

Course title Wykład monograficzny - Wybrane zagadnienia z chemii cukrów/Monographic lecture - Selected issues of carbohydrate chemistry		ECTS code 13.3.0490	
Name of unit administrating study Faculty of Chemistry			
Studies			
Field of study	Type	Form	
Chemistry	Masters	Full-time studies	
Teaching staff dr hab. Beata Liberek, prof. UG			
Forms of classes, the realization and number of hours		ECTS credits	
A. Forms of classes, in accordance with the UG Rector's regulations lecture		classes 30 h tutorial classes 10 h student's own work 35 h TOTAL: 75 h - 3 ECTS	
B. The realization of activities In-class learning			
Number of hours lecture 30 h			
The academic cycle Second year, summer semester			
Type of course obligatory		Language of instruction Polish	
Teaching methods Lecture with a multimedial presentation		Form and method of assessment and basic criteria for evaluation or examination requirements	
		A. Final evaluation, in accordance with the UG study regulations Course completion (with a grade)	
		B. Assessment methods test	
		C. The basic criteria for evaluation or exam requirements 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".	
Required courses and introductory requirements a. Formal requirements First degree studies completed. b. Prerequisites Basic knowledge of organic chemistry.			
Aims of education <ul style="list-style-type: none"> • To familiarize students with the basic issues of modern sugar chemistry and glycobiology. • 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 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.

Bibliography of literature

A. 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

B. Extracurricular readings

Knowledge

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.

Skills

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.

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.