



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Biokemija
Course title:	Biochemistry

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Ekologija z naravovarstvom, 1. stopnja		1.	2.
Undergraduate university programme Ecology with Nature Conservation, 1st degree		1st	2nd

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45	-	30	-	-	105	6

Nosilec predmeta / Lecturer:

Jeziki / Languages:	Predavanja /	Slovenski
	Lectures:	Slovene
	Vaje / Tutorial:	Slovenski/Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: **Prerequisites:**

Vsebina:

- Proteini: aminokisljine, peptidi, proteini, encimi, koencimi, imobilizirani encimi, metabolizem proteinov in aminokisljin
- Ogljikovi hidrati: struktura, klasifikacija, funkcija, razgradnja, biosinteza
- Lipidi: struktura, klasifikacija, funkcija, razgradnja, biosinteza
- Nukleinske kisline: struktura, biosinteza in funkcija, razgradnja
- Dihalna veriga in oksidativna fosforilacija, fotosinteza
- Hormonski mehanizmi
- Vaje:
 - Preparativne metode: homogenizacija, ekstrakcija, frakcionirano obarjanje, gelska kromatografija, elektroforeza
 - Analitske metode: reakcije na proteine, lipide in ogljikove hidrate
 - Encimatika: kinetika, določanje encimske enote

Content (Syllabus outline):

- Proteins: amino acids, peptides, proteins, enzymes, coenzymes, immobilized enzymes metabolism of proteins and amino acids
- Carbohydrates: structure, classification, function, catabolism, biosynthesis
- Lipids: structure, classification, function, digestion, biosynthesis
- Nucleic acids: structure, biosynthesis and function, degradation
- Respiratory chain and oxidative phosphorylation, photosynthesis.
- Hormone mechanisms
- Practicum:
 - Preparative methods: homogenization, extraction, fractionary precipitation, gel chromatography, electrophoresis
 - Analytical methods: reactions on proteins, lip and carbohydrates
 - Enzymatics: kinetics, determination of the enzyme unit

Temeljni literatura in viri / Readings:

- Berg J, Tymoczko JL, Stryer L 2011. Biochemistry, International Edition. 7. izdaja. 1098 str., Palgrave Macmillan.
- Nelson DL in Cox MM 2008. Lehninger Principles of Biochemistry. 5. izdaja. 1119 str., Palgrave Macmillan.
- Voet DJ in Voet JG 2011. Biochemistry. 4. izdaja, 1520 str., John Wiley & Sons.

Cilji in kompetence:

- Seznanitev študentov s kemijsko zgradbo in reakcijami v biotskih sistemih

Objectives and competences:

- To inform students about chemical structure and reactions in biotic systems

Predvideni študijski rezultati:**Znanje in razumevanje:**

- Poznavanje kemijskih sestavin živih organizmov in razumevanje njihove funkcije ter medsebojnih pretvorb

Prenesljive/ključne spretnosti in drugi atributi:

- Sposobnost uporabe osnovne literature iz biokemije, modelov biomolekul in tabel metabolnih poti
- Delo z nizkotlačno kolonsko kromatografijo in elektroforezo
- Praktično znanje izolacije lipidov in proteinov iz organizmov

Intended learning outcomes:**Knowledge and understanding:**

- Knowledge of chemical constituents of living organisms and understanding their function and their interconversions

Transferable/Key Skills and other attributes:

- Capability of using basic biochemistry literature, models of biomolecules and tables with metabolic pathways
- Working with low pressure column chromatography and electrophoresis.
- Practical knowledge of isolation of lipids and proteins from organisms

- Izvedba kvalitativnih in kvantitativnih reakcij na proteine, lipide in ogljikove hidrate
- Določitev encimske aktivnosti

- Carrying out qualitative and quantitative reactions on proteins, lipids and carbohydrates
- Determination of the enzyme activity

Metode poučevanja in učenja:

- Predavanja
- Laboratorijske vaje

Learning and teaching methods:

- Lectures
- Laboratory excersises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): <ul style="list-style-type: none"> • Kolokvij • Pisni izpit 	40 % 60 %	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> • Partial exam • Written 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.* v tisku.
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. Biotechnol.* 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., Trülsch 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.