



Univerza v Mariboru

Medicinska fakulteta

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	<b>Biologija celice</b>
<b>Course title:</b>	<b>Cell Biology</b>

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Dentalna medicina/Dental Medicine 2. stopnja/2nd cycle		1	1

Vrsta predmeta / Course type

Obvezni/ Compulsory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
45	30	45			90	7

Nosilec predmeta / Lecturer:

Izr. prof. dr. Saška Lipovšek

Jeziki /

Predavanja / Lectures: slovenščina/slovene

Languages:

Vaje / Tutorial: slovenščina/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 seznanijo 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, mitoz in mejoza
12. Medcelične komunikacije
13. Apoptoza in nekroza

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. Organization 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
12. Cell cycle, mitosis and meiosis

14. Celice imunskega sistema 15. Maligno transformirane celice 16. Razmnoževanje in razvoj	13. Cell to cell interaction 14. Apoptosis and necrosis 15. Cells of the immune system 16. Malignant transformation Reproduction and development
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**Temeljni literatura in viri / Readings:**

<ol style="list-style-type: none"> <li>1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., Walter, P., 2014: Molecular Biology of the Cell (6<sup>th</sup> Ed.), Garland Science, Taylor &amp; Francis Group, New York.</li> <li>2. Cooper, G. M., Hausman, R. F., 2013: The Cell: A Molecular approach (6<sup>th</sup> Ed.). ASM Press, Washington, D. C.</li> <li>3. Lodish, H., Berk, A., 2016: Molecular Cell Biology (8<sup>th</sup> Ed.). W. H. Freeman and Company, New York.</li> <li>4. Dariš B., Lipovšek S.: Biologija celice: navodila za laboratorijske vaje. Maribor: Univerza v Mariboru, Univerzitetna založba, 2021</li> </ol> <p><b>Dopolnilno gradivo:</b></p> <ol style="list-style-type: none"> <li>5. Alberts, B., Bray, D., 2016: Essential Cell Biology, Garland Science, Taylor &amp; Francis Group, New York.</li> <li>6. Pavelka M., Roth J., 2015: Functional Ultrastructure: Atlas of Tissue Biology and Pathology (3<sup>rd</sup> Ed.), Springer.</li> </ol>
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**Cilji in kompetence:**

<ul style="list-style-type: none"> <li>– Študenti razumejo strukturo, funkcijo in molekularno organizacijo celice.</li> <li>– Pridobijo poglobljena znanja na specifičnih področjih biologije celice.</li> </ul>
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**Objectives and competences:**

<ul style="list-style-type: none"> <li>– Students understand the structure, the function and the molecular organisation of the cell.</li> <li>– Students acquire advanced knowledge in specific fields in cell biology.</li> </ul>
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**Predvideni študijski rezultati:**

<p>Znanje in razumevanje:</p> <ul style="list-style-type: none"> <li>– Študenti razumejo dosežke s področja biologije celice, ki so nujno potrebni na drugih področjih biologije in medicine.</li> <li>– Študenti spoznajo nekatera področja medicine, kjer uporabljamo znanja biologije celice.</li> </ul> <p>Prenesljive/ključne spretnosti in drugi atributi:</p> <ul style="list-style-type: none"> <li>– Študenti pridobijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu.</li> <li>– Znajo uporabljati znanstvene prispevke in zahtevnejšo študijsko literaturo.</li> </ul>
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**Intended learning outcomes:**

<p>Knowledge and understanding:</p> <p>Knowledge and Understanding:</p> <ul style="list-style-type: none"> <li>– Students understand achievements in cell biology which is essential for other fields of biology and medicine.</li> <li>– Students get acquainted with the areas of medicine in which cell biology is applied.</li> </ul> <p>Transferable/Key Skills and other attributes:</p> <ul style="list-style-type: none"> <li>– Students acquire experience and laboratory skills which are essential for an autonomous laboratory work.</li> <li>– They understand articles in scientific journals and advanced text-books.</li> </ul>
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**Metode poučevanja in učenja:**

<ul style="list-style-type: none"> <li>– Predavanja</li> <li>– Seminar</li> <li>– Vaje</li> </ul>
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**Learning and teaching methods:**

<ul style="list-style-type: none"> <li>– Lectures</li> <li>– Seminars</li> <li>– Tutorial (laboratory)</li> </ul>
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**Delež (v %) /****Weight (in %)****Assessment:**

<b>Načini ocenjevanja:</b>	<b>Delež (v %) / Weight (in %)</b>	<b>Assessment:</b>
Način (pisni izpit, ustno izpraševanje, naloge, projekt)	30	Type (examination, oral, coursework, project):
Pisni praktični kolokvij (30%)	10	Written practical examination (30%)
Seminar (10%)	60	Seminar (10%)
Pisni izpit (60%)		Written final examination (60%)
<b>ŠTUDIJSKE OBVEZNOSTI ŠTUDENTOV</b>		<b>ACADEMIC OBLIGATIONS OF STUDENTS:</b>
Prisotnost na vajah		Each student has to:
Napisani protokoli		- be present on each practical course;
Opravljen kolokvij, seminar in izpit		

<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>		<ul style="list-style-type: none"> <li>- write down the protocol on each practical course;</li> <li>- pass written practical examination, written seminar and written final examination.</li> </ul> <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, JANŽEKOVIČ, Franc, WEILAND, Nina, LEITINGER, Gerd. Malpighian tubule cells in overwintering cave crickets *Troglophilus cavicola* (Kollar, 1833) and *T. neglectus* Krauss, 1879 (Rhopidophoridae, 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 (Rhopidophoridae, Saltatoria) during overwintering. *Protoplasma*, ISSN 0033-183X, 2016, vol. 253, iss. 2, str. 457-466.

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

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

LIPOVŠEK DELAKORDA, Saška, LETOFSKY-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, ZAHR-AKRAWI, 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.