DEPARTMENT OF MOLECULAR BIOTECHNOLOGY
COURSE SYLLABUS

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

Language	German					
Level	**Undergraduate**	**X**	**Graduate**		**Postgraduate**	
Department / Program	Molecular Biotechnology					
Forms of Teaching and Learning	Face to Face					
Course Type	**Compulsory**	**X**	**Elective**			
Objectives	Students acquire the basic knowledge of organic chemistry. They have a good understanding of the common classes of substances, the linking of structure, binding and the classification of organic compounds. Here, in addition to a deeper understanding of the chemical principles, a good understanding of the standard organic-chemical reactions with mechanistic details, the influence of the framework conditions in an organic-chemical reaction and the most important analytical methods (eg mass spectrometry, IR and NMR spectroscopy) should be developed.					
Content	Structure and Binding of Organic Molecules, Structure and Reactivity: Introduction to Organic Molecule Reactions: Kinetics, Acidity / Basicity and Mechanisms, Functional Groups, Alkanes and Their Reactions, Nomenclature and Stereochemistry, Alcohols and Ethers and Their Reactions, Alkenes and Haloalkanes, Mass Spectrometry, IR and NMR spectroscopy for structure elucidation, alkynes and their reactions, aromatics and their reactions, reactions of carbonyl compounds, aldehydes, ketones and carboxylic acids, amines and thiols, carbohydrates, amino acids, peptides and proteins.					
Prerequisites						
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement	No					

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	

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Exams		
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		30
Attendance		
Recitations		
Projects		
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	15	2	30
Self-Study	15	5	75
Assignments	10	4	40
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations			
Laboratory	10	2	20
Projects			
Final Exam	1	2	2
		Total Work Load	**184**
		ECTS Points (Total Work Load / Hours)	**6**

Learning Outcomes

1	basic principles of organic chemistry, organic molecular bonding, properties and reactivity; properties and

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	behavior of organic compounds. Understanding organic synthesis and mechanisms
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Weekly Content	
1	Atoms, molecules, bonding, polar and nonpolar molecules, intermolecular forces, solubilities, Lewis structures, resonance, acids and bases
2	Introduction to orbitals, molecular orbital description of bonding, hybridization, structure of methane
3	Alkanes- conformational analysis, structural isomerism and nomenclature, alkyl groups
4	Alkenes- structure and bonding, nomenclature, E-Z notation, hydrogenation, relative stabilities.
5	Stereochemistry
6	Ring systems
7	Alkyl halides, substitution reactions of alkyl halides- SN 2 and SN 1 mechanisms. Elimination reactions- E1 and E2 mechanisms
8	Overview of substitution and elimination reactions, oxidation of alcohols, rates and equilibria, syntheses
9	Functional Groups I
10	Functional Groups II
11	Functional Groups III
12	Functional Groups IV
13	Functional Groups V
14	Biological Compounds I
15	Biological Compounds II

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

	P1	P2	P3	P4	P5	P6	P7
1	3	3	3			3	
2							

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