

Table 5.2 Course specification

Type and level of studies: Bachelor of Science Degree			
Course name: Applied Biochemistry			
Course status: elective			
Number of ECTS credits: 5			
Requirement: none			
<p>Course aims to provide students with facts considering practical applications of fundamental biochemical principles in many aspects of our modern life; (2) to give systematic overview on achievements of the state-of-the-art biotechnological processes, (3) to encourage students to critically think on the ethical and moral issues considering use of genetically modified organisms / products.</p>			
<p>Course outcome After this course students will be able to (1) discuss the scope of application of biotechnological processes, and outline numerous examples; (2) point out advantages/disadvantages of application of microorganisms, plant cultures, animal cells or isolated enzymes for the production of commercially-important specialty chemicals and medically-related biochemicals.</p>			
<p>Course content <i>Theory</i> Historical overview of traditional biotechnology - fermentation promoted food (beer, wine, cheese) production. Classical biotechnology - microbial synthesis of commercially valuable products: amino acids to improve food taste, quality or preservation; enzymes (cellulase, collagenase, diastase, glucose isomerase, invertase, lipase, pectinase, protease), vitamins, pigments. Modern biotechnology - genetic engineering (principles, methods, bottlenecks in transformation). Biotechnological products (transgenic animals, transgenetics in agriculture). Cloning (difficulties, therapeutic application). Medical application – human health (gene therapy, vaccines and antibiotics, pre-natal diagnosis of inherited diseases), cosmetics, pharmacogenomics. Bioremediation (organisms for the purpose of cleaning the environment). Biodiversity maintenance (analysis of populations and species, comparison/classification and cloning to preserve species and genome storage technologies). Bioterrorism (pathogens and potential uses for terrorism purposes, toxins, bio-defense, agro-terrorism). Ethical aspects related to biotechnology (ethics and genetic engineering, gene patents, eugenics, case study). Regulatory agencies and biosafety.</p> <p><i>Practice: Practical classes, OFT, SRW</i> Lab work - small scale production of alcoholic beverages and sour milk products. Visit to selected factories / laboratories where traditional and / or modern technological solutions involving enzymes and other biomolecules are applied. Writing and presenting a mini-project on the selected topic.</p>			
<p>Literature 1. Smith J. E.: Biotechnology, Fifth Ed. Cambridge University Press, Cambridge, UK, 2009 2. Aehle W.: Enzymes in Industry: Production and Application, 3rd ed. Wiley-Vch, 2007 3. Borém A., Santos F., Bowen D.: Understanding biotechnology, Prentice Hall PTR, 2003 - selected scientific papers</p>			
Number of classes of active teaching			Other classes
Lectures: 2	Practice: 2	OFT: SRW:	
<p>Teaching methods Lectures, laboratory work, seminar (s)</p>			
Assessment of knowledge (maximum of 100 points)			
Pre-exam obligations	Points	Final exam	points
activity during lecture classes	5	oral exam	65
practical teaching	10		
project presentation	20		