



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Biologija celice
Course title:	Biology of the Cell

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Biologija, 1. stopnja		1.	1.
Undergraduate university programme Biology, 1st degree		1st	1st

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		30			120	6

Nosilec predmeta / Lecturer:

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

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

Jih ni.

Prerequisites:

No.

Vsebina:

Razumevanje biologije celice je temeljno za razumevanje drugih področij biologije. Pri predmetu se študenti seznanijo z metodami, ki se uporabljajo v moderni biologiji celice in s kemijsko sestavo celic. Študentje spoznajo celične strukture in njihove funkcije.

Povzetek vsebin:

Izvor celic, organizacija evkariotske in prokariotske celice; modelni organizmi v biologiji celice

Molekularna sestava celic

Metode proučevanja celic

Celične membrane

Transport snovi skozi membrano

Mitochondriji in mehanizem oksidativne fosforilacije

Endoplazemski retikulum

Golgijev aparat

Lizosomi in peroksisomi

Citoskelet in gibanje celice (aktinski filamenti, intermediatni filamenti in mikrotubuli)

Jedro, jedrna ovojnica in transport snovi med jedrom in citoplazmo

Kromatin in kromosomi

Celični ciklus

Mitoza in mejoza

Medcelične povezave

Apoptoza in nekroza

Content (Syllabus outline):

Understanding the biology of the cell is an fundamental research area to all biological sciences.

This subject provides an introduction to the methods for studying cells and the chemical structure of cells. It focuses on cell structures and their functions.

Abstract of contents:

The origin of cells, organisation of eucariotic and prokariotic cell; cells as experimental models

The molecular composition of cells

Tools of cell biology

Cell membranes

Membrane transport

Mitochondria and the mechanism of oxidative phosphorylation

The endoplasmic reticulum

The Golgi apparatus

Lysosomes and peroxisomes

The cytoskeleton and cell movement (actin filaments, intermediate filaments and microtubules)

The nucleus, nuclear envelope and traffic between the nucleus and cytoplasm

Chromatin and chromosomes

Cell cycle

Mitosis and meiosis

Cell-cell interactions

Apoptosis and necrosis

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:

Jezernik K., Veranič P., Sterle M. (2012) Celična biologija. Učbenik za študente Medicinske fakultete. DZS, Ljubljana.

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:

Razumevanje metod, ki se uporabljajo v moderni biologiji celice
Poznavanje struktur in razumevanje osnovnih procesov v celicah
Poznavanje področij, na katerih se uporabljajo znanja biologije celice (npr. ekologija, kmetijstvo, biotehnologija in medicina).

Objectives and competences:

Understanding of basic methods used in modern cell biological research
Knowledge of cell structures and understanding of basic cell processes
In addition, students get to know the areas in which cell biology is applied (e. g. ecology, agriculture, biotechnology and medicine).

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent bo:

- znal samostojno načrtovati laboratorijsko delo in pripraviti material za izvedbo dela;
- pridobil izkušnje in spretnosti, ki so nujno potrebne pri samostojnem laboratorijskem delu;
- razumel kemijske lastnosti makromolekul v celici in na osnovi znanja bo predvideval o strukturnih značilnostih celičnih organelov;
- sposoben uporabiti znanje o strukturnih značilnostih različnih tipov evkariotskih celic in posledično bo pravilno predvideval o njihovih funkcijah;
- na osnovi novega znanja znal ovrednotiti pomen kompleksne povezanosti celic v tkivih;
- razumel metode, ki se uporabljajo v moderni biologiji celice;
- pridobil znanja o biologiji celice, ki so nujno potrebna na drugih področjih biologije;
- spoznal, na katerih področjih se aplicirajo znanja biologije celice (npr. ekologija, kmetijstvo);
- usposobljen za delo v biološkem laboratoriju pri zahtevnejših bioloških eksperimentih.

Intended learning outcomes:

Knowledge and understanding:

Student will be able to:

- plan the laboratory work and the material independently;
- acquire experience and skills that are essential for individual laboratory work;
- understand chemical characteristics of different macromolecules in the cell, consequently he will be able to predict structural characteristics of the cell organelles;
- use the knowledge about structural characteristics of different types of eukaryotic cells, and consequently, he will be able to make important conclusions about their functions;
- evaluate the importance of complex connectivity of different types of cells in the tissue;
- understand methods used in modern cell biology research;
- capture knowledge of cell biology that is essential to other subjects in the field of biology;
- get knowledge of areas in which cell biology is applied (e. g. ecology, agriculture, biotechnology);
- students qualify for work in the biological laboratory at advanced biological experiments.

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Metode poučevanja in učenja:

Predavanja
Laboratorijske vaje

Learning and teaching methods:

Lectures
Laboratory excersises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Pisni in praktični kolokviji	40	Written and practical examinations
Pisni izpit	60	Written examination

Reference nosilca / Lecturer's references:

LIPOVŠEK DELAKORDA, Saška, JANŽEKVIČ, Franc, NOVAK, Tone. Autophagic activity in the midgut gland of the overwintering harvestmen *Gyas annulatus* (Phalangidae, Opiliones). *Arthropod structure & development*, ISSN 1467-8039, 2014, vol. 43, iss. 5, str. 493-500, ilustr., doi: [10.1016/j.asd.2014.06.001](https://doi.org/10.1016/j.asd.2014.06.001).

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, iaa. 2, str. 131-141, ilustr., doi: [10.1016/j.asd.2014.12.002](https://doi.org/10.1016/j.asd.2014.12.002).

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, ilustr., doi: [10.1007/s00709-015-0824-3](https://doi.org/10.1007/s00709-015-0824-3).

LIPOVŠEK DELAKORDA, Saška, JANŽEKVIČ, 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, JANŽEKVIČ, Franc, GORGOŃ, Szymon, KAMIŃSKA, Karolina, ROST-ROSZKOWSKA, 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, LEITINGER, Gerd, NOVAK, Tone, JANŽEKOVIČ, Franc, GORGOŃ, Szymon, KAMIŃSKA, Karolina, ROST-ROSZKOWSKA, 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/s00418-017-1623-z>, doi: [10.1007/s00418-017-1623-z](https://doi.org/10.1007/s00418-017-1623-z).

KAMIŃSKA, Karolina, LIPOVŠEK DELAKORDA, Saška, KASZUBA, F., ROST-ROSZKOWSKA, Magdalena. Ultrastructure of the fat body in the soil centipedes *Lithobius forficatus* (Lithobiidae) and *Geophilus flavus* (Geophilidae) according to their seasonal rhythms. *Zoologischer Anzeiger*, ISSN 0044-5231, 2019, vol. 279, str. 82-93, ilustr., doi: [10.1016/j.jcz.2019.01.004](https://doi.org/10.1016/j.jcz.2019.01.004).