

Table 5.2 Course specification

Type and level of studies: Bachelor of Science degree			
Course name: Chemoenzymatic transformations			
Course status: elective			
Number of ECTS credits: 6			
Requirement: -			
Course aim Approaches to complex carbohydrate molecules and their mimetics are facilitated using enzymatic and chemoenzymatic transformations. This will allow students to better understand the important processes in glycobiology such as receptor-mediated recognition and processing of glycoproteins.			
Course outcome Upon successful completion of this course, the student should be able to: <ul style="list-style-type: none"> • Define and justify the application of enzymes in vitro synthetic conditions. • Explain the receptor-mediated recognition of glycobiology and glycoprotein processing. • Upgrade knowledge about the types and mechanisms of individual enzymatic processes that can be accomplished <i>in vitro</i>. 			
Course content <i>Theory</i> Aldol condensation with aldolases: dihydroxyacetone phosphate-dependent aldolase, phosphoenolpyruvate and pyruvate-dependent aldolase, 2-deoxyribose-5-phosphate aldolase and glycine-dependent aldolase. Enzymatic glycosylations: glycosidases and glycosyltransferases. Application of lipases, proteases and oxidoreductases for preparation of chiral starting compounds. Catalysis of specific functional group transformations.			
<i>Practice:</i> Reductions of β -ketoesters catalyzed by baker's yeast (<i>Saccharomyces cerevisiae</i>). Obtaining and purification of intermediates in multiphase syntheses of selected biologically active molecules.			
Literature 1. Bojana Srećo Zelenović: Chemoenzymatic transformations, internal script (ePMF), 2019. 2. V. Gotor, I. Alfonso, E. Garcia-Urdiales: Asymmetric Organic Synthesis with Enzymes, Wiley-VCH Verlag, 2008. 3. S. Hanessian: Preparative carbohydrate chemistry, Marcel Dekker, 1997. 4. G.J. Boons, K.J. Hale: Organic Synthesis with Carbohydrates, Sheffield Academic Press, 2000. 5. D.L. Levi, P. Fugedi: The Organic Chemistry of Sugars, Taylor&Francis Group, 2006.			
Number of classes of active teaching			Other classes
Lectures: 2 (30)	Practice: 2 (30)	OFT: SRW:	
Teaching methods Lectures, laboratory work, seminar(s).			
Assessment of knowledge (maximum of 100 points)			
Pre-exam obligations	Points	Final exam	points
activity during lecture classes	10	written exam	70
practical teaching	10	oral exam	
seminars	10		