2025/2026

Univerza v Mariboru
Medicinska fakulteta

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Ime predmeta:	**Biologija celice**
Course title:	**Cell biology**

Študijski program in stopnja Study programme and cycle	Študijska smer Study option	Letnik Year of study	Semester Semester
Splošna medicina, enovit magistrski študijski program		Prvi	2.
General medicine, Uniform master's degree study program		First	2nd

Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)	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
		AV	LV	RV				
45	30		45				90	7

Nosilec predmeta / Course coordinator:	**izr. prof. dr. Saška Lipovšek**

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites for enrolling in the course or for performing study obligations:**

Vsebina (kratek pregled učnega načrta):	**Content (syllabus outline):**
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 5. Receptorji 6. Ekstracelularni matriks 7. Mitohondriji in mehanizem oksidativne fosforilacije	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

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	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 / Reading materials:

- Alberts, B. et al.,, 2015: Molecular Biology of the Cell 6th Ed.. Garland Science, Taylor & Francis Group, New York.
- Alberts, B. et al., 2022: Molecular Biology of the Cell 7th Ed.. Garland Science, Taylor & Francis Group, New York.
- Jezernik, K., Veranič, P., Sterle, M., 2012: Celična biologija. Učbenik za študente Medicinske fakultete. DZS, Ljubljana.
- Veranič, P., Romih, R., Pšeničnik, M., 2009: Praktični pouk celične biologije. TZS, Ljubljana.
- Cooper, G. M., R. F. Hausman, 2009: The Cell: a molecular approach (5th Ed.). ASM Press, Washington, D. C.
- Karp, G., 2015: Cell and molecular biology. Concepts and experiments. John Wiley & Sons, Inc., New York.
- Lodish, H., Berk, A., Matsudaira, P., Kaiser, C. A., Krieger, M., Scott, M. P., Zipursky, S. L., Darnell, J., 2010: Molecular Cell Biology6th Ed.). W. H. Freeman and Company, New York.
- Dariš B., Lipovšek S.., 2021: Biologija celice: navodila za laboratorijske vaje. Univerza v Mariboru, Univerzitetna založba, Maribor.

Dopolnilno gradivo:

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

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:

Intended learning outcomes:

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:

• Študenti pridobijo izkušnje in laboratorijske spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu. • Znajo uporabljati znanstvene prispevke in zahtevnejšo študijsko literaturo.	• 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 • Laboratorijske vaje • Seminar	• Lectures • Laboratory excersises • Seminar

Načini ocenjevanja:	Delež (v %) / Share (in %)	**Assessment methods:**
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 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	**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; - 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 / Course coordinator'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]