

FACULTY of Chemistry						
SUBJECT CARD						
Name of subject in Polish		Chemia kombinatoryczna				
Name of subject in English		Combinatorial chemistry				
Main field of study (if applicable):		Chemistry				
Specialization (if applicable):		Medicinal Chemistry				
Profile:		academic				
Level and form of studies:		2nd level, full-time				
Kind of subject:		optional				
Subject code		CHC020017				
Group of courses		NO				
	Lecture	Classes	Laboratory	Project	Seminar	
Number of hours of organized classes in University (ZZU)	30					
Number of hours of total student workload (CNPS)	60					
Form of crediting	Crediting with grade					
For group of courses mark (X) final course						
Number of ECTS points	2					
including number of ECTS points for practical (P) classes						
including number of ECTS points for direct teacher-student contact (BK) classes	1					
PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES						
Knowledge of organic chemistry corresponding to completion of "Principles of organic chemistry" course						
SUBJECT OBJECTIVES						
C1 Knowledge of modern techniques and methods of synthesis of organic compounds libraries in solution and on the solid support.						
C2 Examples of their application in the development of compounds of the targeted biological activity or physicochemical properties.						
C3 Presentation of combinatorial synthetic methodologies leading to low molecular weight compounds and natural oligomers.						
C4 Teaching of English nomenclature.						
SUBJECT EDUCATIONAL EFFECTS						
relating to knowledge:						
PEK_W01 The student knows the principles of construction and use of solid polymer supports, understands the role and advantages of immobilization.						
PEK_W02 The student knows methodologies of obtaining and deconvolution of chemical libraries in solution and on the solid support.						
PEK_W03 The student knows examples of combinatorial chemistry application in the development of a product of targeted physicochemical properties.						
PEK_W04 The student understands the role of combinatorial synthesis in the development of new drugs.						
PEK_W05 The student is familiar with classical and combinatorial synthesis of peptides, oligonucleotides, and oligosaccharides.						
PEK_W06 The student got to know instrumental techniques of combinatorial chemistry used in the synthesis and analysis of the products.						
PEK_W06 The student knows specific English nomenclature and vocabulary.						
PROGRAMME CONTENT						
Lectures						Number of hours
Lec 1	Introduction to combinatorial chemistry. Basic concepts. Classical chemistry <i>versus</i>					2

	parallel and combinatorial synthesis.	
Lec 2	Combinatorial libraries in solution. Indexed libraries. Scaffolds.	2
Lec 3	Structure and examples of solid supports. Polymer resins. Merrifield, Wang, Mitchell and Rink resin. Structure and function of linkers and spacers.	2
Lec 4	Strategies for the synthesis of peptides on a solid support. Protecting groups, coupling agents. Advantages of immobilization. Instrumentation and apparatus.	2
Lec 5	Peptide libraries. Preparation by coupling of isokinetic mixtures and "mix and split" method. Examples of application.	2
Lec 6	Libraries of oligonucleotides. Flow synthesis. Microarrays. Phage display.	2
Lec 7	Classical and combinatorial synthesis of oligosaccharides on a solid support. Sugar units as a "scaffold". Soluble solid support.	2
Lec 8	Methods of deconvolution of combinatorial libraries. Isolation of the active component.	2
Lec 9	Determining the structure of the active compound. Instrumental techniques. Tags. Encoded libraries.	2
Lec 10	Organic synthesis on a solid support. Immobilized reagents. Examples of low molecular weight compound libraries.	2
Lec 11	Multicomponent reactions. Isonitriles. Passerini and Ugi condensations.	2
Lec 12	Combinatorial chemistry in drug design.	2
Lec 13	Other applications: catalysis, materials science.	2
Lec 14	Instrumentation of combinatorial chemistry. Automated synthesis.	2
Lec 15	Analytical techniques in the characterization of combinatorial libraries.	2
	Total hours	30

TEACHING TOOLS USED

N1. lecture with multimedia presentation

EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT

Evaluation (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
C	PEK_W01–PEK_W07	multimedia presentation with discussion

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

- [1] Molecular Diversity and Combinatorial Chemistry: Principle and Applications (M. C. Pirrung Ed.); Elsevier, 2004.
- [2] Combinatorial Chemistry and Technologies: Methods and Applications (G. Fassina, S. Miertus Eds); Taylor and Francis, 2005.
- [3] A. Furka. Combinatorial Chemistry. Principles and Techniques,
<http://members.iif.hu/furka.arpad/BookPDF.pdf>

SECONDARY LITERATURE:

- [1] Combinatorial Chemistry: Synthesis, Analysis, Screening (G. Jung Ed.); Wiley, 2001.
- [2] Combinatorial Chemistry: From Theory to Application (W. Bannwarth, B. Hinzen Eds.); Wiley, 2005.

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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