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

Course aimis to provide students withfacts considering practical applications of fundamental biochemical principles in many aspects of our modern life; (2) to give systematic overviewon 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.

Course outcome

After this course studentswill be able to (1) discuss the scope of application of biotechnological processes, and ouline numerous examples; (2) point out advantages/disadvantages of application of microorganisms, plant cultures, animal cells or isolated enzymesfor the production of commercially-important specialty chemicals and medically-related biochemicals.

Course content

Theory

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 maintainance (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 espects related to biotechnology (ethics and genetic engineering, gene patents, eugenics,case study).Regulatoryagencies and biosafety.

Practice: Practical classes, OFT, SRW

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.

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. Willey-Vch, 2007
3. Borém A., Santos F., Bowen D.: Understanding biotechnology, Prentice Hall PTR, 2003
- selected scientific papers

Number of classes of active teaching				Other classes
Lectures:2	Practice:2	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	**5**	oral exam	65
practical teaching	**10**		
project presentation	**20**		