

Study Programme: Bachelor Academic Studies in Biochemistry
Course Unit Title: Monosaccharides and Bioactive Derivatives
Course Unit Code: IB-502
Name of Lecturer(s): Associate Professor Bojana Srećo-Zelenović
Type and Level of Studies: Bachelor of Science Degree
Course Status (compulsory/elective): elective
Semester (winter/summer): winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 6
Prerequisites: none
<p>Course Aims:</p> <p>Nomenclature of Carbohydrates. Obtaining bioactive sugar molecules using methods of organic chemistry and chemo-enzymatic way. Introduce students to the biological mechanism of action of selected natural and synthetic derivatives of monosaccharides and oligosaccharides.</p>
<p>Learning Outcomes:</p> <p>Master knowledge about types of modified carbohydrates. Synthesis and mechanism of action of the selected modified sugar and nucleoside analogues of biomedical interest. Mastering the nomenclature of natural monosaccharides and modified sugars.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Ways of showing the structure of monosaccharides. Chemical and chemo-enzymatic synthesis of homonucleoside, C-glycosides, C-nucleosides, aza sugars, carba sugars, thio sugars and sugar mimics. The mechanism of action of selected biologically active derivatives of monosaccharides (glycosidases and glycosyltransferases inhibitors, antiviral agent, etc.). Nucleoside analogues with a modified base as drugs. Chemical glycobiology. Glycocode. Glycoproteins. Lectins. Carbohydrates in inflammation. Proteoglycan and selected their mimetic. Nomenclature of monosaccharides and derivatives of monosaccharides.</p> <p><i>Practice</i></p> <p>Multi-step synthesis of biologically active sugar derivatives.</p>
<p>Required Reading:</p> <ol style="list-style-type: none"> 1. Miljković, M. <i>Carbohydrates, Synthesis, Mechanisms, and Stereoelectronic Effects</i>, Springer Science+Business Media, LLC 2009. 2. Stoddart, J. F. <i>Stereochemistry of Carbohydrates</i>, Willey Interscience, New York, 1971. 3. Kennedy, J. F. <i>Carbohydrate Chemistry</i>, Clarendon Press, Oxford, 1988. 4. International Union of Pure and Applied Chemistry and International Union of Bio-chemistry and Molecular Biology, Joint Commission on Biochemical Nomenclature, McNaught, A. D. <i>Nomenclature of Carbohydrates</i>, Pure & Appl. Chem. 1996, 68 (10), 1919. 5. Nelson, D.L.; Cox, M. N. <i>Lehninger, Principles of Biochemistry</i>, Fifth Edition, W.H.Freeman and Company, 2008. 6. Collins, P.; Ferrier, R. <i>Monosaccharides. Their Chemistry and Their Roles in Natural Products</i>, John Wiley & Sons, England, 1995.

Weekly Contact Hours: 5 (75)	Lectures: 2 (30)	Practical work: 3 (30)	
Teaching Methods: Lectures, laboratory work			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	80
Practical work	10	oral exam	
Preliminary exam(s)		
Seminar(s)			
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			