



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 Preservation, 1st level		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 / Lectures:	Slovenski
		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 mehanizem
- Vaje:
 - Preparativne metode: homogenizacija, ekstrakcija, frakcionirano obarjanje, gelska kromatografija, elektroforeza
 - Analitične 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, Gatto G. 2019. Biochemistry, International Edition. 9. izdaja. 1296 str., Freeman W.H.
- Nelson DL in Cox MM 2021. Lehninger Principles of Biochemistry. 8. izdaja. 1248 str., Freeman W.H.
- D.J. Voet in J.G. Voet. 2016. Fundamentals of Biochemistry: Life at the Molecular Level. 5. izdaja, 1184 str., Wiley.

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

Prenosljive/ključne spretnosti in drugi atributi:

- Sposobnost uporabe osnovne literature iz biokemije, modelov biomolekul in tabel metabolnih poti

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.

- Delo z nizekotlačno kolonsko kromatografijo in elektroforezo
- Praktično znanje izolacije lipidov in proteinov iz organizmov
- Izvedba kvalitativnih in kvantitativnih reakcij na proteine, lipide in ogljikove hidrate
- Določitev encimske aktivnosti

- Practical knowledge of isolation of lipids and proteins from organisms
- 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):		Type (examination, oral, coursework, project):
• Kolokvij	50	• Partial exam
• Pisni izpit	50	• Written exam

Reference nosilca / Lecturer's references:

1. Jelenko K., Cepec E., Nascimento F.X., **Trček J.** 2023. Comparative genomics and phenotypic characterization of *Gluconacetobacter entanii*, a highly acetic acid-tolerant bacterium from vinegars. *Foods* 12(1), 1-15.
2. Simonič M., Slapničar Š., **Trček J.**, Bogovič Matijašič B., Mohar Lorbeg P., Vesel A., Fras Zemljič L., Peršin Fratnik Z. 2023. Probiotic *Lactobacillus paragasseri* K7 nanofiber encapsulation using nozzle-free electrospinning. *Appl. Biochem. Biotechnol.* v tisku, 12 str.
3. Cepec E. in **Trček J.** 2022. Antimicrobial resistance of *Acetobacter* and *Komagataeibacter* species originating from vinegars. *Int. J. Environ. Res. Public Health* 19(1), str. 1-10.
4. Ajdnik U., Fras Zemljič L., Plohl, O., Pérez L., **Trček J.**, Bračič M., Mohan T. 2021. Bioactive functional nanolayers of chitosan-lysine surfactant with single- and mixed-protein-repellent and antibiofilm properties for medical implants. *ACS Appl. Mater. Interfaces* 13(20), 23352–23368.
5. **Trček J.**, Dogša I., Accetto T., Stopar D. 2021. Acetan and acetan-like polysaccharides: genetics, biosynthesis, structure, and viscoelasticity. *Polymers* 13(5), 1-16.