

FACULTY CHEMISTRY					
SUBJECT CARD					
Name of subject in English:	Synthesis and Fabrication of Nano-engineering Systems				
Main field of study (if applicable):	Chemical and Process Engineering				
Specialization (if applicable):	Chemical nanoengineering				
Profile:	academic				
Level and form of studies:	2nd level, full-time				
Kind of subject:	obligatory				
Subject code:	ICC025002				
Group of courses:	NO				
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30	15			
Number of hours of total student workload (CNPS)	60	30			
Form of crediting	Exam	crediting with grade			
For group of courses mark (X) final course	X	X			
Number of ECTS points	2	1			
including number of ECTS points for practical (P) classes		1			
including number of ECTS points for direct teacher-student contact (BK) classes	1	0,5			
<b>PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES</b> 1. Basic knowledge of organic and inorganic chemistry 2. Basic knowledge of spectroscopic methods					
<b>SUBJECT OBJECTIVES</b> C1. To provide students with the issues of organic chemistry in nano-engineering systems including bioorganic chemistry C2. To provide students with the issues of nano-engineering mimetic systems C3. To provide students with the molecular receptors issues C4. To provide students with the structure, properties and use of particular groups of compounds used in nano-engineering systems C6. To acquaint students with scientific literature and literature examples					
<b>SUBJECT EDUCATIONAL EFFECTS</b> <b>related to knowledge:</b> PEK_W01 – student knows what nano-engineering is and knows the scope of its applicability PEK_W02 – student knows the properties of particular groups of compounds used in nano-engineering PEK_W03 – student knows the methods of nanosystems synthesis					

PEK\_W04 – student knows the types of interactions between molecules and knows what compounds form individual interactions

**related to skills:**

PEK\_U01 - student can find a suitable group of compounds that can be used in nano-engineering systems

PEK\_U02 - student can construct complex questions in factographic databases and find and analyze professional literature

PEK\_U03 - student can analyze the types of interactions responsible for the interaction of molecules

PEK\_U04 - student can distinguish and describe the properties of particular groups of compounds applicable in nano-engineering systems

PEK\_U05 - student is able to design a potential receptor or mimetic of a biologically active compound based on the acquired knowledge in nano-engineering systems

**related to social competences:**

PEK\_K01 student is able to work in a group, performing various roles including group leader

PEK\_K02 student is ready to critically evaluate his/her knowledge and received content

**PROGRAMME CONTENT**

<b>Lectures</b>		<b>Number of hours</b>
Lec 1	Presentation of the general characteristics of the subject	2
Lec 2	Organic chemistry reactions	2
Lec 3	Click chemistry and nano-scaffolds	2
Lec 4	Synthesis, structure, properties and application of rotaxanes and catenanes in nano-engineering systems	2
Lec 5	Synthesis, properties and application of dendrimers in nano-engineering systems	2
Lec 6	Peptide and protein mimetics in nano-engineering systems	2
Lec 7	Cyclodextrins in nano-engineering systems	2
Lec 8	Synthesis, structure, properties and application of cyclophanes in nano-engineering systems	2
Lec 9	Designing, properties and application of calixarenes	2
Lec 10	Mimetics of DNA and RNA nucleic acids in nano-engineering systems	2
Lec 11	Enzyme mimetics - Molecular imprinting polymers	2
Lec 12	Micellar catalysis, liposomes, fatty acid mimetics	2
Lec 13	Construction, properties and application of porphyrins	2
Lec 14	Carbohydrates and their derivatives in nano-engineering systems	2
Lec 15	Receptors for compounds with diol moieties	2
	<b>Total</b>	30
<b>Classes</b>		<b>Number of hours</b>
Cl1	General characteristics of the subject nano-engineering systems	1
Cl2	Organic chemistry reactions	1
Cl3	Click chemistry and nano-scaffolds	2
Cl4	Synthesis, structure, properties and application of rotaxanes and catenanes in nano-engineering systems	1

CI5	Synthesis, properties and application of dendrimers in nano-engineering systems	1
CI6	Peptide and protein mimetics in nano-engineering systems	1
CI 7	Cyclodextrins in nano-engineering systems	1
CI 8	Synthesis, structure, properties and application of cyclophanes in nano-engineering systems	1
CI 9	Designing, properties and application of calixarenes	1
CI 10	Mimetics of DNA and RNA nucleic acids in nano-engineering systems	1
CI 11	Enzyme mimetics - Molecular imprinting polymers	1
CI 12	Micellar catalysis, liposomes, fatty acid mimetics	1
CI 13	Construction, properties and application of porphyrins	1
CI 14	Carbohydrates and their derivatives in nano-engineering systems	1
	<b>Total</b>	<b>15</b>
<b>TEACHING TOOLS USED</b>		
Lecture N1 information lecture N2 problem lecture N3 multimedia presentation  Classes N8 multimedia presentation		
<b>EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT</b>		
<b>Evaluation</b> (F – forming (during semester), P – concluding (at semester end))	Educational effect number	Way of evaluating educational effect achievement
F1 Classes	CI1-CI14	Score from multimedia presentation
P Lecture	multimedia presentation	
<b>PRIMARY AND SECONDARY LITERATURE</b>		
[1] Source literature - scientific publications		
<b>SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)</b>		
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