DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

Course Details								
Code				**Academic Year**			**Semester**	
CHE112				1			Spring	
Title				**T**	**A**	**L**	**ECTS**	
Chemistry 2				2	1	2	6	

Language	German							
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**			
Department / Program	Energy Science and Technology							
Forms of Teaching and Learning	Face-to-face							
Course Type	**Compulsory**	**X**	**Elective**					
Objectives	The aim of this course is to teach the fundamental concepts and principles of organic chemistry and to develop students' skills in solving organic chemistry problems.							
Content	This course covers the structures, bonding, and chemical reactivity of organic molecules in a comprehensive manner. Topics include an introduction to the reactions of organic molecules, reaction kinetics, the concepts of acidity and basicity, reaction mechanisms, and functional groups. The course also includes reactions and nomenclature related to alkanes, alcohols, ethers, alkenes, haloalkenes, alkynes, aromatic compounds, carbonyl group components (aldehydes, ketones, carboxylic acids), amines, and thiols. Additionally, the applications of mass, infrared, and nuclear magnetic resonance spectroscopy in chemical structure analysis are studied. Biomolecules such as carbohydrates, amino acids, peptides, and proteins are also part of the course content.							
Prerequisites	None							
Coordinator	Assoc. Prof. Dr. Çağla SÖZ							
Lecturer(s)	Assoc. Prof. Dr. Çağla SÖZ Assist. Prof. Dr. Samira Fatma KURTOĞLU ÖZTULUM							
Assistant(s)	None							
Work Placement	None							

Recommended or Required Reading	
Books / Lecture Notes	K.P.C. Vollhardt, N.E. Schore, K. Peter. "Organische Chemie"
Other Sources	1. K.P.C. Vollhardt, N.E. Schore, K. Peter. "Organische Chemie" 2. N.E. Schore. "Arbeitsbuch Organische Chemie" 3. H.G.O Becker et al. "Organikum" 4. R. Brückner "Reaktionsmechanismen" 5. M. Hesse, H. Meier, B. Zeeh. "Spektroskopische Methoden in der organischen Chemie"

Additional Course Material	
Documents	-
Assignments	-

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
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Exams	1 Midterm, 1 Final Exam

Course Composition

Mathematics und Basic Sciences		%
Engineering		%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences	100	%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	%30
Quiz		
Assignments		
Attendance		
Recitations	1	%20
Projects		
Final Exam	1	%50
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	2	28
Self-Study	13	7	91
Assignments			
Presentation / Seminar Preparation			
Midterm Exam	1	3	3
Recitations	14	1	14
Laboratory	14	2	28
Projects			
Final Exam	1	4	4
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	The student will learn the fundamental principles of organic chemistry.

DEPARTMENT OF ENERGY SCIENCE AND TECHNOLOGY
COURSE SYLLABUS

2	The student will gain knowledge about the bonding, properties, and reactivity of organic molecules.
3	The student will understand the properties and behaviors of organic compounds and their derivatives.
4	The student will comprehend organic synthesis and reaction mechanisms.
Weekly Content	
1	Atoms, Molecules, Bonds, Polar and Non-Polar Molecules, Intermolecular Forces, Solubility, Lewis Structures, Resonance, Acids and Bases
2	Introduction to Orbitals, Molecular Orbital Definition of Bonds, Hybridization, Methane Structure
3	Alkanes - Conformation Analysis, Structural Isomerism and Nomenclature, Alkyl Groups
4	Alkenes - Structure and Bonding, Nomenclature, E-Z Notation, Hydrogenation, Relative Stabilities
5	Stereochemistry
6	Ring Structures
7	Alkyl Halides, SN2 and SN1 Mechanism Substitution Reactions, Elimination Reactions - E1 and E2 Mechanisms
8	Midterm Exam
9	Overview of Substitution and Elimination Reactions, Oxidation of Alcohols, Rate and Equilibrium Laws, Syntheses
10	Functional Groups I
11	Functional Groups II
12	Functional Groups III
13	Functional Groups IV
14	Functional Groups V
15	Biological Molecules I and II
16	Final Exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7	P8	P9
Ö1	5	5	5	5	5	5	5	5	
Ö2	5	5	5	5	5	5	5	5	
Ö3	5	5	5	5	5	5	5	5	
Ö4	5	5	5	5	5	5	5	5	

Contribution Level 1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High

Compiled by:	Res Asst. Kevser Celep
Date of Compilation:	27.01.2025