



## COURSE UNIT DESCRIPTION

Course unit title	Code
<b>Selected Topics in Organic and Bioorganic Chemistry</b>	

Annotation
This course is dedicated to selected topics on structure, properties and reactivity of organic compounds.

Lecturer(s)	Department, Faculty
<b>Coordinating: Prof. Edvinas Orentas</b>	Faculty of Chemistry and Geosciences, Institute of Chemistry Naugarduko str. 24, LT-03225 Vilnius
<b>Other:</b>	

Study cycle	Type of the course unit
Second	Optional

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face to face	Autumn semester	English

Requisites	
<b>Prerequisites:</b> Organic Chemistry	<b>Co-requisites (if relevant):</b>

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Individual work
5	135	64	71

Purpose of the course unit: programme competences to be developed			
This course aims to provide a deeper understanding of the principles that govern the reactivity of organic compounds in chemical and biochemical settings. The selected topics will largely focus on mechanistic and stereochemical details of organic reactions.			
Learning outcomes of the study programme	Learning outcomes of the course unit	Teaching and learning methods	Assessment methods
1.1, 2.1, 4.1, 5.1	Student will be able to analyze, systemize and critically evaluate scientific information about the reactivity and applications of organic compounds	Reading the literature Lectures Problem-based teaching Discussion in seminars	Intermediate assessment Final exam
1.2, 5.1, 5.2	Student will be able to apply acquiring knowledge in practice for solving problems related with the reactivity of organic compounds using available experimental data	Reading the literature Lectures Discussion in seminars Independent study during preparation for seminar	Intermediate assessment Final exam
1.1, 4.1	Student will be able to predict the reactivity and properties of organic compounds	Reading the literature Lectures Discussion in seminars Independent study during preparation for seminar	Intermediate assessment Final exam
1.1, 4.1, 4.2, 5.2, 5.4	Student will be able to draw plausible reaction mechanisms,	Reading the literature Lectures Discussion in seminars	Intermediate assessment Final exam

	predict the outcome of a new reaction	Independent study during preparation for seminar	
4.1. 5.2, 5.3	Student will be able to evaluate the impact of chirality on the recognition processes in biosystems, to propose methods to separate enantiomers of a given compound	Reading the literature Lectures Discussion in seminars Independent study during preparation for seminar	Intermediate assessment Final exam
4.1. 5.2, 5.3	Student will be able to explain the stereochemical outcome of chemical and enzymatic reactions	Reading the literature Lectures Discussion in seminars Independent study during preparation for seminar	Intermediate assessment Final exam
1.1, 3.2, 5.2, 5.4	The student will be able to plan his / her time, work independently, according to the set deadlines	Independent study Preparation for seminar	Intermediate assessment Final exam

Course content: breakdown of the topics	Contact hours							Individual work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship/work placement	Contact hours, total	Individual work	Assignments
1. Introduction to organic chemistry	2		2				4	4	Introduction to the outline of the course, assessment methods and scientific topics to be covered.
2. Structure, geometry of molecules, nature of the chemical bond	4		4				8	4	Textbook reading (Solomon, Clayden) and problem solving
3. Hybridization, resonance, writing chemical structures and reactions in organic chemistry	2		2				4	4	Textbook reading (Solomon, Clayden) and problem solving.
4. Acidity and basicity	2		2				4	4	Textbook reading (Solomon, Clayden) and problem solving.
5. Inductive and resonance effects. Functional groups.	2		2				4	4	Textbook reading (Solomon, Clayden) and problem solving.
6. Reaction mechanisms and elementary steps.	6		4				10		Textbook reading (Solomon, Clayden) and problem solving
Intermediate assessment	4						4	4	
7. Conformational analysis	2		2				4	4	Textbook reading (Solomon, Clayden, Eliel) and problem solving.
8. Introduction to stereochemistry	1		2				3	5	Textbook reading (Solomon, Clayden, Eliel) and problem solving.
9. Molecular chirality in organic chemistry, biochemistry and drug design	2		2				4	5	Textbook reading (Eliel) and problem solving.

10. Asymmetric synthesis, separation of enantiomers	2		2				4	5	Textbook reading (Eliel) and problem solving.
11. Stereoselective and stereospecific reactions	2		2				4	5	Textbook reading (Eliel) and problem solving.
12. General aspects of enzyme-catalysed reactions.	2		2				4	5	Problem solving.
<b>Total</b>	<b>3</b>		<b>3</b>				<b>64</b>	<b>8</b>	
	<b>4</b>		<b>0</b>					<b>7</b>	

Assessment strategy	Weight %	Deadline	Assessment criteria
Intermediate assessment	50	During semester	Theory questions and problems (4-5 in total, max. points 10). The use of textbooks, lecture notes and molecular models (shared) are allowed. Grading is proportional to points collected (points collected/max. points*10)
Final exam	50	During the examination session	

Author	Publishing year	Title	Issue of a periodical or volume of a publication; pages	Publishing house or internet site
<b>Required reading</b>				
E. L. Eliel, S. H. Wilen, M. P. Doyle	2001	<b>Basic organic stereochemistry</b>		New York: Wiley
J. Clayden, N. Greeves, and S. Warren	2002	Organic Chemistry		Oxford University Press
T.W.Graham Solomons, Craig B. Fryhle	2002-2018	Organic Chemistry		New York: Wiley
<b>Recommended reading</b>				
H. Dugas	1996	Bioorganic Chemistry: A Chemical Approach to Enzyme Action		Springer-Verlag New York, LLC