İzmir Institute of Technology

Faculty of Engineering
MECHANICAL ENGINEERING

ME222	DYNAMICS				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
4	ME222	DYNAMICS	2+2	3	5

Mode of Delivery:
Face to Face
Language of Instruction:
English
Level of Course Unit:
First Cycle
Work Placement(s):
No
Department / Program:
MECHANICAL ENGINEERING
Type of Course Unit:
Required
Objectives of the Course:
The main objective of this course is to offer students the basics of kinematics and the kinetics of particle/rigid bodies and provide the background necessary for advanced courses related to Dynamics offered in the Mechanical Engineering Department.
Teaching Methods and Techniques:
Motion of Particles. Rigid Bodies under the action of Forces and Moments. Newton's Second Law of Motion. Kinematics of Motion in Rectangular and Polar Coordinates. Work Energy and Impulse-Momentum Method.
Prerequisites and co-requisities:
(ME221 or MATH142)
Course Coordinator:

Name of Lecturers:
Prof.Dr. BÜLENT YARDIMOĞLU
Assistants:

Recommended or Required Reading

Resources J.L.Meriam & L.G.Kraige, 'Engineering Mechanics Dynamics', John Wiley, 4th Edition, New York, 1998.

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Introduction to Dynamics.		p.1-12
2	Plane kinematics of particle: Introduction, Rectilinear motion.		p. 17-45
3	Plane kinematics of particle: curvilinear motion, relative motion.		p. 54-71, p. 90-93
4	Plane kinetics of particle: force-mass-acceleration.		p. 117-156
5	Plane kinetics of particle: Work and Energy.		p. 157-190
6	Plane kinetics of particle: Impulse and Momentum, Special applicatios.		p. 191-229
7	Midterm exam 1.		
8	Plane kinematics of rigid bodies: introduction, rotation, absolute motion.		p. 325-350
9	Plane kinematics of rigid bodies: relative velocity and acceleration, velocity pole.		p. 351-390
10	Plane kinematics of rigid bodies: motion relative to rotating axes.		p. 391-406
11	Plane kinetics of rigid bodies: force-mass-acceleration.		p. 416-469
12	Plane kinetics of rigid bodies: Work and Energy.		p. 470-497
13	Plane kinetics of rigid bodies: Impulse and Momentum.		p. 498-516
14	Midterm exam 2.		
15	Final 1st week		
16	Final 2nd week		

Course Learning Outcomes

No	Learning Outcomes
C01	Knowledge of kinematics of particles and rigid bodies with vector calculus.
C02	Knowledge of kinetics of particles and rigid bodies with Newton and energy methods.
C03	Ability to formulate and solve dynamics problems in proper co-ordinate systems by convenient way.
C04	Ability to create mechanical systems by using knowledge gained in this course.

Program Learning Outcomes

No	Learning Outcome
P01	Sufficient knowledge of mathematics, science and program-specific engineering topics
P05	Ability to design a complex system, process, instrument or product under realistic constraints and conditions, with the goal of fulfilling specified requirements
P23	Knowledge about contemporary issues and the global and societal effects of engineering practices on health, environment, and safety; awareness of the legal consequences of engineering solutions
P22	Awareness of entrepreneurship and inovativeness; knowledge about sustainable development
P21	Knowledge of business practices such as project management, risk management and change management
P20	Knowledge of standards used in engineering applications
P19	Consciousness of acting upon the code of ethics, knowledge of professional and ethical resposibility
P18	Awareness of the necesity of life-long learning; ability to access knowledge, to follow developments in science and technology and to to continue to educate her/himself
P17	Ability to give and receive clear and intelligible instructions
P16	Ability to prepare design and production reports
P04	Ability to choose and apply suitable analysis and modeling methods to solve complex engineering problems
P15	Ability to effectively write reports and to understand written reports
P13	Ability to work individually
P12	Ability to work effectively in disciplinary and multi-disciplinary teams
P11	Ability to analyze and interpret the experimental results to investigate complex engineering problems or program-specific research areas
P10	Ability to conduct experiments and collect data to investigate complex engineering problems or program-specific research areas
P09	Ability to design experiments to investigate complex engineering problems or program-specific research areas
P08	Ability to use information technologies effectively for analysis and solution of complex problems faced in engineering applications
P07	Ability to choose and use modern techniques and tools needed for analysis and solution of complex problems faced in engineering applications
P03	Ability to define, formulate and solve complex engineering problems
P02	Ability to use theoretical and applied knowledge of mathematics, science and program-specific engineering topics in complex engineering problems
P14	Ability of oral communication and presentation in the language of instruction
P06	Ability to apply modern design techniques in order to design a complex system

Assessment Methods and Criteria		
In-Term Studies	**Quantity**	**Percentage**
Midterm exams	2	%50
Quizzes	0	%0
Homeworks	2	%10
Other activities	0	%0
Laboratory works	0	%0
Projects	0	%0
Final examination	1	%40
Total		**% 100**

ECTS Allocated Based on Student Workload			
Activities	**Quantity**	**Duration**	**Total Work Load**
Weekly Course Time	1	36	36
Outside Activities About Course (Attendance, Presentation, Midterm exam,Final exam, Quiz etc.)	1	28	28
Application (Homework, Reading, Self Study etc.)	0	0	0
Laboratory	0	0	0
Exams and Exam Preparations	1	46	46
Total Work Load			**110**
ECTS Credit of the Course			**4**

Contribution of Learning Outcomes to Programme Outcomes

Contribution: 0: Null 1:Slight 2:Moderate 3:Significant 4:Very Significant