



Univerza v Mariboru

Medicinska fakulteta

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

|                      |                  |
|----------------------|------------------|
| <b>Predmet:</b>      | Biologija celice |
| <b>Course title:</b> | Cell biology     |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|-----------------------------------------------------------|-------------------------------|-------------------------|----------------------|
| Splošna medicina<br>General medicine - EMŠP               |                               | 1.                      | 2.                   |
|                                                           |                               |                         |                      |

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

| Predavanja<br>Lectures | Seminar<br>Seminar | Sem. vaje<br>Tutorial | Lab. vaje<br>Laboratory work | Teren. vaje<br>Field work | Samost. delo<br>Individ. work | ECTS |
|------------------------|--------------------|-----------------------|------------------------------|---------------------------|-------------------------------|------|
| 45                     | 30                 | -                     | 45                           | -                         | 90                            | 7    |

Nosilec predmeta / Lecturer:

Izr. prof. dr. Saška Lipovšek

Jeziki /

Predavanja / Lectures: Slovenski jezik/slovene

Languages:

Vaje / Tutorial: Slovenski jezik/slovene

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

Prerequisites:

Vsebina:

Razumevanje biologije celice je temeljno za razumevanje drugih področij biologije in medicine. Pri predmetu se študenti seznajajo s sodobnimi raziskovalnimi metodami. Študenti spoznajo kemijsko sestavo celic, značilnosti prokariotskih in evkariotskih celic. Poudarek je na študiju struktur in organelov evkariotskih celic ter njihovih funkcijah.

Kratek povzetek vsebin:

1. Organizacija evkariotske in prokariotske celice; celice kot eksperimentalni modeli
2. Molekularna sestava celic
3. Metode proučevanja celic
4. Celične membrane in transport snovi Receptorji
5. Ekstracelularni matriks
6. Mitohondriji in mehanizem oksidativne fosforilacije
7. Endoplazemski retikulum in Golgijev aparat
8. Lizosomi in peroksisomi
9. Citoskelet in gibanje celice
10. Jedro, kromatin in kromosomi
11. Celični ciklus, mitotična in mejoza
12. Medcelične komunikacije

Content (Syllabus outline):

Understanding of the cell biology is an area of research that is fundamental to all of the biological and medical sciences. This subject provides an introduction to the methods for studying cells. It focuses on the chemical structure of the cells, main characteristics of the prokaryotic and the eukaryotic cells, especially structures and organelles of the eukaryotic cells and their function. Short abstract of contents:

1. Organisation of eukaryotic and prokaryotic cell; cells as experimental models
2. The molecular composition of cells
3. Tools of cell biology
4. Cell membranes and membrane transport
5. Receptors
6. Extracellular matrix
7. Mitochondria and the mechanism of oxidative phosphorylation
8. Endoplasmic reticulum and Golgi Complex
9. Lysosomes and peroxisomes
10. The cytoskeleton and cell movement
11. The nucleus, chromatin and chromosomes

13. Apoptoza in nekroza
14. Celice imunskega sistema
15. Maligno transformirane celice
16. Razmnoževanje in razvoj

12. Cell cycle, mitosis and meiosis
13. Cell to cell interaction
14. Apoptosis and necrosis
15. Cells of the immune system
16. Malignant transformation  
Reproduction and development

**Temeljni literatura in viri / Readings:**

- Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P., 2014: Molecular Biology of the Cell 8<sup>th</sup> Ed.. Garland Science, Taylor & Francis Group, New York.
- Becker, M. W., Kleinsmith, L. J., Hardin, J., 2004: The World of the Cell (5<sup>th</sup> Ed.). The Benjamin/Cummings Publishing Company, San Francisco.
- Cooper, G. M., R. F. Hausman, 2009: The Cell: a molecular approach (5<sup>th</sup> Ed.). ASM Press, Washington, D. C.
- Junqueira, L. C. and Carneiro, J., 1996: Histologie – Zytologie, Histologie und mikroskopische Anatomie des Menschen. Springer-Verlag Berlin, Heidelberg.
- Lodish, H., Berk, A., Matsudaira, P., Kaiser, C. A., Krieger, M., Scott, M. P., Zipursky, S. L., Darnell, J., 2010: Molecular Cell Biology 6<sup>th</sup> Ed.). W. H. Freeman and Company, New York.

**Cilji in kompetence:**

- Študenti razumejo strukturo, funkcijo in molekularno organizacijo celice.
- Pridobijo poglobljena znanja na specifičnih področjih biologije celice.

**Objectives and competences:**

- Students understand the structure, the function and the molecular organisation of the cell.
- Students acquire advanced knowledge in specific fields in cell biology.

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

- Študenti razumejo dosežke s področja biologije celice, ki so nujno potrebni na drugih področjih biologije in medicine.
- Študenti spoznajo nekatera področja medicine, kjer uporabljamo znanja biologije celice.

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

- Študenti pridobijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu.
- Znajo uporabljati znanstvene prispevke in zahtevnejšo študijsko literaturo.

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

- Students understand achievements in cell biology which is essential for other fields of biology and medicine.
- Students get acquainted with the areas of medicine in which cell biology is applied.

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

- Students acquire experience and laboratory skills which are essential for an autonomous laboratory work.
- They understand articles in scientific journals and advanced text-books.

**Metode poučevanja in učenja:**

- Predavanja
- Laboratorijske vaje
- Seminar

**Learning and teaching methods:**

- Lectures
- Laboratory excersises
- Seminar

**Načini ocenjevanja:**

Delež (v %) /  
Weight (in %)

**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)  
Pisni praktični kolokvij (30%)  
Seminar (10%)  
Pisni izpit (60%)

30  
10  
60

Type (examination, oral, coursework, project):  
Written practical examination (30%)  
Seminar (10%)  
Written final examination (60%)

ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV  
Prisotnost na vajah  
Napisani protokoli  
Opravljen kolokvij, seminar in izpit

ACADEMIC OBLIGATIONS OF STUDENTS:  
Each student has to:  
- be present on each practical course;  
- write down the protocol on each practical course;  
- pass written practical examination, written

|                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA</p> <p>Pogoj za pristop h kolokviju:</p> <ul style="list-style-type: none"> <li>-opravljene vaje;</li> <li>-napisani protokoli.</li> </ul> <p>Pogoji za pristop k izpitu:</p> <ul style="list-style-type: none"> <li>-opravljen kolokvij, seminar</li> </ul> <p>Pozitivna ocena: doseženih 50 % in več</p> |  | <p>seminar and written final examination.</p> <p>REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING:</p> <ul style="list-style-type: none"> <li>- performed practical courses;</li> <li>-written protocols.</li> </ul> <p>CONDITIONS FOR WRITTEN FINAL EXAM:</p> <ul style="list-style-type: none"> <li>-performed written practical exam and seminar.</li> </ul> |
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**Reference nosilca / Lecturer's references:**

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKVIČ, Franc, WEILAND, Nina, LEITINGER, Gerd. Malpighian tubule cells in overwintering cave crickets *Troglophilus cavicola* (Kollar, 1833) and *T. neglectus* Krauss, 1879 (Raphidophoridae, Ensifera). *PLoS one*, ISSN 1932-6203, 2016, vol. 11, iss. 7.

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone. Autophagy in the fat body cells of the cave cricket *Troglophilus neglectus* Krauss, 1878 (Raphidophoridae, Saltatoria) during overwintering. *Protoplasma*, ISSN 0033-183X, 2016, vol. 253, iss. 2, str. 457-466.

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, JANŽEKVIČ, Franc, LEITINGER, Gerd. Changes in the midgut diverticula in the harvestmen *Amilenus aurantiacus* (Phalangidae, Opiliones) during winter diapause. *Arthropod structure & development*, ISSN 1467-8039, 2015, vol. 44, iss. 2, str. 131-141.

LIPOVŠEK DELAKORDA, Saška, JANŽEKVIČ, Franc, NOVAK, Tone. Autophagic activity in the midgut gland of the overwintering harvestmen *Gysa annulatus* (Phalangidae, Opiliones). *Arthropod structure & development*, ISSN 1467-8039, 2014, vol. 43, iss. 5, str. 493-500.

LIPOVŠEK DELAKORDA, Saška, LETOFŠKY-PAPST, Ilse, HOFER, Ferdinand, PABST, Maria Anna, DEVETAK, Dušan. Application of analytical electron microscopic methods to investigate the function of spherites in the midgut of the larval antlion *Euroleon nostras* (Neuroptera: Myrmeleontidae). *Microscopy research and technique*, ISSN 1059-910X, 2012, vol. 75, iss. 4, str. 397-407.

NYQVIST, Daniel, SPEIER, Stephan, RODRIGUEZ-DIAZ, Rayner, MOLANO, R. Damaris, LIPOVŠEK DELAKORDA, Saška, RUPNIK, Marjan, DICKER, Andrea, ILEGEMS, Erwin, ZÄHR-ÄKRAWI, Elsie, MOLINA, Judith, LOPEZ-CABEZA, Maite, VILLATE, Susana, ABDULREDA, Midhat, RICORDI, Camillo, CAICEDO, Alejandro, PILEGGI, Antonello, BERGGREN, Per-Olof. Donor islet endothelial cells in pancreatic islet revascularization. *Diabetes*, ISSN 0012-1797, 2011, vol. 60, no. 10, str. 2571-2577.