ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINEERING & SCIENCE
MATERIALS SCIENCE AND MECHANICAL ENGINEERING PROGRAM
COURSE DESCRIPTION AND SYLLABUS

Course Title	Code	Semester	T+L Hours	Credit	ECTS
ADVANCED REACTIONS IN MATERIALS SCIENCE	MSME-608	FALL-SPRING	3 + 0	3	10

Prerequisite Courses	Fundamentals of Organic Materials and Applications (MSME 607)

Type	Selective
Language	English
Coordinator	Assoc. Prof. Hakan Usta
Instructor	Assoc. Prof. Hakan Usta
Additional Instructors/TAs	none
Aim	Learning the fundamental principles of organic reactions and mechanisms and the detailed study of their applications in materials science and nanotechnology.
Learning Outcomes	• Learning the types of organic reactions and gaining the ability to write reaction mechanisms in detail. • Detailed study of the applications of organic reactions in the fields of materials science and nanotechnology • Gaining the ability to propose plausible mechanisms for new reactions.
Course Content	• Alkene and Alkyne Compounds and Chemistry • Nuclear Magnetic Resonance and Mass Spectrometry • Radical Reactions • Alcohols and Ethers • Alcohols from Carbonyl Compounds • Conjugated Unsaturated Aromatic Systems • Aromatic Compounds

WEEKLY TOPICS AND PRELIMINARY STUDY

Week	Topic	Preliminary Study
1	Alkene and Alkyne Compounds and Chemistry-I	The relevant articles from the literature
2	Alkene and Alkyne Compounds and Chemistry-II	The relevant articles from the literature
3	Nuclear Magnetic Resonance and Mass Spectrometry-I	The relevant articles from the literature
4	Nuclear Magnetic Resonance and Mass Spectrometry-II	The relevant articles from the literature
5	Radical Reactions-I	The relevant articles from the literature
6	Radical Reactions-II	The relevant articles from the literature
7	Midterm	The relevant articles from the literature
8	Alcohols and Ethers-I	The relevant articles from the literature
9	Alcohols and Ethers-II	The relevant articles from the literature
10	Alcohol from Carbonyl Compounds-I	The relevant articles from the literature
11	Alcohol from Carbonyl Compounds-II	The relevant articles from the literature
12	Conjugated Unsaturated Systems-I	The relevant articles from the literature
13	Conjugated Unsaturated Systems-II	The relevant articles from the literature

14	Aromatic Compounds-I	The relevant articles from the literature
15	Aromatic Compounds-II	The relevant articles from the literature
16	Final Exam	

SOURCES	
Lecture Notes	Lecture slides
Other Sources	**Course Textbook:** "Organic Chemistry" by T. W. Graham Solomons, Wiley; 11th edition (January 17, 2013), ISBN-10: 1118133579. (Chapters 7-15) **Additional Materials:** 1. "Organic Chemistry" by L. G. Wade, Pearson; 8th edition (January 6, 2012), ISBN-10: 0321768418. 2. "General Chemistry: Principles and Modern Applications" by Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura, Carey Bissonnette.

COURSE MATERIALS SHARING	
Documents	Lecture notes, slides and molecular model set
Homeworks	Students will be given one homework each week
Exams	1 Midterm and 1 Final Exam

EVALUATION SYSTEM		
SEMESTER STUDY	**NUMBER**	**CONTRIBUTION**
Midterm	1	20
Homework	14	25
Quiz	14	25
SUB-TOTAL		70
Contribution of Semester Study		70
Contribution of Final Exam	1	30
TOTAL		100

Course Category	
Sciences and Mathematics	70%
Engineering	30%
Social Sciences	0%

RELATIONSHIPS BETWEEN LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS							
No	Program Qualifications	Contribution Level				
		1	2	3	4	5
1	Accessing knowledge, evaluating and interpreting information by doing scientific research in the field of Materials Science and Mechanical Engineering					**x**
2	Ability to use science and engineering knowledge for development of new methods in Materials Science and Mechanical Engineering					**x**
3	To be able to understand and analyze materials by using basic knowledge on Materials Science and Mechanical Engineering					**x**
4	Design and implement analytical, modeling and experimental research					**x**
5	Solve and interpret the problems encountered in experimental research					**x**
6	Considering scientific and ethical values during the collection and interpretation of data				**x**	
7	Integrating knowledge of different disciplines with the help of scientific methods, and completion and implementation of scientific knowledge using data			**x**		
8	To gain leadership ability and responsibility in disciplinary and interdisciplinary team works					**x**
9	To be able to contribute to the solution of social, scientific and ethical problems encountered in the field of Materials Science and Mechanical Engineering					**x**
10	To be able to define, interpret and create new information about the interactions between various discipline of Materials Science and Mechanical Engineering					**x**

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 16x total course hours)	16	3	48
Out-of-class Study Time (Pre-study, practice)	16	5	90
Internet search, library work, literature search	16	4	64
Presentation	7	3	21
Homework	16	4	64
Midterm	1	15	15
Final Exam	1	20	20
Total Work Load			322
Total Work Load / 30			322/30
Course ECTS Credit			10