İzmir Institute of Technology

INSTITUTE OF ENGINEERING AND SCIENCE(M.S.)
MECHANICAL ENGINEERING

ME579	PRINCIPLES OF ROBOTICS II				
Semester	**Course Unit Code**	**Course Unit Title**	**L+P**	**Credit**	**Number of ECTS Credits**
2	ME579	PRINCIPLES OF ROBOTICS II	3	3	8

Mode of Delivery:
Face to Face
Language of Instruction:
English
Level of Course Unit:
Second Cycle
Work Placement(s):
No
Department / Program:
MECHANICAL ENGINEERING
Type of Course Unit:
Elective
Objectives of the Course:
At the end of this course, the student will be able to; - Carry out the quasi-static force/torque analysis of a serial or parallel industrial robot; - Accomplish the forward and inverse dynamic analyses of a serial or parallel industrial robot. - Design free position controller of robot manipulators and position controller of robot manipulators with surface-contact
Teaching Methods and Techniques:
- Overview of Vectors and Fundamentals of Kinematics - Quasi-Static Force/Torque Analysis using Virtual Work Method - Forward and Inverse Dynamic Analyses using the Newton-Euler and Lagrange's Equations - Dynamic Analysis of Serial and Parallel Industrial Robots - Free Position Control of Robot Manipulators - Position Control of Robot Manipulators with Surface Contact
Prerequisites and co-requisities:
(ME571 or ME574)
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. W. Spong, and M. Vidyasagar, "Robot Dy

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Overview of Robot Kinematics		J. J. Craig, "Introduction to Robotics: Me
2	Overview of Robot Kinematics		J. J. Craig, "Introduction to Robotics: Me
3	Overview of Robot Kinematics		J. J. Craig, "Introduction to Robotics: Me
4	Quasi-Static Force/Torque Analysis		J. J. Craig, "Introduction to Robotics: Me
5	Quasi-Static Force/Torque Analysis		J. J. Craig, "Introduction to Robotics: Me
6	Quasi-Static Force/Torque Analysis		J. J. Craig, "Introduction to Robotics: Me
7	Midterm Exam #1		J. J. Craig, "Introduction to Robotics: Me
8	Inverse Dynamics Analysis with Newton-Euler Formulation		J. J. Craig, "Introduction to Robotics: Me
9	Inverse Dynamics Analysis with Newton-Euler Formulation		J. J. Craig, "Introduction to Robotics: Me
10	Inverse Dynamics Analysis with Newton-Euler Formulation		J. J. Craig, "Introduction to Robotics: Me
11	Midterm Exam #2		J. J. Craig, "Introduction to Robotics: Me
12	Forward Dynamics Analysis with Lagrange s Equation		J. J. Craig, "Introduction to Robotics: Me
13	Forward Dynamics Analysis with Lagrange s Equation		J. J. Craig, "Introduction to Robotics: Me
14	Forward Dynamics Analysis with Lagrange s Equation		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 perform quasi-static force/torque analysis for robot manipulators
C02	Ability to perform inverse dynamic analysis for robot manipulators
C03	Ability to perform forward dynamic analysis for robot manipulators
C04	Ability to design controller for robot manipulators

Program Learning Outcomes

No	Learning Outcome
P05	To have advanced skills in scientific and technical writing and oral communication.
P06	To have the ability to present his/her study in national or international congresses, conferences and other scientific meetings.
P07	To have an appreciation of ethical values in scientific and technical studies.
P04	To have the ability to identify, model, formulate, and solve mechanical engineering problems in the field of research.
P01	To have advanced knowledge in the master thesis subject.
P02	To have the ability to carry out independent research and study.
P03	To have the ability to use the knowledge learned in the courses.

Assessment Methods and Criteria

In-Term Studies	Quantity	Percentage
Midterm exams	2	%50
Quizzes	5	%15
Homeworks	0	%0
Other activities	0	%0
Laboratory works	0	%0
Projects	0	%0
Final examination	1	%35
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	112	112
Application (Homework, Reading, Self Study etc.)	0	0	0
Laboratory	0	0	0
Exams and Exam Preparations	1	36	36
Total Work Load			**184**
ECTS Credit of the Course			**8**

Contribution of Learning Outcomes to Programme Outcomes

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

	P01	P02	P03	P04
C01	3	1	1	4
C02	3	1	1	4
C03	3	1	1	4
C04	3	1	1	4