İzmir Institute of Technology

Faculty of Engineering
Mechanical Engineering BS

ME462	DYNAMIC MODELLING AND CONTROL OF ROBOTS				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
8	ME462	DYNAMIC MODELLING AND CONTROL OF ROBOTS	3	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 BS
Type of Course Unit:
Elective
Objectives of the Course:
This course is a robotics course where the main focus is on dynamic modelling of robots and controller design using computer-aided engineering tools. This course aims to make use of the theoretical dynamic modelling and controller design information in task-oriented custom simulation development. Thus, provide the application knowledge of these theoires in a simulation environment.
Teaching Methods and Techniques:
• Mechanism construction in CAD software • Dynamic modelling of robots • Task-oriented simulation of the robot • Creating the virtual reality representation of the robot • Controller design and tests in simulation environment
Prerequisites and co-requisities:

Course Coordinator:

Name of Lecturers:
Asist Prof.Dr. MEHMET İSMET CAN DEDE
Assistants:

Recommended or Required Reading

Resources J. J. Craig, "Introduction to Robotics: Mechanics and Control," Prentice Hall, 3rd Edition, New Jersey, 2004.,M.İ.C. Dede, "Fault-Tolerant Teleoperation S

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Review of robot kinematics		J. J. Craig, "Introduction to Robotics: Me
2	Review of robot dynamics		J. J. Craig, "Introduction to Robotics: Me
3	Mechanism construction in CAD software		M.İ.C. Dede, "Fault-Tolerant Teleoperati
4	Mechanism construction in CAD software		M.İ.C. Dede, "Fault-Tolerant Teleoperati
5	Introduction to Matlab Simulink		M.İ.C. Dede, "Fault-Tolerant Teleoperati
6	Dynamic modelling of robots		M.İ.C. Dede, "Fault-Tolerant Teleoperati
7	Midterm Exam		J. J. Craig, "Introduction to Robotics: Me
8	Task-oriented simulation of the robot		M.İ.C. Dede, "Fault-Tolerant Teleoperati
9	Task-oriented simulation of the robot		M.İ.C. Dede, "Fault-Tolerant Teleoperati
10	Creating the virtual reality representation of the robot		M.İ.C. Dede, "Fault-Tolerant Teleoperati
11	Controller design and tests in simulation environment		M.İ.C. Dede, "Fault-Tolerant Teleoperati
12	Controller design and tests in simulation environment		J. J. Craig, "Introduction to Robotics: Me
13	Controller design and tests in simulation environment		J. J. Craig, "Introduction to Robotics: Me
14	Controller design and tests in simulation environment		J. J. Craig, "Introduction to Robotics: Me
15	Final 1st week		J. J. Craig, "Introduction to Robotics: Me
16	Final 2nd week		J. J. Craig, "Introduction to Robotics: Me

Course Learning Outcomes

No	Learning Outcomes
C01	Ability to develop CAD model of a robot arm
C02	Ability to perform mechanism analysis of a robot arm in CAD environment
C03	Ability to develop a robot arm s dynamics model in Matlab Simulink simulation environment
C04	Ability to carry out task-oriented simulation of a robot arm and to document the study
C05	Ability to create the virtual reality representation of a robot arm
C06	Ability to design and test robot arm controller, and to report and present the test results

Program Learning Outcomes

No	Learning Outcome
P03	To have the ability to use modern technical tools which are necessary for engineering applications and to efficiently implement information technologies.
P02	To be able to design a complicated system or device that can satisfy the requirements under realistic conditions; to have the ability to use modern design methods for that purpose.
P04	To have the ability to detect, define, formulize and solve complicated engineering problems.
P06	To have the ability to design experiments, analyze and interpret results in order to examine engineering problems.
P05	To be able to choose and apply modeling and analysis methods for the encountered problems.
P01	To have the ability of modeling and solving engineering problems, using the acquired information about math, science and engineering subjects.
P08	To have the ability to construct verbal and written communication in educational language.
P07	To have the ability to work in disciplinary and interdisciplinary teams efficiently.
P09	To be able to act conscious for the necessity of innovation and lifetime-learning; to have the ability of self-renewal and to follow the progress.
P11	To be able to have tendency to the applications in professional life and creativity.
P10	To have the ability to act with a sense of professional and ethical responsibility; and with environmental and safety concerns.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Midterm exams	1	%20
Quizzes	4	%20
Homeworks	0	%0
Other activities	0	%0
Laboratory works	0	%0
Projects	2	%40
Final examination	1	%20
Total		**%100**

ECTS Allocated Based on Student Workload

Activities	Quantity	Duration	Total Work Load
Weekly Course Time	1	39	39
Outside Activities About Course (Attendance, Presentation, Midterm exam,Final exam, Quiz etc.)	1	42	42
Application (Homework, Reading, Self Study etc.)	0	0	0
Laboratory	0	0	0
Exams and Exam Preparations	1	45	45
Total Work Load			**126**
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

	P01	P02	P03	P04	P05	P06	P08	P09	P11
C01	2	4	4	2	2			1	
C02	1	3	3	2	4	4		1	
C03	3	3	4	2	4			1	
C04	3	3	4	4	2		2	1	1
C05	3	3	4	2	4			1	1
C06	1	3	3	2	4	4	2	1	