



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: Biologija, 1. stopnja		1.	2.
Undergraduate university programme: Biology, 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 /	Slovenski
	Lectures:	Slovene
	Vaje / Tutorial:	Slovenski/Slovene

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

Prerequisites:

Vsebina:

- Proteini: aminokislina, peptidi, proteini, encimi, koencimi, imobilizirani encimi, metabolizem proteinov in aminokislina
- 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 2012. Lehninger Principles of Biochemistry. 7. izdaja. 1328 str., Freeman WH.
- Voet D, Voet JG in Pratt JG. 2018. Voet's Principles of Biochemistry. 1200 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

Prenosljive/ključne spretnosti in drugi atributi:

- Sposobnost uporabe osnovne literature iz biokemije, modelov biomolekul in tabel metabolnih poti
- Delo z nizkotlačno kolonsko kromatografijo

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.

in elektroforezo <ul style="list-style-type: none"> • Praktično znanje izolacije lipidov in proteinov iz organizmov • Izvedba kvalitativnih in kvantitativnih reakcij na proteine, lipide in ogljikove hidrate • Določitev encimske aktivnosti 	<ul style="list-style-type: none"> • 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
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Metode poučevanja in učenja:

<ul style="list-style-type: none"> • Predavanja • Laboratorijske vaje

Learning and teaching methods:

<ul style="list-style-type: none"> • 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 	50 50	Type (examination, oral, coursework, project): <ul style="list-style-type: none"> • Partial exam • Writtem exam

Reference nosilca / Lecturer's references:

<ol style="list-style-type: none"> 1. Lee C., Franke K.B., Kamal S.M., Kim H., Lünsdorf H., Jäger J., Nimtz M., Trček J., Jänsch L., Bukau B., Mogk A., Römling U. 2018. Stand-alone ClpG disaggregase confers superior heat tolerance to bacteria. <i>Proc. Natl. Acad. Sci. USA</i> 115 (2):E273-E282. 2. Škraban J., Kyrpides N.C., Shapiro N., Whitmann W.B., Trček J. 2018. Draft genome sequence of <i>Chryseobacterium limigenitum</i> SUR2^T (LMG 28734^T) isolated from dehydrated sludge. <i>Braz. J. Microbiol.</i> 49 (1), 5-6. 3. Korenak J., Ploder J., Trček J., Hélix-Nielsen C., Petrinic I. 2018. Decolourisation and biodegradation of model azo dye solutions using a sequence batch reactor, followed by ultrafiltration. <i>Int. J. Environ. Sci. Technol.</i> 15 (3), 483-492. 4. Škraban J. and Trček J. 2017. Comparative genomics of <i>Acetobacter</i> and other Acetic Acid Bacteria. In: <i>Acetic Acid Bacteria: Fundamentals and Food Applications</i>, pp. 44-70. Editor: Ilikin Yucel Sengun, CRC Press. 5. Lee C., Wigren E., Trček J., Peters V., Kim J., Hasni S., Nimtz M., Lindqvist Y., Park C., Curth U., Lünsdorf H., Römling U. 2015. A protein quality control mechanism might contribute to survival of world-wide distributed <i>Pseudomonas aeruginosa</i> clone C strains. <i>Environ. Microbiol.</i> 17 (11), 4511-4526.
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