AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Microfluidics								
Course Code	MME506		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	9	Workload	225 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	Help students to learn the concept of microfluidics and its applications in lab-on-a-chip systems								
Course Content	Introduction to microfluidics, fabrication methods for microfluidics, applications of microfluidics in lab-on-a-chip systems, microfluidic sample preparation and detection, organ-on-a-chip, and unconventional microfluidics will be covered in this course.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Discussion, Problem Solving								
Name of Lecturer(s)	Assoc. Prof. Adem ÖZÇELİK								

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	20
Final Examination	1	50
Assignment	3	10
Project	1	20

Recommended or Required Reading	
1	1. Patrick Tabeling, Introduction to Microfluidics, Oxford University Press, 2010.
2	2. Henrik Bruus, Theoretical microfluidics, Oxford University, 2007.
3	3. Nam-Trung Nguyen, Steven T. Wereley, Fundamentals and Applications of Microfluidics, Artec House, 2002.

Week	Weekly Detailed Course Contents	
1	Theoretical	Concept of microfluidics
2	Theoretical	Basic Theory of microfluidics
3	Theoretical	Microfluidic transport
4	Theoretical	Fabrication and material selection for microfluidics
5	Theoretical	Microfluidic sample preparation and analysis
6	Theoretical	Microfluidic cell culture
7	Theoretical	Lab-on-a-chip applications
8	Intermediate Exam	Midterm Exam
9	Theoretical	Organ-on-a-chip applications
10	Theoretical	Digital microfluidics
11	Theoretical	Paper based microfluidics
12	Theoretical	Applications of acoustics in microfluidics
13	Theoretical	Applications of magnetic/optic/electric field in microfluidics
14	Theoretical	Flexible microfluidic electronics and Flexible microfluidic force sensor for tactile feedback
15	Theoretical	Microfluidic-based soft robotics
16	Final Exam	Final Exam

Workload Calculation				
Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	14	5	3	112
Assignment	3	6	0	18
Term Project	1	20	10	30
Quiz	5	4	1	25
Midterm Examination	1	16	2	18

Final Examination	1	20	2	22
			Total Workload (Hours)	225
			[Total Workload (Hours) / 25*] = **ECTS**	9
**25 hour workload is accepted as 1 ECTS*				

Learning Outcomes	
1	1. To be able understand the fundamentals of microfluidics technology and apply it towards the manipulation and analysis of biological cells and biomolecules on biochips.
2	2. To be able to design a microfluidic LOC system to solve a real-world diagnostics problem.
3	3. To be able to describe the steps in constructing a microsystem (design, fabrication) for biological sample preparation and analysis.
4	4. To be able to recognize the benefits of using microfluidics
5	5. To be able to conduct literature search and present on a given topic.

Programme Outcomes *(Mechanical Engineering (English) Master)*	
1	To be able to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	To be able to complete and implement “limited or incomplete data” by using the scientific methods
3	To be able to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	To be able to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	To be able to gain comprehensive information on modern techniques, methods and their borders which are being applied to engineering
6	To be able to design and apply analytical, modeling and experimental based research, analyze and interpret the faced complex issues during the design and apply process
7	To be able to gain high level ability to define the required information and data
8	To be able to work in multi-disciplinary teams and to take responsibility to define approaches for complex situations
9	To be able to transfer of the process and results of studies at national and international environments systematic and clear verbal or written
10	To be able to be aware of social, scientific and ethical values guarding adequacy at all professional activities and at the stage of data collection, interpretation, and announcement
11	To be able to become aware of new and developing application of profession and ability to analyze and study on those applications
12	To be able to interpret engineering application’s social and environmental dimensions and it’s compliance with the social environment

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5
P1	5	5	5	4	4
P2	5	4	4	5	5
P3	5	5	5	4	4
P4	4	4	4	5	5
P5	5	5	5	4	4
P6	4	4	4	5	5
P7	5	5	5	4	5
P8	4	4	4	5	5
P9	5	5	5	4	4
P10	4	4	4	3	4
P11	5	5	5	4	3
P12	4	4	4	5	4