COURSE DESCRIPTION FORM	
Course Code and Title	CE224 MECHANICS II (DYNAMICS)
Semester	4
Catalog description	Study of motion for particles and rigid bodies using vector mechanics.
Required reading	R.C. Hibbeler, "Engineering Mechanics: Dynamics", Pearson.
Recommended reading	F.P. Beer & E.R. Johnston, "Vector Mechanics For Engineers: Statics", McGraw Hill.
ECTS	5
Prerequisites and co-requisites	Prerequisite of this course is: **CE223 Mechanics I (Statics)** Required attendance to lectures is at least 70% of total term hours.
Compulsory/Elective	Compulsory course
Language of instruction	English
Aim of course	The aim of this course is to teach how to determine the kinematic and kinetic quantities for motion of particles and rigid bodies and solve related problems with the emphasis on engineering examples.
Learning outcomes of the course unit	Upon completion of the course student should be able to; 1. Analyze the problems related with particle kinematics, 2. Determine the kinematical quantities for relative and dependent motion, 3. Define the components of kinematical quantities in certain coordinate systems, 4. Write the equation of motion for different coordinate systems and solve kinetic problems, 5. Solve particle kinetics problems using energy methods , 6. Solve particle kinetics problems using momentum methods, 7. Analyze systems of rigid bodies and define the kinematic quantities for each rigid body, 8. Solve rigid body kinetics problems using energy and momentum methods, 9. Solve one degree of freedom vibration problems.
Mode of delivery	The mode of delivery of this course is face to face.
Course content	1. Course information, particle kinematics, definition of motion, rectilinear and curvilinear motion. 2. Curvilinear motion: Cartesian components, normal and tangential components, cylindrical and polar components. 3. Planar relative motion: Motion of coordinate frame, planar dependent and relative motion. 4. Particle kinetics: Newton's laws of motion, equation of motion in Cartesian coordinate system, equation of motion for system of particles. 5. Particle kinetics: Equation of motion using normal and tangential coordinates, Polar coordinates. 6. Energy methods: Work done by a force, work and energy principle, work and energy principle for system of particles, conservation of energy 7. Momentum methods: Linear momentum and impulse, particle systems, angular momentum, conservation of momentum 8. Momentum methods: Linear momentum and impulse, particle systems, angular momentum, conservation of momentum and Midterm examination-1

	9. Rigid body kinematics: Planar motion, translation and rotation about a fixed axis. Velocity and acceleration analysis for absolute and relative motion. 10. Rigid body kinetics: Mass moment of inertia, equation of motion. 11. Rigid body kinetics: Energy and momentum methods. 12. Rigid body kinetics: Energy and momentum methods. 13. Midterm examination-2 14. Vibrations: Particle and rigid body vibrations. 15. Vibrations: Particle and rigid body vibrations.
Planned learning activities and teaching methods	3 lecture hours per week (3+0) Reading Midterm exam and required works Final exam and required works

Assessment methods and criteria

	Quantity	Percentage (%)
Mid-terms	2	60
Assignment	-	-
Exercises	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Contribution of In-term Studies to Overall Grade %		60
Contribution of Final Examination to Overall Grade (%)		40
Attendance		

Workload

Work activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester
Theoretical Study Hours of Course Per Week	14	3	42
Practicing Hours of Course Per Week	0	0	0
Reading	14	3	42
Searching in Internet and Library	0	0	0
Designing and Applying Materials	0	0	0
Preparing Reports	0	0	0
Preparing Presentation	0	0	0
Presentation	0	0	0
Mid-Term and Studying for Mid-Term	2	15	30
Final and Studying for Final	1	15	15
Other	0	0	0
Total Workload:			129
Total Workload / 25:			5.16
ECTS:			5

Course's contribution to program

No	Program Learning Outcomes	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.					X
2	Ability to identify, formulate, and solve complex civil engineering problems; ability to select and apply proper analysis and				X	

		modeling methods for this purpose.					
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.					
	4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in civil engineering practice; ability to employ information technologies and to use at least one computer programming language effectively.					
	5	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex civil engineering problems or discipline specific research questions.					
	6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.					
	7	Ability to work individually.					X
	8	Ability to communicate effectively in Turkish, both orally and in writing; ability to write effective reports and comprehend written reports.					
	9	Knowledge of English of B1 level according to Common European Framework of Reference.				X	
	10	Prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.					
	11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.					
	12	Consciousness to behave according to ethical principles and professional and ethical responsibility.					
	13	Knowledge on standards used in civil engineering practice.					
	14	Knowledge about business life practices such as project management, risk management, and change management.					
	15	Awareness in entrepreneurship, innovation; knowledge about sustainable development.					
	16	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering.					
	17	Awareness of the legal consequences of engineering solutions.					
Name of lecturer(s) and contact information	Prof. Dr. Tekin GÜLTOP, tgultop@gazi.edu.tr, Prof. Dr. Kurtuluş SOYLUK,ksoyluk@gazi.edu.tr Assoc. Dr. Bahadır ALYAVUZ, balyavuz@gazi.edu.tr						