



Izmir Institute of Technology

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

ME580 HAPTICS AND TELEOPERATION					
Semester	Course Unit Code	Course Unit Title	L+P	Credit	Number of ECTS Credits
1	ME580	HAPTICS AND TELEOPERATION	3	3	7

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:

This course covers the field of haptics as it relates to creating touch feedback in simulated virtual environments and in teleoperation systems. It provides an introduction to bilateral teleoperation systems and haptic interfaces. Topics include haptic device design, classification of teleoperation systems, applications of teleoperation, master-slave telemanipulators, human-computer interaction, and parallel position/force and teleoperation controllers.

Teaching Methods and Techniques:

- Introduction to haptics - Haptics device design - Virtual Reality in haptics - Classification of teleoperation systems - Fault tolerance concept in teleoperation - Parallel position/force controllers - Teleoperation controllers

Prerequisites and co-requisites:

Course Coordinator:

Name of Lecturers:

Asist Prof.Dr. MEHMET İSMET CAN DEDE

Assistants:

Recommended or Required Reading

Resources G.C. Burdea, "Force and Touch Feedback for Virtual Reality," Wiley, 1st Edition, New York, 1996.,T.A. Kern, "Engineering Haptic Devices: A Beginner's

Weekly Detailed Course Contents

Week	Topics	Study Materials	Materials
1	Overview of course and robotics		T.A. Kern, "Engineering Haptic Devices:
2	Basics of haptics and teleoperation		T.A. Kern, "Engineering Haptic Devices:
3	Computer aided modeling techniques		M.I.C. Dede, "Fault-Tolerant Teleoperati
4	Terminology in haptics		T.A. Kern, "Engineering Haptic Devices:
5	Human haptic sensing, neurophysiology and psychophysics		T.A. Kern, "Engineering Haptic Devices:
6	Modeling the user		T.A. Kern, "Engineering Haptic Devices:
7	Human-Computer Interaction		T.A. Kern, "Engineering Haptic Devices:
8	Control of haptic devices		T.A. Kern, "Engineering Haptic Devices:
9	Haptic Device Design		T.A. Kern, "Engineering Haptic Devices:
10	Interface selection		T.A. Kern, "Engineering Haptic Devices:
11	Teleoperation systems		M.I.C. Dede, "Fault-Tolerant Teleoperati
12	Fault tolerance in teleoperation		M.I.C. Dede, "Fault-Tolerant Teleoperati
13	Time delay problem		M.I.C. Dede, "Fault-Tolerant Teleoperati
14	Control of teleoperation systems		M.I.C. Dede, "Fault-Tolerant Teleoperati
15	Final 1st week		T.A. Kern, "Engineering Haptic Devices:
16	Final 2nd week		T.A. Kern, "Engineering Haptic Devices:

Course Learning Outcomes

No	Learning Outcomes
C01	Ability to design haptic devices and teleoperation systems
C02	Ability to propose a design project related with haptics and teleoperation
C03	Ability to conduct experiments with haptic devices and teleoperation systems
C04	Ability to construct models of physical systems in virtual environment
C05	Ability to compare and evaluate haptic device structures
C06	Ability to present the design project among the peers and the instructor

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	0	%0
Quizzes	0	%0
Homeworks	0	%0
Other activities	0	%0
Laboratory works	0	%0
Projects	3	%60
Final examination	1	%40
Total		%100

ECTS Allocated Based on Student Workload			
Activities	Quantity	Duration	Total Work Load
Weekly Course Time	1	42	42
Outside Activities About Course (Attendance, Presentation, Midterm exam, Final exam, Quiz etc.)	1	90	90
Application (Homework, Reading, Self Study etc.)	0	0	0
Laboratory	0	0	0
Exams and Exam Preparations	1	27	27
Total Work Load			159
ECTS Credit of the Course			5

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	P07
C01	2	2	2	4			
C02		2		2	4		
C03	2	2	2	4			
C04	2		2	4			
C05	2	2	2	4			
C06		2	2		4	2	1