

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	TEMELJI BIOKEMIJE
<b>Course Title:</b>	FUNDAMENTALS OF BIOCHEMISTRY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UN Biokemija, 1. stopnja	/	1.	2.
USP Biochemistry, 1 <sup>st</sup> Cycle	/	1 <sup>st</sup>	2 <sup>nd</sup>

**Vrsta predmeta / Course Type:** obvezni / Mandatory

**Univerzitetna koda predmeta / University Course Code:** BK110

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
45	30	/	/	/	75	5

**Nosilec predmeta / Lecturer:** prof. dr. Brigita Lenarčič / Dr. Brigita Lenarčič, Full Professor

**Jeziki / Languages:**

<b>Predavanja / Lectures:</b>	slovenski / Slovenian
<b>Vaje / Tutorial:</b>	/

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.	<b>Prerequisites:</b> The course has to be assigned to the student.
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**Vsebina:**

Molekule in življenje.  
 Aminokisliline, peptidi in proteini.  
 3D zgradba proteinov in njihova biološka vloga.  
 Encimi: reakcije, kinetika, inhibicija, koencimi.  
 Ogljikovi hidrati: zgradba in biološka vloga.  
 Lipidi, biološke membrane, transport.  
 DNA in RNA: zgradba in vloga.  
 Ohranjanje in prenos biološke informacije.  
 Rekombinantna DNA in biotehnologija.  
 Osnove celičnega metabolizma in bioenergetike.  
 Glikoliza in glukoneogeneza.  
 Nastanek NADH, NADPH.  
 Verige za prenos elektronov in nastanek ATP.  
 Katabolizem maščobnih kislin in dušikovih

**Content (Syllabus outline):**

Molecules and life.  
 Amino acids, peptides and proteins.  
 3D structures of proteins and biological function.  
 Enzymes: reactions, kinetics, inhibition, coenzymes.  
 Carbohydrates: structure and biological function.  
 Lipids, biological membrane, cellular transport.  
 DNA and RNA: structure and function.  
 Storage and transfer of biological information.  
 Recombinant DNA and biotechnology.  
 Basic concepts of cellular metabolism and bioenergetics.  
 Glycolysis and gluconeogenesis.

spojin.

NADH, NADPH formation.  
Electron-transport chain and ATP formation.  
Catabolism of fatty acids and nitrogenous compounds.

### Temeljna literatura in viri / Readings:

- Temeljni biokemije, Boyer (Študentska založba, 2005) strani 630 (50%)

### Cilji in kompetence:

Namen predmeta je, da študentje pridobijo biokemijske osnove (zgradba in vloga bioloških makromolekul in njihova regulacija, celični metabolizem). Po opravljenih obveznostih bo študent sposoben razumeti razlago osnovnih biokemijskih in fizioloških procesov.

### Objectives and Competences:

The objective of the course is to provide students with the basic biochemical knowledge (structure and function of biological macromolecules and their regulation, cellular metabolism). After completing the course, students will be able to understand the basic biochemical and physiological processes.

### Predvideni študijski rezultati:

#### Znanje in razumevanje

Znanje: poznavanje zgradbe in biološke vloge makromolekul. Energetske molekule in njihove pretvorbe.

Razumevanje: delovanje encimov in inhibitorjev, princip ohranjanja in prenosa genetske informacije, metabolizem.

#### Uporaba

Predmet daje znanja, ki so nujno potrebna za nadaljevanje študija.

#### Refleksija

Študent bo razmišljal o povezavi med strukturo makromolekul in njihovo biološko vlogo.

#### Prenosljive spretnosti

Samostojno in skupinsko delo za pripravo seminarjev, sposobnost uporabe literature in drugih virov, ustno in pisno in poročanje.

### Intended Learning Outcomes:

#### Knowledge and Comprehension

Knowledge of the structure and biological function of macromolecules. High energy molecules and their interconversion. Function of enzymes and their inhibitors, principles of the storage and transfer of biological information, metabolism

#### Application

The course provides knowledge essential for a successful continuation of the study programme.

#### Analysis

Students will reflect on the connection between structure and biological function of macromolecules.

#### Skill-transference Ability

Individual and group work in preparing seminars, the ability to use literature and other sources, oral and written reporting.

### Metode poučevanja in učenja:

Predavanja, individualni in skupinski seminarji.

### Learning and Teaching Methods:

Lectures and individual seminars.

Delež (v %) /

### Načini ocenjevanja:

Weight (in %) **Assessment:**

Seminarska naloga Pisni izpit Ocene: 6-10 (pozitivno), 1-5 (negativno).		Seminar work Written exam Grades: 6-10 (positive), 1-5 (negative)
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**Reference nosilca / Lecturer's references:**

- KLEMENČIČ, Marina, NOVINEC, Marko, MAIER, Silke, HARTMANN, Ursula, **LENARČIČ, Brigita**. The heparin-binding activity of secreted modular calcium-binding protein 1 (SMOC-1) modulates its cell adhesion properties. PloS one, 2013, vol. 8, no. 2, art.no. e56839 (doi: 10.1371/journal.pone.0056839).
- NOVINEC, Marko, PAVŠIČ, Miha, **LENARČIČ, Brigita**. A simple and efficient protocol for the production of recombinant cathepsin V and other cysteine cathepsins in soluble form in Escherichia coli. Protein expression and purification, 2012, vol. 82, no. 1, str. 1-5.
- PAVŠIČ, Miha, **LENARČIČ, Brigita**. Expression, crystallization and preliminary x-ray characterization of the human epithelial cell-adhesion molecule ectodomain. Acta crystallographica. Section F, Structural biology and crystallization communications, 2011, vol. F67, no. 11, str. 1363-1366.

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