ABDULLAH GÜL UIVERSITY
GRADUATE SCHOOL OF ENGİNEERİNG AND SCIENCE
ADVANCED MATERIALS AND NANOTECHNOLOGY MSC. PROGRAM
COURSE DESCRIPTION

Course Name	Code	Semester	T+P Hour	Credit	ECTS
Membrane Technology	AMN 550	FALL - SPRING	3 + 0	3	10

Prerequisite Courses	-

Type of the Course	Selective
Language of Instruction	English
Coordinator of the Course	Assist. Prof. İlker ERDEM
Lecturer(s) of the Course	Assist. Prof. İlker ERDEM
Assisting Personnel	-
Objective of the Course	Introduction of fundamentals on properties, preparation, utilization and characterization of membranes which can be used for versatile applications like separation, purification, concentration
Learning Outcomes	1. Learning types of membranes and their utilization in different applications 2. Learning raw materials of membranes 3. Learning properties of membranes 4. Learning techniques used for characterization of technical properties of membranes 5. Learning utilization of membranes for different purposes
Course Content	• Introduction of types of membranes and their application areas, • Introduction of structure of membranes, • Introduction of processing techniques for membranes, • Introduction of characteristics of membranes, • Introduction of characterization methods for membranes, • Introduction of technological applications for various membrane types

SUBJECTS, PRELIMINARY PREPARATIONS AND POST-LECTURE ACTIVITIES

Week	Subjects	Practice
1	**Introduction:** Membranes and their technologic importance	
2	**The types of membranes and their application areas:** Polymer, ceramic and metal membranes and their applications	
3	**The structure of membranes:** The materials used in different membranes and their structures	
4	**The structure of membranes:** The materials used in different membranes and their structures	
5	**Processing techniques for membranes:** Preparation of membranes via different raw materials	
6	**Processing techniques for membranes:** Preparation of membranes via different raw materials	
7	**Characteristics of membranes:** Porosity, permeability, separation/retention efficiency	
8	**Characteristics of membranes:** Porosity, permeability, separation/retention efficiency	
9	**Characterization of membranes:** Permeability determination methods, microscopic characterization techniques, etc.	
10	**Midterm**	
11	**Characterization of membranes:** Permeability	

	determination methods, microscopic characterization techniques, etc.	
12	**Different applications of membranes:** Dialysis, pressure-driven filtration applications (micro-, ultra-, nano-filtration, reverse osmosis) techniques and their utilization in different industries.	
13	**Different applications of membranes:** Dialysis, pressure-driven filtration applications (micro-, ultra-, nano-filtration, reverse osmosis) techniques and their utilization in different industries.	
14	**Different applications of membranes:** Dialysis, pressure-driven filtration applications (micro-, ultra-, nano-filtration, reverse osmosis) techniques and their utilization in different industries.	
15	**Different applications of membranes:** Dialysis, pressure-driven filtration applications (micro-, ultra-, nano-filtration, reverse osmosis) techniques and their utilization in different industries.	

SOURCES/REFERENCES	
Course Notes	The notes and the slides of the course
Other References	• M. Cheryan, "Ultrafiltration and Microfiltration Handbook", 2nd Ed., CRC Press, 1998. • K. Li, "Ceramic Membranes for Separation and Reaction", John Wiley & Sons Ltd., West Sussex, 2007. • R.R. Bhave, "Inorganic Membranes Synthesis, Characteristics and Applications", Van Nostrand Reinhold, NY, 1991. • A. I. Schafer, A. G. Fane, T. D. Waite, "Nanofiltration – Principles and Applications", Elsevier, 2005. • c

MATERIAL SHARING	
Documents	The lecturing slides of the course are shared on canvas or another online application
Homeworks	The homeworks are shared on canvas or another online application.
Exams	
Projects	

EVALUATION METHODS		
IN-TERM ACTIVITIES	**QUANTITY**	**WEIGHT, %**
Midterm Exam	1	30
Homework	4	5
Term Project	1	25
Final Exam	1	40
TOTAL		100
Effect of in-term Activities on Success		60
Effect of Final Exam on Success		40
TOTAL		100

Course Category	
Basic Sciences and Mathematics	
Engineering Sciences	X
Social Sciences	

RELATIONSHIP BETWEEN LEARNING OUTCOMES OF THE COURSE WITH THE QUALIFICATIONS OF THE PROGRAM		
No	Program Qualifications	Contribution Level

		1	2	3	4	5
1	PQ1. Ability of Working Independently and Taking Responsibility				X	
2	PQ2. Lerning Competence				X	
3	PQ3. Communication and Social Activity				X	
4	PQ4. Field-specific Competence					X

*from 1 to 5 the score increases.

ECTS / WORK LOAD TABLE			
Activities	Activities	Duration (Hour)	Total Work Load (Hour)
Lectures (including exam week: 16x total lecture hours)	15	3	45
Midterm Exam (Preparation)	1	35	35
Final Exam (Preparation)	1	45	45
Homeworks	4	10	40
Repetition of the Topics	14	5	70
Report Preparation for Term Project	1	40	40
Presentation Preparation for Term Project	1	20	20
Total Work Load			295
Total Work Load / 30			9.83
ECTS Credits			10