

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	SPLOŠNA BIOLOGIJA
Course Title:	GENERAL BIOLOGY

Študijski program in stopnja Study Programme and Level	Študijska smer Study Field	Letnik Academic Year	Semester Semester
UN Biokemija, 1. stopnja	/	1.	1.
USP Biochemistry, 1 st Cycle	/	1 st	1 st

Vrsta predmeta / Course Type: obvezni / Mandatory

Univerzitetna koda predmeta / University Course Code: BK105

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje Work	Druge oblike študija	Samost. delo Individual Work	ECTS
40	15	20 LV	/	/	75	5

Nosilec predmeta / Lecturer: doc. dr. Nada Žnidaršič / Dr. Nada Žnidaršič, Assistant Professor

Jeziki / Languages:

Predavanja / Lectures:	slovenski / Slovenian
Vaje / Tutorial:	slovenski / Slovenian

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

Študent oz. kandidat mora imeti predmet opredeljen kot študijsko obveznost.	Prerequisites: The course has to be assigned to the student.
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Vsebina:

Biologija – veda o življenju, veda o živih organizmih, osnove zgradbe celic: značilnosti živih organizmov; kemijska sestava in zgradba prokariotskih in evkariotskih celic (rastline, glive, živali); osnove ultrastrukture in funkcij celic; osnove mikroskopskih tehnik v biologiji.

Tkiva in organi živali in rastlin: raznolikost celic; povezovanje celic v tkiva; osnove histološke zgradbe in funkcij tkiv živali – epitelna tkiva, vezivna tkiva, mišična tkiva in živčno tkivo. Organski sistemi živali. Rastlinska tkiva in organi.

Osnovni mehanizmi razmnoževanja, razvoja in rasti živali in rastlin: razmnoževanje in razvoj živali; primarna in sekundarna rast

Content (Syllabus outline):

Biology – science that studies life and living organisms, basics of cell structure: characteristics of living organisms; composition and structure of prokaryotic and eukaryotic cells (animal, plant and fungi); basic concepts of cell ultrastructure and function; fundamentals of microscopic techniques in biology.

Tissues and organs of animals and plants: diversity of cells; organisation of tissues; basic histological characteristics and functions of animal tissues – epithelia, connective tissues, muscle tissues and nerve tissue. Animal organ systems. Plant tissues and plant organs.

Basic mechanisms of reproduction, growth and development of animals and plants:

rastlin; razmnoževanje rastlin.

Organizmi in okolje: interakcije mikroorganizmov, rastlin in živali med seboj in z okoljem ter antropogeni vplivi na okolje.

reproduction and development of animals; primary and secondary growth in plants; plants reproduction.

Organisms and environment: interactions of microorganisms, plants and animals with environment and anthropogenic influences.

Temeljna literatura in viri / Readings:

- Splošna zoologija (Štrus, J., Študentska založba, Ljubljana)
- Biologija živalske celice (Štrus, J., Kostanjšek, R., Študentska založba, Ljubljana)
- Histology: A text and atlas (Ross, M.H., Pawlina, W., Lippincott Williams & Wilkins) (samo izbrani odseki) ali primerljiv histološki učbenik (atlas)
- Essential cell biology (Alberts in sod., Garland Science, Taylor & Francis group) (samo izbrani odseki)
- Dermastia M. (2007). Pogled v rastline. NIB. ISBN 978-961-90363-7-2
- Integrated Principles of Zoology – izbrana poglavja (Hickman in sod., McGraw-Hill Education, New York)
- Campbell, N.A, J.B. Reece, E.J. Simon. Essential biology with physiology (Pearson International Edition, San Francisco)
- izročki predavanj za pregled vsebine
- izbrana aktualna poglavja in pregledni znanstveni članki s področja biologije za seminarje

Cilji in kompetence:

Cilj predmeta je poznavanje osnovnih zakonitosti življenja, načel in pojmov v biologiji. Študent spozna osnovne značilnosti živih sistemov, zgradbo in delovanje celic, tkiv, organov in povezovanje v organizem.

Spozna enotnost in raznolikost živega sveta, interakcije med organizmi in njihovo povezanost z neživim svetom. Študent pridobi osnovne spretnosti za delo z organizmi in se seznanja z osnovnimi metodami dela v biologiji. Spoznava strokovno terminologijo in je zmožen iskati in uporabljati ustrezne vire za pridobivanje in poglobljanje biološkega znanja. Na osnovi poznavanja zgradbe je študent zmožen primerjati in razložiti delovanje različnih organizmov.

Objectives and Competences:

Students will get basic knowledge on structure and dynamics of animal and plant cells, tissues and organs. Students get practical skills in light microscopy and methods of samples preparation. They will understand the importance of cell biology and histology in research and applications in diagnostics and industry, understand the importance of cell and tissue cultures in research and applications. They will be able to use and combine different informational sources.

Students will understand basic concepts and principles in biology. They become familiar with structure of main organic systems in animals and plants and can interpret their function. They get insight into inheritance, reproductive and developmental processes of animals and plants and master basic concepts in ecology. The students get basic on animal reproduction and development and are able to link different levels of biological organization.

Predvideni študijski rezultati:Znanje in razumevanje

Razumevanje osnovnih bioloških procesov, ki vzdržujejo življenje. Poznavanje zgradbe in delovanja celic enoceličnih organizmov ter celic, tkiv in organov večceličnih organizmov. Poznavanje osnovne zgradbe in delovanja človeškega organizma.

Razumevanje interakcij med organizmi in okoljem ter poznavanje vplivov na okolje. Razumevanje pomena raznolikosti živih bitij za ohranjanje naravnega okolja.

Uporaba

Razlikovanje različnih tipov celic in tkiv. Vzdrževanje celic in tkiv v kulturi. Zmožnost uporabe metod za ločevanje, analizo in identifikacijo celic in tkiv. Poznavanje biologije osnovnih skupin rastlin in živali in njihove povezanosti. Poznavanje zgradbe in delovanja človeškega organizma, ki je osnova za razumevanje bolezenskih procesov. Zmožnost uporabe strokovne terminologije.

Refleksija

Na osnovi pridobljenih znanj o zgradbi in delovanju modelnih organizmov bo študent zmožen primerjati različne tipe organizmov in interpretirati njihove značilnosti ter medsebojno povezanost. Študent bo razumel osnovne genetske mehanizme in pomen spolnega razmnoževanja za raznolikost živih bitij. Spoznal bo občutljivost okolja za antropogene vplive in znal predvideti škodljive posledice.

Prenosljive spretnosti

Študent bo obvladal osnovne tehnike priprave bioloških preparatov za opazovanje zgradbe z različnimi tipi mikroskopov. Znal bo določiti osnovne tipe rastlinskih in živalskih organizmov. Poznal bo osnovno anatomijo človeka.

Intended Learning Outcomes:Knowledge and Comprehension

Basic knowledge on animal cell and tissue structure and understanding of basic biological concepts and principles of life. Understanding interactions between organisms and their environment. The significance of maintenance of biological diversity and nature conservation.

Application

Preparation of animal and plant cell and tissue samples for microscopy. Differentiation between different animal cell and tissue types. Knowledge of biology of different organisms and their interactions. Identification of basic animal types and their reproductive and developmental stages. Biology of different animal groups and their role in different environments. Learning and usage of biological terminology.

Analysis

Understanding and comparing life at cellular and tissue levels; interpretation of cell structure of different organic systems in lower and higher animals and plants. Basic reproductive mechanisms and significance of sexuality for biodiversity. Understanding the sensitivity of the environment for anthropogenic influences and prediction of possible harmful effects.

Skill-transference Ability

Preparation of animal tissues for microscopy, observations by light microscopy, imaging and documenting histological samples, interpretation of cell ultrastructure, histology and organ structure in animals and plants; preparation of reports and proper use of literature and biological terminology.

Metode poučevanja in učenja:

Predavanja, laboratorijske vaje, seminarji kot skupinsko in problemsko zasnovano delo. Študent pridobi praktične izkušnje pri laboratorijskem delu in jih dopolni s teoretičnim znanjem pri predavanjih in skupinsko predstavitvijo seminarjev iz aktualnih bioloških tem povezanih s teoretičnimi znanji pri predmetu. Znanje nadgrajuje s samostojnim študijem in z uporabo ustreznih študijskih in informacijskih virov.

Learning and Teaching Methods:

Lectures, practical courses, seminars as team work and project based learning. Prevailing experience during practical work is upgraded by theoretical basis from lectures and presentation of seminars based on up-to date topics in biology. Upgrading knowledge in biology through individual student work using different study and information sources.

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

Opravljenе vaje so pogoj za pristop k izpitu.		Practical work is prerequisite for written exam.
Kolokvij iz laboratorijskih vaj 30 %	30 %	Colloquium from practical work
Seminarska naloga 10 %	10 %	Seminar
Pisni izpit 60 %	60 %	Written exam
Ocene: pozitivno 6-10; negativno 1-5.		Grades: passed:6-10, failed 1-5

Reference nosilca / Lecturer's references:

ADEN, Saša, KOZOROG, Mirijam, ŠVIGELJ, Tomaž, POKLAR ULRIH, Nataša, ŽNIDARŠIČ, Nada, PODOBNIK, Marjetka, ANDERLUH, Gregor. Cholesterol enriched archaeosomes as a molecular system for studying interactions of cholesterol-dependent cytolysins with membranes. The journal of membrane biology, ISSN 0022-2631, 2018, vol. 251, iss. 3, str. 491-505, ilustr., doi: 10.1007/s00232-018-0018-y. [COBISS.SI-ID 4885880]

BOGATAJ, Urban, MRAK, Polona, ŠTRUS, Jasna, ŽNIDARŠIČ, Nada. Ultrastructural differentiation of plasma membrane and cell junctions in the hindgut cells is synchronized with key developmental transitions in *Porcellio scaber*. Arthropod structure & development, ISSN 1467-8039, 2019, vol. 50, str. 78-93, ilustr., doi: 10.1016/j.asd.2019.04.004. [COBISS.SI-ID 5071439]

ŽNIDARŠIČ, Nada, MRAK, Polona, RAJH, Eva, ŽAGAR, Kristina, ČEH, Miran, ŠTRUS, Jasna. Cuticle matrix imaging by histochemistry, fluorescence, and electron microscopy. Resolution & discovery : new beacon for the microscopy community, ISSN 2498-8707, 2018, 8 str., [in press]. <https://akademai.com/doi/abs/10.1556/2051.2017.00045>, doi: 10.1556/2051.2018.00052. [COBISS.SI-ID 4679503]