SYLLABUS

Name of the course (as specified in the approved curriculum) **Organic Chemistry**			Number of ECTS Credits **5**
Name of the course in Polish **Chemia organiczna**			
Unit providing the course (Department/Institute) **Department of Chemistry**			
Course co-ordinator **dr hab. Karolina Hoppe**			
Field of study	Level **First degree studies**	Profile **General academic**	Semester **II**
Scope	Thesis specialisation		

TYPE OF CLASSES AND COURSE LOAD
(lectures and self-learning of the student)

Mode of studies: full-time		Mode of studies: part-time	
- lectures	15	- lectures	-
- practical classes	30	- practical classes	-
- other with teacher (consultation, exam)	5	-	
- Self- learning	50		
Total number of hours:	100	Total number of hours:	-

OBJECTIVE OF THE COURSE
The main objective of the course is to familiarize students with the basics of organic chemistry by focusing on the structure, properties and chemical reactivity of various functional groups. The course will also cover various aspects of isomerism observed in organic compounds as well as reaction mechanisms (substitution, elimination and addition). The course will also present methods of separation and purification of substances as well as various analytical techniques.

TEACHING METHODS
Lecture with multimedia presentation, laboratory classes – individual work with students

	Course learning outcomes	The reference to field of study outcomes
Knowledge	O1: Knows and understands the basic concepts and definitions used in organic chemistry. Knows and understands the structure, properties, purpose (practical application) and occurrence of organic compounds in nature. O2: He knows and understands the purpose and principles of operation of the basic chemical apparatus for the separation and purification of organic compounds.	
Skills	O3: He can determine the structure and correctly classify organic compounds. He can describe the properties and give natural sources and importance in the economy for individual groups of organic compounds. O4: He is able to describe and explain the principles of operation of the basic apparatus used for the separation and purification of organic compounds and demonstrates the ability to correctly interpret experimental data.	
Social skills	O5: cooperation and work within the group, taking on different roles, including the role of a group leader O6: assess the impact of the activities carried out, including risks to their own safety, colleagues and the environment	

Methods of evaluation of learning outcomes	Symbols of course learning outcomes
final exam (written)	O1, O2
weekly tests	O1, O2, O5
verification of protocols	O3-O6
evaluation of take home projects and project presentations	O1, O6
evaluation of the discussion on the justification for choosing the appropriate method for the analysis	O1, O2, O4, O6
assessment of activity in classes	O1-O7

TEACHING CONTENTS

Lecture topics

- Hydrocarbons - IUPAC nomenclature: alkanes, bicyclic compounds, alkenes, alkynes, arenes; their physical and chemical properties. Arene electrophilic substitution reactions: nitration, halogenation, sulfonation, alkylation and acylation acc. Friedel-Crafts. Directing influence of substituents (ortho-, meta- and para- isomerism). Reactions of radical substitution of alkylarenes. Electrophilic and nucleophilic addition reactions of alkynes. Oxidation, ozonolysis and reduction of alkenes and alkylarenes.
- Alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, amines, esters, amides, carbohydrates, their nomenclature, physical properties and reactivity. Organic compounds of sulfur and phosphorus.
- Amino acids, peptides and proteins: acid-base properties of amino acids, isoelectric point, peptide bond, synthesis of peptides and proteins, determining the structure of peptides and proteins.
- Aspects of stereochemistry of organic compounds: conformations of alkanes, cycloalkanes and their derivatives, cis-trans isomerism, substituent order rules, chirality of organic compounds, optical isomerism, determination of spatial configuration of compounds with asymmetric carbon atom.
- Practical acquisition and improvement of work skills in a chemical laboratory, determination of physicochemical properties of organic compounds, synthesis of selected chemical connections, determination of purity of compounds using chromatographic methods, analysis and identification of selected classes of organic compounds by classical chemical analysis.

Exercise topics

- Characteristic reactions of functional groups of organic compounds (alkenes, alcohols, aldehydes, ketones, amino acids, proteins, fats, sugars)
- Selected methods of separation and purification of natural products (extraction of plant dyes and their chromatographic separation, urea crystallization).
- Fundamentals of analytical chemistry in organic compounds

The course completion methods and criteria	Percentage of a final grade
Lecture:	
- exam	100%
Laboratory classes:	
- tests (weekly)	80%
- take home projects (two projects prepared in groups)	20%

LITERATURE REFERENCE

1. Maitland Jones and Steven A. Fleming, “Organic Chemistry”, Fifth Edition, ISBN 0393931498
2. Maitland Jones, Jr., Henry L. Gingrich, Steven A. Fleming, “Study Guide/Solutions Manual to Accompany Organic Chemistry”, Fifth Edition, ISBN 978-0-393-93659- 9
3. Clayden Jonathan et al., “Organic Chemistry”, ISBN 0-19-850346-6
4. Michael Hornby and Josephine Peach, “Foundations of Organic Chemistry”, ISBN 978-0-19-855680-0