

IM 224 MECHANICS II (Dynamics)		CIVIL ENGINEERING	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
4	3	0	0
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	IM 223 – Mechanics I (Statics)		
Catalog Description	Kinematics of particles, planar relative motion, systems of particles. Kinetics of particles, work and energy, impulse and momentum. Kinematics of rigid bodies, planar motion of rigid bodies, methods of energy and momentum. Vibrations.		
Course Objectives	Teaching the analysis of the motion of bodies by the use of the fundamentals of engineering mechanics.		
Course Outcomes	Ability to solve basic motion and vibration problems.		
Textbook and /or References	Vector Mechanics For Engineers, Dynamics, F.P. Beer and E.R.Johnston, Mc Graw-Hill, 6 th Edition.		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	50
	Quizzes	-	-
	Homeworks	-	-
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	50	
	Engineering Design	0	
	Social Sciences	0	
Instructors	Prof. Dr. Tekin Gültop, Doç. Dr. Kurtuluş Soyluk		

COURSE PLAN

Week	Topics
1	LINEAR MOTION: Rectilinear motion, constrained motion, relative motion.
2	CURVILINEAR MOTION: Cartesian, polar, normal and tangential coordinates, radius of curvature, differentiation of unit vectors.
3	PLANAR RELATIVE MOTION: Absolute and relative coordinate frames, differentiation of vectors, sample problems.
4	KINETICS OF PARTICLES: Newton's law of motion, equations of motion in different coordinate systems.
5	1st MIDTERM EXAMINATION
6	MOMENTUM: Linear momentum of particles, linear impulse, angular momentum and impulse.
7	WORK AND ENERGY: Elastic and gravitational potential energy, kinetic energy, work and energy, conservation of energy.
8	SYSTEMS OF PARTICLES: Angular momentum and impulse, conservation of angular momentum and impulse, collisions.
9	KINEMATICS OF RIGID BODIES: Planar motion, relative motion.
10	KINETICS OF RIGID BODIES: Equations of motion, rotational motion.
11	2nd MIDTERM EXAMINATION
12	MOMENTUM AND IMPULSE: Principle of angular momentum and impulse in rigid bodies.
13	ENERGY: Conservation of energy in rigid bodies in rigid bodies and applications.
14	VIBRATIONS: Free and forced vibration, damped vibration, vibration under ground motion.

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM

Program Outcomes		1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data	X		
3	An ability to design a system, component, or process to meet desired needs		X	
4	An ability to function on multi-disciplinary teams	X		
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility		X	
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context			X
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues	X		
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	X		

Contribution of the course : 1:None 2:Partially 3:Completely