics.	Chap 1
2		Introduction to kinematics of particles. Rectilinear motion.	Chap 2
3		Plane curvilinear motion. Rectilinear coordinates.	Chap 2
4		Normal and tangential coordinates. Polar coordinates.	Chap 2
5		Space curvilinear motion. Relative motion.	Chap 2
6		Constrained motion of connected particles. Solve problems.	Chap 2
7		Introduction to kinetics of particles. Force, mass, and acceleration, Newtown's second law. Calculation of motion.	Chap 3&4
8		Solve problems – Review. **Midterm**	
9		Work and Kinetics Energy. Potential Energy.	Chap 3&4
10		Impulse and momentum	Chap 3&4

11		Kinetics of systems of particles. Review.	Chap 3&4
12		Plane kinematics of Rigid Bodies. Rotation. Absolute motion.	Chap 5
13		Plane kinematics of Rigid Bodies. Relative velocity. Instantaneous center of zero velocity	Chap 5
14		Plane Kinetics of Rigid Bodies. General Equations of motion	Chap 6
15		Review – Solve problems	
16		**Final Exam**	