2024/2025

Univerza v Mariboru

Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Biologija celice**
Course title:	**Cell Biology**

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**			**60**	**6**

Nosilec predmeta / Lecturer:	**Izr. prof. dr. Saška Lipovšek**

Jeziki / Languages:	**Predavanja / Lectures:**	slovenščina/slovene
	Vaje / Tutorial:	slovenščina/slovene

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

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. Receptorji
6. Ekstracelularni matriks
7. Mitohondriji in mehanizem oksidativne fosforilacije
8. Endoplazemski retikulum in Golgijev aparat
9. Lizosomi in peroksisomi
10. Citoskelet in gibanje celice
11. Jedro, kromatin in kromosomi
12. Celični ciklus, mitoza in mejoza
13. Medcelične komunikacije
14. Apoptoza in nekroza
15. Celice imunskega sistema
16. Maligno transformirane celice
17. Razmnoževanje in razvoj

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
13. Cell to cell interaction
14. Apoptosis and necrosis
15. Cells of the immune system
16. Malignant transformation
17. Reproduction and development

Temeljni literatura in viri / Readings:

1. Alberts, B. et al., 2015: Molecular Biology of the Cell 6th Ed.. Garland Science, Taylor & Francis Group, New York.
2. Alberts, B. et al.,, 2022: Molecular Biology of the Cell 7th Ed.. Garland Science, Taylor & Francis Group, New York.
3. Jezernik, K., Veranič, P., Sterle, M., 2012: Celična biologija. Učbenik za študente Medicinske fakultete. DZS, Ljubljana.
4. Veranič, P., Romih, R., Pšeničnik, M., 2009: Praktični pouk celične biologije. TZS, Ljubljana.
5. Cooper, G. M., R. F. Hausman, 2009: The Cell: a molecular approach (5th Ed.). ASM Press, Washington, D. C.
6. Karp, G., 2015: Cell and molecular biology. Concepts and experiments. John Wiley & Sons, Inc., New York.
7. Lodish, H., Berk, A., 2016: Molecular Cell Biology (8th Ed.). W. H. Freeman and Company, New York.
8. Dariš B., Lipovšek S.: Biologija celice: navodila za laboratorijske vaje. Maribor: Univerza v Mariboru, Univerzitetna založba, 2021

Dopolnilno gradivo:

9. Alberts, B., Bray, D., 2016: Essential Cell Biology, Garland Science, Taylor & Francis Group, New York.
10. Pavelka M., Roth J., 2015: Functional Ultrastructure: Atlas of Tissue Biology and Pathology (3rd Ed.), Springer.
11. Junqueira, L. C. and Carneiro, J., 1996: Histologie – Zytologie, Histologie und mikroskopische Anatomie des Menschen. Springer-Verlag Berlin, Heidelberg.

Cilji in kompetence:	**Objectives and competences:**
– Študenti razumejo strukturo, funkcijo in molekularno organizacijo celice. – Pridobijo poglobljena znanja na specifičnih področjih biologije celice.	– 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:	**Intended learning outcomes:**
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.	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:	**Learning and teaching methods:**
– Predavanja – Seminar – Vaje	– Lectures – Seminars – Tutorial (laboratory)

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

POGOJI ZA PRISTOP K POSAMEZNEMU PREVERJANJU ZNANJA Pogoj za pristop h kolokviju: -opravljene vaje; -napisani protokoli. Pogoji za pristop k izpitu: -opravljen kolokvij, seminar Pozitivna ocena: doseženih 50 % in več.		- write down the protocol on each practical course; - pass written practical examination, written seminar and written final examination. REQUIREMENTS FOR ACCESS TO INDIVIDUAL KNOWLEDGE CHECKING: - performed practical courses; -written protocols. CONDITIONS FOR WRITTEN FINAL EXAM: -performed written practical exam and seminar.

Reference nosilca / Lecturer's references:

LIPOVŠEK DELAKORDA, Saška, DOLENŠEK, Jurij, DARIŠ, Barbara, VALLADOLID-ACEBES, Ismael, VAJS, Tanja, LEITINGER, Gerd, STOŽER, Andraž, SKELIN, Maša. Western diet-induced ultrastructural changes in mouse pancreatic acinar cells. *Frontiers in cell and developmental biology*. **2024**, vol. 12, [article no.] 1380564, 17 str. ISSN 2296-634X. https://www.frontiersin.org/articles/10.3389/fcell.2022.934684/full, DOI: 10.3389/fcell.2024.1380564. [COBISS.SI-ID 189348099]

KOZEL, Peter, NOVAK, Tone, JANŽEKOVIČ, Franc, LIPOVŠEK DELAKORDA, Saška. Starvation hardiness as preadaptation for life in subterranean habitats. *Scientific reports*. **2023**, vol. 13, article no. 9643, 18 str., ilustr. ISSN 2045-2322. https://dk.um.si/IzpisGradiva.php?id=86400, DOI: 10.1038/s41598-023-36556-9, DOI: 20.500.12556/DKUM-86400. [COBISS.SI-ID 155869443].

LIPOVŠEK DELAKORDA, Saška, NOVAK, Tone, DARIŠ, Barbara, HOFER, Ferdinand, LEITINGER, Gerd, LETOFSKY-PAPST, Ilse. Ultrastructure of spherites in the midgut diverticula and Malpighian tubules of the harvestman Amilenus aurantiacus during the winter diapause. *Histochemistry and cell biology*. Jan. **2022**, vol. 157, iss. 1, str. 107-118, ilustr. ISSN 0948-6143. DOI: 10.1007/s00418-021-02046-0. [COBISS.SI-ID 83684611]

SKELIN, Maša, DOLENŠEK, Jurij, VALLADOLID-ACEBES, Ismael, STOŽER, Andraž, LIPOVŠEK DELAKORDA, Saška. Application of transmission electron microscopy to detect changes in pancreas physiology. V: MHADHBI, Mohsen (ur.). *Electron microscopy*. London: IntechOpen, **2022**. Str. 1-22, ilustr. ISBN 978-1-80355-946-9, ISBN 978-1-80355-947-6. https://www.intechopen.com/chapters/81936, DOI: 10.5772/intechopen.104807. [COBISS.SI-ID 118338051]

LIPOVŠEK DELAKORDA, Saška, KOZEL, Peter, LEITINGER, Gerd, NOVAK, Tone. Malpighian tubules in harvestmen. *Protoplasma*. **2021**, vol. 258, iss. 5, str. 1145-1153, ilustr. ISSN 0033-183X. DOI: 10.1007/s00709-021-01634-0. [COBISS.SI-ID 57977603]