


KAPITAŁ LUDZKI
 NARODOWA STRATEGIA SPÓJNOŚCI

 Projekt współfinansowany przez
 Unię Europejską w ramach
 Europejskiego Funduszu
 Społecznego

UNIA EUROPEJSKA
 EUROPEJSKI
 FUNDUSZ SPOŁECZNY


Course title		ECTS code	
Monographic lecture - Selected issues of carbohydrate chemistry		13.3.0490	
Name of unit administrating study			
Faculty of Chemistry			
Studies			
faculty	field of study	type	drugiego stopnia
Wydział Chemii	Chemia	form	stacjonarne
		specjalty	chemia biomedyczna, analityka i diagnostyka chemiczna, chemia i technologia środowiska, chemia obliczeniowa
		specialization	wszystkie
Teaching staff			
dr hab. Beata Liberek, profesor uczelni			
Forms of classes, the realization and number of hours		ECTS credits	
Forms of classes		3	
Lecture		classes 30 h	
The realization of activities		tutorial classes 10 h	
classroom instruction		student's own work 35 h	
Number of hours		TOTAL: 75 h - 3 ECTS	
Lecture: 30 hours			
The academic cycle			
2023/2024 summer semester			
Type of course		Language of instruction	
obligatory		polish	
Teaching methods		Form and method of assessment and basic criteria for evaluation or examination requirements	
multimedia-based lecture		Final evaluation	
		Graded credit	
		Assessment methods	
		(mid-term / end-term) test	
		The basic criteria for evaluation	
		Achievement of at least 51% of the total number of points from the single choice test. The test consists of about 40 questions. The percentage result is correlated with the mark in the way indicated in "Study Regulations of University of Gdansk".	
Method of verifying required learning outcomes			
Required courses and introductory requirements			
A. Formal requirements			
First degree studies completed			
B. Prerequisites			
Basic knowledge of organic chemistry.			
Aims of education			
To familiarize students with the basic issues of modern sugar chemistry and glycobiology.			
<ul style="list-style-type: none"> • Preparing students to use modern solutions for sugar synthesis and analysis. • To prepare students to properly describe carbohydrate and glycobiology issues. 			
Course contents			
Carbohydrate functions; Structural diversity of aldoses and ketoses; Optical rotation of saccharides; Sugar equilibriums in aqueous solution; Reductive and non-reductive carbohydrates; L series of monosaccharides: L-fucose and L-idouronic acid; Protecting groups in carbohydrate			

<p>chemistry: ether, silyl, ester, acetal, introduction and deprotection; Strategies of glycosidic bond synthesis; Commonly used glycosyl donors; Bonding of sugar with amino acid; Glycosides in medicine: antibiotics, vitamins, alkaloids, steroids, terpenes, flavonoids; Pyranose ring conformations: factors influencing conformer stability, anomeric effect, conformational analysis, application of NMR for conformational studies; Furanose ring conformations; Oligosaccharide conformations; Glycan conformation: Carbohydrate biosynthesis; Glycoconjugates: division and functions; Proteoglycans, glycosaminoglycans, peptidoglycans; Glycoproteins: division and biosynthesis; N-glycosylation of peptide chain; O-Glycans; Blood groups determinants; Mannose-6-phosphate as a tag</p>	
<p>Bibliography of literature</p> <p>Literature required to pass the course A. Wiśniewski, J. Madaj Podstawy Chemii Cukrów, 1997 H. M. I. Osborn Carbohydrates J. F. Stoddart Stereochemistry of Carbohydrates A. Varki, R. D. Cummings, J. D. Esko... Essentials of Glycobiology J. Świdorski, J. Struciński, A. Temeriusz Podstawy Chemii Węglowodanów, 1973</p> <p>Extracurricular readings</p>	
<p>The learning outcomes (for the field of study and specialization)</p>	<p>Knowledge</p> <p>Student characterizes carbohydrate divisions due to their structure, functional groups, size, properties. Explains the methods of protection and deprotection of functional groups in carbohydrates; Describes strategies of glycosidic bonds formation; Lists the glycosyl donors commonly used; Characterizes glycosides used in medicine; Describes conformations of monosaccharide ring, explains factors influencing their stability; Explains NMR applications in structural analysis of carbohydrates; Describes conformations of oligosaccharides and glycans; Recognizes glycoconjugates, characterizes their division and functions; Defines proteoglycans and lists glycosaminoglycans; Characterizes peptidoglycan; Describes biosynthesis of N-glycans; Characterizes mucins; Identifies blood groups determinants; Explains the role of mannose-6-phosphate in a cell.</p>
	<p>Skills</p> <p>Classifies carbohydrates according to their structure, functional groups, size, properties; Indicates appropriate methods of protection and deprotection of functional groups in sugars; Designs a strategy for glycoside synthesis; Recognizes glycosides used in medicine; Analyses monosaccharide ring conformations; Concludes about the structure of saccharide based on NMR; Predicts oligosaccharide and glycans conformations; Classifies glycoconjugates, assigns them functions; Recognizes proteoglycans, glycosaminoglycans, peptidoglycan; Discusses biosynthesis of N-glycans; Recognizes mucins; Verifies blood group substances; Discusses the role of mannose-6-phosphate in the cell</p>
	<p>Social competence</p> <p>Social competence Recognizes and appreciates the need to harmonize and complement each other elements of different sciences; Shows creativity in solving problems; Maintains criticism formulating conclusions; Understand the need for deliberate and group action.</p>
<p>Contact</p> <p>beata.liberek@ug.edu.pl</p>	