Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz biokemije proteinov in encimov**
Course title:	**Selected Topics in Biochemistry of Proteins and Enzymes**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		**1. ali 2.; 1st or 2nd**	**1. 2. ali 3. ; 1st, 2nd or 3rd**
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type Izbirni/Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
5	**-**	**5**	**-**	**-**	**140**	**5**

Nosilec predmeta / Lecturer: Janja TRČEK

Jeziki / Languages:		
	Predavanja / Lectures:	slovenski / slovene
	Vaje / Tutorial:	slovenski / slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Poznavanje eksperimentalnih metod v biokemiji na ravni univerzitetnega programa.	Knowledge of experimental methods in biochemistry at graduate level

Vsebina:	**Content (Syllabus outline):**
Obravnavana bodo izbrana poglavja iz naslednjih sklopov: - Priprave na izolacijo proteina - Ekstrakcija in raztapljanje proteina - Določanje koncentracije proteina - Koncentriranje raztopine proteina - Analiza proteinov z masno spektrometrijo - Gelska elektroforeza pod denaturirajočimi pogoji - Gelska elektroforeza pod nedenaturirajočimi	Selected topics in the following chapters will be discussed: - Preparation for protein isolation - Protein extraction and solubilization - Protein concentration determination - Concentrating protein solutions - Gel electrophoresis under denaturating conditions - Gel electrophoresis under non-denaturating conditions

pogoji - Izoelektrično fokusiranje in dvodimenzionalna elektroforeza - Immunobloting - Iosko izmenjevalna kromatografija - Gelska kromatografija - Afinitetna kromatografija - Kristalizacija proteina - Analiza encimov: študij kinetike, tehnike ekstrakcije encimov, pregledna analiza encimov, določanje koncentracije aktivnih mest, aktivatorji, inhibitorji.	- Isoelectric focusing and two-dimensional gel electrophoresis - Immunobloting - Ion exchange chromatography - Gel filtration chromatography - Affinity chromatography - Protein crystalisation - Enzyme assays: kinetic studies, techniques for enzyme extraction, high throughout screening, determination of active site concentration, activators, inhibitors.

Temeljni literatura in viri / Readings:

- Voet DJ in Voet JG 2011. Biochemistry. John Wiley & Sons.
- Simpson RJ, Adams PD, Golemis EA 2008. Basic Methods in Protein Purification and Analysis: A Laboratory Manual. Cold Spring Harbor Laboratory.
- Cutler P 2003. Protein Purification Protocols. Humana Press, New York.
- Eisenthal R, Danson M 2002. Enzyme Assays: A Practical Approach. Oxford Univ. Press.

Cilji in kompetence:	**Objectives and competences:**
• Obvladanje izbranih metod za čiščenje proteinov • Obvladanje izbranih kvalitativnih in kvantitativnih analiz proteinov	• Skills of using selected of methods of protein purification • Skills of using selected qualitative and quantitative analysis of proteins

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Poznavanje podrobnih lastnosti izbranih proteinov • Iskanje možnosti in omejitev čiščenja in analize proteinov **Prenesljive/ključne spretnosti in drugi atributi:** • Priprava vsega potrebnega za izolacijo proteinov • Obvladovanje homogenizacije, frakcioniranega obarjanja, kromatografskih in elektroforetskih metod pri izbranih proteinih • Koncentriranje raztopin izbranih proteinov in določanje njihove koncentracije	**Knowledge and understanding:** • Knowledge and Understanding: Advanced knowledge on properties of selected proteins • Searching possibilities and limits of protein purification and analysis **Transferable/Key Skills and other attributes:** • Preparation of all requirements for protein isolation • Skill on homogenization, fractionary precipitation, chromatographic and electrophoretic methods on selected proteins • Concentrating solutions of selected proteins and determining their concentration

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Laboratorijske vaje	• Lectures • Laboratory excersises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
• Pisni izpit • Ustni izpit	50 % 50 %	• Written exam • Oral exam

Reference nosilca / Lecturer's references:

1. **Trček J.** 2014. Plasmid analysis of high acetic acid-resistant bacterial strains by two-dimensional agarose gel electrophoresis and insights into the phenotype of plasmid pJK2-1. Ann. Microbiol. in press.
2. **Trček J.,** Matsushita K. 2013. A unique enzyme of acetic acid bacteria, PQQ-dependent alcohol dehydrogenase is also present in *Frateuria aurantia*. Appl. Microbiol. Biotechol. 97, 7369-7376.
3. Slapšak N., Cleenwerck I., De Vos P., **Trček J.** 2013. *Gluconacetobacter maltaceti*, a novel vinegar producing acetic acid bacterium. Syst. Appl. Microbiol. 36, 17-21.
4. **Trček J.**, Fuchs T.M., Trülzsch K. 2010. Analysis of *Yersinia enterocolitica* invasin expression *in vitro* and *in vivo* using a novel *luxCDABE* reporter system. Microbiology, 156, 2734-2745.
5. Bresolin G., **Trček J.**, Scherer S., Fuchs T.M. 2008. Presence of a functional flagellar cluster Flag-2 and low-temperature expression of flagellar genes in *Yersinia enterocolitica* W22703. Microbiology 154, 196-206.