



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	<b>Izbrana poglavja iz citologije in histologije</b>
<b>Course title:</b>	<b>Selected Topics in Cytology and Histology</b>

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.;	1.- 4.;
Doctoral Study Ecological Sciences, 3rd degree		1st or 2nd	1st-4th

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
15	15				150	6

Nosilec predmeta / Lecturer: Saška LIPOVŠEK

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

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

Poznavanje citologije in histologije na ravni univerzitetnega programa

**Prerequisites:**

Knowledge of cytology and histology at Graduate level

**Vsebina:**

Pri predmetu se študenti seznanijo z izbranimi raziskovalnimi metodami citologije, histologije ter s kemijsko sestavo celic. Študenti spoznajo značilnosti rastlinske in živalske celice, celične strukture, njihove funkcije in različne vrste tkiv. Obravnavana so izbrana poglavja iz naslednjih sklopov.  
-Organizacija evkariotske in prokariotske celice

**Content (Syllabus outline):**

This subject provides an introduction to the selected methods for studying cells and the chemical structure of the cells. It focuses on main characteristics of plant and animal cells, cell structures, their function and different types of tissue. Selected topics in the following chapters are discussed.  
-Organisation of eukaryotic and prokaryotic cell

- Celice kot eksperimentalni modeli
- Molekularna sestava celic
- Metode proučevanja celic
- Celične membrane in transport snovi skozi
- Mitohondriji in mehanizem oksidativne fosforilacije
- Endoplazemski retikulum in Golgijev aparat
- Lizosomi in peroksisomi
- Citoskelet in gibanje celice (aktinski filamenti, intermediatni filamenti in mikrotubuli)
- Jedro, kromatin in kromosomi
- Celicni ciklus, mitozna in mejoza
- Medcelicne povezave
- Vrste tkiv in njihove funkcije

- Cells as experimental models
- The molecular composition of cells
- Tools of cell biology
- Cell membranes and membrane transport
- Mitochondria and the mechanism of oxidative phosphorylation
- Endoplasmic reticulum and Golgi apparatus
- Lysosomes and peroxisomes
- The cytoskeleton and cell movement (actin filaments, intermediate filaments and microtubules)
- The nucleus, chromatin and chromosomes
- Cell cycle, mitosis and meiosis
- Cell to cell interaction
- Types of tissue and their function

### Temeljni literatura in viri / Readings:

Temeljni vir:

Alberts B. s sod. (2014) Molecular biology of the cell, 6th Ed. Garland Science, New York.

Dodatni viri:

Pavelka M., Roth J., 2015. Functional Ultrastructure. Springer, Wien, New York.

Alberts B. s sod. (2009) Essential cell biology. Garland Science, New York.

Karp G. (2013) Cell and Molecular Biology. Concepts and Experiments. John Wiley & Sons, Inc., New York.

### Cilji in kompetence:

Študenti obvladajo izbrane metode v moderni citologiji in histologiji.

Usvojijo vrhunska znanja na specifičnih področjih v citologiji in histologiji.

### Objectives and competences:

Students get skills in selected methods used in modern cytology and histology.

Students acquire top-level knowledge in specific fields in cytology and histology.

### Predvideni študijski rezultati:

#### Znanje in razumevanje:

- Poglobljeno razumejo znanja s področja biologije celice, ki so nujno potrebna nadrukih področjih biologije.
- Podrobno spoznajo izbrana področja, kjer uporabljamo znanja biologije celice (ekologija, kmetijstvo, biotehnologija, medicina itd.).

### Intended learning outcomes:

#### Knowledge and understanding:

- Students understand advanced knowledge concerning cytology and histology, which are essential for other fields of biology. They get acquainted with advanced knowledge with the areas in which cell biology is applied (ecology, agriculture, biotechnology, medicine and others).

**Prenesljive/ključne spretnosti in drugi atributi:**

- Študenti izpopolnijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu. Razumejo najzahtevnejše znanstvene prispevke.

**Transferable/Key Skills and other attributes:**

- Students acquire advanced experience and laboratory skills which are essential for an autonomous laboratory work. They understand most advanced scientific contributions.

**Metode poučevanja in učenja:**

- Predavanja, seminarsko delo, seminarska naloga

**Learning and teaching methods:**

- Lectures, seminar work, seminar essay

**Načini ocenjevanja:**

Seminarska naloga,  
Pisni izpit

Delež (v %) /

Weight (in %)

**Assessment:**

Seminar essay  
Written exam

**Reference nosilca / Lecturer's references:**

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone. Autophagy in the fat body cells of the cave cricket *Troglophilus neglectus* Krauss, 1878 (Rhaphidophoridae, Saltatoria) during overwintering. *Protoplasma*, ISSN 0033-183X, 2016, vol. 253, iss. 2, str. 457-466, ilustr., doi: [10.1007/s00709-015-0824-3](https://doi.org/10.1007/s00709-015-0824-3).

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKovič, Franc, WEILAND, Nina, LEITINGER, Gerd. Malpighian tubule cells in overwintering cave crickets *Troglophilus cavicola* (Kollar, 1833) and *T. neglectus* Krauss, 1879 (Rhaphidophoridae, Ensifera). *PLoS one*, ISSN 1932-6203, 2016, vol. 11, iss. 7, str. e0158598-1-e0158598-16, ilustr., doi: [10.1371/journal.pone.0158598](https://doi.org/10.1371/journal.pone.0158598).

LIPOVŠEK DELAKORDA, Saška, JANŽEKovič, Franc, NOVAK, Tone. Ultrastructure of fat body cells and Malpighian tubule cells in overwintering *Scoliopteryx libatrix* (Noctuoidea). *Protoplasma*, ISSN 0033-183X, 2017, vol. 254, iss. 6, str. 2189-2199, ilustr., doi: [10.1007/s00709-017-1110-3](https://doi.org/10.1007/s00709-017-1110-3).

LIPOVŠEK DELAKORDA, Saška, LEITINGER, Gerd, NOVAK, Tone, JANŽEKovič, Franc, GORGON, Szymon, KAMIŃSKA, Karolina, ROST-ROSKOWSKA, Magdalena. Changes in the midgut cells in the European cave spider, *Meta menardi*, during starvation in spring and autumn. *Histochemistry and cell biology*, ISSN 0948-6143, Mar. 2018, vol. 149, iss. 3, str. 245-260, ilustr. <https://link.springer.com/article/10.1007%2Fs00418-017-1623-z>, doi: [10.1007/s00418-017-1623-z](https://doi.org/10.1007/s00418-017-1623-z).

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKovič, Franc, BRDELAK, Nina, LEITINGER, Gerd. Changes in the midgut diverticula epithelial cells of the European cave spider, *Meta menardi*, under controlled winter starvation. *Scientific reports*, ISSN 2045-2322, 2018, vol. 8, art. no. 13645, str. 1-13, ilustr. <https://www.nature.com/articles/s41598-018-31907-3>, doi: [10.1038/s41598-018-31907-3](https://doi.org/10.1038/s41598-018-31907-3).