PRAKTIČNA PROKARIONTSKA GENOMIKA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Praktična prokariontska genomika
Course title:	Practical prokaryotic genomics
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0568366
Koda učne enote na članici/UL Member course code:	0

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	5	5	0	15	100	5

Nosilec predmeta/Lecturer:	Tomaž Accetto

Izvajalci predavanj:	Tomaž Accetto
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	individualno raziskovalni /individual research

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General prerequisites for enrolment into doctoral studies

Vsebina:	Content (Syllabus outline):
-strategije sekvenciranja NGS: primernost različnih tipov knjižnic in tehnologij sekvenciranja za različne cilje pri sekvenciranju bakteriofagov, genomov čistih kultur in metagenomov. -klasična in hibridna sestava genomov/filtracija kontaminacije -sestava metagenomov, klasifikacija odčitkov, metagenomske vrste	-NGS sequencing strategies: choosing the right sequencing library preparation and sequencing technology for particular goals in bacteriophage, bacteria or metagenome sequencing -classic and hybrid genome assembly/contaminant removal -assembly of metagenomes, read classification, metagenome derived genomes

-preverjanje biološke koherence in taksonomske pripadnosti dobljenih sestav -osnovna in napredna anotacija -filogenomika in analiza rekombinacije -poljubno iskanje različnih genetskih elementov po naboru genomov in strategije primerjav	-checking the biological coherence of obtained assemblies, taxonomy assignment -elementary and advanced annotation -phylogenomics and recombination analysis -custom searches for genetic elements in a panel of genomes

Temeljna literatura in viri/Readings:

Pregledni in primarni članski s področja:
Wick RR, Judd LM, Holt KE. Assembling the perfect bacterial genome using Oxford Nanopore and Illumina sequencing. PLoS computational biology [Internet]. 2023;19(3):0–12.
Nakano K, Shiroma A, Shimoji M, Tamotsu H, Ashimine N, Ohki S, idr. Advantages of genome sequencing by long-read sequencer using SMRT technology in medical area. Human Cell [Internet]. 2017;30(3):149–61.
Lu J, Rincon N, Wood DE, Breitwieser FP, Pockrandt C, Langmead B, idr. Metagenome analysis using the Kraken software suite. Nature protocols [Internet]. 2022;17(12):2815–39..
Pierce NT, Irber L, Reiter T, Brooks P, Brown CT. Large-scale sequence comparisons with sourmash [version 1; peer review: 2 approved]. F1000 research [Internet]. 2019;8:1006–1006.
Croucher NJ, Page AJ, Connor TR, Delaney AJ, Keane JA, Bentley SD, idr. Rapid phylogenetic analysis of large samples of recombinant bacterial whole genome sequences using Gubbins
Knjiga:
Tettelin H, Medini D. The Pangenome [Internet]. 1st ed. 2020. Diversity, Dynamics and Evolution of Genomes. Springer Nature; 2020.

Cilji in kompetence:	**Objectives and competences:**
- samostojna in pravilna zasnova projekta NGS za različne scenarije. - kritična analiza dobljenih podatkov - razumevanje delovanja združevalcev odčitkov in njihovih omejitev - taksonomsko ovrednotenje združenih odčitkov genomov in metagenomov - ustvarjanje in primerjava repertoarjev za študenta zanimivih genskih skupin iz nabora preučevanih genomov	- independent and correct design of a NGS project - critical assessment of the obtained data - understanding the workings and limitations of genome assemblers - taxonomy assignment of assembled genomes and metagenomes - ability to create and compare custom gene groups among genomes

Predvideni študijski rezultati:	**Intended learning outcomes:**
Uspešna obdelava problema, ki se dotika sekvenciranja NGS v sklopu doktorske naloge	An NGS-based solution to a problem encountered in the doctoral thesis.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminar, ki teoretično uvede študenta v orodja, primerna za reševanje problema. Postavitev primernega okolja za reševanje problema in rešitev lepe pozitivne kontrole. Konzultacije tekom samostojne izvedbe.	An introduction to the theory used in solving the problem (a seminar). Setting up of the computer environment suitable to solve the problem and a test run using a simple example. Consultations during the actual work

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminar	20,00 %	Seminar
Izvedba naloge	80,00 %	Project work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Tomaž Accetto

Hedžet, S., Rupnik, M., Accetto, T. (2022) Broad host range may be a key to long-term persistence of bacteriophages infecting intestinal Bacteroidaceae species. Sci Rep 12(1), 21098, Doi: 10.1038/s41598-022-25636-x.

Rozman, V., Mohar Lorbeg, P., Treven, P., Accetto, T., Golob, M., Zdovc, I., Bogovič Matijašić, B. (2022) Lactic acid bacteria and bifidobacteria deliberately introduced into the agro-food chain do not significantly increase the antimicrobial resistance gene pool. Gut Microbes 14(1), 2127438, Doi: 10.1080/19490976.2022.2127438

Hedžet, S., Rupnik, M., Accetto, T. (2021) Novel Siphoviridae Bacteriophages Infecting Bacteroides uniformis Contain Diversity Generating Retroelement. Microorganisms 9(5), 892, Doi: 10.3390/microorganisms9050892.

Trček, J., Dogsa, I., Accetto, T., Stopar, D. (2021) Acetan and Acetan-Like Polysaccharides: Genetics, Biosynthesis, Structure, and Viscoelasticity. Polymers (Basel) 13(5), 815, Doi: 10.3390/polym13050815.

Accetto, T., Avguštin, G. (2019) The diverse and extensive plant polysaccharide degradative apparatuses of the rumen and hindgut *Prevotella* species: A factor in their ubiquity? Syst. Appl. Microbiol. 42(2), 107–16, Doi: 10.1016/j.syapm.2018.10.001.

Accetto, T., Janež, N. (2018) The lytic *Myoviridae* of *Enterobacteriaceae* form tight recombining assemblages separated by discontinuities in genome average nucleotide identity and lateral gene flow. Microb. Genomics 4(3), Doi: 10.1099/mgen.0.000169.

Vidic, M., Smuc, T., Janez, N., Blank, M., Accetto, T., Mavri, J., Nascimento, I.C., Nery, A.A., Ulrich, H., Lah, T.T. (2018) In silico selection approach to develop DNA aptamers for a stem-like cell subpopulation of non-small lung cancer adenocarcinoma cell line A549. Radiol. Oncol. 52(2), 152–9, Doi: 10.2478/raon-2018-0014.

PREDSTAVITEV DOKTORSKE DISERTACIJE PRED JAVNIM ZAGOVOROM

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Predstavitev doktorske disertacije pred javnim zagovorom
Course title:	Presentation of Doctoral Dissertation Prior to Defence
Članica nosilka/UL Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)	4. letnik	Celoletni	obvezni

Univerzitetna koda predmeta/University course code:	0037374
Koda učne enote na članici/UL Member course code:	3904

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	0	0	0	125	0	5

Nosilec predmeta/Lecturer:	

Izvajalci predavanj:	
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	obvezni

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

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

Vsebina:	**Content (Syllabus outline):**

Temeljna literatura in viri/Readings:

Cilji in kompetence:	**Objectives and competences:**

Predvideni študijski rezultati:	Intended learning outcomes:

Metode poučevanja in učenja:	Learning and teaching methods:

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

PREDSTAVITEV TEME DOKTORSKE DISERTACIJE

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Predstavitev teme doktorske disertacije
Course title:	Presentation of Theme of Doctoral Dissertation
Članica nosilka/UL Member:	

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)	2. letnik	Celoletni	obvezni

Univerzitetna koda predmeta/University course code:	0037371
Koda učne enote na članici/UL Member course code:	3905

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	0	0	0	125	0	5

Nosilec predmeta/Lecturer:	

Izvajalci predavanj:	
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	obvezni

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

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

Vsebina:	Content (Syllabus outline):

Temeljna literatura in viri/Readings:

Cilji in kompetence:	Objectives and competences:

Predvideni študijski rezultati:	Intended learning outcomes:

Metode poučevanja in učenja:	Learning and teaching methods:

Načini ocenjevanja:	Delež/Weight	Assessment:

Ocenjevalna lestvica:	Grading system:

Reference nosilca/Lecturer's references:

PREHRANA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Prehrana
Course title:	Nutrition
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037324
Koda učne enote na članici/UL Member course code:	3827

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	40	0	0	0	190	10

Nosilec predmeta/Lecturer:	Janez Salobir

Izvajalci predavanj:	Simon Horvat, Tanja Pajk Žontar, Janez Salobir
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Diplomanti študijskih programov 2. stopnje in enovitih magistrskih študijskih programov s področja biomedicinskih in biotehniških usmeritev, ki so na predhodno opravljenem oz. opravljenih študijskih programih opravili skupno vsaj 60 KT s področja prehrane, hrane, biokemije ali fiziologije ljudi ali višjih živali.	Graduates of study programmes of the 2nd grade and uniform master's programmes in the field of biomedical and biotechnical orientations, who have completed a total of at least 60 ECTS in the fields of nutrition, food, biochemistry or physiology of humans or higher animals on previous studies.

Vsebina:	**Content (Syllabus outline):**
Vsebino predmeta predstavljajo aktualne teme iz naslednjih področij:	The contents of the course are current subjects from the following fields:

• Razvoj prehrane v luči evolucije in evolucijske adaptacije ljudi in živali na način in vrsto prehrane, posledice napak načina prehranjevanja, ki ne ustreza genetskim zahtevam organizma, za zdravje. • Trajnostna prehrana ljudi in živali. • Prehrana in mikrobiota prebavil: vplivi na razvoj mikrobne združbe prebavil, interakcije med zaužitimi snovmi, mikrobno združbo prebavil in prebavili, vpliv na tkiva in sisteme, zdravje, prehranska manipulacija mikrobne združbe. • Sodobne raziskovalne metode v prehrani: uporaba nutrigenomskih in metabolomskih metod pri proučevanju vpliva prehrane na produkcijo specifičnih genskih produktov in odzivnost metabolnih poti zaradi povezav z zdravjem ljudi oz. zdravjem in proizvodnostjo živali. • Vpliv prehrane na dolgoživost: vpliv posameznih makrohranil in mikrohranil na dolgoživost ter vpliv energijsko restriktivne prehrane na življenjsko dobo. • Prehranska varnost v odvisnosti od različnih aktualnih dogodkov (epidemije, vojne …). • Vloga in pomen vladnih politik za oblikovanje trajnostnih prehranskih sistemov in izboljšanje kakovosti prehrane. • Prehranska priporočila (Food based dietary guidelines) in povezave z iniciativami globalnega zdravja in cilji trajnostnega razvoja. • Pomen in vloga podatkov o sestavi živil v trajnostnih prehranskih sistemih. • Prehransko preoblikovanje živil in dejavniki sprejemljivosti pri potrošnikih.	• Diet in the light of evolution and evolutionary adaptation of humans and animals, the consequences of wrong dietary habits and nutrient intake that not meet the genetic requirements of the organism for health. • Sustainable diet of humans and animals. • Nutrition and microbiology of the gut: effect of nursing on the development of microbial ecosystems, interactions between ingested nutrients, microbial population and the gut, the effects on tissues and systems, nutritional manipulations. • Current research methods in nutritional research: the use of nutrigenomic and metabolomic methods in relation to human and animal health. • The impact of diet on longevity: the impact of individual macronutrients and micronutrients on longevity and the impact of energy restrictive diets on lifespan. • Food security depending on various events (epidemics, wars...). • The role and importance of government policies for creating sustainable food systems and improving the quality of nutrition. • Food-based dietary guidelines and links to global health initiatives and sustainable development goals. • The importance and role of data on the composition of food in sustainable food systems. • Food reformulation and factors of acceptability among consumers.

Temeljna literatura in viri/Readings:

Aktualni članki s posameznega področja oz. vsebin, druga učna gradiva.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je, da študent s pomočjo predavanj in seminarskega dela ter konzultacij poglobi znanje na področju aktualnih raziskovalnih problemov prehrane ljudi in živali. Ob tem je cilj predmeta tudi osvajanje nekaterih sodobnih raziskovalnih metod v prehrani. Študent pridobi tovrstno znanje na različnih primerih prehranskih raziskav.	By means of lectures, seminars and laboratory work and consultations, the student will obtain knowledge of current topics in nutritional research into human and also animal nutrition. At the same time, modern nutritional research methods will be presented and discussed.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Predviden študijski rezultat je usposobitev študenta za kritično ocenjevanje prehranskih raziskav ter vpogled v njihovo načrtovanje in izvajanje.	The intended outcome of the course is to qualify the student for critical evaluation of nutritional research and to introduce them into planning and performing of research.

Metode poučevanja in učenja:	Learning and teaching methods:
Predavanja (20 ur) in seminar (10 ur) potekajo v predavalnici.	Lectures (20 hours) and seminar (10 hours): in the classroom.

Načini ocenjevanja:	Delež/Weight	Assessment:
- Ustni/pisni izpit	60,00 %	- Written/oral exam
- Seminarsko delo	40,00 %	- seminar work

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Janez Salobir

1. PERIĆ, Lidija, ŽIKIĆ, Dragan, ĐUKIĆ STOJČIĆ, Mirjana, TOMOVIĆ, Vladimir, LESKOVEC, Jakob, LEVART, Alenka, SALOBIR, Janez, KANAČKI, Zdenko, REZAR, Vida. Effect of chestnut tannins and vitamin E supplementation to linseed oil-enriched diets on growth performance, meat quality, and intestinal morphology of broiler chickens. *Agriculture*. 2022, no. 11, art. 1772, str. 1-12. ISSN 2077-0472. https://www.mdpi.com/2077-0472/12/11/1772, DOI: 10.3390/agriculture12111772. [COBISS.SI-ID 127205123], [JCR, SNIP, WoS, Scopus]
kategorija: 1A1 (Z, A', A1/2)

2. PODGORNIK, Maja, BUČAR-MIKLAVČIČ, Milena, LEVART, Alenka, SALOBIR, Janez, REZAR, Vida, BUTINAR, Bojan. Chemical characteristics of two-phase olive-mill waste and evaluation of their direct soil application in humid Mediterranean regions. *Agronomy*. 2022, no. 7, art. 1621, str. 1-10. ISSN 2073-4395. https://doi.org/10.3390/agronomy12071621, https://dirros.openscience.si/IzpisGradiva.php?id=15290&lang=slv. [COBISS.SI-ID 114077699], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,17, Scopus do 31. 12. 2022: št. citatov (TC): 3, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,50]
kategorija: 1A1 (Z, A', A1/2)6

3. PEČJAK PAL, Manca, LESKOVEC, Jakob, LEVART, Alenka, SALOBIR, Janez, REZAR, Vida. Effects of dietary vitamin E, vitamin C, selenium and their combination on carcass characteristics, oxidative stability and breast meat quality of broiler chickens exposed to cyclic heat stress. *Animals*. 2022, no. 14, art. 1789, str. 1-14. ISSN 2076-2615. https://www.mdpi.com/2076-2615/12/14/1789, DOI: 10.3390/ani12141789. [COBISS.SI-ID 115293187], [JCR, SNIP, WoS do 14. 12. 2022: št. citatov (TC): 2, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0,00, Scopus do 5. 12. 2022: št. citatov (TC): 1, čistih citatov na avtorja (CIAu): 0,00]
kategorija: 1A1 (Z, A', A1/2)

4. NEMEC SVETE, Alenka, VERK, Barbara, ČEBULJ-KADUNC, Nina, SALOBIR, Janez, REZAR, Vida, DOMANJKO-PETRIČ, Aleksandra. Inflammation and its association with oxidative stress in dogs with heart failure. *BMC veterinary research*. 2021, vol. 17, str. [1-10], art. no. 176. ISSN 1746-6148. https://bmcvetres.biomedcentral.com/track/pdf/10.1186/s12917-021-02878-x.pdf, DOI: 10.1186/s12917-021-02878-X. [COBISS.SI-ID 61194499], [JCR, SNIP]
kategorija: 1A1 (Z, A', A1/2)6

5. PISKERNIK, Saša, LEVART, Alenka, KOROŠEC, Mojca, PERME, Kaja, SALOBIR, Janez, PAJK ŽONTAR, Tanja. Fatty acid profiles, nutritional quality and sensory characteristics of unconventional oils and fats on the Slovenian market. *Journal of food and nutrition research*. 2021, vol. 60, no. 4, str. 373-383. ISSN 1336-8672. https://www.vup.sk/en/index.php?mainID=2&navID=34&version=2&volume=60&article=2251. [COBISS.SI-ID 85890819], [JCR, SNIP]
kategorija: 1A4 (Z)

6. PIRMAN, Tatjana, REZAR, Vida, VRECL, Milka, SALOBIR, Janez, LEVART, Alenka. Effect of olive leaves or marigold petal extract on oxidative stress, gut fermentative activity, and mucosa morphology in broiler chickens fed a diet rich in n-3 polyunsaturated fats. *Journal of poultry science*. 2021, vol. 58, no. 2, str. 119-130, ilustr. ISSN 1346-7395. https://www.jstage.jst.go.jp/article/jpsa/advpub/0/advpub_0200026/_article, DOI: 10.2141/jpsa.0200026. [COBISS.SI-ID 26484227], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,20, Scopus do 18. 2. 2022: št. citatov (TC): 2, čistih

citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,40]
kategorija: 1A3 (Z)
7. LESKOVEC, Jakob, REZAR, Vida, NEMEC SVETE, Alenka, SALOBIR, Janez, LEVART, Alenka. Antioxidative effects of olive polyphenols compared to vitamin E in piglets fed a diet rich in N-3 PUFA. *Animals*. 2019, vol. 9, no. 4, str. 1-12, e 161. ISSN 2076-2615. https://www.mdpi.com/2076-2615/9/4/161, DOI: 10.3390/ani9040161. [COBISS.SI-ID 4204936], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 12, čistih citatov (CI): 11, čistih citatov na avtorja (CIAu): 2,20, Scopus do 20. 9. 2021: št. citatov (TC): 12, čistih citatov (CI): 11, čistih citatov na avtorja (CIAu): 2,20]
kategorija: 1A1 (Z, A', A1/2)
8. TREBUŠAK, Tina, VRECL, Milka, SALOBIR, Janez, PIRMAN, Tatjana. The effect of substitution of palm fat with linseed oil on the lipid peroxidation, antioxidative capacity and intestinal morphology in rabbits (Oryctolagus cuniculus). *Animals*. 2019, vol. 9, [no. 10], art. no. 830, str. 1-12, ilustr. ISSN 2076-s2615. https://www.mdpi.com/2076-2615/9/10/830/htm, DOI: 10.3390/ani9100830. [COBISS.SI-ID 4315272], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,50, Scopus do 5. 11. 2022: št. citatov (TC): 3, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,75]
kategorija: 1A1 (Z, A', A1/2)
9. LESKOVEC, Jakob, LEVART, Alenka, PERIĆ, Lidija, ĐUKIĆ STOJČIĆ, Mirjana, TOMOVIĆ, Vladimir, PIRMAN, Tatjana, SALOBIR, Janez, REZAR, Vida. Antioxidative effects of supplementing linseed oil-enriched diets with alfa-tocopherol, ascorbic acid, selenium, or their combination on carcass and meat quality in broilers. *Poultry science*. 2019, vol. 98, no. 12, str. 6733-6741, ilustr. ISSN 0032-5791. https://academic.oup.com/ps/advance-article/doi/10.3382/ps/pez389/5535541?searchresult=1, DOI: 10.3382/ps/pez389. [COBISS.SI-ID 4269192], [JCR, SNIP, WoS do 17. 12. 2022: št. citatov (TC): 22, čistih citatov (CI): 20, čistih citatov na avtorja (CIAu): 2,50, Scopus do 29. 11. 2022: št. citatov (TC): 23, čistih citatov (CI): 21, čistih citatov na avtorja (CIAu): 2,63]
kategorija: 1A1 (Z, A', A1/2)
10. LESKOVEC, Jakob, LEVART, Alenka, NEMEC SVETE, Alenka, PERIĆ, Lidija, ĐUKIĆ STOJČIĆ, Mirjana, ŽIKIĆ, Dragan, SALOBIR, Janez, REZAR, Vida. Effects of supplementation with alfa-tocopherol, ascorbic acid, selenium, or their combination in linseed oil-enriched diets on the oxidative status in broilers. *Poultry science*. 2018, vol. 97, no. 5, str. 1641-1650. ISSN 0032-5791. https://academic.oup.com/ps/advance-article/doi/10.3382/ps/pey004/4864311, DOI: 10.3382/ps/pey004. [COBISS.SI-ID 4484730], [JCR, SNIP, WoS do 23. 12. 2022: št. citatov (TC): 27, čistih citatov (CI): 24, čistih citatov na avtorja (CIAu): 3,00, Scopus do 13. 12. 2022: št. citatov (TC): 28, čistih citatov (CI): 25, čistih citatov na avtorja (CIAu): 3,13]
kategorija: 1A1 (Z, A', A1/2)

Tanja Pajk Žontar

1. PISKERNIK, Saša, LEVART, Alenka, KOROŠEC, Mojca, PERME, Kaja, SALOBIR, Janez, PAJK ŽONTAR, Tanja. Fatty acid profiles, nutritional quality and sensory characteristics of unconventional oils and fats on the Slovenian market. *Journal of food and nutrition research*. 2021, vol. 60, no. 4, str. 373-383. ISSN 1336-8672. https://www.vup.sk/en/index.php?mainID=2&navID=34&version=2&volume=60&article=2251. [COBISS.SI-ID 85890819] kategorija: 1A4
2. DRAŠLER, Varineja, BERTONCELJ, Jasna, KOROŠEC, Mojca, PAJK ŽONTAR, Tanja, POKLAR ULRIH, Nataša, CIGIĆ, Blaž. Difference in the attitude of students and employees of the University of Ljubljana towards work from home and online education : lessons from COVID-19 pandemic. *Sustainability*. 2021, vol. 13, iss. 9, str. 1-24, ilustr. ISSN 2071-1050. https://www.mdpi.com/2071-1050/13/9/5118, DOI: 10.3390/su13095118. [COBISS.SI-ID 62743811] kategorija: 1A1
3. ŠEGATIN, Nataša, PAJK ŽONTAR, Tanja, POKLAR ULRIH, Nataša. Dielectric properties and dipole moment of edible oils subjected to 'frying' thermal treatment. *Foods*. 2020, vol. 9, iss. 7, str. 1-17, ilustr. ISSN 2304-8158. https://www.mdpi.com/2304-8158/9/7/900, DOI: 10.3390/foods9070900. [COBISS.SI-ID 22479875] kategorija: 1A1
4. PAJK ŽONTAR, Tanja, VIDRIH, Rajko. Nutrition and Covid-19 epidemic. *Acta agriculturae Slovenica*. [Spletna izd.]. 2021, vol. 117, no. 2, str. 1-7 (1980). ISSN 1854-1941. DOI: 10.14720/aas.2021.117.2.1980. [COBISS.SI-ID 69671427]
5. PISKERNIK, Saša, VIDRIH, Rajko, DEMŠAR, Lea, KORON, Darinka, ROGELJ, Maja, PAJK ŽONTAR, Tanja. Fatty acid profiles of seeds from different Ribes species. *Lebensmittel-Wissenschaft + Technologie*. Dec. 2018, vol. 98, str. 424-427. ISSN 0023-6438. DOI: 10.1016/j.lwt.2018.09.011. [COBISS.SI-ID 4945528]
6. PETERMAN, Marjana, PAJK ŽONTAR, Tanja. Consumer information and labeling. V: MOTARJEMI, Yasmine (ur.), ANDERSEN, Veslemøy (ur.), LELIEVELD, Huub L. M. (ur.). *Food safety management : a*

practical guide for the food industry. 2nd ed. Amsterdam [etc.]: Elsevier: Academic Press, 2021. Str. [1-11, v tisku]. ISBN 0-12-820013-8. [COBISS.SI-ID 74110723]

Simon Horvat

1. MORTON, Nicholas M., BELTRAM, Jasmina, CARTER, Roderick, GORJANC, Gregor, ..HORVAT, Simon. Genetic identification of thiosulfate sulfurtransferase as an adipocyte-expressed antidiabetic target in mice selected for leanness. *Nature medicine*. Jul. 2016, vol. 22, no. 7, str. 771-779.
2. KOTNIK, Primož, KNAPIČ, Eva, KOKOŠAR, Janez, KOVAČ, Jernej, JERALA, Roman, BATTELINO, Tadej, HORVAT, Simon. Identification of novel alleles associated with insulin resistance in childhood obesity using pooled-DNA genome wide association study approach. *International journal of obesity*. 2018, vol. 42, iss. 4, str. 686-695.
3. LAINŠČEK, Duško, ŠUŠTAR, Urša, CARTER, Roderick, MORTON, Nicholas M., HORVAT, Simon. Tst gene mediates protection against palmitate-induced inflammation in 3T3-L1 adipocytes. *Biochemical and biophysical research communications*. 5. Jul. 2020, vol. 527, iss. 4, str. 1008-1013.
4. PIRMAN, Tatjana, LENARDIČ, Ajda, NEMEC SVETE, Alenka, HORVAT, Simon. Supplementation with >Your< Iron Syrup corrects iron status in a mouse model of diet-induced iron deficiency. *Biology*. 22. apr. 2021, vol. 10, no. 5, str. 1-21.
5. ZUPANČIČ, Barbara, UMEK, Nejc, UGWOKE, Chiedozie Kenneth, CVETKO, Erika, HORVAT, Simon, GRDADOLNIK, Jože. Application of FTIR spectroscopy to detect changes in skeletal muscle composition due to obesity with insulin resistance and STZ-induced diabetes. International journal of molecular sciences. 2022, vol. 23, no. 20, str. 1-22.
6. PIRMAN, Tatjana, MRAK, Vesna, FONSECA, Rita, HORVAT, Simon. Protein digestibility and bioavailability in an F2 mouse cross between the selected fat mouse line and an M2 congenic line carrying the anti-obesity and anti-diabetic Tst allele. Journal of animal physiology and animal nutrition. 2022, vol. 106, no. 4, str. 881-887.

PREHRANA PREŽVEKOVALCEV IN NEPREŽVEKOVALCEV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Prehrana prežvekovalcev in neprežvekovalcev
Course title:	Nutrition of ruminants and non-ruminants
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037325
Koda učne enote na članici/UL Member course code:	3828

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	20	15	0	0	80	5

Nosilec predmeta/Lecturer:	Andrej Lavrenčič

Izvajalci predavanj:	Andrej Lavrenčič, Janez Salobir
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Na predhodno končanih študijskih programih skupno vsaj 30 KT s področja prehrane, biokemije in fiziologije ljudi oz. višjih živali.	At least 30 ECTS gained in previously completed study programs in the fields of nutrition, biochemistry and the physiology of humans or higher animals.

Vsebina:	Content (Syllabus outline):
Vsebina predmeta se prilagaja trenutnim aktualnim temam s področja prehrane prežvekovalcev in neprežvekovalcev predvsem s področij: - Potrebe po hranilih: sodobne metode vrednotenje energije, aminokislin in mineralov. - Prebavila: potek prebave …	The content is adapted to current topical themes from the field of nutrition of non-ruminants, primarily the fields of: - needs for food: contemporary methods of assessing energy, amino acids and minerals.

- Interakcije med prehrano in zdravstvenim stanjem (prebavila, imunski sistem …). - Interakcije med prehrano in okoljem: zmanjšanje obremenjevanja okolja s pomočjo prehrane (encimi, GMO …), vpliv prehrane na izločanje toplogrednih plinov, - Učinki nekaterih krmil in krmnih dodatkov v prehrani: klasični, rastlinski ekstrakti. - Antinutritivne snovi in toksini: delovanje, vpliv na zdravje, preprečevanje. - Vpliv prehrane na kakovost živalskih proizvodov: prehranski vplivi na senzorično in prehransko (funkcionalno) vrednost živalskih proizvodov - Načrtovanje in izvedba prehranske raziskave: *in vivo*, *in vitro*, *in sacco*. Posamezne teme vključujejo tudi spoznavanje z raziskovalnimi metodami. Nekatere analitske metode pa bodo predstavljene v okviru laboratorijskih vaj.	- interaction between food and health state (digestive and immune system etc.) - interaction between food and the environment: reduction of burden on the environment with the aid of food (enzymes, GMO, greenhouse gasses etc.) - effects of some feed and feed additives: mainly the effects and operation of classical feed additives (probiotics, organic acids, plant extracts) - antinutritive substances and toxins: mode of action, impact on health, prevention - influence of feed on the quality of animal products: food influence on sensoric and nutritional (functional) value of animal products - planning and implementation of nutrition research: : *in vivo*, *in vitro*, *in sacco* Individual themes also include familiarity with research methods. Some analytical methods will be presented within the framework of laboratory practicals.

Temeljna literatura in viri/Readings:

Aktualni članki s posameznega področja oz. vsebin, druga učna gradiva.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je, da študenti preko predavanj, izdelave seminarske naloge in dela v laboratoriju obdelajo posamezne aktualne teme v prehrani živali. Pri tem se naučijo reševati prehranske probleme na ravni oskrbe, proizvodnosti živali, zdravstvenim stanjem prebavil, imunskim sistemom, okoljem oz. varovanjem okolja, specifik delovanja nekaterih krmil in krmnih dodatkov v prehrani neprežvekovalcev. Študenti z izbranimi praktičnimi laboratorijskimi vajami spoznajo nekatere analitske pristope k reševanju raziskovalnih problemov prehrane živali.	The aim of the subject is that by means of lectures, preparation of seminar tasks and work in the laboratory, students work on individual topical themes in the nutrition of ruminants and non-ruminants. They learn to solve nutritional problems on the level of supply, animal breeding, health state of the digestive organs, immune system, environment or protection of the environment, the specifics of mode of action of some feeds and feed additives in the animal nutrition. Students get to know some analytical approaches to resolving research problems of feed of animals through selected practical laboratory exercises.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Predviden študijski rezultat je usposobitev študenta za s problematiko in vrsto neprežvekovalcev povezanim načrtovanjem in izvedbo prehranske raziskave. Predviden študijski rezultat je kandidata usposobiti za izvedbo raziskav s področja prehrane živali. Kandidat naj bi bil po opravljenem izpitu sposoben kritičnega presojanja rezultatov lastnih raziskav in aktualnih pojavov povezanih s prehrano živali.	Knowledge and understanding: The intended learning outcome is to qualify the student for planning and implementing research connected with these problems in animal nutrition. The intended learning outcome is to qualify the candidate for carrying out research in the field of animal nutrition. The candidate should be capable after passing the examination of critical judgement of the results of his or her own research and current phenomena connected with the nutrition of animals.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja (10 ur) in seminar (5 ur) potekajo v predavalnici. Laboratorijske vaje (15 ur) v manjših skupinah v laboratoriju.	Lectures (10 hours) and seminar (5 hours): in the classroom. Practical tutorials: laboratory work (15 hours) in small groups in the laboratory.

Načini ocenjevanja:	Delež/Weight	Assessment:
Ocena izpita: - Ustni/pisni izpit	60,00 %	Exam score: - Written/oral exam
Seminarsko delo	40,00 %	- seminar work

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Andrej Lavrenčič

1. LAVRENČIČ, Andrej, LEVART, Alenka. In vitro dry matter and crude protein rumen degradation and abomasal digestibility of soybean meal treated with chestnut and quebracho wood extracts. *Food science & nutrition*. 2021, vol. 9, no. 2, str. 1034-1039. ISSN 2048-7177. https://onlinelibrary.wiley.com/doi/10.1002/fsn3.2072, DOI: 10.1002/fsn3.2072. [COBISS.SI-ID 52537859], [JCR, SNIP, WoS]

2. LAVRENČIČ, Andrej, PIRMAN, Tatjana. In vitro gas and short-chain fatty acid production from soybean meal treated with chestnut and quebracho wood extracts by using sheep rumen fluid. *Journal of Animal and Feed Sciences*. 2021, vol. 30, no. 4, str. 312-319. ISSN 1230-1388. http://www.jafs.com.pl/-In-vitro-gas-and-short-chain-fatty-acid-production-from-soybean-nmeal-treated-with,144587,0,2.html, DOI: 10.22358/jafs/144587/2021. [COBISS.SI-ID 99418627], [JCR, SNIP, WoS]

3. SARNATARO, Chiara, SPANGHERO, Mauro, LAVRENČIČ, Andrej. Supplementation of diets with tannins from Chestnut wood or an extract from Stevia rebaudiana Bertoni and effects on in vitro rumen fermentation, protozoa count and methane production. *Journal of animal physiology and animal nutrition*. 15. jul. 2020, vol. 104, [no. 5], str. 1310-1316. ISSN 1439-0396. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jpn.13414, DOI: 10.1111/jpn.13414. [COBISS.SI-ID 61184003], [JCR, SNIP, WoS]

4. LAVRENČIČ, Andrej, VETERNIK, Darko. Differences between sheep and red deer in in vitro apparent and true digestibility of commonly used red deer feeds. *Acta agriculturae Slovenica*. [Tiskana izd.]. 2018, letn. 112, št. 1, str. 5-9, tabele. ISSN 1581-9175. http://ojs.aas.bf.uni-lj.si/index.php/AAS/article/view/561/263, DOI: 10.14720/aas.2018.112.1.1. [COBISS.SI-ID 4083848], [SNIP, Scopus,]

5. LAVRENČIČ, Andrej, PIRMAN, Tatjana, ŽGUR, Silvester. Use of hop cones in growing beef cattle nutrition. *Annals of Warsaw University of Life Sciences-SGGW. Animal Sciences*. 2018, vol. 57, no. 2, str. 121-131. ISSN 1898-8830. http://annals-wuls.sggw.pl/files/files/animal/asc2018no572p121-131.pdf, DOI: 10.22630/AAS.2018.57.2.12. [COBISS.SI-ID 4098184]

6. LAVRENČIČ, Andrej, VETERNIK, Darko. Gas and short- chain fatty acid production from feeds commonly fed to red deer (Cervus elaphus L.) and incubated with rumen inoculum from red deer and sheep. *Journal of animal physiology and animal nutrition*. 2018, vol. 102, no. 5, str. 1146-1153. ISSN 0931-2439. https://onlinelibrary.wiley.com/doi/epdf/10.1111/jpn.12943, DOI: 10.1111/jpn.12943. [COBISS.SI-ID 4095112], [JCR, SNIP, WoS, Scopus]

Janez Salobir

1. PEČJAK PAL, Manca, LESKOVEC, Jakob, LEVART, Alenka, SALOBIR, Janez, REZAR, Vida. Effects of dietary vitamin E, vitamin C, selenium and their combination on carcass characteristics, oxidative stability and breast meat quality of broiler chickens exposed to cyclic heat stress. *Animals*. 2022, no. 14, art. 1789, str. 1-14. ISSN 2076-2615. https://www.mdpi.com/2076-2615/12/14/1789, DOI: 10.3390/ani12141789. [COBISS.SI-ID 115293187], [JCR, SNIP, WoS do 14. 12. 2022: št. citatov (TC): 2, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0,00, Scopus do 5. 12. 2022: št. citatov (TC): 1, čistih citatov na avtorja (CIAu): 0,00] kategorija: 1A1 (Z, A', A1/2); uvrstitev: SCIE, Scopus, MBP (ZR, CAB, FSTA, PUBMED, DOAJ); tip dela je verificiral OSICB
točke: 23.99, št. avtorjev: 5

2. PIRMAN, Tatjana, REZAR, Vida, VRECL, Milka, SALOBIR, Janez, LEVART, Alenka. Effect of olive leaves or marigold petal extract on oxidative stress, gut fermentative activity, and mucosa morphology in broiler chickens fed a diet rich in n-3 polyunsaturated fats. *Journal of poultry science*. 2021, vol. 58, no. 2, str. 119-130, ilustr. ISSN 1346-7395. https://www.jstage.jst.go.jp/article/jpsa/advpub/0/advpub_0200026/_article, DOI: 10.2141/jpsa.0200026. [COBISS.SI-ID 26484227], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,20, Scopus do 18. 2. 2022: št. citatov (TC): 2, čistih

citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,40]
kategorija: 1A3 (Z); uvrstitev: SCIE, Scopus, MBP (BIOABS, BIOPREW, CAB, PUBMED); tip dela je verificiral OSICB
točke: 15.62, št. avtorjev: 5

3. LESKOVEC, Jakob, REZAR, Vida, NEMEC SVETE, Alenka, SALOBIR, Janez, LEVART, Alenka. Antioxidative effects of olive polyphenols compared to vitamin E in piglets fed a diet rich in N-3 PUFA. *Animals*. 2019, vol. 9, no. 4, str. 1-12, e 161. [JCR, SNIP, WoS

4. TREBUŠAK, Tina, VRECL, Milka, SALOBIR, Janez, PIRMAN, Tatjana. The effect of substitution of palm fat with linseed oil on the lipid peroxidation, antioxidative capacity and intestinal morphology in rabbits (Oryctolagus cuniculus). *Animals*. 2019, vol. 9, [no. 10], art. no. 830, str. 1-12, ilustr [JCR, SNIP

5. LESKOVEC, Jakob, LEVART, Alenka, PERIĆ, Lidija, ĐUKIĆ STOJČIĆ, Mirjana, TOMOVIĆ, Vladimir, PIRMAN, Tatjana, SALOBIR, Janez, REZAR, Vida. Antioxidative effects of supplementing linseed oil-enriched diets with alfa-tocopherol, ascorbic acid, selenium, or their combination on carcass and meat quality in broilers. *Poultry science*. 2019, vol. 98, no. 12, str. 6733-6741, ilustr. ISSN 0032-5791 [JCR, SNIP,

6. LESKOVEC, Jakob, LEVART, Alenka, NEMEC SVETE, Alenka, PERIĆ, Lidija, ĐUKIĆ STOJČIĆ, Mirjana, ŽIKIĆ, Dragan, SALOBIR, Janez, REZAR, Vida. Effects of supplementation with alfa-tocopherol, ascorbic acid, selenium, or their combination in linseed oil-enriched diets on the oxidative status in broilers. *Poultry science*. 2018, vol. 97, no. 5, str. 1641-1650.

PREHRANSKA BIOKEMIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Prehranska biokemija
Course title:	Nutritional biochemistry
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037326
Koda učne enote na članici/UL Member course code:	3829

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	30	0	0	20	180	10

Nosilec predmeta/Lecturer:	Nataša Poklar Ulrih

Izvajalci predavanj:	Tadej Battelino, Nataša Poklar Ulrih
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Katabolno-anabolne pretvorbe v različnih fizioloških stanjih organizma; v hranilnem / ne-hranilnem obdobju, telesnem naporu, stradanju, stresu, travmi, izpostavitvi mrazu in odraščanju. Nevralni in hormonski nadzor prebavnih podprocesov: gibanja in izločanja v prebavilih. Prebava ogljikovih hidratov in beljakovin, absorpcija njihovih presnovkov v prebavilih. Prebava in absorpcija lipidov. Biliarni sistem, enterohepatično kroženje žolčnih kislin in	Metabolic (catabolic-anabolic) interrelationships in well-fed and starved states, under stress, trauma, body exercise; growing up; under cold conditions. Digestion and absorption: digestive tract, digestion and absorption of proteins, digestion and absorption of carbohydrates, digestion and absorption of lipids; absorption physiology; biliary systems, urobilinogen cycle, enterohepatic circulation of bile acids, diet and cholesterol regulation of energy metabolism: the brain

urobilinski ciklus. Holesterol v prehrani. Regulacija energijskega metabolizma: možgani in energijski metabolizem, hormonska regulacija, alkohol in poživila, debelost. Najpomembnejše presnovne in prebavne motnje. Vpliv prehrane na zdravje človeka. Nutrigenomika in nutrigenetika. Ateroskleroza. Bolezni srca in ožilja, diabetes. Prehrana in rak. Spojine sekundarnega metabolizma: razdelitev, razširjenost. Pregled in glavne stopnje biosinteznih poti izoprenoidov, fenolnih spojin in taninov. Mesta regulacije. Pomen nekaterih sekundarnih metabolitov, posebno izoprenoidov (kot karotenoidov) in fenolnih spojin (fenolnih kislin, antocianov in flavonoidov) za človeško prehrano. Potencialni biološki učinki. Biorazpoložljivost fenolnih spojin.	and energy metabolism; hormonic regulation of metabolism, alcohol and drugs, obesity. Nutrigenomic and nutriomics, diet and health: effect of diet and drugs on atherosclerosis, diabetes, cardiovascular disease, diet and cancer. Compounds of secondary metabolism: classification, distribution. Overview of their biosynthetic pathways with regulation. Importance of some secondary metabolites esp. isoprenoids (like carotenoids) and phenolic compounds (like anthocyanins and flavonoids) in human nutrition. Their potential biological activity. Bioavailability of phenolic compounds.

Temeljna literatura in viri/Readings:

- NUTRITIONAL BIOCHEMISTRY Current Topics in Nutrition Research (2015). Ed. C. Cox, CRC Press Taylor & Francis Group and Apple Academic Press, Inc., Oakville, Canada.

Aktualni članki s posameznega področja

Cilji in kompetence:	**Objectives and competences:**
Izobraževalni cilji: Študenti bodo poglobili znanje o glavnih metaboličnih poteh primarnega in sekundarnega metabolizma, njihovi regulaciji in delovanju posameznih tkiv in organov ter presnovi v različnih bolezenskih stanjih. Študijski rezultati: Vse to naj bi šŠtudenti omnaj bi omogočilopoglobili razumevanje in povezovanje kompleksnih procesov metabolizma in pravilni prehrani.	Educational outcomes: students will deepen their knowledge of the main metabolic processes of primary and secondary metabolisms, their regulation, function of selected tissues, organs and their metabolic pathways in different diseases. Results: All the above should enable sStudents should be able to understand and connect complex processes of metabolism with proper diet.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje.	Knowledge and understanding.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, priprava seminarjev - timsko delo in debate.	Lectures. Seminars – team work and discussions.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminar	50,00 %	Seminars
Pisni izpit	50,00 %	Written examination

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Nataša Poklar Ulrih

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Tadej Battelino

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2. RAY, Ross, TONG, Zhentao, BROWN, Katelyn. Efficacy of once-weekly tirzepatide versus once-daily insulin degludec on glycaemic control measured by continuous glucose monitoring in adults with type 2 diabetes (SURPASS-3 CGM) : a substudy of the randomised, open-label, parallel-group, phase 3 SURPASS-3 trial. *The Lancet : Diabetes & Endocrinology*. Jun. 2022, vol. 10, iss. 6, str. 407-417. ISSN 2213-8587. DOI: 10.1016/s2213-8587(22)00077-8. [COBISS.SI-ID 106174211], [JCR, SNIP]

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PREUČEVANJE BIOLOŠKIH PROCESOV NA RAVNI GENOMA, TRANSKRIPTOMA IN PROTEOMA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Preučevanje bioloških procesov na ravni genoma, transkriptoma in proteoma
Course title:	Global analysis of genome, transcriptome and proteome
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037292
Koda učne enote na članici/UL Member course code:	3794

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
	7	18	0	0	100	5

Nosilec predmeta/Lecturer:	Jernej Jakše, Nataša Štajner, Polona Jamnik

Izvajalci predavanj:	Jernej Jakše, Polona Jamnik, Nataša Štajner
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	individualno raziskovalni/individual research

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General conditions for enrollment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Izziv današnjega raziskovalnega dela predstavlja povezovanje znanj in eksperimentalnih podatkov posameznih raziskovalnih področij (npr. genomika, transkriptomika, proteomika) in generacija vedno večjih setov podatkov. S tem individualnim raziskovalnim predmetom želimo podati študentu preko laboratorijskih primerov vpogled v konkretne	The challenge of current research work presents the integration of knowledge and experimental data sets from different research fields (e.g. genomics, transcriptomics, proteomics) and generation of vast data sets. In the frame of this individual research subject we would like to introduce student using real laboratory experiments or data sets with designated

raziskovalne primere in primere obdelav rezultatov s področij genomike, transkriptomike in proteomike:

1) Kvantificiranje DNA/RNA
Kvantificiranje DNA/RNA je obsežno področje, ki se široko uporablja v biotehnoloških raziskavah. Za določevanje tarčnega produkta se tako uporabljajo nekatere tradicionalne metode, kot npr. spektrofotometrija ali PicoGreen dsDNA kvantificiranje, ki niso vrstno specifične, medtem ko je zelo natančno določanje tarčnih genov / DNA / RNA omogočeno predvsem z metodami, ki temeljijo na tehnologiji verižne reakcije. Uporabljajo se v širokem obsegu za DNA kvantificiranje saj amplifikacija tarčne sekvence omogoča visoko občutljivost detekcije. Pri kvantitativnih PCR (QPCR) tehnikah je količina tarčnega gena povezana z intenziteto fluorescence reporterskih molekul. Signal fluorescence na osnovi katerega želimo izračunati začetno količino tarčnega gena lahko merimo na koncu reakcije (endpoint QPCR) ali pa med samim potekom reakcije (real-time QPCR). Novejša tehnologija imenovana digitalni PCR (dPCR) pa je verzija klasičnega PCR-ja, ki se lahko direktno uporablja za kvantificiranje in pomnoževanje nukleinskih kislin. Največja razlika med njima je v tem, da je pri dPCR vzorec razdeljen na veliko število manjših delov v katerih potekajo posamezne reakcije. V sklopu tega predmeta se bodo študentje seznanili predvsem z uporabo in aplikacijami tehnologije PCR v realnem času, ki je zaenkrat najboj široko uporabna.
2) Obdelava genomskih in transkriptomskih NGS podatkov – uporabna bioinformatika
V zadnjih nekaj letih so postopki naslednjih generacij določevanja nukleotidnih zaporedij (NGS) povsem spremenili področje genomike in transkriptomike. V tem sklopu predmeta se bodo študenti seznanili z naslednjimi aktivnostmi:
a) Hiter vpogled s trenutnimi NGS tehnologijami, ki so aktualne
b) NCBI-jev arhiv »Sequence Read Archive«, čemu je namenjen, prenos surovih podatkov sekvenciranja različnih platform, seznanitev s formati teh podatkov, pretvorba podatkov s pomočjo programskega paketa »SRA Toolkit«
c) Analiza kvalitete NGS podatkov (QC analysis) in interpretacija analize
d) Čiščenje surovih NGS podatkov
e) Osnovni formati NGS podatkov, seznanitev z njimi, njihova obdelava (FASTQ, SAM, BAM, GFF, VCF, BED)
f) *De-novo* zlaganje in rekonstrukcija zaporedij na osnovi mapiranja
g) Vizualizacija NGS podatkov.
3) Preučevanje proteoma
Različni omski pristopi omogočajo preučevanje bioloških procesov na molekularni ravni. Med njimi ima proteomika pomembno prednost, kajti preučuje

research subjects and examples of data analysis from fields of genomics, transcriptomics and proteomics:

1) DNA/RNA quantification
There are a number of methods available to quantify DNA. The traditional method of DNA quantitation involves measuring the absorbance of the sample on a spectrophotometer. Another method involves the use of a fluorescent dye, is PicoGreen dsDNA quantitation method. But all these techniques are not species-specific, while very precise determination of target genes / DNA / RNA was enabled by methods based on the polymerase chain reaction technology. The latest development in DNA quantitation is based on the technique of real time PCR. Several different approaches of real time quantitation of DNA are based on the principle of fluorescent dye binding double-stranded DNA as it accumulates during the PCR process. As the technique is based on the polymerase chain reaction, DNA quantitation can be undertaken by targeting any specific region of template DNA. Another, improved technology called digital PCR (dPCR), is a refinement of conventional PCR methods that can be used to directly quantify and clonally amplify nucleic acids. dPCR carries out a single reaction within a sample, however the sample is separated into a large number of partitions and the reaction is carried out in each partition individually. Within this course-set the students will gain the knowledge about most widely applicable real-time PCR methods and techniques.
2) Analysis of genomics and transcriptomics NGS data set – applied bioinformatics
The data sets generated by next generation sequencing methodologies (NGS) revolutionized the fields of genomics and proteomics in the last few years. The students will be familiarized by the next topics:
a) Quick overview of relevant NGS technologies
b) Sequence Read Archive maintained by NCBI, data acquisition produced by different NGS platforms and data formatting using SRA Toolkit
c) QC analysis of raw NGS data
d) NGS data trimming
e) Basic NGS formats, properties, their use (FASTQ, SAM, BAM, GFF, VCF, BED)
f) Read mapping approach of sequence reconstruction and *de-novo* assembly
g) NGS data visualization.
3) Study of proteome
Different omics approaches enable investigation of biological processes at the molecular level. Among them proteomics has an important advantage, it investigates proteins that carry out functions of every living cell. By using different proteomic tools information about protein expression, post-translational modifications and protein interactions

proteine, ki so nosilci funkcij vsake žive celice. Z uporabo različnih proteomskih orodij lahko pridobimo informacijo o izražanju proteinov, njihovih posttranslacijskih modifikacijah in proteinskih interakcijah. Študenti se bodo v tem sklopu seznanili z naslednjimi aktivnostmi: - Priprava biološkega materiala – postavitev poskusa, vzorčenje in priprava vzorca za proteomsko analizo z 2-D elektroforezo in masno spektrometrijo - Analiza proteoma z 2-D elektroforezo - Obdelava 2-D slik gelov z računalniškim programom - Vrednotenje rezultatov, proteomske analize	can be obtained. In the context of this part students will gain knowledge in the following topics: - Biological material preparation – experiment setup, sampling and sample preparation for proteome analysis by 2-D electrophoresis and mass spectrometry - Proteome analysis by 2-D electrophoresis - Analysis of 2-D gel images by using specific computer software - Evaluation of results of proteome analysis.

Temeljna literatura in viri/Readings:

1) An introduction to molecular biotechnology: fundamentals, methods and applications, 3rd, completely rev. ed. izd. Weinheim: Wiley-Blackwell, 2021, str. XXIV, 518.2) PEVSNER, J (2015) Bioinformatics and Functional Genomics 3rd Edition. Wiley-Blackwell.
3) Revijalni članki s področja, tekoča periodika ter druga učna gradiva/ Review articles in the field, current periodicals and other educational materials

Cilji in kompetence:	**Objectives and competences:**
Namen predmeta je: 1) predstaviti tehnike kvantificiranja DNA/RNA ter jih podpreti s konkretnimi laboratorijskimi poskusi in izračuni ter vrednotenji dobljenih rezultatov, 2) seznaniti študente z osnovnimi karakteristikami podatkov NGS, njihovimi oblikami, podatkovnimi bazami za shranjevanje, ter s potekom analize. 3) predstaviti analizo proteoma od priprave vzorca, separacije proteinov do vrednotenja proteomskih podatkov Študenti bodo preko praktičnih primerov spoznali, kako razumeti biološke procese na ravni genoma, transkriptoma in proteoma in znali pravilno načrtovati eksperiment.	The objective of this course is to: 1) introduce the DNA/RNA quantification methods and to perform some practical laboratory experiments and calculations on the basis of the obtained results, 2) acquaint students with basics characteristics of NGS data, their databases for storing and with recommended flow of the analysis 3) introduce proteome analysis from sample preparation , protein separation to proteomic data evaluation Based on the practical examples and real data sets students will learn how to understand biological processes on the level of genome, transcriptome and proteome. They will also be able to properly design such experiments.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Pridobitev znanja s področja postavitve poskusa za PCR v realnem času • Razumevanje in poznavanje metod in tehnik za določanje količine tarčnega gena v vzorcu oz. izražanje posameznih tarč z metodo PCR v realnem času. • Analiza podatkov in vrednotenje rezultatov z različnimi metodološkimi pristopi. • Statistična analiza rezultatov in grafična predstavitev • Poznavanje osnov uporabne bioinformatike na primerih NGS podatkov • Poznavanje pomena proteomike za razumevanje bioloških procesov in sposobnost načrtovanja proteomskega eksperimenta od priprave	Knowledge and understanding: • To gain knowledge on basic principles of Real-Time PCR assay design • To understand methods and techniques for determining the amount of target gene in the sample or analyzing the expression of individual targets by the method of real-time PCR. • Data analysis and evaluation of the results of different methodological approaches. • Statistical analysis of results and graphical presentation • Understanding of the basis of applied bioinformatics related to NGS data • Knowledge of importance of proteomics for understanding biological processes and ability to design proteomic experiment from biological material

biološkega materiala do analize proteoma z 2-D elektroforezo elektroforezo in masno spektrometrijo.	preparation to proteome analysis by 2-D electrophoresis and mass spectrometry.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Teoretične osnove • Praktično laboratorijsko delo oz. delo z računalnikom • Analiza rezultatov s pomočjo programske opreme in različnih računalniških aplikacij	• Theoretical basic • Practical lab work or computer work • Analysis of the results using specialized computer software

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Izdelava in predstavitev projektne naloge	100,00 %	Research and presentation of project work

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Polona Jamnik:

1. KOVAČ, Vito, BERGANT, Matic, ŠČANČAR, Janez, PRIMOŽIČ, Jasmina, JAMNIK, Polona, POLJŠAK, Borut. Causation of oxidative stress and defense response of a yeast cell model after treatment with orthodontic alloys consisting of metal ions. *Antioxidants*. 2022, vol. 11, iss. 1, str. 1-24, art. 63, ilustr. ISSN 2076-3921. https://www.mdpi.com/2076-3921/11/1/63, DOI: 10.3390/antiox11010063. [COBISS.SI-ID 91359235],
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4. JAMNIK, Polona, VOLK, Helena, OGRINC, Nives, JERŠEK, Barbara. Potential of bovine kappa - casein as biomarker for detection of adulteration of goat's milk with cow's milk. *Mljekarstvo : proizvodnja proučavanje i tehnologija mlijeka i mliječnih proizvoda*. 2019, vol. 69, no. 1, str. 78-84, ilustr. ISSN 0026-704X. https://hrcak.srce.hr/213431, DOI: 10.15567/mljekarstvo.2019.0107. [COBISS.SI-ID 4963704]
5. SKRT, Mihaela, JAMNIK, Polona, POKLAR ULRIH, Nataša. Antioxidative activity of methanolic and water extracts from the hyperthermophilic archaeon Aeropyrum pernix K1. *Acta chimica slovenica*. [Spletna izd.]. 2018, vol. 65, no. 1, str. 172-182, ilustr. ISSN 1580-3155. https://acta.chem-soc.si/issues/year-2018-vol-65-no-1/, DOI: 10.17344/acsi.2017.3765. [COBISS.SI-ID 4877176]
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Nataša Štajner:

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6. GONZALEZ, Francisco, JIBIN, Johny, WALKER III, William B., GUAN, Qingtian, MFARREJ, Sara, JAKŠE, Jernej, MONTAGNÉ, Nicolas, JACQUIN-JOLY, Emmanuelle, ALQARNI, Abdulaziz A., MOHAMMED ALI, Al-Saleh, PAIN, Arnab, ANTONY, Binu. Antennal transcriptome sequencing and identification of candidate chemoreceptor proteins from an invasive pest, the American palm weevil, Rhynchophorus palmarum. Scientific reports. 2021, vol. 11, str. 1-14 (8334), ilustr. ISSN 2045-2322. https://www.nature.com/articles/s41598-021-87348-y, DOI: 10.1038/s41598-021-87348-y. [COBISS.SI-ID 60452099]

PRIMARNI IN SEKUNDARNI METABOLIZEM HORTIKULTURNIH RASTLIN

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Primarni in sekundarni metabolizem hortikulturnih rastlin
Course title:	Primary and secondary metabolism of horticultural plants
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037308
Koda učne enote na članici/UL Member course code:	3810

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	30	0	0	10	190	10

Nosilec predmeta/Lecturer:	Robert Veberič

Izvajalci predavanj:	Maja Mikulič Petkovšek, Robert Veberič
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Vključijo se lahko vsi, ki so uspešno končali MSc programe s področja ved o živi naravi (Life Sciences) ali univerzitetne programe z istega področja.	Students who have successfully completed the MSc programs in the field of Life Sciences or university programs of the same field.

Vsebina:	Content (Syllabus outline):
Predstavljen bo pomen fenolne sintezne poti s ključnimi regulacijami in skupinami snovmi ter njihov pomen v mehanizmih odpornosti na stres, bolezni ter škodljivce. Predstavljen bo specifični in nespecifični odziv rastline na patogena.	Phenolic synthetic pathway, key enzymes and groups of secondary metabolites will be presented with an emphasis of their importance for the mechanisms of resistance to stress, disease and pests. Specific and non-specific response of plants to pathogens will be determined.

Predstavljena bo sinteza, razgradnja in vloga aromatičnih spojin v sadju in grozdju; razdelitev aromatičnih spojin, ki se pojavljajo v sadju in grozdju, kateri so njihovi prekurzorji, kdaj se posamezne arome sintetizirajo in v katerem delu sadeža jih lahko pričakujemo. Podani bodo ukrepi, ki vplivajo na sintezo aromatičnih spojin, s poudarkom na sorti, tehnologiji, okolju in načinu pridelave. Podani bodo dejavniki, ki vplivajo na vsebnost biološko aktivnih snovi v zeliščih ter ukrepi za optimizacijo proizvodnje teh snovi. Sekundarni metabolizem rastline lahko služi kot mehanizem za ugotavljanje skladnosti med sorto in podlago pri različnih sadnih vrstah. Podani bodo primeri in metode ugotavljanja neskladnosti v različnih življenjskih obdobjih rastline s pomočjo analize sekundarnih metabolitov. Primarni in sekundarni metaboliti odločilno vplivajo na kakovost hortikulturnih rastlin. S kakovost se zajema tako zunanji izgled, kot tudi vsebnost snovi v različnih uporabnih rastlinskih delih. Predstavljene bodo skupine snovi in njihov pomen za kakovost plodov ter tehnološki ukrepi za izboljšanje vsebnosti primarnih in sekundarnih metabolitov. Predstavljen bo vse večji pomen sekundarnih metabolitov v sadju za zdravje ljudi. Tematika bo obdelana z vidika preventive kakor tudi izboljšanje bolezenskega stanja ob rednem uživanju sadja	The synthesis, classification, decomposition and role of aromatic compounds in fruits and grapes will be stated. The precursors of aromatic compounds will be listed and the distribution of aromatic compounds in various tissues and physiological stages of fruits and grapes will be presented. Measures affecting the synthesis of aromatic compounds will be described, with an emphasis on cultivar, technology, environment, and production mode. Factors influencing the content of biologically active compounds in herbs will be addressed and measures to optimize the production of these compounds discussed. The content of secondary metabolites in plants can predict the consistency between the cultivar and rootstock in various plant species. Examples and methods for determining cultivar/rootstock inconsistency in different physiological stages will be discussed from the view of plant secondary metabolites. Primary and secondary metabolites are crucial for the quality of horticultural crops. External and internal quality parameters will be analyzed; the latter is related to the content of specific metabolites in different edible plant parts. Groups of primary and secondary metabolites will be presented along with their importance for food quality and technological measures which increase the content of primary and secondary metabolites in fruit. The growing importance of fruit secondary metabolites for human health and regular consumption of fruit will be described in terms of prevention as well as faster improvement in case of sickness.

Temeljna literatura in viri/Readings:

Michael W. 2010. Biochemistry of Plant Secondary Metabolism (Annual Plant Reviews S.). Sheffield Academic Press, 464 str. ISBN 978-1405183970 Revijalni članki s področja, tekoča periodika, druga učna gradiva… Articles from scientific journals, current magazines, other readings …

Cilji in kompetence:	**Objectives and competences:**
Cilj je suvereno poznavanje primarnega in sekundarnega metabolizma pri hortikulturnih rastlinah, ki je v večini osnova za nastanek bioaktivnih snovi pomembnih za interakcijo med rastlino, okoljem in tehnologijo ter pridelavo funkcionalne hrane..	The aim of the study is in the broadened knowledge on the primary and secondary metabolism of horticultural plants, representing the basis for the synthesis of bioactive compounds. This are important for the plant-environment interactions as well as for the adequate use of technology and the production of functional foods

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent razume pomen in vlogo primarnega in sekundarnega metabolizna (bioaktivnih snovi) pri hortikulturnih rastlinah z vidika vloge, ki jo imajo te snovi pri ekološki funkciji, odpornosti rastlin na patogene, na različne oblike stresa, kakovosti plodov.	Knowledge and understanding: The student understands the importnace and role of the primary and secondary metabolism (bioactive compounds) of horticultural plants from the ecological viewpoint, plants' resistance to the pathogens, different forms of stress and fruit quality.

Študent razume pomen sekundarnih metabolitov za človekovo zdravje.	The student understands the importance of secondary metabolites for the human health.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, izdelava seminarske naloge	Lectures, seminar work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminar, zagovor seminarja	100,00 %	Seminar and its presentation

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

prof. dr. Robert VEBERIČ

1. SOLAR, Anita, MEDIČ, Aljaž, SLATNAR, Ana, MIKULIČ PETKOVŠEK, Maja, BOTTA, Roberto, ROVIRA, Merce, SARRAQUIGNE, Jean-Paul, SILVA, Ana Paula, VEBERIČ, Robert, ŠTAMPAR, Franci, HUDINA, Metka, BACCHETTA, Loretta. The effects of the cultivar and environment on the phenolic contents of hazelnut kernels. Plants. 2022, vol. 11, iss. 22, 3051, str. 1-15, ilustr. ISSN 2223-7747. https://www.mdpi.com/2223-7747/11/22/3051, DOI: 10.3390/plants11223051. [COBISS.SI-ID 129602307],

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7. ZAMLJEN, Tilen, VEBERIČ, Robert, HUDINA, Metka, SLATNAR, Ana. The brown marmorated stink bug (Halyomorpha halys Stål.) influences pungent and non-pungent Capsicum cultivars' pre- and post-harvest quality. *Agronomy*. 2021, vol. 11, iss. 11, str. 1-16 (2252), ilustr. ISSN 2073-4395. https://www.mdpi.com/2073-4395/11/11/2252, DOI: 10.3390/agronomy11112252. [COBISS.SI-ID 84512259],

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10. PERŠIĆ, Martina, MIKULIČ PETKOVŠEK, Maja, HALBWIRTH, Heidi, SOLAR, Anita, VEBERIČ, Robert, SLATNAR, Ana. Red walnut: characterization of the phenolic profiles, activities and gene expression of selected enzymes related to the phenylpropanoid pathway in pellicle during walnut development. *Journal of agricultural and food chemistry*. 2018, vol. 66, iss. 11, str. 2742-2748. ISSN 0021-8561. DOI: 10.1021/acs.jafc.7b05603. [COBISS.SI-ID 8947833], [

izr. prof. dr. Maja MIKULIČ PETKOVŠEK

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6. KIPROVSKI, Biljana, MALENČIĆ, Đorđe, LJUBOJEVIĆ, Mirjana, OGNJANOV, Vladislav, VEBERIČ, Robert, HUDINA, Metka, MIKULIČ PETKOVŠEK, Maja. Quality parameters change during ripening in leaves and fruits of wild growing and cultivated elderberry (Sambucus nigra) genotypes. *Scientia horticulturae*. [Print ed.]. 2021, vol. 277, art no. 109792, str. 1-9. ISSN 0304-4238. DOI: 10.1016/j.scienta.2020.109792. [COBISS.SI-ID 34180611],

PROBIOTIKI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Probiotiki
Course title:	Probiotics
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037327
Koda učne enote na članici/UL Member course code:	3830

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	15	10	0	0	90	5

Nosilec predmeta/Lecturer:	Irena Rogelj

Izvajalci predavanj:	Irena Rogelj
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Razvoj probiotikov za živali in ljudi. Selekcijski kriteriji za probiotike; sposobnost kolonizacije, fiziološke lastnosti, varnost (invazivnost, rezistenca proti antibiotikom, tvorba toksinov, virulentni faktorji, kompetitivnost), tehnološke lastnosti (preživetje tehnoloških postopkov fermentacije, sušenja, liofilizacije, enkapsulacije; obstojnost v različnih matriksih in pogojih skladiščenja,).	Development of probiotics for animals and humans. Selection criteria for probiotics: colonisation ability, physiological properties, safety (invasiveness, resistance to antibiotics, formation of toxins, virulence factors, competitiveness), technological properties (survival during technological procedures of fermentation, drying, lyophilisation, encapsulation; resistance in various matrices and storage conditions).

Mehanizmi delovanja in markerji sledenja: kompeticija za hranila, kompeticija za mesta pripenjanja, protimikrobna in protivirusna aktivnost, komunikacija s črevesnimi celicami, posredna in neposredna regulacija metabolizma, protimutagena aktivnost, uravnavanje imunskega sistema. Teorija obrambe na treh nivojih. Pomen razvoja mikrobioma za zdravje organizma, spremembe mikrobiote prebavil v različnih življenskih obdobjih in pod vplivom zunanjih dejavnikov ter možna preventiva in terapija s probiotiki. Trditve o zdravstvenih učinkih probiotikov (»health claims«); Probiotiki kot funkcionalna živila, prehranska dopolnila in krmni dodatki (prirast, preprečevanje okužb). Probiotiki kot terapevtiki: laktozna intoleranca, črevesne okužbe in vnetja, preprečevanje AAD (antibiotic associated diarhea), rotavirusna driska, *Helicobacter pylori*, urogenitalne okužbe, zaščita mlečne žleze. Nove kategorije izdelkov: psihobiotiki, postbiotiki, živi bioterapevtski izdelki. Osnovne značilnosti in razlike med temi izdelki, prebiotiki in fermentiranimi živili Vaje: predstavitev klasičnih in genetskih metod proučevanja zgoraj naštetih mehanizmov delovanja probiotikov ter metod, ki se uporabljajo za kontrolo probiotičnih preparatov in probiotičnih živil. Seminarske vaje: načrtovanje in-vivo in kliničnih raziskav.	Mechanisms of functioning and markers for tracing: competition for nutrients, competititon for attachment sites, antimicrobial and antivirus activity, communication with intestinal cells, indirect and direct regulation of metabolism, antimutagenic activity, balancing the immune system. Theory of defence on three levels. Importance of the development of microbiomes for the health of an organism, changes of intestinal microbiota in various life periods and under the influence of external factors and possible preventive treatment and therapy with probiotics. Claims of the health effects of probiotics (»health claims«); probiotics as functional food, food and feed additives (growth, preventing infection). Probiotics as therapeutics: lactose intolerance; intestinal infections and inflammation, preventing AAD (antibiotic associated diarrhea), rotavirus diarrhea, *Helicobacter pylori*, urogenital infections, protection of mammary gland. New product categories: psychobiotics, postbiotics, live biotherapeutic products. Basic characteristics and differences between these products, prebiotics and fermented foods Exercises: presentation of classical and genetic methods for studying the probiotics and methods used for control of probiotic preparations and probiotic foods. Seminar exercises: planning *in vivo* and clinical research.

Temeljna literatura in viri/Readings:

- Binda S, Hill C, Johansen E, Obis D, Pot B, Sanders ME, Tremblay A and Ouwehand AC (2020) Criteria to Qualify Microorganisms as "Probiotic" in Foods and Dietary Supplements. Front. Microbiol. 11:1662. doi: 10.3389/fmicb.2020.01662
- EFSA FEEDAP. 2018. Guidance on the characterisation of microorganisms used as feed additives or as production organisms. EFSA Journal 16(3):5206, 24 pp. https://doi.org/10.2903/j.efsa.2018.5206
- Hill, C. *et al.* The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic Nat. Rev. Gastroenterol. Hepatol. 11, 506–514 (2014); published online 10 June 2014; doi:10.1038/nrgastro.2014.66
- Cordaillat-Simmons et al. Live biotherapeutic products: the importance of a defined regulatory framework. Experimental & Molecular Medicine (2020) 52:1397–1406; https://doi.org/10.1038/s12276-020-0437-6
- Sanders ME, Benson A, Lebeer S, et al. 2018. Shared mechanisms among probiotic taxa: implications for general probiotic claims. Curr Opin Biotechnol. 49: 207–216; 10.1016/j.copbio.2017.09.007

Tekoča znanstvena periodika

Cilji in kompetence:	**Objectives and competences:**
Temeljni izobraževalni cilj je poglobiti znanja s celotnega področja probiotikov (funkcionalna živila, prehranska dopolnila, krmni dodatki, terapevtiki), ki bo omogočilo študentu samostojno delo od izbire novih sevov, proučevanja mehanizmov učinkovanja in potrjevanja probiotičnih učinkov (*in-vitro*, *in-vivo*, klinične študije), preverjanja varnosti in tehnoloških lastnosti do možnih aplikacij.	Educational aims: The basic educational aim is to deepen knowledge from the whole field of probiotics (functional food, food and feed additives, therapeutics) which will enable a student to perform independent work, from selection of new strains, studying mechanisms of action and confirming probiotic effects (*in vitro, in vivo,* clinical studies),

	checking safety and technological properties to possible applications.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: delovanja probiotikov, njihove možne vloge v razvoju črevesne mikrobiote, vzdrževanju mikrobiote in terapiji pri različnih kliničnih indikacijah	Knowledge and understanding: of probiotic's activity and their possible role in the development of the intestinal microbiota, in maintaining of balanced microbiota and in various clinical indications therapy

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predmet se bo izvajal v obliki: • predavanj, na katerih bodo predavatelji skušali predstaviti celotno področje znanosti o probiotikih s poudarkom na najnovejših odkritjih in metodah proučevanja, • seminarskih vaj, kjer bodo študentje skupaj z učitelji oblikovali problemsko temo seminarske naloge in • laboratorijskih vaj, kjer bodo na konkretnih primerih spoznali sodobne metode proučevanja probiotikov.	The subject will be taught in the form of: • lectures, at which the lecturer will try to present the entire field of science of probiotics with a stress on the most recent discoveries and methods of studying probiotics. • seminar, at which students together with teachers will design problem themes for seminar tasks and • laboratory exercises at which they will learn contemporary methods of studying probiotics through specific cases.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminar	30,00 %	Seminar
Pisni ali ustni izpit	70,00 %	Written or oral exam

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Irena Rogelj

1. PAVELJŠEK, Diana, IVIČAK-KOCJAN, Karolina, TREVEN, Primož, BENČINA, Mojca, JERALA, Roman, ROGELJ, Irena. Distinctive probiotic features share common TLR2-dependent signalling in intestinal epithelial cells.*Cellular microbiology*. 2021, vol. 23, no. 1 , e13264, str. 1-12, ilustr. ISSN 1462-5822, DOI:10.1111/cmi.13264. [COBISS.SI-ID 32067331]
2. FIJAN, Sabina, FRAUWALLNER, Anita, VARGA, László, LANGERHOLC, Tomaž, ROGELJ, Irena, LORBER, Mateja, LEWIS, Peter, POVALEJ BRŽAN, Petra. Health professionals' knowledge of probiotics : an international survey. *International journal of environmental research and public health*. [Online ed.]. 2019, vol. 16, no. 17, str. 1-16, graf. prikazi. ISSN 1660-4601. COBISS.SI-ID 2516644]
3. PAVELJŠEK, Diana, JUVAN, Peter, KOŠIR, Rok, ROZMAN, Damjana, HACIN, Biljana, IVIČAK-KOCJAN, Karolina, ROGELJ, Irena. Lactobacillus fermentum L930BB and Bifidobacterium animalis subsp. animalis IM386 initiate signalling pathways involved in intestinal epithelial barrier protection. *Beneficial microbes*. 2018, vol. 9, no. 3, str. 515-525, ilustr. ISSN 1876-2883. DOI: 10.3920/BM2017.0107. [COBISS.SI-ID 4072328],
4. FIJAN, Sabina, FRAUWALLNER, Anita, LANGERHOLC, Tomaž, KREBS, Bojan, HAAR, Jessica ter, HESCHL, Adolf, MIČETIĆ-TURK, Dušanka, ROGELJ, Irena. Efficacy of using probiotics with antagonistic activity against pathogens of wound infections : an integrative review of literature. *BioMed research international*, vol. 2019, art. id 7585486, str. 1-21, ilustr. ISSN 2314-6141, DOI: 10.1155/2019/7585486. [COBISS.SI-ID 4341128],
5. TURKOVÁ, Kristýna, MAVRIČ, Anja, NARAT, Mojca, RITTICH, Bohuslav, ŠPANOVÁ, Alena, ROGELJ, Irena, BOGOVIČ MATIJAŠIĆ, Bojana. Evaluation of *Lactobacillus* strains for selected probiotic properties. *Folia microbiologica*, ISSN 0015-5632. [Print ed.], 2013, vol. 58, issue 4, str. 261-267, doi: 10.1007/s12223-012-0208-4. [COBISS.SI-ID 3147400]

6. TREVEN, Primož, TURKOVÁ, Kristýna, TRMČIĆ, Aljoša, OBERMAJER, Tanja, ROGELJ, Irena, BOGOVIČ MATIJAŠIĆ, Bojana. Detection and quantification of probiotic strain *Lactobacillus gasseri* K7 in faecal samples by targeting bacteriocin genes. *Folia microbiologica*, ISSN 0015-5632. [Print ed.], 2013, vol. 58, no. 6, str. 623-630, doi: 10.1007/s12223-013-0252-8. [COBISS.SI-ID 3222664].

PROCESI IN MEHANIZACIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Procesi in mehanizacija
Course title:	Processes and mechanisation
Članica nosilka/UL Member:	UL FS

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037332
Koda učne enote na članici/UL Member course code:	3835

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	20	0	0	20	190	10

Nosilec predmeta/Lecturer:	Leon Kos

Izvajalci predavanj:	Leon Kos
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Procesi v naravi. Preslikava procesov v funkcije. Razdelitev procesov v podprocese in podfunkcije sistemov. Tehnični sistemi in njihova struktura. Koncipiranje tehničnih sistemov in podsistemov. Izpeljava mehanskih, električnih, toplotnih in optičnih sistemov. Povezovanje različnih sistemov v sestav, mehanizacijo. Primeri sestavov in njihova analiza. Modeliranje raznih sestavov mehanizacije za specifične namene oz. področja. Predstavitev	Processes in nature. Copying processes into functions. Division of processes into sub-processes and systems' sub-functions. Technical systems and their structure. Conceiving technical systems and sub-systems. Execution of mechanical, electrical, heat and optical systems. Combining various systems into an assembly, mechanical equipment. Examples of assemblies and their analysis. Modelling various assemblies of mechanical equipment for specific

konceptualnih izračunov. Izdvojitev transportnih podsistemov. Transport trdnih kosov, tekočin in plinov. Transportni profili. Logistika transporta. Opredelitev orodja za izvajanje procesa. Sistemska zasnova energijskega izvora. Modeliranje spreminjanje energije v celotnem procesu od izvora do neposredne porabe. Seminarske naloge: Zasnova mehanizacije za izbrani proces. Modeliranje tehničnega sistema. Koncipiranje mehanskega sistema od energetskega izvora, spreminjanje energije glede na zahtevano obliko mehanskega dela in opredelitev orodja. Opredelitev parametrov vseh funkcij in njihovih poezav, ki omogočajo izvajanje krmiljenja. Analiza intervala parametrov na vstopu v mehanski sestav. Opredelitev primernega intervala vhodnih parametrov za koncipiranje predmetarnosti po funkcijah. Koncipiranje predmetarnosti po geometriji.	purposes and areas. Presentation of concept calculations. Extraction of transport sub-systems. Transport of solid parts, liquids and gases. Transport profiles. Transport logistics. Defining tools for process execution. Systems concept of the energy source. Modelling energy changes throughout the entire process, from source to direct consumption. Seminar work: Mechanical equipment concept for a selected process. Modelling a technical system. Conceiving a mechanical system from the energy source, energy changes with a view to the required shape of the mechanical part and defining the tool. Defining parameters of all functions and their relations that enable the application of control. Analysis of parameter intervals on entry into a mechanical assembly. Defining a suitable interval of input parameters for conceiving modularity by functions. Conceiving modularity by geometry.

Temeljna literatura in viri/Readings:

- Stjepandić, Josip (ur.), WOGNUM, Nel (ur.), VERHAGEN, Wim J. C. (ur.). Concurrent engineering in the 21st century : foundations, developments and challenges. Cham [etc.]: Springer. 2015. COBISS.SI-ID – 14071835 (CTK, FSLJ)
- Stark, J. Product Lifecycle Management, 2009, 21st Century Paradigm for Product Realisation, Springer, London, (UL e-book link)
- Wimmer W., Lee K. M., Quella F., Polak J., Ecodesign, The competitive advantage, Springer, 2010. (UL e-book link)
- Ulrich K. T., Eppinger S. D., Product design and development, McGreaw-Hill Education, New York, 2016. COBISS.SI-ID – 6140500 (FSLJ, FERLJ, CTK)
- Otto, K. N., Wood, K. L. Product design : techniques in reverse engineering and new product development, Upper Saddle River : Prentice Hall, 2001 COBISS.SI-ID – 23946757 (CTK, FSLJ)
- Vezzoli, C., Manzini, E. Design for environmental sustainability, London : Springer, 2008, (UL e-book link)
- Hoffmann, K, Krenn, E., Stanker,G. Fördertechnik. #Band #1, Bauelemente, ihre Konstruktion und Berechnung, 7. Aufl., Wien, München : R. Oldenbourg, 2005 COBISS.SI-ID – 1024011100 (FSLJ, FEKRS)
- Hoffmann, K, Krenn, E., Stanker,G. Fördertechnik. #Band #2, Maschinensätze, Fördermittel, Tragkonstruktionen, Logistik, 5. Aufl., Wien, München: Oldenbourg, 2004, COBISS.SI-ID – 896795 (FSLJ, FEKRS, UKM)

Cilji in kompetence:	**Objectives and competences:**
Izobraževalni cilji: Osnovni namen predmeta je osvojiti znanja o tehničnih procesih in njihovi izvedbi s tehničnimi sistemi. Glavni poudarek je namenjen zahtevam po trajnostnem razvoju: snovanju z uporabo nizko vplivnih materialov, uporabi podsistemov z nizko porabo energijo ter visokim izkoristkom energijskih pretvorb.	The main objective of the course is to acquire key knowledge of technical processes and their application by means of technical systems. The main emphasis is on the requirements of sustainable development: designing with the use of low-impact materials, using sub-systems with low energy consumption and highly efficient energy conversions.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Slušatelj je po zaključku predmeta usposobljen za samostojno in multidisciplinarno timsko delo na področju zasnove ali izbire ter analize primernih tehničnih procesov. Na njihovi osnovi je sposoben zasnovati ustrezne tehnične sisteme in ob tem upoštevati zahteve trajnostnega razvoja. Prav tako je	After the course, students will be competent for individual and multidisciplinary team work in the areas of design or selection and analysis of suitable technical processes. On their basis, they will be capable of designing suitable technical systems, while simultaneously taking account of the requirements of

na osnovi predmetarne gradnje sposoben oblikovati družine izdelkov, ki izvajajo izbrane procese.	sustainable development. On the basis of modular building, they are trained to design product families that carry out the selected processes.

Metode poučevanja in učenja:	**Learning and teaching methods:**
V primeru manjšega števila študentov pod 5 bo študij izveden po predloženi literaturi in s konzultacijami. Običajno pa s predavanji in vajami za pripravo seminarskih nalog.	In the event of fewer than 5 students, the course will be conducted in the form of consultations and with the use of the provided literature. The regular course will include lectures and exercises for the preparation of seminar work.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Kandidat lahko pristopi k ustnemu izpitu po predložitvi pozitivno ocenjene seminarske naloge.	100,00 %	A candidate can sit an oral examination after submitting a favourable assessment of seminar work.

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Leon Kos

1. COBURN, Jonathan, LEHNEN, M., PITTS, Richard, SIMIČ, Gregor, ARTOLA, Francisco Javier, THOREN, E., RATYNSKAIA, S., IBANO, K., BRANK, Matic, KOS, Leon, KHAYRUTDINOV, R., LUKASH, V., STEIN-LUBRANO, B., MATVEEVA, E., PAUTASSO, G. Energy deposition and melt deformation on the ITER first wall due to disruptions and vertical displacement events. *Nuclear fusion*. Jan. 2022, vol. 62, no. 1, str. 1-12, ilustr. ISSN 0029-5515. https://iopscience.iop.org/article/10.1088/1741-4326/ac38c7, DOI: 10.1088/1741-4326/ac38c7. [COBISS.SI-ID 93299971], [JCR, SNIP, WoS do 4. 12. 2023: št. citatov (TC): 8, čistih citatov (CI): 8, čistih citatov na avtorja (CIAu): 0.68, Scopus do 16. 1 2023: št. citatov (TC): 11, čistih citatov (CI): 11, čistih citatov na avtorja (CIAu): 0.94
2. PITTS, Richard, GRIBOV, Y., COBURN, Jonathan, FUENTES, F. J., SEVERINO, G., VAYAKIS, George, AMOSKOV, V.M., BRANK, Matic, CARPENTIER, S., D'AMICO, G., DUBROV, M. L., FERNÁNDEZ-MARINA, F., JONG, C., KOS, Leon, SIMIČ, Gregor, et al. First wall power flux management during plasma current ramp-up on ITER. *Nuclear fusion*. 2022, vol. 62, no. 9, str. 1-16, ilustr. ISSN 0029-5515. https://iopscience.iop.org/article/10.1088/1741-4326/ac8062, DOI: 10.1088/1741-4326/ac8062. [COBISS.SI-ID 115549955], [JCR, SNIP, WoS, Scopus]
3. VASILESKA, Ivona, BONNIN, Xavier, KOS, Leon. Kinetic-fluid coupling simulations of ITER Type I ELM. *Fusion engineering and design*. [Print ed.]. Jul. 2021, vol. 168, str. 1-5, ilustr. ISSN 0920-3796. https://www.sciencedirect.com/science/article/pii/S0920379621001836, DOI: 10.1016/j.fusengdes.2021.112407. [COBISS.SI-ID 53572099], [JCR, SNIP, WoS do 9. 5. 2023: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.67, Scopus do 28. 4. 2023: št. citatov (TC): 2, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0.67]
4. HOELZL, Matthias, HUIJSMANS, Guido, PAMELA, Stanislas, BÉCOULET, Marina, NARDON, Eric, ARTOLA, Francisco Javier, NKONGA, Boniface, ATANASIU, Calin, BANDARU, Vinodh, BHOLE, Ashish, KOS, Leon, PENKO, Dejan (konzultant), et al. The JOREK non-linear extended MHD code and applications to large-scale instabilities and their control in magnetically confined fusion plasmas. *Nuclear fusion*. 2021, vol. 61, no. 6, str. 1-71, ilustr. ISSN 0029-5515. https://iopscience.iop.org/article/10.1088/1741-4326/abf99f, DOI: 10.1088/1741-4326/abf99f. [COBISS.SI-ID 61762819], [JCR, SNIP, WoS do 18. 12. 2022: št. citatov (TC): 42, čistih citatov (CI): 35, čistih citatov na avtorja (CIAu): 2,02, Scopus do 2. 2023: št. citatov (TC): 44, čistih citatov (CI): 38, čistih citatov na avtorja (CIAu): 2,19]
5. VASILESKA, Ivona, KOS, Leon. Time-dependent boundary conditions during ELMs in ITER plasma. *Journal of fusion energy*. Oct. 2020, vol. 39, iss. 5, str. 212-220, ilustr. ISSN 0164-0313. https://link.springer.com/article/10.1007%2Fs10894-020-00241-w, DOI: 10.1007/s10894-020-00241-w. [COBISS.SI-ID 17566979], [JCR, SNIP, WoS do 9. 1. 2023: št. citatov (TC): 4, čistih citatov (CI): 3, čistih

citatov na avtorja (CIAu): 1,50, Scopus do 8. 1 2021: št. citatov (TC): 3, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 1,00]

6. KOS, Leon, BRANK, Matic, ANAND, H., PITTS, Richard, VRIES, P. C. de, SNIPES, J. A., NUNES, I., ZABEO, L., GRIBOV, Y. A framework for the assessment and control of ITER main chamber heat loads. *Nuclear fusion*. [Online ed.]. 2020, vol. 60, no. 3, 12 f., ilustr. ISSN 1741-432 https://iopscience.iop.org/article/10.1088/1741-4326/ab6150/pdf, DOI: 10.1088/1741-4326/ab6150. [COBISS.SI-ID 17034011], [JCR, SNIP, WoS do 20. 11. 2022: št. citatov (TC): 8, čistih citatov (CI): 6, čistih citatov na avtorja (CIAu): 0,67, Scopus do 31. 1. 2022: št. citatov (TC): 7, čistih citatov (CI): 5, čistih citatov na avtorja (CIAu): 0,56]
7. BRANK, Matic, PITTS, Richard, SIMIČ, Gregor, LAMALLE, P., KOCAN, M., KÖCHL, F., GRIBOV, Y., POLLI, V., and KOS, Leon. Assessment of plasma power deposition on the ITER ICRH antennas. *Nuclear materials and energy*. Jun. 2021, vol. 27, str. 1-9, ilustr. ISSN 2352-1791. https://www.sciencedirect.com/science/article/pii/S2352179121000971, DOI: 10.1016/j.nme.2021.101021. [COBISS.SI-ID 78883331], [JCR, SNIP, WoS do 18. 11. 2022: št. citatov (TC): 4, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,33, Scopus do 15. 9. 2022: št. citatov (TC): 3, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,22]
8. COBURN, Jonathan, THOREN, E., PITTS, Richard, ANAND, H., LEHNEN, M., KOS, Leon, BRANK, Matic, RATYNSKAIA, S., TOLIAS, P. First wall energy deposition during vertical displacement events on ITER. *Physica scripta*. Jan. 2020, vol. 2020, no. t171, str. 1-6, ilustr. ISSN 0031-8949. https://iopscience.iop.org/article/10.1088/1402-4896/ab4c6b/meta, DOI: 10.1088/1402-4896/ab4c6b. [COBISS.SI-ID 28850179], [JCR, SNIP, WoS do 1. 12. 2022: št. citatov (TC): 7, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,33, Scopus do 1. 12. 2022: št. citatov (TC): 6, čistih citatov (CI): 2, čistih citatov na avtorja (CIAu): 0,22]
9. KOS, Leon, PITTS, Richard, SIMIČ, G., BRANK, Matic, ANAND, H., ARTER, W. SMITER : a field-line tracing environment for ITER. *Fusion engineering and design*, ISSN 0920-379 [Print ed.], Sep. 2019, vol. 146, pt. B, str. 1796-1800, ilustr. https://www.sciencedirect.com/science/article/pii/S092037961930359X?via%3Dihub, doi: 10.1016/j.fusengdes.20103.037. [COBISS.SI-ID 16530203], [JCR, SNIP, WoS do 25. 10. 2019: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0, Scopus do 1. 4. 2019: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0]
kategorija: 1A1 (Z, A', A1/2); uvrstitev: SCI, Scopus, MBP; tip dela je verificiral OSICN
točke: 167, št. avtorjev: **6**
10. ANAND, H., PITTS, Richard, VRIES, P. C. de, SNIPES, J. A., NESPOLI, F., LABIT, B., GALPERTI, C., CODA, S., BRANK, Matic, KOS, Leon. Experimental implementation of a real-time power flux estimator for the ITER first wall on the TCV tokamak. Fusion engineering and design. [Print ed.]. Oct. 2019, vol. 147, str. 1-7, ilustr. ISSN 0920-3796. https://www.sciencedirect.com/science/article/pii/S0920379619307203#!, DOI: 1016/j.fusengdes.2019.111242. [COBISS.SI-ID 16703771], [JCR, SNIP, WoS do 18. 2019: št. citatov (TC): 0, čistih citatov (CI): 0, Scopus do 12. 2019: št. citatov (TC): 0, čistih citatov (CI): 0]

PROIZVODNI SISTEMI V REJI ŽIVALI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Proizvodni sistemi v reji živali
Course title:	Animal production systems
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037352
Koda učne enote na članici/UL Member course code:	3855

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	70	0	0	0	160	10

Nosilec predmeta/Lecturer:	Mojca Simčič

Izvajalci predavanj:	Mojca Simčič
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Splošni pogoji za vpis na doktorski študij.	General conditions for enrolment in doctoral studies.

Vsebina:	**Content (Syllabus outline):**
Pri predmetu bomo spoznali proizvodne sisteme v živinoreji na nacionalnem, evropskem in svetovnem nivoju. Obravnavane bodo vse pomembne vrste rejnih živali (govedo, prašiči, ovce, koze, perutnina, konji, akvakultura) in vse pomembne proizvodne usmeritve (prireja mleka, prireja mesa, prireja jajc, prireja volne,…). Spoznali bomo katere celine in katere države priredijo največ živalskih proizvodov s katerimi zalagajo svetovne trge in kateri proizvodni	In the course, we will cover the production systems in animal husbandry at the national, European and global level. All important species of farm animals (cattle, pigs, sheep, goats, poultry, horses, aquaculture) and all important productions (milk production, meat production, egg production, wool production,…) will be considered. We will discuss which continents and which countries produce the largest amounts of animal products and how they

sistemi so najbolj uveljavljeni in razširjeni. Poseben poudarek bo na visoko selekcioniranih specializiranih globalnih pasmah na eni strani in na lokalnih pasmah z majhnimi populacijami na drugi strani, ki znatno prispevajo k lokalnemu trgu. Predstavili bomo primernost genotipov živali za posamezen proizvodni sistem. Predstavljene bodo dobre prakse v primarni prireji živil živalskega izvora. Pri ekoloških vidikih bomo izpostavili primerno uporabo živalskih iztrebkov in ukrepe za zaščito okolja v različnih tehnologijah reje. Obravnavana bodo najnovejša spoznanja in dileme o vplivih živinoreje na okolje (toplogredni plini, smrad,…). Spoznali bomo načrtovanje, izvedbo in analizo podatkov iz raziskav s področja različnih vrst, pasem, tehnologije reje in kakovosti živalskih proizvodov. Predstavljene bodo ustrezne metode statistične analize podatkov iz takšnih raziskav.	supply the world markets as well as which production systems are the most established and widespread. Particular emphasis will be placed on highly selected specialized global breeds on the one hand and on local breeds with small populations on the other hand, which make a significant contribution to the local market. We will study the suitability of different genotypes for each production system. Good practices in the primary production of food of animal origin will be presented. In the ecological aspects, we will highlight the appropriate use of animal excrement and measures to protect the environment in various rearing technologies. The latest findings and dilemmas about the effects of livestock farming on the environment (greenhouse gases, odours, …) will be discussed. We will learn about the design, implementation and data analysis considered various species, breeds, rearing technology and quality of animal products. Appropriate methods of statistical analysis of data from such studies will be presented.

Temeljna literatura in viri/Readings:

Animal production and animal science worldwide: a review on developments and research in livestock systems. Ur. A. Rosati, A. Tewolde, C. Mosconi. 2009. Wageningen: Wageningen Academic. 264 str.
Livestock production systems in Central and Eastern Europe. Ur. A. Gibon, S. Mihina. 2003. Wageningen: Wageningen Academic Publishers. 255 str.
FAO. 2012. Global Livestock Production Systems. Rome, Food & Agriculture Organization, 168 str.
Squires V.R., Bryden W.L. 2019. Livestock: Production, Management Strategies and Challenges, NY, Nova Science Publishers, Inc., 532 str.
Revijalni članki s področja, tekoča periodika ter, druga učna gradiva.…

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je pridobitev vpogleda v raznolikost proizvodnih sistemov v živinoreji in kompetentno poznavanje teh sistemov. Študent z analitskim pristopom kompleksno prouči določeno vrsto rejnih živali v določenem proizvodnem sistemu za prirejo kakovostnih živalskih proizvodov, z upoštevanjem tehnoloških, etoloških in okoljskih zahtev.	The aim of the course is to gain an insight into the diversity of production systems in animal husbandry and a competent knowledge of these systems. With an analytical approach, each student will comprehensively recognize the most suitable farm animal species for a certain production system to produce animal products with a high quality, taking into account technological, ethological and environmental requirements.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Predvideni študijski rezultat je pridobitev poglobljenih znanj o proizvodnih sistemih v živinoreji in usposobitev kandidata za načrtovanje, izvajanje in analiziranje rezultatov raziskav s področja reje živali.	The expected study result is acquisition of deep knowledge of production systems in livestock farming and training of the student for planning, implementation and data analysis from animal husbandry researches.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja, • Individualne konzultacije, • Samostojna priprava seminarja	• Lectures, • Individual consultations, • Independent preparation of the seminar

Načini ocenjevanja: **Delež/Weight** **Assessment:**

-	seminar,	50,00 %	-	seminar,
-	pisni izpit	50,00 %	-	written examination

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Mojca Simčič

1. SIMČIČ, Mojca, LUŠTREK, Barbara, ŠTEPEC, Miran, LOGAR, Betka, POTOČNIK, Klemen. Estimation of genetic parameters of type traits in first parity cows of the autochthonous Cika cattle in Slovenia. *Frontiers in genetics*. nov. 2021, vol. 12, art. 724058, str. 1-9, ilustr. ISSN 1664-8021. https://www.frontiersin.org/articles/10.3389/fgene.2021.724058/full, DOI: 10.3389/fgene.2021.724058. [COBISS.SI-ID 85837059]

2. KUKUČKOVÁ, Veronika, MORAVČÍKOVÁ, Nina, FERENČAKOVIĆ, Maja, **SIMČIČ, Mojca**, MÉSZÁROS, Gábor, SÖLKNER, Johann, TRAKOVICKÁ, Anna, KADLEČÍK, Ondrej, ČURIK, Ino, KASARDA, Radovan. Genomic characterization of Pinzgau cattle : genetic conservation and breeding perspectives. *Conservation Genetics*. 2017, vol. 18, no. 4, str. 893-910, ilustr. ISSN 1566-0621. http://link.springer.com/article/10.1007/s10592-017-0935-9, DOI: 10.1007/s10592-017-0935-9. [COBISS.SI-ID 3861640], [JCR, SNIP, WoS do 13. 1. 2021: št. citatov (TC): 17, čistih citatov (CI): 15, Scopus do 29. 12. 2020: št. citatov (TC): 22, čistih citatov (CI): 21]

KOLENC, Borut, MALOVRH, Špela, PAVELJŠEK, Diana, ROZMAN, Vita, **SIMČIČ, Mojca**, TREVEN, Primož. Correlations of goat milk coagulation properties between dams and daughters. International dairy journal. 2023, vol. 142, [article no.]105644, str. 1-8, ilustr. ISSN 1879-0143. https://www.sciencedirect.com/science/article/pii/S0958694623000638?via%3Dihub, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=145078, DOI: 10.1016/j.idairyj.2023.105644. [COBISS.SI-ID 147365891]

3. SIMČIČ, Mojca, CIVIDINI, Angela, BARAĆ, Zdravko, ŠPEHAR, Marija. Non-genetic factors affecting somatic cell count in milk of dairy goat populations in Croatia and Slovenia. *Acta fytotechnica et zootechnica*. 2018, vol. 21, no. 4, str. 179-182. ISSN 1335-258X. http://acta.fapz.uniag.sk/journal/index.php/on_line/article/view/483/pdf, DOI: 10.15414/afz.2018.21.04.179-182. [COBISS.SI-ID 4176264]

4. SIMČIČ, Mojca, ČEPON, Marko, ŽGUR, Silvester. Carcass and meat quality of young Cika and Simmental bulls finished under similar conditions. *Animal production science*. 2018, vol. 58, no. 5, str. 950-957. ISSN 1836-0939. http://www.publish.csiro.au/AN/AN15745, DOI: 10.1071/AN15745. [COBISS.SI-ID 3839368], [JCR, SNIP, WoS, Scopus]

5. CIVIDINI, Angela, **SIMČIČ, Mojca**, STIBILJ, Vekoslava, VIDRIH, Matej, POTOČNIK, Klemen. Changes in fatty acid profile of Bovec sheep milk due to different pasture altitude. *Animal : an international journal of animal bioscience*. 2019, vol. 13, no. 5, str. 1111-1118. ISSN 1751-7311. https://www.cambridge.org/core/journals/animal/article/changes-in-fatty-acid-profile-of-bovec-sheep-milk-due-to-different-pasture-altitude/E9952903EC75659EE96FCC89ADC9077C, DOI: 10.1017/S1751731118002598. [COBISS.SI-ID 4176008], [JCR, SNIP, WoS do 25. 12. 2020: št. citatov (TC): 4, čistih citatov (CI): 4, Scopus do 3. 12. 2019: št. citatov (TC): 1, čistih citatov (CI): 1]

6. MARKOVIC, Bozidarka, DOVČ, Peter, MARKOVIĆ, Milan, RADONJIĆ, Dušica, ADAKALIĆ, Mirjana, **SIMČIČ, Mojca**. Differentiation of some Pramenka sheep breeds based on morphometric characteristics. *Archives animal breeding*. 2019, vol. 62, no. 2, str. 393-402, ilustr. ISSN 2363-9822. https://www.arch-anim-breed.net/62/393/2019/, DOI: 10.5194/aab-62-393-2019. [COBISS.SI-ID 4266120], [JCR, SNIP, WoS do 5. 2. 2021: št. citatov (TC): 2, čistih citatov (CI): 2, Scopus]

7. OGOREVC, Jernej, **SIMČIČ, Mojca**, ZORC, Minja, ŠKRJANC, Monika, DOVČ, Peter. TLR2 polymorphism (rs650082970) is associated with somatic cell count in goat milk. *PeerJ*. 31. jul. 2019, vol. 7, str. 1-9, e-7340, ilustr. ISSN 2167-8359. https://peerj.com/articles/7340.pdf, DOI: 10.7717/peerj.7340. [COBISS.SI-ID 4274568], [JCR, SNIP, WoS, Scopus]

8. KAIĆ, Ana, LUŠTREK, Barbara, **SIMČIČ, Mojca**, POTOČNIK, Klemen. Milk quantity, composition and hygiene traits of routinely machine milked Lipizzan mares. *Slovenian veterinary research : the scientific journal of the Veterinary Faculty University of Ljubljana*. [English print ed.]. 2019, letn. 56, št. 3, str. 115-123. ISSN 1580-4003. https://www.slovetres.si/index.php/SVR/article/view/683/262, DOI: 10.26873/SVR-683-2019.

[COBISS.SI-ID 4312968], [JCR, SNIP, WoS do 11. 10. 2020: št. citatov (TC): 2, čistih citatov (CI): 2, Scopus do 30. 3. 2020: št. citatov (TC): 1, čistih citatov (CI): 1]

9. CIVIDINI, Angela, TERČIČ, Dušan, **SIMČIČ, Mojca**. The effect of feeding system on the carcass quality of crossbred lambs with Texel. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*. 2020, vol. 68, no. 1, str. 17-24, ilustr. ISSN 1211-8516. https://acta.mendelu.cz/68/1/0017/, DOI: 10.11118/actaun202068010017. [COBISS.SI-ID 4357000], [SNIP, Scopus]

10. KOLENC, Borut, MOHAR LORBEG, Petra, ČANŽEK MAJHENIČ, Andreja, CIVIDINI, Angela, **SIMČIČ, Mojca**, TREVEN, Primož. Influence of two feed supplements on technological properties of goat's milk. *Mljekarstvo : proizvodnja proučavanje i tehnologija mlijeka i mliječnih proizvoda*. 2020, vol. 70, no. 3, str. 162-170, ilustr. ISSN 0026-704X. https://doi.org/10.15567/mljekarstvo.2020.0303, DOI: 10.15567/mljekarstvo.2020.0303. [COBISS.SI-ID 21092611], [JCR, SNIP, WoS, Scopus]

RAČUNSKA BIOLOGIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Računska biologija
Course title:	Computational Biology
Članica nosilka/UL Member:	UL FRI

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037265
Koda učne enote na članici/UL Member course code:	3767

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
0	5	5	0	15	100	5

Nosilec predmeta/Lecturer:	Miha Mraz

Izvajalci predavanj:	
Izvajalci seminarjev:	Aleš Belič, Miha Moškon, Miha Mraz
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	individualno raziskovalni/individual research course

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
• Splošni pogoji za vpis na doktorski študij	General prerequisites for the enrolment in the doctoral programme

Vsebina:	**Content (Syllabus outline):**
• Biološka omrežja: gensko-regulatorna omrežja, signalna omrežja, metabolna omrežja. • Procesiranje informacij v bioloških sistemih. • Pristopi za računsko modeliranje bioloških sistemov: deterministično in stohastično modeliranje, agentno modeliranje, logično modeliranje, modeliranje na podlagi omejitev, modeliranje na nivoju genoma.	• Biological networks: gene-regulatory networks, signalling networks, metabolic networks. • Biological information processing. • Computational approaches for modelling of biological systems: deterministic and stochastic modelling, agent-based modelling, logic modelling, constraint-based modelling, genome-scale modelling.

• Simulacija dinamike bioloških sistemov. • Pristopi za računsko analizo bioloških sistemov: kvalitativna in kvantitativna analiza, preiskovanje prostora dopustnih vrednosti kinetičnih parametrov. • Hevristike za analizo in načrtovanje bioloških sistemov. • Kontekstno-specifično modeliranje in prilagajanje računskih modelov specifičnemu kontekstu. • Modeliranje populacij bioloških entitet z agentnimi modeli. • Dopolnjevanje eksperimentalnega dela z računalniškim modeliranjem in uporaba eksperimentalno pridobljenih podatkov pri postavitvi, dopolnjevanju in prilagajanju računskih modelov. • Uporaba računskih modelov pri interpretaciji eksperimentalnih podatkov. • Uporaba računskih modelov za generiranje novih podatkov in testiranje postavljenih hipotez.	• Dynamical simulations of biological systems. • Computational analysis of biological systems: qualitative and quantitative analysis, investigation of feasible values of kinetic parameters. • Heuristics for analysis and design of biological systems. • Context-specific modelling and adaptation of computational models to a specific context. • Population-based modelling of biological entities using agent-based models. • Complementing experimental work with computational modelling. Application of experimental data to the establishment, enhancement, and adaptation of computational models. • Interpretation of experimental data using computational models. • Application of computational models to the generation of new data and hypothesis testing.

Temeljna literatura in viri/Readings:

- Alon, Uri. (2006) *An introduction to systems biology: design principles of biological circuits*. Chapman and Hall/CRC.
- Palsson, Bernhard Ø, (2015) *Systems Biology: Constraint-Based Reconstruction and Analysis*. Cambridge University Press; 1st edition.
- Sneppen, K. (2014). *Models of life*. Cambridge University Press.

Klipp, E., Liebermeister, W., Wierling, C., & Kowald, A. (2016). *Systems biology: a textbook*. John Wiley & Sons.

- Ostalo: revijski članki s področja, tekoča periodika in druga učna gradiva.

Priporočena literatura:

Ingalls, Brian P. (2013). *Mathematical modeling in systems biology: an introduction*. MIT press.

Cilji in kompetence:	**Objectives and competences:**
Poznavanje računskih pristopov za modeliranje, simulacijo, analizo in načrtovanje bioloških sistemov. Sposobnost gradnje in prilagajanja računskih modelov pri reševanju specifičnih problemov. Uporaba računskih modelov v kombinaciji z eksperimentalnim delom za interpretacijo eksperimentalno-pridobljenih podatkov, generiranje novih podatkov in testiranje postavljenih hipotez.	To get an overview on the computational modelling, simulation, analysis, and design approaches in the biological systems domain. To be able to construct and adapt a computational model in the context of the student's research work. To be able to use computational models in a combination with experimental work for data interpretation, generation of new data, and testing of hypotheses.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje računskega modeliranja, analize in načrtovanja bioloških sistemov.	Knowledge and understanding of computational modelling, analysis, and design of biological systems.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminarji, vaje, individualne konzultacije	Seminars, hands-on tutorials, individual consultations

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Domače naloge	0,00 %	Homework assignments
Seminarsko delo	100,00 %	Project work

Ocenjevalna lestvica: **Grading system:**

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Miha Mraz

- WALAKIRA, Andrew, ROZMAN, Damjana, REŽEN, Tadeja, MRAZ, Miha, MOŠKON, Miha. Guided extraction of genome-scale metabolic models for the integration and analysis of omics data. Computational and Structural Biotechnology Journal. 2021, vol. 19, str. 3521-3530, graf. prikazi. ISSN 2001-0370. https://www.sciencedirect.com/science/article/pii/S2001037021002476, DOI: 10.1016/j.csbj.2021.06.009. [COBISS.SI-ID 66227971]
- MOŠKON, Miha, PUŠNIK, Žiga, ZIMIC, Nikolaj, MRAZ, Miha. Field-programmable biological circuits and configurable (bio)logic blocks for distributed biological computing. Computers in Biology and Medicine. [Print ed.]. Jan. 2021, vol. 128, str. 1-9, ilustr. ISSN 0010-4825. https://www.sciencedirect.com/science/article/abs/pii/S0010482520304406, DOI: 10.1016/j.compbiomed.2020.104109. [COBISS.SI-ID 37003267]
- MOŠKON, Miha, KOMAC, Roman, ZIMIC, Nikolaj, MRAZ, Miha. Distributed biological computation : from oscillators, logic gates and switches to a multicellular processor and neural computing applications. Neural computing & applications. Aug. 2021, vol. 33, no. 15, str. 8923-8938, ilustr. ISSN 0941-0643. https://link.springer.com/article/10.1007/s00521-021-05711-6, DOI: 10.1007/s00521-021-05711-6. [COBISS.SI-ID 48415747]
- BLAGOTINŠEK COKAN, Kaja, URLEP, Žiga, MOŠKON, Miha, MRAZ, Miha, KONG, Xiang Y., ESKILD, Winnie, ROZMAN, Damjana, JUVAN, Peter, REŽEN, Tadeja. Common transcriptional program of liver fibrosis in mouse genetic models and humans. International journal of molecular sciences. 2021, vol. 22, iss. 2, str. 1-21, ilustr. ISSN 1422-0067. https://www.mdpi.com/1422-0067/22/2/832, DOI: 10.3390/ijms22020832. [COBISS.SI-ID 47324419]
- PUŠNIK, Žiga, MRAZ, Miha, ZIMIC, Nikolaj, MOŠKON, Miha. Computational analysis of viable parameter regions in models of synthetic biological systems. Journal of biological engineering. Sep. 2019, vol. 13, str. 1-21, graf. prikazi. ISSN 1754-1611. https://jbioleng.biomedcentral.com/articles/10.1186/s13036-019-0205-0, DOI: 10.1186/s13036-019-0205-0. [COBISS.SI-ID 1538345411]
- MAGDEVSKA, Lidija, MRAZ, Miha, ZIMIC, Nikolaj, MOŠKON, Miha. Initial state perturbations as a validation method for data-driven fuzzy models of cellular networks. BMC bioinformatics. Sep. 2018, vol. 19, str. 1-7, graf. prikazi. ISSN 1471-2105. https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-018-2366-0, DOI: 10.1186/s12859-018-2366-0. [COBISS.SI-ID 1537917379]

Aleš Belič

1. KISS, Ádám, BELIČ, Aleš, et al. Phenoconversion of CYP2D6 by inhibitors modifies aripiprazole exposure. European archives of psychiatry and clinical neuroscience. 2020, vol. 270, str. 71-82. ISSN 0940-1334. DOI: 10.1007/s00406-018-0975-2. [COBISS.SI-ID 30244611]
2. BRINC, Matjaž, BELIČ, Aleš. Optimization of process conditions for mammalian fed-batch cell culture in automated micro-bioreactor system using genetic algorithm. Journal of biotechnology. [Print ed.]. 2019, vol. 300, str. 40-47. ISSN 0168-1656. DOI: 10.1016/j.jbiotec.2019.05.001. [COBISS.SI-ID 30237187]
3. TÓTH, Katalin, BELIČ, Aleš, et al. Potential role of patients' CYP3A-status in clozapine pharmacokinetics. The international journal of neuropsychopharmacology. 2017, vol. 20, issue 7, str. 529-537. ISSN 1461-1457. DOI: 10.1093/ijnp/pyx019. [COBISS.SI-ID 1358686]
4. KANDUŠER, Maša, BELIČ, Aleš, ČOROVIĆ, Selma, ŠKRJANC, Igor. Modular Serial Flow Through device for pulsed electric field treatment of the liquid samples. Scientific reports. 2017, 7, art. no. 8115, str. 1-12, ilustr. ISSN 2045-2322. https://www.nature.com/articles/s41598-017-08620-8, DOI: 10.1038/s41598-017-08620-8. [COBISS.SI-ID 11793492]
5. RUTAR, Veronika, ZUPANC, Vlasta, BELIČ, Aleš, MANOUILIDOU, Christina, KORITNIK, Blaž, BON, Jurij, PEČARIČ-MEGLIČ, Nuška, VRABEC, Matej, ŽIBERT, Janez, REPOVŠ, Grega, ZIDAR, Janez. Beyond aphasia : altered EEG connectivity in Broca's patients during working memory task. Brain and language. Dec. 2016, vol. 163, str. 10-21, ilustr. ISSN 0093-934X. http://dx.doi.org/10.1016/j.bandl.2016.08.003, DOI: 10.1016/j.bandl.2016.08.003. [COBISS.SIID 3138220]
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Miha Moškon

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- MOŠKON, Miha. CosinorPy : a Python package for cosinor-based rhythmometry. BMC bioinformatics. Oct. 2020, vol. 21, str. 1-12, graf. prikazi. ISSN 1471-2105. https://bmcbioinformatics.biomedcentral.com/articles/10.1186/s12859-020-03830-w, DOI: 10.1186/s12859-020-03830-w. [COBISS.SI-ID 34886403]

RASTLINSKA BIOTEHNOLOGIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Rastlinska biotehnologija
Course title:	Plant biotechnology
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037293
Koda učne enote na članici/UL Member course code:	3795

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	50	0	0	30	150	10

Nosilec predmeta/Lecturer:	Nataša Štajner

Izvajalci predavanj:	Špela Baebler, David Dobnik, Jana Murovec, Nataša Štajner
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Zaključen drugostopenjski študij iz smeri biotehniških ved (UL-Biotehniška fakulteta). Za študente, ki v predhodnih programih niso zaključili zgoraj navedenih ustreznih smeri, se lahko določi opravljanje dodatnih obveznosti iz manjkajočih predmetov v obsegu od 10 do 30 KT prvo oz. drugostopenjskih programov.	Completed second degree of academic studies (MSc) at the Biotechnical Faculty. Students completing other related second degree study programmes may be required to enroll in additional 10-30 ECTS level 1 or 2 courses to meet the requirements.

Vsebina:	Content (Syllabus outline):
1. Biotehnološki pristopi k premoščanju ovir pri manipulacijah genov in genomov pri rastlinah. 2. Strategije genskega spreminjanja rastlin	1. Biotechnological approaches to plant gene and genome manipulation 2. Strategies of plant genetic modification

3. Presoja tveganja uporabe gensko spremenjenih rastlin 4. Žlahtnjenje rastlin s pomočjo markerjev 5. Diagnostika rastlinskih patogenov 6. Primerjalna genomika pri rastlinah 8. Rastlinska translacijska genomika Pri premoščanju ovir pri manipulacijah genov in genomov pri rastlinah se bodo študentje seznanili z inovativnimi biotehnološkimi metodami žlahtnjenja rastlin predvsem z genskim inženiringom in s tehnologijami mestno specifičnih nukleaz, žlahtnjenje s pomočjo markerjev in podobno. Predstavljene bodo strategije genskega spreminjanja rastlin za izboljšanje agronomskih lastnosti, odpornosti na biotske in abiotske strese, ustreznejšo kakovost, produkcijo zdravil ali drugih komponent. Obravnavana bodo področja biološke varnosti gensko spremenjenih rastlin ter biotehnološki pristopi pri diagnostiki rastlinskih patogenov. Slušatelji se bodo nadalje seznanili z usmeritvami primerjalne genomike pri rastlinah ter z uporabo genomskih podatkov modelnih organizmov pridobljenih z visoko zmogljivimi tehnologijami in funkcijskimi analizami v žlahtnjenju rastlin.	3. Biosafety of genetically modified plants 4. Marker assisted selection 5. Diagnostics of plant pathogenes 6. Plant comparative genomics 7. Plant translation genomics Student will learn about innovative biotechnological breeding methods, particularly genetic engineering, site-specific nuclease technologies and marker assisted selection. The strategies of plant genetic manipulation will include agronomic traits, resistance to biotic and abiotic stress, improvement of quality, production of drugs and other materials. Students will gain knowledge of scientific and legal aspects of biosafety and of advanced methods used in plant pathogen diagnostics. Students will also learn about plant comparative genomics and genomic data of model organisms obtained by high throughput technologies (NGS, proteomics, transcriptomics, metabolomics) and functional analysis, and their application in plant biotechnology

Temeljna literatura in viri/Readings:

Pregledni znanstveni članki področja / Review articles from specific fields
Chawla, H. S.; **Introduction to plant biotechnology;** 3rd ed., 3th. Reprint; New Delhi : Oxford & IBH Publishing, 2019, cop. 2009; **COBISS.SI-ID** - 79805187
Knjiga se nahaja na BF, Oddelek za agronomijo, Ljubljana

Cilji in kompetence:	**Objectives and competences:**
Cilj je osvojitev konceptov rastlinske biotehnologije pri razvoju biotehnoloških orodij, žlahtnjenju novih kultivarjev in diganostiki rastlinskih patogenov. Poleg trdnih osnov iz rastlinkse biotehnologije je cilj predmeta predstaviti najsodobnejša znanj iz področij ekspertiz predavateljev, ki se z raziskovalnim delom uveljavljajo na mednarodni ravni. Kompetence, ki jih bo študent pridobil, so zlasti sposobnost celovitega razumevanja biotehnoloških konceptov in razvijanje "biotehnološkega" načina razmišljanja pri obravnavanju problemov s področja rastlinske pridelave, uporabo biotehnologije za analizo in razumevanje delovanja večplastnih bioloških sistemov, sposobnost načrtovanja poskusov ter usposobljenost za vrhunsko in odgovorno delovanje na raziskovalnem področju ter v relevantnih strokovnih in svetovalnih državnih telesih (npr. etične komisije, odbori za gensko spremenjene organizme ipd.)	Students in this course should be able to acquire knowledge of a wide spectrum of biotechnological concepts in the development of biotechnological tools, breeding of new cultivars and in plant pathogen diagnostics. In addition to providing solid knowledge of plant biotechnology, the aim of the course is also to present advanced, state of the art topics in plant biotechnology drawing on the expertise of course lecturers in internationally recognized research. Competences gained cover a comprehensive understanding of biotechnological concepts and development of a biotechnological approach to agricultural production. Competence in using advanced biotehnological tools will enable students to analyse and understand multiple layers of biological systems. Students should be competent in conducting research in plant biotechnology and participation in professional and advisory bodies (e.g., ethical committees, scientific advisory boards on genetically modified organisms etc.).

Predvideni študijski rezultati:	**Intended learning outcomes:**

Pridobljeno znanje bo zadoščalo za učinkovito raziskovalno delo na področju rastlinske biotehnologije. Študent bo pridobil tudi osnovna znanja strokovnih in pravnih vidikov uporave proizvodov rastlinske biotehnologije.	Knowledge gained in this course should provide a solid basis for efficient research work in plant biotechnology. Students will also gain basic knowledge of professional and legal issues on the use of plant biotechnology products.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja: predstavitev glavnih konceptov ter uvajanja v problematiko Seminarska naloga: obravnava specifičnega problema Induvidualne konzultacije	Lectures: introduction to concepts and topics Seminar project: work on specific topics Individual consultations

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni izpit	60,00 %	Written final exam
opravljena seminarska naloga	40,00 %	seminar project

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Štajner Nataša

1. MILJANIĆ, Vanja, JAKŠE, Jernej, KUNEJ, Urban, RUSJAN, Denis, ŠKVARČ, Andreja, ŠTAJNER, Nataša. Virome status of preclonal candidates of grapevine varieties (Vitis vinifera L.) from the Slovenian wine-growing region Primorska as determined by high-throughput sequencing. *Frontiers in microbiology*. 2022, vol. 13, 11 str., ilustr. ISSN 1664-302X. https://www.frontiersin.org/articles/10.3389/fmicb.2022.830866/full, DOI: 10.3389/fmicb.2022.830866. [COBISS.SI-ID 98211843],

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str. 1-12. ISSN 1664-462X. https://www.frontiersin.org/articles/10.3389/fpls.2019.01111/abstract, DOI: 10.3389/fpls.2019.01111. [COBISS.SI-ID 9287289]
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Jana Murovec

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15. STAJIČ, Ester, KIEŁKOWSKA, Agnieszka, **MUROVEC, Jana**, BOHANEC, Borut. Deep sequencing analysis of CRISPR/Cas9 induced mutations by two delivery methods in target model genes and the CENH3 region of red cabbage (*Brassica oleracea* var. *capitata* f. *rubra*). Plant cell, tissue and organ culture. [Print ed.]. 2019, vol. 139, iss. 2, str. 227-235. ISSN 0167-6857
16. MUROVEC, Jana, GUČEK, Katja, BOHANEC, Borut, AVBELJ, Monika, JERALA, Roman. DNA-free genome editing of Brassica oleracea and B. rapa protoplasts using CRISPR-Cas9 ribonucleoprotein complexes. Frontiers in plant science. 2018, art. 1594, vol. 9, str. 1-9. ISSN 1664-462X.

Špela Baebler

LUKAN, Tjaša, ŽUPANIČ, Anže, MAHKOVEC POVALEJ, Tjaša, BRUNKARD, Jacob O., KMETIČ, Mirjam, JUTERŠEK, Mojca, **BAEBLER, Špela**, GRUDEN, Kristina. Chloroplast redox state changes mark cell-to-cell signaling in the hypersensitive response. The new phytologist. **2023**, vol. 237, iss. 2, str. 548-562, ilustr. ISSN 1469-8137. DOI: 10.1111/nph.18425.
JUTERŠEK, Mojca, PETEK, Marko, RAMŠAK, Živa, GIMENÉZ, Elena Moreno, GIANOGLIO, Silvia, FERNÁNDEZ, Rubèn Mateos, ORZAEZ, Diego, GRUDEN, Kristina, **BAEBLER, Špela.** Transcriptional deregulation of stress-growth balance in Nicotiana benthamiana biofactories producing insect sex pheromones. Frontiers in plant science. 26. Okt. **2022**, vol. 13, str. 1-14. ISSN 1664-462X. DOI: 10.3389/fpls.2022.941338. [COBISS.SI-ID 127685123]
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David Dobnik

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RAZISKAVE V GOZDNI FITOCENOLOGIJI IN GOJENJU GOZDOV

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Raziskave v gozdni fitocenologiji in gojenju gozdov
Course title:	Research in forest phytosociology and silviculture
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037339
Koda učne enote na članici/UL Member course code:	3842

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	30	20	0	10	170	10

Nosilec predmeta/Lecturer:	Jurij Diaci

Izvajalci predavanj:	Jurij Diaci, Andrej Rozman, Dušan Roženbergar
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
splošni pogoji za vpis na doktorski študij	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Raziskave gozdnih rastišč: Srednjeevropska metoda proučevanja gozdne vegetacije in primerjava z drugimi metodami (Grime-ove strategije, uporaba funkcionalnih znakov), metode statistične obdelave floristčnih in vegetacijskih podatkov (npr. klasifikacija, ordinacija), fitoindikacija (pojavljanje posameznih rastlinskih vrst glede na okoljske parametre), sekundarne sukcesije po motnjah, tekoči raziskovalni dosežki, vrednotenje gozdnih rastišč,	Research into forest habitats: Central European method of studying forest vegetation and comparison with other methods (Grime's strategies, use of functional markers), methods of statistical processing of floristic and vegetational data (e.g., classification, ordination), phytoindication (appearance of individual plants species in relation to environmental parameters), secondary succession after disturbance, current research achievements, evaluating forest

interdisciplinarni pristopi, uporaba raziskovalnih metod pri analizi in napovedovanju razvoja vegetacije. Eksperimentalno gojenje gozdov: Posebnosti raziskovalnega dela v gojenju gozdov in presoja aktualnih raziskav v Sloveniji in svetu. Pomen in meritve izbranih ekoloških dejavnikov v gozdovih. Uporaba ekološkega modeliranja v gojenju gozdov. Gozdna mikroklima in ekologija pomlajevanja gozdnih sestojev. Alternacija drevesnih vrst. Posebnosti raziskovalnega dela v pragozdovih, varovalnih in visokogorskih gozdovih. Trajne raziskovalne ploskve, primeri dobrih praks, bodoči razvoj gojenja gozdov. Ekološko in sonaravnejše gojenje gozdov.	habitats, interdisciplinary approaches, use of research methods in the analysis and prognosis of the development of vegetation. Experimental silviculture: Characteristics of research work in silviculture and assessment of current research in Slovenia in the world. Importance and measurement of selected ecological factors in forests. Application of ecological modelling in silviculture. Forest microclimate, forest stand regeneration ecology. Alternation of tree species. Particularities of research work in old-growth, protective and high mountain forests. Permanent research plots, examples of good practice, future development of silviculture. Ecological and closer-to-nature silviculture.

Temeljna literatura in viri/Readings:

Barnes, B.V., Zak, D.R., Denton, S.R., Spurr, S.H., 1998. Forest ecology. John Wiley & Sons, New York.
Kimmins, J.P., 1997. Forest Ecology: A Foundation for Sustainable Management. Prentice Hall, Upper Saddle River, New Jersey.
Krumm, F., Schuck, A., and Rigling, A. (eds.). (2021). How to balance forestry and biodiversity conservation. WSL, EFI.
Larsen, J.B., Angelstam, P., Bauhus, J., Carvalho, J.F., Diaci, J., Dobrowolska, D., Gazda, A., Gustafsson, L., Krumm, F., Knoke, T., Konczal, A., Kuuluvainen, T., Mason, B., Motta, R., Pötzelsberger, E., Rigling, A., Schuck, A. (2022). Closer-to-Nature Forest Management. European Forest Institute.
Smith, D.M., Larson, B.C., Kelthy, M.J., Ashton, P.M.S., 1997. The practice of silviculture: applied forest ecology. John Wiley & Sons, inc., New York.
Van der Marel, E., 2005. Vegetation Ecology; Blackwell Science Ltd., 395 s.
revijalni članki s področja, tekoča periodika, druga učna gradiva …

Cilji in kompetence:	**Objectives and competences:**
Izobraževalni cilj so: nadgraditi temeljna znanja na področjih ekologije gozdov, gozdne fitocenologije in gojenja gozdov; z diskusijami o sodobnih ekoloških paradigmah in teorijah poglobiti razumevanje temeljnih mehanizmov in procesov v gozdnih ekosistemih ter spoznati vpliv gospodarjenja na njihovo zgradbo in delovanje.	Educational aims: to develop the basic knowledge in the fields of forest ecology, phytocenology and silviculture; with discussions on contemporary ecological paradigms and theories to deepen understanding of the basic mechanisms and processes in forest ecosystems and to recognise the influence of management on their structure and functioning.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: usposobiti slušatelje za samostojno zahtevnejše strokovno in osnovno raziskovalno delo na področju gozdne fitocenologije in gojenja gozdov. Poudarek je na razvijanju sposobnosti kritične presoje raziskovalnega dela in znanstvenih objav, v zaznavanju razvojnih in raziskovalnih problemov, izbiri primernih metod in pripravi predlogov raziskovalnih projektov; razumevanje načinov povezovanja pedagoškega, raziskovalnega in razvojnega dela ter poznavanje pomena dolgoročnih raziskav in trajnih raziskovalnih ploskev.	Knowledge and understanding: to qualify students for independent demanding developmental and elementary research work within scientific fields of forest ecology, phytocenology and silviculture. The stress is on developing the capacity for critical assessment of research results and scientific publications, characterising development and research problems, choice of suitable methods and preparation of proposals of research projects; understanding methods of linking pedagogic, research and development work and recognising the importance of long-term research and permanent research plots.

Metode poučevanja in učenja: **Learning and teaching methods:**

Predavanja s sodelovalnim, refleksivnim učenjem / poučevanjem in diskusijo. Vodeno seminarsko delo v kabinetu in na terenu. Poudarek je na sprotnem učenju in sodelovanju. Končni izpit se opravlja neposredno po opravljenih kontaktnih urah. Sprotno ocenjevanje dosežkov stimulira študenta k rednem delu.	Lectures with participative, reflexive teaching/learning and discussions. Guided seminar work indoors and in the field. The stress is on simultaneous teaching and participation. The final examination is taken immediately after contact hours have been completed. Simultaneous assessment of achievements stimulates students for regular

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Končna ocena izpita je sestavljena iz: (1) poprečne ocene sodelovanja na predavanjih / konzultacijah dveh sklopov	25,00 %	The final grade of the subject consists of: (1) average grade for participation at lectures of the two modules
(2) poprečne ocene dveh seminarskih nalog	25,00 %	(2) average grade for two seminar assignments
(3) zaključnega pisnega izpita.	50,00 %	(3) final written examination.

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Jurij Diaci

Arnič, D., Krč, J., and Diaci, J. (2021). Modeling of time consumption for selective and situational precommercial thinning in mountain beech forest stands. iForest-Biogeosciences and Forestry 14(2), 137.

Cerioni, M., Fidej, G., Diaci, J., and Nagel, T.A. (2022). Dynamics and drivers of post-windthrow recovery in managed mixed mountain forests of Slovenia. European Journal of Forest Research, 1-12.

de Groot, M., Diaci, J., and Ogris, N. (2019). Forest management history is an important factor in bark beetle outbreaks: Lessons for the future. Forest Ecology and Management 433, 467-474. doi: https://doi.org/10.1016/j.foreco.2018.11.025.

de Groot, M., Diaci, J., Kandare, K., Krajnc, N., Pisek, R., Ščap, Š., et al. (2021). Private forest owner characteristics affect European spruce bark beetle management under an extreme weather event and host tree density. Forests 12(3), 346.

Diaci, J., Adamic, T., Fidej, G., and Rozenbergar, D. (2022). Toward a Beech-Dominated Alternative Stable State in Dinaric Mixed Montane Forests: A Long-Term Study of the Pecka Old-Growth Forest. Frontiers in Forests and Global Change 5. doi: 10.3389/ffgc.2022.937404.

Diaci, J., Adamič, T., Rozman, A., Fidej, G., and Roženbergar, D. (2019). Conversion of Pinus nigra Plantations with Natural Regeneration in the Slovenian Karst: The Importance of Intermediate, Gradually Formed Canopy Gaps. Forests 10(12). doi: 10.3390/f10121136.

Diaci, J., Rozman, J., and Rozman, A. (2020). Regeneration gap and microsite niche partitioning in a high alpine forest: Are Norway spruce seedlings more drought-tolerant than beech seedlings? Forest Ecology and Management 455, 117688. doi: https://doi.org/10.1016/j.foreco.2019.117688.

Lendvai, S., Diaci, J., and Roženbergar, D. (2020). Response of black alder (Alnus glutinosa (L.) Gaertn.) to selective thinning of various intensities: a half-century study in northeastern Slovenia. Sumarski list 144(7-8), 367-378.

Mason, W.L., Diaci, J., Carvalho, J., and Valkonen, S. (2021). Continuous cover forestry in Europe: usage and the knowledge gaps and challenges to wider adoption. Forestry: An International Journal of Forest Research. doi: 10.1093/forestry/cpab038.

O'Hara, K.L., Bončina, A., Diaci, J., Anić, I., Boydak, M., Curovic, M., et al. (2018). Culture and Silviculture: Origins and Evolution of Silviculture in Southeast Europe. International Forestry Review 20(1), 130-143. doi: 10.1505/146554818822824228.

Dušan Roženbergar

1. ASZALÓS, Réka, THOM, Dominik, AAKALA, Tuomas, ANGELSTAM, Per, BRŪMELIS, Guntis, GÁLHIDY, László, GRATZER, Georg, HLÁSNY, Tomáš, KATZENSTEINER, Klaus, KOVÁCS, Bence, ROŽENBERGAR, Dušan, et al. Natural disturbance regimes as a guide for sustainable forest management in Europe. *Ecological applications : a publication of the ecological society of America.* 2022, vol. 32, iss. 5, 23 str. ISSN 1051-

0761. https://esajournals.onlinelibrary.wiley.com/doi/10.1002/eap.2596, https://doi.org/10.1002/eap.2596, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=137295, DOI: 10.1002/eap.2596. [COBISS.SI-ID 111124483], [JCR, SNIP, WoS do 18. 12. 2022: št. citatov (TC): 4, čistih citatov (CI): 4, čistih citatov na avtorja (CIAu): 0,29, Scopus do 12. 1. 2023: št. citatov (TC): 3, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,22]

2. DIACI, Jurij, ADAMIČ, Tomaž, FIDEJ, Gal, ROŽENBERGAR, Dušan. Toward a beech-dominated alternative stable state in dinaric mixed montane forests : a long-term study of the Pecka old-growth forest. *Frontiers in forests and global change*. 2022, vol. 5, art. 937404, 11 str., ilustr. ISSN 2624-893X. https://doi.org/10.3389/ffgc.2022.937404, https://www.frontiersin.org/articles/10.3389/ffgc.2022.937404/full, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=138637, DOI: 10.3389/ffgc.2022.937404. [COBISS.SI-ID 117408771], [JCR, SNIP, WoS, Scopus]

3. ROŽENBERGAR, Dušan, PAVLIN, Jakob, NAGEL, Thomas Andrew. Short-term survival and crown rebuilding of European broadleaf tree species following a severe ice storm. *Canadian journal of forest research*. [Spletna izd.]. 2020, vol. 50, iss. 11, str. 1131-1137, ilustr. ISSN 1208-6037. https://doi.org/10.1139/cjfr-2020-0063, https://www.nrcresearchpress.com/doi/10.1139/cjfr-2020-0063#.X3rptsIzbRZ, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=121420, DOI: 10.1139/cjfr-2020-0063. [COBISS.SI-ID 31057155], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,33, Scopus do 2. 1. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,33]

4. LENDVAI, Simon, DIACI, Jurij, ROŽENBERGAR, Dušan. Response of black alder (Alnus glutinosa (L.) Gaertn.) to selective thinning of various intensitiese : a half-century study in northeastern Slovenia = Odziv crne johe (Alnus glutinosa (L.) Gaertn.) na različite intenzitete selektivne prorjedee : pedesetgodišnja istraživanja u sjeveroistočnoj Sloveniji. *Šumarski list*. 2020, vol. 144, iss. 7/8, str. 367-378. ISSN 0373-1332. https://doi.org/10.31298/sl.144.7-8.3, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=121419, DOI: 10.31298/sl.144.7-8.3. [COBISS.SI-ID 30073859], [JCR, SNIP, WoS do 26. 10. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,33, Scopus do 27. 9. 2022: št. citatov (TC): 1, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,33]

6. DIACI, Jurij, ADAMIČ, Tomaž, ROZMAN, Andrej, FIDEJ, Gal, ROŽENBERGAR, Dušan. Conversion of Pinus nigra plantations with natural regeneration in the Slovenian Karst : the importance of intermediate, gradually formed canopy gaps. *Forests*. [Online ed.]. 2019, iss. 12, article 1136, 13 str. ISSN 1999-4907. https://doi.org/10.3390/f10121136, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=114124, DOI: 10.3390/f10121136. [COBISS.SI-ID 5605030], [JCR, SNIP, WoS do 1. 12. 2022: št. citatov (TC): 4, čistih citatov (CI): 4, čistih citatov na avtorja (CIAu): 0,80, Scopus do 1. 8. 2022: št. citatov (TC): 3, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,60]

Andrej Rozman

KLOPČIČ, Matija, ROZMAN, Andrej, BONČINA, Andrej. Evidence of a climate-change-induced shift in European beech distribution : an unequal response in the elevation, temperature and precipitation gradients. *Forests*. [Online ed.]. vol. 13, art. 1311, 16 str. ISSN 1999-4907. https://doi.org/10.3390/f13081311, https://www.mdpi.com/1999-4907/13/8/1311, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=138852, DOI: 10.3390/f13081311. [COBISS.SI-ID 118899715]

NAGEL, Thomas Andrew, FIRM, Dejan, ROZMAN, Andrej. Intermediate disturbances are a key driver of long-term tree demography across old-growth temperate forests. *Ecology and evolution*. 2021, vol. 11, iss. 23, str. 16862-16873, ilustr. ISSN 2045-7758. https://doi.org/10.1002/ece3.8320, https://onlinelibrary.wiley.com/doi/10.1002/ece3.8320, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=134606, DOI: 10.1002/ece3.8320. [COBISS.SI-ID 83520515]

DIACI, Jurij, ROZMAN, Jurij, ROZMAN, Andrej. Regeneration gap and microsite niche partitioning in a high alpine forest : are Norway spruce seedlings more drought-tolerant than beech seedlings?. *Forest Ecology and Management*. [Print ed.]. 2020, vol. 455, article 117688, 9 str. ISSN 0378-1127. https://doi.org/10.1016/j.foreco.2019.117688, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=114122, DOI: 10.1016/j.foreco.2019.117688. [COBISS.SI-ID 5562790]

DIACI, Jurij, ADAMIČ, Tomaž, ROZMAN, Andrej, FIDEJ, Gal, ROŽENBERGAR, Dušan. Conversion of Pinus nigra plantations with natural regeneration in the Slovenian Karst : the importance of intermediate, gradually formed canopy gaps. *Forests*. [Online ed.]. 2019, iss. 12, article 1136, 13 str. ISSN 1999-4907. https://doi.org/10.3390/f10121136, https://repozitorij.uni-lj.si/IzpisGradiva.php?id=114124, DOI: 10.3390/f10121136. [COBISS.SI-ID 5605030]

NAGEL, Thomas Andrew, IACOPETTI, Giovanni, JAVORNIK, Jernej, ROZMAN, Andrej, DE FRENNE, Pieter, SELVI, Federico, VERHEYEN, Kris. Cascading effects of canopy mortality drive long-term changes in understorey diversity in temperate old-growth forests of Europe. *Journal of vegetation science : official organ of the International Association for Vegetation Science (IAVS)*. [Print ed.]. 2019, vol. 30, iss. 5, str. 905-916, ilustr. ISSN 1100-9233. https://doi.org/10.1111/jvs.12767, DOI: 10.1111/jvs.12767. [COBISS.SI-ID 5562278]

BONČINA, Andrej, KLOPČIČ, Matija, SIMONČIČ, Tina, DAKSKOBLER, Igor, FICKO, Andrej, ROZMAN, Andrej. A general framework to describe the alteration of natural tree species composition as an indicator of forest naturalness. *Ecological indicators : integrating monitoring, assessment and management*. 2017, vol. 77, str. 194-204, ilustr. ISSN 1470-160X. https://doi.org/10.1016/j.ecolind.2017.01.039, DOI: 10.1016/j.ecolind.2017.01.039. [COBISS.SI-ID 4703398]

FIDEJ, Gal, ROZMAN, Andrej, DIACI, Jurij. Drivers of regeneration dynamics following salvage logging and different silvicultural treatments in windthrow areas in Slovenia. *Forest Ecology and Management*. [Print ed.]. 2017, vol. 409, str. 378-389, ilustr. ISSN 0378-1127. https://doi.org/10.1016/j.foreco.2017.11.046, DOI: 10.1016/j.foreco.2017.11.046. [COBISS.SI-ID 4914598]

Znanstvene objave brez SCI

DAKSKOBLER, Igor (avtor, fotograf), ROZMAN, Andrej. Vegetation analysis of the subalpine beech forest on the upper forest line in the Julian Alps (NW Slovenia and NW Italy) and in the northern Dinaric Alps. *Hacquetia*. [Tiskana izd.]. 2021, letn. 20, št. 2, str. 373-564, ilustr. ISSN 1581-4661. https://ojs.zrc-sazu.si/hacquetia/article/view/9077/9152, DOI: 10.2478/hacq-2021-0013. [COBISS.SI-ID 78683907]

ROZMAN, Andrej, DAKSKOBLER, Igor, ŠILC, Urban. Phytosociological analysis of basophilic Scots pine forests in the Southeastern Alps. *Hacquetia*. [Tiskana izd.]. 2020, letn. 19, št. 1, str. 23-80, ilustr. ISSN 1581-4661. https://ojs.zrc-sazu.si/hacquetia/article/view/7403/7453, DOI: 10.2478/hacq-2019-0015. [COBISS.SI-ID 46116397]

DAKSKOBLER, Igor, SELIŠKAR, Andrej, ROZMAN, Andrej. Phytosociological analysis of European larch forests in the Southeastern Alps. *Hacquetia*. [Tiskana izd.]. 2018, letn. 17, št. 2, str. 247-519, ilustr. ISSN 1581-4661. DOI: 10.2478/hacq-2018-0004. [COBISS.SI-ID 43357229]

RAZISKOVALNE METODE V EKOLOGIJI IN UPRAVLJANJU PROSTOŽIVEČIH ŽIVALI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Raziskovalne metode v ekologiji in upravljanju prostoživečih živali
Course title:	Research methods used in wildlife ecology and management
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037341
Koda učne enote na članici/UL Member course code:	3844

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	25	0	0	10	80	5

Nosilec predmeta/Lecturer:	Klemen Jerina

Izvajalci predavanj:	Klemen Jerina
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Kandidatovo raziskovalno področje se vsaj deloma pokriva s področjem upravljanja in raziskav prostoživečih živalskih vrst. Osnovna predznanja statičnih metod (na do-diplomskem ali podiplomskem študiju končan vsaj en predmet, ki pokriva osnovne statistične metode)	Candidate's study topic is at least partly connected with wildlife research and management. Basic knowledge of statistical methods (completed at least one course on basic statistics during under- or post-graduate study).

Vsebina:	**Content (Syllabus outline):**
Pregled glavnih raziskovalnih pristopov in metod, ki se uporabljajo pri sodobnem raziskovanju in	Overview of main research methods and approaches used in modern wildlife research and management.

upravljanju prostoživečih živali, zlasti večjih zavarovanih vrst in divjadi, s poudarkom na vsebinah, ki so pomembne za pripravo doktorske disertacije slušatelja.	Focused on large protected species and game animals and on content that is important for preparation of the candidate's doctorate thesis.
Prostorski podatki: pomeni, dostopnost, viri, vsebine, načini in možnosti pridobivanje, priprava in obdelava, programi za obdelavo, najpogostejši protokoli za pripravo in obdelavo, kriging, primeri uporabe.	Spatial data: importance, availability, sources, content, possibilities and approaches for data acquisition, data preparation and manipulation, softwares used, main protocols for data processing, kriging, examples of usage.
Metode spremljanja gibanja, aktivnosti in rabe prostora živali: (i) cilji in dometi posameznih metod, (ii) VHF in GPS telemetrija: odlov, in spremljanje živali, nabor možnih spremljanih podatkov, optimizacija zajema podatkov glede na cilje raziskave (iii) spremljanje z avtomatskimi foto- in video kamerami (foto-pasti): uporabnost in primeri rabe metode, omejitve metode, optimizacija zajema podatkov glede na cilje raziskave, (iv) analitske metode pri preučevanju gibanja, aktivnosti in rabe prostora	Methods for monitoring animal movement, activity and space use: (i) goals and possibilities of different methods, (ii) VHF and GPS telemetry: animal capture and monitoring, possible data types to be collected, optimisation of data acquisition in regard to study goals, (iii) use of automatic cameras (photo- and video-traps): usage and examples of its use, limitations, optimisation of data acquisition in regard to study goals, (iv) analytic methods for studying animal movement, activity and space use
Metode za določanje lokalnih gostot, številčnosti in populacijske dinamike izbranih živalskih vrst: (i) pregled izhodiščnih podatkov in metod za posamezne skupine, prednosti in slabosti: štetje kupčkov iztrebkov, podatki o odvzemu, foto-pasti, oglašanje, sledi in drugi posredni znaki prisotnosti, neinvazivna genetika, (ii) metoda ulova, markiranja in ponovnega ulova, predpostavke, omejitve, statistični modeli, (iii) rekonstrukcija številčnosti, spolne in starostne sestave ter populacijske dinamike na osnovi podatkov o spolni in starostni sestavi evidentirane smrtnosti, kohortna analiza	Methods for estimating local densities, abundances and population dynamics of selected animal species: (i) overview of potential data and methods for various groups of animals, advantages and drawbacks: pellet group counting, removal data, camera-traps data, vocalizations, tracks and other indirect signs of presence, non-invasive genetics, (ii) capture-mark-recapture methods, assumptions, limitations, statistical models, (iii) reconstruction of abundance, demographic structure and population dynamics based on demographic data from recorded mortality, cohort analysis
Metode za raziskovanje prehrane, plenjenja in prehranjevalnega vedenja: pregled najpogostejših metod, njihove prednosti in slabosti: analiza iztrebkov in vsebine prebavil (vključno z analizo vzorcev kutikule dlak in mikrostrukture perja za določanje vrstne pripadnosti), spremljanje stopnje plenjenja s pomočjo sledenja in VHF ali GPS telemetrije, spremljanja konzumacije hrane s foto-pastmi, analiza ostankov plena (fizična kondicija, demografski podatki)	Methods for studying diet, predation and feeding behaviour: overview of main methods with their advantages and drawbacks: analysis of scats and digestive tract content (including analysis of hair and feather microstructure used for species recognition), estimating predation rate with the use of tracking and VHF or GPS telemetry, monitoring of feeding behaviour with camera-traps, analysis of prey remains (physical condition, demographic data)
Metode in izhodiščni podatki za določanja rodnosti in drugih kazalnikov vitalnosti živalskih vrst: pregled podatkov in metod po skupinah vrst, prednosti in slabosti: telesna masa, dolžina čeljusti ali drugih delov skeleta, vsebnost maščevja v kostnem mozgu in drugi podatki o odvzetih živali, metode za določanje oplojenosti pri odvzetih osebkih	Methods and raw data for measuring natality and other indicators of population vitality for various animal groups: overview of available data and methods for different animal groups, advantages and drawbacks: body mass, length of lower jaw and other skeletal parts, marrow-fat index and other data from removed animals, methods for estimating fertility in removed animals
Metode za preučevanja odnosov javnosti do prostoživečih živali: kvantitativne in kvalitativne metode socialne psihologije, metode raziskovanja stališč, fokusne skupine, globinski intervjuji	Methods for studying public attitude towards wildlife species: quantitative and qualitative methods of social psychology, methods for studying public opinion, focus groups, in-depth interviews

Temeljna literatura in viri/Readings:

Krebs, C.J. 1999. Ecological Methodology, 2nd ed. Addison-Wesley Educational Publishers, Inc,.620 str Izbrane monografije (znanstveni priročniki) in članki iz znanstvenih publikacij, ki pokrivajo kandidatovo raziskovalno področje./ Selected monographs (expert guidelines) and scientific papers related to candidate's field.

Cilji in kompetence:	**Objectives and competences:**
Cilji bodo povsem prilagojeni izbrani temi in raziskovalnem področju slušatelja. Slušatelj bo pridobil pregled nad naborom obstoječih in možnosti pridobivanja novih podatkov in metod, ki se uporabljajo na njegovem področju in so aktualne za izdelavo njegove naloge. Poleg tega bo eno ali nekaj izbranih metod (v dogovoru z mentorjem) osvojil v meri, da jo/jih bo zmožen uporabljati.	Objectives will be adapted to the candidate's research field. Candidate will gain overview of available data and approaches for acquisition of new data, as well as of methods used in given field that are important in preparation of his/her thesis. Candidate will (in agreement with his/her supervisor) become familiar with one of the selected methods to the level to be able to use it independently.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Kandidat spozna glavne analitske metode in postopke za zajem podatkov, ki se uporabljajo na področju raziskav in upravljanja prostoživečih živalskih vrst in se eno ali nekaj metod, ki so ciljno izbrane za njegovo področje, nauči uporabljati.	Knowledge and understanding: Candidate will gain an overview of main analytic methods and approaches used for acquisition of data needed in wildlife research and management. He/she will be able to independently use one or several methods needed for his/her research.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• vsebine se v veliki meri prilagodijo raziskovalnemu interesu kandidata/kandidatke. • predavanja (izbrane vsebine) in priprava vodenega seminarja, • v primeru večjega števila slušateljev, ki jih zanimajo iste vsebine (npr. uporaba GIS orodij) izvedba praktikuma, • konzultacije, terensko delo, vključitev v raziskovalni projekt. • glavnino naštetih vsebin predmeta lahko pokrije nosilec, izbrane teme pa izbrani vabljeni predavatelji/raziskovalci	- content will be in large part adapted to the individual research interest of the candidate - lectures (selected topics) and preparation of guided seminar - practical course in case of larger number of candidates interested in the same topics (e.g. use of GIS tools) - consultations, field-work, involvement in research projects - majority of topics will be covered by the lecturer, other selected topics by guest lecturers/researchers

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Ocena pri predmetu je povprečje: 1. ocene seminarja	50,00 %	Final grade will be an average of grades of the: 1. seminar
2. ocene na osnovi ustnega preverjanja znanja ob zaključni konzultaciji.	50,00 %	2. oral exam at the final consultation.

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Klemen Jerina: RODRIGUEZ RECIO, Mariano, KNAUER, Felix, MOLINARI-JOBIN, Anja, HUBER, Đuro, FILACORDA, Stefano, JERINA, Klemen. Context-dependent behaviour and connectivity of recolonizing

brown bear populations identify transboundary conservation challenges in Central Europe. Animal conservation. 2021, vol. 24, iss. 1, str. 73-83.
HOPKINS, John B., III, FERGUSON, Jake M., FREDERICK, Cheryl, JERINA, Klemen. Measuring the impact of corn on mammalian omnivores. Journal of mammalogy. 2021, vol. 102, iss. 1, str. 270-282.
SEBASTIÁN-GONZÁLEZ, Esther, MORALES-REYES, Zebensui, BOTELLA, Francisco, NAVES-ALEGRE, Lara, PÉREZ-GARCÍA, Juan M., MATEO-TOMÁS, Patricia, OLEA, Pedro P., MOLEÓN, Marcos, MAGALHÃES BARBOSA, Jomar, JERINA, Klemen, KROFEL, Miha, et al. Network structure of vertebrate scavenger assemblages at the global scale : drivers and ecosystem functioning implications. Ecography. 2020, vol. 43, iss. 8, str. 1143-1155
PRPIĆ, Ana Marija, GANČEVIĆ, Pavao, SAFNER, Toni, KAVČIĆ, Krešimir, JERINA, Klemen, ŠPREM, Nikica. Activity patterns of aoudad (Ammotragus lervia) in a Mediterranean habitat. Journal of vertebrate biology. [Spletna izd.]. 2020, iss. 4, e 20055, 8 str.
JAVORNIK, Jernej, HOPKINS, John B., III, ZAVADLAV, Saša, LEVANIČ, Tom, LOJEN, Sonja, POLAK, Tomaž, JERINA, Klemen. Effects of ethanol storage and lipids on stable isotope values in a large mammalian omnivore. Journal of mammalogy. 2019, vol. 100, iss. 1, str. 150-157
HOFMAN, M. P. G, HAYWARD, Matt W., HEIM, M., MARCHAND, P., ROLANDSEN, C. M., MATTISSON, J., URBANO, F., HEURICH, Marco, MYSTERUD, A., MELZHEIMER, Joerg, JERINA, Klemen, et al. Right on track? Performance of satellite telemetry in terrestrial wildlife research. PloS one. 2019, iss. 5, e0216223, 26 str.

RAZISKOVALNE VEŠČINE, POMEMBNE ZA PODROČJE ZNANOSTI O LESU IN BIOKOMPOZITIH

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Raziskovalne veščine, pomembne za področje znanosti o lesu in biokompozitih
Course title:	Wood Science and Biocomposites Relevant Research Skills
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code: 0643578

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	20	10	0	0	85	5

Nosilec predmeta/Lecturer: Davor Kržišnik

Izvajalci predavanj:	Davor Kržišnik
Izvajalci seminarjev:	Davor Kržišnik
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type: teoretični /theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General prerequisites for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
V vse bolj konkurenčnem akademskem svetu se morajo doktorski kandidati bolj zavedati pomena razvoja kompetenc in prenosljivih veščin, zato je namen predmeta, da doktorski kandidat (raziskovalec) spozna osnovna znanja in kompetence, ki jih mora imeti v različnih stopnjah raziskovalnega procesa, da ga lahko uspešno izvede.	In an increasingly competitive academic world, doctoral candidates must be more aware of the importance of developing competences and transferable skills, therefore the purpose of the course is for the doctoral candidate (researcher) to learn the basic knowledge and competences that he must have

Spoznati kompetenčna področja modela doktorskega študija: • Raziskovalne sposobnosti in znanja. Raziskovalci so sposobni oblikovati jasna raziskovalna vprašanja in hipoteze ter oblikovati raziskovalne protokole. Raziskovalci izkazujejo poglobljeno poznavanje svojega področja, izzivov, ki so pred njimi, in širok znanstveni interes zunaj njihovega specifičnega raziskovalnega področja. • Odgovorno ravnanje v znanosti. Raziskovalci dokazujejo sposobnost sprejemanja tehtnih etičnih in pravnih odločitev na podlagi poznavanja sprejetih strokovnih raziskovalnih praks, ustreznih politik in smernic. Raziskovalci se morajo zavedati razpoložljivih virov, če se pojavijo etični pomisleki ali pomisleki glede integritete. • Poučevanje. Raziskovalci so sposobni opredeliti učne rezultate za ciljno skupino ter ustrezno in primerno motivacijsko posredovati snov. • Komunikacija. Raziskovalci izkazujejo medosebne, pisne, verbalne, slušne in neverbalne komunikacijske veščine, ki jim omogočajo učinkovito in ustrezno sporočanje dejstev, idej ali mnenj kolegom, predstavnikom javnosti in medijem. • Osebna učinkovitost. Raziskovalci lahko prilagodijo svoje osebne lastnosti in vedenje, da dosežejo boljše rezultate. • Profesionalni razvoj. Raziskovalci lahko izboljšajo svoje prenosljive spretnosti in si tako povečajo svoje karierne možnosti. • Vodenje in upravljanje. Raziskovalci so opremljeni za upravljanje in razvoj projektnih idej ter omogočajo učinkovito timsko delo, vključno z veščinami reševanja problemov.	in the various stages of the research process to be able to successfully be performed. Get to know the competence areas of the doctoral study model: • Research Skills and Knowledge. Researchers can formulate clear research questions and hypotheses, and design solid research protocols. Researchers demonstrate in-depth knowledge of their field, the challenges that lie ahead and a broad scientific interest outside their specific research area. • Responsible Conduct of Science. Researchers demonstrate the ability to make sound ethical and legal choices based on knowledge of accepted professional research practices, relevant policies, and guidelines. Researchers should be aware of the resources available, should ethical or integrity concerns arise. • Teaching. Researchers can define the learning outcomes for the target group as well as adequately and suitable convey the material in a motivational manner. • Communication. Researchers demonstrate interpersonal, written, verbal, listening and non-verbal communication skills enabling them to communicate facts, ideas, or opinions effectively and appropriately to colleagues, members of public and media. • Personal Effectiveness. Researchers can adapt their personal qualities and behaviours to achieve improved results. • Professional Development. Researchers can improve their transferable skills to further their career prospects. • Leadership and Management. Researchers are equipped to manage and develop project ideas as well as facilitate effective teamwork including problem solving skills.

Temeljna literatura in viri/Readings:

Durette, Barthélémy, et al. "The Core Competencies of PhDs." Studies in Higher Education, vol. 41, no. 8, Taylor & Francis, 2016, pp. 1355–70, doi:10.1080/03075079.2014.968540.
Meerah, T. Subahan Mohd, et al. "Developing an Instrument to Measure Research Skills." Procedia - Social and Behavioral Sciences, vol. 60, 2012, pp. 630–36, doi:10.1016/j.sbspro.2012.09.434.
Meissner, Dirk, and Natalia Shmatko. "Integrating Professional and Academic Knowledge: The Link between Researchers Skills and Innovation Culture." Journal of Technology Transfer, vol. 44, no. 4, Springer US, 2019, pp. 1273–89, doi:10.1007/s10961-018-9662-8.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je zgraditi jedro znanj, spretnosti in veščin (kompetenc) neodvisnega raziskovalca, ki: • zna jedrnato oblikovati in kritično vrednotiti raziskovalno vprašanje, • zna razviti načrt iskanja informacij, krmariti po strokovni literaturi in identificirati visokokakovostne vire, • razume različne zasnove in metode raziskovalne študije ter uporabi ustrezne,	The objective of the course is to build a core of knowledge, skills, and competences of an independent research investigators who: • can concisely frame and critique a research question, • can develop information search plan, navigate scholarly literature, and identify high quality resources, • understand various research study design and methods and integrate appropriate one,

• lahko zbira podatke, ki obravnavajo raziskovalna vprašanja, • razume pomen osnovnega upravljanja/analize in interpretacije kvantitativnih/kvalitativnih podatkov, • razume splošno obliko znanstvenega izvlečka in zna napisati učinkovit povzetek za predlagano raziskovalno temo, • razume splošno strukturo in načela znanstvenega pisanja ter zna razviti raziskovalno temo, • razume korake in načine komunikacije vključene v postopek objave članka s strokovnim pregledom, • zna pripraviti znanstveno predstavitev in učinkovito komunicirati na znanstveni konferenci.	• can collect data that address the research questions, • understand the importance of basic quantitative/qualitative data management/analysis and interpretation, • understand the general format of a scientific abstract and can write an effective abstract for proposed research topic, • understand the general structure and principles of scientific writing and develop a research manuscript, • understand steps and communications involved in peer review publication process, • can develop scientific presentation and communicate effectively in a scientific conference.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Ker je cilj predmeta zgraditi jedro znanj, spretnosti in veščin (kompetenc) neodvisnega raziskovalca se predvideni študijski rezultati in cilji predmeta in kompetence prekrivajo. Ob zaključku predmeta doktorski kandidat: • zna jedrnato oblikovati in kritično vrednotiti raziskovalno vprašanje, • zna razviti načrt iskanja informacij, krmariti po strokovni literaturi in identificirati visokokakovostne vire, • razume različne zasnove in metode raziskovalne študije ter uporabi ustrezne, • lahko zbira podatke, ki obravnavajo raziskovalna vprašanja, • razume pomen osnovnega upravljanja/analize in interpretacije kvantitativnih/kvalitativnih podatkov, • razume splošno obliko znanstvenega izvlečka in zna napisati učinkovit povzetek za predlagano raziskovalno temo, • razume splošno strukturo in načela znanstvenega pisanja ter zna razviti raziskovalno temo, • razume korake in načine komunikacije vključene v postopek objave članka s strokovnim pregledom, • zna pripraviti znanstveno predstavitev in učinkovito komunicirati na znanstveni konferenci.	Knowledge and understanding: Since the aim of the course is to build the core of knowledge, skills and abilities (competencies) of an independent researcher, the intended learning outcomes and objective and competences overlap. Upon completion of the course, the PhD candidate: • can concisely frame and critique a research question, • can develop information search plan, navigate scholarly literature, and identify high quality resources, • understand various research study design and methods and integrate appropriate one, • can collect data that address the research questions, • understand the importance of basic quantitative/qualitative data management/analysis and interpretation, • understand the general format of a scientific abstract and can write an effective abstract for proposed research topic, • understand the general structure and principles of scientific writing and develop a research manuscript, • understand steps and communications involved in peer review publication process, • can develop scientific presentation and communicate effectively in a scientific conference.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Na študenta osredinjena predavanja podprta z IKT orodji, uporaba obrnjenega učenja, konzultacije in uporaba povratne informacije, praktične demonstracije, seminarji, individualno projektno delo, uporaba vrstniških podpornih skupin za razvoj kompetenc.	Student-centered lectures supported by ICT tools, use of flipped learning, consultations and use of feedback, practical demonstrations, seminars, individual project work, use of peer support groups for competence development.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminar (pisni izdelek)	20,00 %	Seminar (written version)
Predstavitev individualnega projekta	20,00 %	Presentation of an individual project
Samoocenjevanje	60,00 %	Self-assessment

Ocenjevalna lestvica: **Grading system:**

5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Davor Kržišnik

1. REPIČ, Rožle, PONDELAK, Andreja, KRŽIŠNIK, Davor, HUMAR, Miha, SEVER ŠKAPIN, Andrijana. Combining mineralisation and thermal modification to improve the fungal durability of selected wood species. Journal of cleaner production. [Online ed.]. Jun. 2022, vol. 351, str. 1-9, ilustr. ISSN 1879-1786. https://www.sciencedirect.com/science/article/pii/S0959652622011507, DOI: 10.1016/j.jclepro.2022.131530. [COBISS.SI-ID 102872067]
2. KOCBEK, Eva, GARCIA, Hector A., HOOIJMANS, Christine M., MIJATOVIĆ, Ivan, KRŽIŠNIK, Davor, HUMAR, Miha, BRDJANOVIC, Damir. Effects of the sludge physical-chemical properties on its microwave drying performance. Science of the total environment. [Online ed.]. 2022, vol. 828, 1 spletni vir (1 datoteka pdf ([15] str.)), ilustr. ISSN 1879-1026. https://www.sciencedirect.com/science/article/pii/S0048969722012347?via%3Dihub, DOI: 10.1016/j.scitotenv.202154142. [COBISS.SI-ID 99101955]
3. KAVKLER, Katja, HUMAR, Miha, KRŽIŠNIK, Davor, TURK, Martina, TAVZES, Črtomir, GOSTINČAR, Cene, DŽEROSKI, Sašo, POPOVIC, Stefan, PENKO, Ana, GUNDE-CIMERMAN, Nina, ZALAR, Polona. A multidisciplinary study of biodeteriorated Celje Ceiling, a tempera painting on canvas. International Biodeterioration & Biodegradation. [Online ed.]. 2022, vol. 170, 1 spletni vir (1 datoteka pdf ([14 str.])), ilustr. ISSN 1879-0208. https://www.sciencedirect.com/science/article/pii/S0964830522000178, DOI: 10.1016/j.ibiod.2022.105389. [COBISS.SI-ID 99197187]
4. DE ANGELIS, Marco, ROMAGNOLI, Manuela, VEK, Viljem, POLJANŠEK, Ida, OVEN, Primož, THALER, Nejc, LESAR, Boštjan, KRŽIŠNIK, Davor, HUMAR, Miha. Chemical composition and resistance of Italian stone pine (Pinus pinea L.) wood against fungal decay and wetting. Industrial crops and products. 2018, vol. 117, str. 187-196, ilustr. ISSN 0926-6690. https://www.sciencedirect.com/science/article/pii/S0926669018302255, DOI: 10.1016/j.indcrop.2018.03.016. [COBISS.SI-ID 2890633]
5. KRŽIŠNIK, Davor, LESAR, Boštjan, THALER, Nejc, HUMAR, Miha. Micro and material climate monitoring in wooden buildings in sub-Alpine environments. Construction & building materials. [Print ed.]. 2018, vol. 166, str. 188-19 ISSN 0950-0618. https://www.sciencedirect.com/science/article/pii/S0950061818301417, DOI: 10.1016/j.conbuildmat.2018.01.118. [COBISS.SI-ID 2881929]
6. BRISCHKE, Christian, ALFREDSEN, Gry, HUMAR, Miha, CONTI, Elena, COOKSON, Laurie, EMMERICH, Lukas, FORTINO, Stefania, FRANCIS, Lesley, MELCHER, Eckhard, KRŽIŠNIK, Davor, LESAR, Boštjan, et al. Modelling the material resistance of wood. Part 3, Validation and optimization of relative resistance in above and in ground situations : results of a global survey. Forests. [Online ed.]. 2021, 12, iss. 5, [18] str. ISSN 1999-4907. https://www.mdpi.com/1999-4907/12/5/590. [COBISS.SI-ID 62558467]
7. KRŽIŠNIK, Davor, LESAR, Boštjan, THALER, Nejc, PLANINŠIČ, Jože, HUMAR, Miha. A study on the moisture performance of wood determined in laboratory and field trials. European journal of wood and wood products. [Online ed.]. 2020, vol. 78, no. 2, str. 219-235, ilustr. ISSN 1436-736X. https://link.springer.com/article/10.1007/s00107-020-01506-z, DOI: 10.1007/s00107-020-01506-z. [COBISS.SI-ID 3172233]

RAZISKOVALNO DELO V VARSTVU RASTLIN

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Raziskovalno delo v varstvu rastlin
Course title:	Research work in the field of plant protection
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037253
Koda učne enote na članici/UL Member course code:	3755

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
	35	0	0	15	200	10

Nosilec predmeta/Lecturer:	Stanislav Trdan

Izvajalci predavanj:	
Izvajalci seminarjev:	Stanislav Trdan
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	individualno raziskovalni /individual research course

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General conditions for enrolment in doctoral studies.

Vsebina:	Content (Syllabus outline):
Inter- in intraspecifični odnosi v agroekosistemih. Interakcije med rastlinami, njihovimi škodljivci (žuželke, pršice, ogorčice) ali fitopatogenimi organizmi (glive, bakterije, virusi, viroidi, fitoplazme) in koristnimi organizmi v agroekosistemu. Škodljivčeva izbira gostitelja. Vpliv biotičnega stresa na izpad pridelka. Infekcijski procesi pri fitopatogenih organizmih. Vplivanje patogenov na metabolne procese gostiteljskih rastlin. Obrambne reakcije	Inter- and intraspecific relationships in agroecosystems. Interactions between plants, their pests (insects, mites, nematodes) or phytopathogenic organisms (fungi, bacteria, viruses, viroids, phytoplasmas) and beneficial organisms in agroecosystems. Host-plant selection by the pest. Influence of biotic stress on the yield loss. Infection processes in phytopathogenic organisms. Influence of pathogens on metabolic processes of the host plants.

rastlin proti patogenom. Konstitutivna in inducibilna odpornost. Specifičnost odnosov med gostiteljem in parazitom. Poljsko in laboratorijsko določevanje odpornosti škodljivih organizmov. Neciljno delovanje fitofarmacevtskih sredstev in biotičnih agensov. Vmesni posevki, privabilni posevki, prekrivni posevki, antagonistične rastline, antifidanti, naravna fitofarmacevtska sredstva: koncepti in mehanizmi delovanja. Praktična uporaba biopesticidov (glive, bakterije, virusi). Laboratorijsko gojenje škodljivih in koristnih žuželk in drugih živali ter mikroorganizmov. Laboratorijsko in poljsko preizkušanje biopesticidov in biotičnih agensov (plenilske in parazitoidne žuželke, plenilske pršice, entomopatogene ogorčice).	Plant defence reactions against pathogens. Constitutive and inducible resistance. Specificity of relationships between hosts and their parasites. Field and laboratory evaluation of pest organisms resistance. Non-target effect of pesticides and biological control agents. Intercrops, trap crops, cover crops, antagonistic plants, antifeedants, natural plant protection products: concepts and mechanisms. Practical use of biopesticides (fungi, bacteria, viruses). Laboratory rearing of harmful and beneficial insects and other animals and microorganisms. Laboratory and field evaluation of biopesticides and biological control agents (predatory insects, parasitioids, predatory mites, entomopathogenic nematodes) efficacy.

Temeljna literatura in viri/Readings:

Pimentel, D. 2002. Encyclopedia od pest management. Taylor & Francis, Boca Raton, London, New York, Singapore: 929 str., ISBN 0-8247-0632-3.

- Dodatna literatura / Supplementary literature sources:

Pedigo, L.P., Rice, M. E. 2009. Entomology and pest management. Pearson Prentice Hall: 784 str., ISBN-13:978-0-13-513295-1

Peterson, R.K.D., Higley, L.G. 2000. Biotic stress and yield loss. CRC Press, Boca Raton, London, New York, Washington: 261 str., ISBN 0-8493-1145-4.

Prell, H.H., Day, P.R. 2000. Plant fungal pathogen interaction – A classical and molecular view. Springer-Verlag, Berlin etc., 214 str. ISBN 3-540-66727-X.

van Lenteren, 2003. Quality control and production of biological control agents. CABI Publishing, Wallingford: 327 str., ISBN 0-85199-688-4.

in

revijalni članki s področja, tekoča periodika, druga učna gradiva…

Cilji in kompetence:	**Objectives and competences:**
Temeljni izobraževalni cilj je poglobitev znanja za samostojno delo na področju raziskav inter- in intraspecifičnih odnosov med živimi organizmi v agroekosistemih ter načinov njihovega podnebnim in geografskih razmeram Slovenije prilagojenega zatiranja, s poudarkom na okolju in človeku sprejemljivejših metodah.	Fundamental objective of the course is deepening the knowledge needed for individual work in the research field of inter- and intraspecific relationships between living organisms in agroecosystems and the knowledge about the methods of their control, which are adapted to Slovenian climate and geographical conditions, with special emphasis on environmentally and human acceptable methods.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Predviden študijski rezultat je kandidata usposobiti za izvedbo omenjenih raziskav, rezultati katerih bodo predstavljali pomembne prispevke temeljni ali aplikativni znanosti na področju kmetijskih znanosti.	Knowledge and understanding: Intended learning outcome is to qualify the candidate for achievement of mentioned researches, which results will present important contributions to basic and applied science in the field of agricultural sciences.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Seminarji, konzultacije, samostojno delo.	Seminars, consultations, individual work.

Načini ocenjevanja: **Delež/Weight** **Assessment:**

- pisni izpit Pogoja za opravljanje študijskih obveznosti – pisnega izpita je zagovor seminarja	70,00 %	- written exam - individual work of the student Conditions for performing study obligations - written exam is seminar performed
- samostojno delo študenta	30,00 %	- individual work of the student

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

TRDAN STANISLAV

LAZNIK, Žiga, FRANIN, Kristijan, **TRDAN, Stanislav**, VIDRIH, Matej, MAJIĆ, Ivana. Chemotactic response and motility of the mollusc parasitic nematode *Phasmarhabditis papillosa* towards mucus from different mollusc species. *BioControl*. 2022, vol. 67, iss. 3, str. 345–356. ISSN 1386-6141. DOI: 10.1007/s10526-022-10134-w. [COBISS.SI-ID 97348611].

BOHINC, Tanja, ZANELLI, Barbara, VIDRIH, Matej, **TRDAN, Stanislav**. Are prohexadione calcium and *Pseudomonas fluorescens* a solution to limit the spread of annual bluegrass (*Poa annua* L.) on football pitches?. *Folia Horticulturae*. 2021, vol 33, no. 2, str. 275–292. ISSN 0867-1761. DOI: 10.2478/fhort-2021-0021. [COBISS.SI-ID 76812035].

ARTHUR, Frank H., MORRISON III, William R., **TRDAN, Stanislav**. Feasibility of using aeration to cool wheat stored in Slovenia : A predictive modeling approach using historical weather data. *Applied sciences*. 2020, vol. 10, iss. 17, art. 6066, str. 1-11, ilustr. ISSN 2076-3417. https://doi.org/10.3390/app10176066, DOI: 10.3390/app10176066. [COBISS.SI-ID 27740675].

LAZNIK, Žiga, MAJIĆ, Ivana, HORVAT, Aleksander, **TRDAN, Stanislav**. Contact efficacy of different wood ashes against spanish slug, *Arion vulgaris* (Gastropoda: Arionidae). *Applied sciences*. 2020, vol. 10, iss. 23, art. 8564, str. 1-13, ilustr. ISSN 2076-3417. https://www.mdpi.com/2076-3417/10/23/8564, DOI: 10.3390/app10238564. [COBISS.SI-ID 40342275].

MODIC, Špela, ŽIGON, Primož, KOLMANIČ, Aleš, **TRDAN, Stanislav**, RAZINGER, Jaka. Evaluation of the field efficacy of *Heterorhabditis bacteriophora* Poinar (Rhabditida: Heterorhabditidae) and synthetic insecticides for the control of western corn rootworm larvae. *Insects*. 2020, vol. 11, iss. 3 (202), str. 1-15, ilustr. ISSN 2075-4450. DOI: 10.3390/insects11030202. [COBISS.SI-ID 9450361].

BOHINC, Tanja, HORVAT, Aleksander, ANDRIĆ, Goran, PRAŽIĆ GOLIĆ, Marijana, KLJAJIĆ, Petar, **TRDAN, Stanislav**. Natural versus synthetic zeolites for controlling the maize weevil (*Sitophilus zeamais*) - like Messi versus Ronaldo?. *Journal of Stored Products Research*. [Print ed.]. 2020, vol. 88, art. no. 101639, str. 1-9. ISSN 0022-474X. https://doi.org/10.1016/j.jspr.2020.101639, DOI: 10.1016/j.jspr.2020.101639. [COBISS.SI-ID 22073603].

ANDRIĆ, Goran, KLJAJIĆ, Petar, PRAŽIĆ GOLIĆ, Marijana, **TRDAN, Stanislav**, BOHINC, Tanja, BODROŽA-SOLAROV, Marija. Effectiveness of spinosad and spinetoram against three *Sitophilus* species: Influence of wheat endosperm vitreousness. *Journal of Stored Products Research*. [Print ed.]. 2019, vol. 83, str. 209-217. ISSN 0022-474X. [COBISS.SI-ID 9266809].

SOLAR, Anita, JAKOPIČ, Jerneja, MIKLAVC, Jože, ŠTAMPAR, Franci, VEBERIČ, Robert, **TRDAN, Stanislav**. Walnut husk fly substantially affects sensory attributes and phenolic contents of the kernels in common walnut. *Scientia horticulturae*. [Print ed.]. 2019, vol. 247, str. 17-26. ISSN 0304-4238. DOI: 10.1016/j.scienta.2018.11.078. [COBISS.SI-ID 9114489].

JAGODIČ, Anamarija, **TRDAN, Stanislav**, LAZNIK, Žiga. Entomopathogenic nematodes: can we use the current knowledge on belowground multitrophic interactions in future plant protection programmes? - Review. *Plant Protection Science*. 2019, vol. 55, no. 4, str. 242-253. ISSN 1212-2580. DOI: 10.17221/24/2019-PPS. [COBISS.SI-ID 9272441].

BOHINC, Tanja, HORVAT, Aleksander, ANDRIĆ, Goran, PRAŽIĆ GOLIĆ, Marijana, KLJAJIĆ, Petar, **TRDAN, Stanislav**. Comparison of three different wood ashes and diatomaceous earth in controlling the maize weevil under laboratory conditions. *Journal of Stored Products Research*. [Print ed.]. 2018, vol. 79, str. 1-8. ISSN 0022-474X. DOI: 10.1016/j.jspr.2018.06.007. [COBISS.SI-ID 9019257].

RAZVOJ IN LCA ANALIZA NOVEGA IZDELKA V LESNI INDUSTRIJI

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Razvoj in LCA analiza novega izdelka v lesni industriji
Course title:	Development and LCA analysis of new product in wood industry
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037317
Koda učne enote na članici/UL Member course code:	3819

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	35	0	0	0	80	5

Nosilec predmeta/Lecturer:	Leon Oblak

Izvajalci predavanj:	Manja Kitek Kuzman, Leon Oblak
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij.	General requirements for enrolment in doctoral study.

Vsebina:	Content (Syllabus outline):
• Pojem in pomen novih izdelkov • Proces razvoja novih izdelkov (iskanje, zbiranje in ocenjevanje idej, poslovno-tržna analiza, tehnološko-proizvodno, oblikovno in tržno razvijanje novega izdelka, tržno testiranje novega izdelka) • Življenjski cikli izdelkov in strategije	• The concept and importance of new products • The process of new product development (exploration, collection and evaluation of ideas, business and market analysis, technology manufacturing, design and marketing of new product development, market testing of a new product)

• LCA analiza novega izdelka • Standardi, metodologija, certificiranje na področju okoljskih vplivov za etično in socialno odgovorno snovanje in načrtovanje strateških možnosti • Shema za okoljsko označevanje ogljičnega odtisa izdelkov (koncept od zibelke do zibelke) • Določanje scenarijev ob končni življenjski dobi izdelkov • 3R trajnostno načrtovanje: Reduce, Reuse, Recycle. • Primeri dobrih praks interdisciplinarnega raziskovanja za ogljično učinkovito leseno gradnjo v skladu z vrednotami Novega evropskega Bauhaussa	• The life cycles of products and strategy • LCA analysis of a new product • Standards, methodologies and certifications in the field of environmental impacts assessment and their use for ethical and socially responsible design, planning and evaluation of strategic development opportunities of organizations • • Scheme for eco-labeling carbon footprint of products (the concept of cradle to cradle) • Lifecycle scenario design for product end-of-life strategy • • Sustainable Planning 3Rs: Reduce, Reuse, Recycle. • Good practices of interdisciplinary research for carbon-efficient wood construction according the values of New European Bauhaus

Temeljna literatura in viri/Readings:

Kotler, P., Keller, K. L. 2006. Marketing management. Upper Saddle River (New Jersey) : Pearson Education : Prentice Hall, cop., 12th ed.
Oblak, L. 2013. Trženje lesnih izdelkov in storitev. Ljubljana, Biotehniška fakulteta, Oddelek za lesarstvo.
Dovžan, H. 1993. Razvoj in trženje novega izdelka. Ljubljana : Gospodarski vestnik.
Sandberg, D., Kitek Kuzman, M., Gaff, M. 2019. Engineered wood products : wood as engineering and architectural material. Prague: Czech university of life sciences, Prague, CZ.

Cilji in kompetence:	**Objectives and competences:**
Cilji: Cilj predmeta je, da študent osvoji temeljna praktična znanja o razvoju in LCA analizi novega izdelka ter da spozna načine, metode in modele, ki lahko tržno naravnanemu podjetju omogočijo, da izpolni pričakovanja porabnikov bolje od konkurentov. Kompetence: Študent je usposobljen za spremljanje dogajanj v konkurenčnem okolju podjetja, povezanih z razvojem novega izdelka in za hitro reagiranje ob spremembah. Obvlada razvoj in LCA analizo novega izdelka.	Objectives: The aim of the course is that the student acquires a basic practical knowledge on the development and LCA analysis of a new product and to learn the techniques, methods and models that can the market-oriented company allow to meet the expectations of consumers better than competitors. Competences: The student is trained to follow developments in the competitive environment, companies associated with new product development and for rapid reaction to the change. Mastered the development and LCA analysis of a new product.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent razvije sposobnosti in veščine za sprejemanje samostojnih strokovnih odločitev, povezanih z razvojem in LCA analizo novega izdelka. Pozna načine in pristope k pridobivanju podatkov in informacij, ki so za to potrebne.	Knowledge and understanding: Students develop the ability and skills to adopt independent professional decisions related to the development and LCA analysis of a new product. He knows the methods and approaches to obtaining data and information that are needed for this purpose.

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Seminar	• Lectures • Seminar

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Pisni/ustni izpit	50,00 %	Written/oral exam
Seminar	50,00 %	Seminar

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Leon Oblak

1. JELAČIĆ, D., PIRC BARČIĆ, A., OBLAK, L., MOTIK, D., GROŠELJ, P., JOŠT, M. 202 Sustainable production management model for small and medium enterprises in some South-Central EU countries. Sustainability, iss. 12, article 6220, 15 str.
2. OBLAK, L., KROPIVŠEK, J., JOŠT, M., ZUPANČIČ, A., KITEK KUZMAN, M. 2019. Impact of the circular economy on the use of wood in modern Slovenian sacral architecture. V: ČOBANOVA, Rosica (ur.). Digitalisation and circular economy : forestry and forestry based industry implications : proceedings of scientific Papers. Zagreb: WoodEMA; Varna: Union of Scientists of Bulgaria, str. 99-104.
3. PIRC BARČIĆ, A., KITEK KUZMAN, M., HAVIAROVA, E., OBLAK, L. 2019. Circular economy and sharing collaborative economy principles : a case study conducted in wood-based sector. V: ČOBANOVA, Rosica (ur.). Digitalisation and circular economy : forestry and forestry based industry implications : proceedings of scientific Papers. Zagreb: WoodEMA; Varna: Union of Scientists of Bulgaria, str. 23-28.
4. ŠIVIC, M., OBLAK, L.. 2020. Razvoj izdelka v lesni industriji z metodo razvoja funkcij kakovosti = Product development in the wood industry with quality function deployment method. Les. [Tiskana izd.], letn. 69, št. 1, str. 85-99.
5. PIRC BARČIĆ, A., GROŠELJ, P., OBLAK, L., MOTIK, D., KAPUTA, V., GLAVONJIĆ, B., BEGO, M., PERIĆ, I. 2020. Possibilities of increasing renewable energy in Croatia, Slovenia and Slovakia - wood pelets = Mogućnosti povećanja obnovljivih izvora energije u Hrvatskoj, Sloveniji i Slovačkoj - drvni peleti. Drvna industrija : Znanstveno stručni časopis za pitanja drvne tehnologije, vol. 71, iss. 4, str. 395-402.
6. PALUŠ, H., PAROBEK, J., VLOSKY, R. P., MOTIK, D., OBLAK, L., JOŠT, M., GLAVONJIĆ, B., DUDIK, R., WANAT, L. 2018. The status of chain-of-custody certification in the countries of Central and South Europe. European journal of wood and wood products. [Print ed.], vol. 76, iss. 2, str. 699-710.

Manja Kitek Kuzman

1. KITEK KUZMAN, M., OBLAK, L., GLAVONJIĆ, B., PIRC, A. OBUĆINA, M., HAVIAROVA, E., GROŠELJ, P. 2023. Impact of COVID-19 on wood-based products industry : an exploratory study in Slovenia, Croatia, Serbia, and BiH. Wood material science & engineering, 18, 3: 1115-1126.
2. HAJDAREVIĆ, S., OBUĆINA, M., KITEK KUZMAN, M., SANDBERG, D. 2023. Bending moment of mortise-and-tenon joints in a crossed chair base = Moment savijanja spojeva s čepom i rupom na križnoj potkonstrukciji sjedala stolice. Drvna industrija,74, 1: 3-11.
3. KITEK KUZMAN, M., KLARIĆ, S., PIRC BARČIĆ, A., VLOSKY, R., JANAKIESKA, M., M., GROŠELJ, P. 2018. Architect perceptions of engineered wood products : an exploratory study of selected countries in Central and Southeast Europe. Construction & building materials, 179: 360-370.
4. GLAVONJIĆ, B., KITEK KUZMAN, M., SANDBERG, D. 2022. Engineered wood products in contemporary architecture : new ways to use timber in future = Kompozitni proizvodi od drveta u savremenoj arhitekturi : novi načini korišćenja drveta u budućnosti. Luleå: Luleå University of Technology, 272 str.
5. AYRILMIS, N. KARIŽ, M., ŠERNEK, M., KITEK KUZMAN, M. 2021. Effects of sandwich core structure and infill rate on mechanical properties of 3D-printed wood/PLA composites. The international journal of advanced manufacturing technology, 115, 9/10: 3233-3242.
6. HAJDAREVIĆ, S., KITEK KUZMAN, M., OBUĆINA, M. VRATUŠA, S., KUŠAR, T., KARIŽ, M. 2023. Strength and stiffness of 3D-printed connectors compared with the wooden mortise and tenon joints for chairs. Wood material science & engineering, 18, 3: 870-883.

REOLOGIJA IN KINETIKA UTRJEVANJA LEPIL ZA LES

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Reologija in kinetika utrjevanja lepil za les
Course title:	Rheology and curing kinetics of wood adhesives
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037318
Koda učne enote na članici/UL Member course code:	3820

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
10	30	0	0	0	85	5

Nosilec predmeta/Lecturer:	Milan Šernek

Izvajalci predavanj:	Milan Šernek
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:	teoretični/theoretical

Jeziki/Languages:	Predavanja/Lectures:	Angleščina, Slovenščina
	Vaje/Tutorial:	Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General conditions for enrollment in doctoral study

Vsebina:	Content (Syllabus outline):
• Reologija polimerov in lepil za lepljenje lesa • Viskoelastične lastnosti lepil • Elastični in viskozni strižni modul • Temperatura steklastega prehoda • Spremembe stanja med utrjevanjem duromernih lepil • Reologija talilnih lepil • Analiza utrjevanja lepil • Vpliv časa in temperature na utrjevanje lepil	• Rheology of polymers and adhesives for wood bonding • Viscoelastic properties of adhesives • Elastic and viscous shear modulus • Glass transition temperature • Transitions during of curing of thermosetting adhesives. • Rheology of hot-melt adhesives • Analysis of adhesive cure

• Kinetika utrjevanja urea-formaldehidnih, melamin-formaldehidnih in fenol-formaldehidnih lepil z DSC • Dielektrična analiza lepil • Dinamična mehanska analiza lepil • Avtomatsko ovrednotenje trdnosti lepilnega spoja (ABES) • Bio-osnovana lepila za les	• Influence of time and temperature on adhesive cure • Curing kinetics of urea-formaldehyde, melamine-formaldehyde in phenol-formaldehyde adhesive with DSC • Dielectric analysis of adhesives • Dynamical mechanical analysis of adhesives • Automated bonding evaluation system (ABES) • Bio-based wood adhesives

Temeljna literatura in viri/Readings:

1. Dillard, D.A. 2010. Advances in structural adhesive bonding. Cambridge : Woodhead ; Boca Raton: CRC Press, 637 str.
2. He, Z. 2017. Bio-based wood adhesives : preparation, characterization, and testing. Boca Raton : CRC Press, 356 str.
3. Mezger, T. 2002. The rheology handbook : for users of rotational and oscillatory rheometers. Hannover : Vincentz, 252 str. (izbrana poglavja)
4. Mulligan, D. 2003. Cure monitoring for composites and adhesives. Rapra Technology, Shawbury, 112 str. (izbrana poglavja)
5. Revijalni članki s področja, tekoča periodika, druga učna gradiva…

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je poglobljeno spoznati in razumeti reološke lastnosti lepil za les in poznati mehanizme adhezije pri lepljenja lesa in/ali drugih materialov. Poznati analitske metode za proučevanje utrjevanja lepil in se usposobiti za znanstveno raziskovalno delo na področju lepljenja. Znati analizirati in modelirati proces utrjevanja lepila s sodobnimi računalniškimi orodji. Pridobiti znanja o novih bio-osnovanih lepilih za les.	The objective of the course is to get deep and detailed knowledge about rheological properties of wood adhesives and to understand mechanisms of adhesion when bonding of wood and/or other materials. Get familiar with analytical methods for studying the curing of adhesives and to become qualified for scientific research in the field of bonding. Get knowledge for analysis and modelling of the curing process of adhesives with the software. Get knowledge about novel bio-based wood adhesives.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent razume pomen reoloških lastnosti lepil za doseganje zadostne adhezije pri lepljenju lesa in drugih materialov. Razume vpliv parametrov lepljenja na kinetiko utrjevanja lepil. Pozna metode za proučevanje in analizo procesa utrjevanja lepila ter trdnostne lastnosti lepilnih spojev. *Uporaba:* Znanje uporabi za razumevanje tehnologije lepljenja lesa in lepljenje drugih materialov. Znanje uporabi pri razvoju novih lepil in postopkov lepljenja. Izvaja lahko zahtevne preskuse in raziskave z laboratorijskimi instrumenti in opremo. *Refleksije:* Poznavanje lepil za les in druge materiale, obvladovanje tehnologije lepljenja lesa in drugih materialov, izvajanje zahtevnih raziskovalnih metod na področju reologije lepil in lepljenja.	*Knowledge and understanding:* The student understands the meaning of rheological properties of adhesives for achievement of sufficient adhesion at bonding of wood and other materials. He/she understands the effect of bonding parameters on the curing kinetics of adhesives. He/she knows methods for monitoring and analysing the process of curing of adhesives and strength properties of adhesive bonds. *Use:* Knowledge allows student to understand the technology of wood bonding and bonding of other materials. Knowledge can be used in development of new adhesive and bonding processes. Student is capable of conducting the comprehensive tests and studies with laboratory instruments and equipment. *Reflection:* Knowledge about wood adhesives, technology of bonding of wood and other materials, and complex

Prenosljive spretnosti: Študent pridobi spretnosti uporabe znanstvene literature in priprave znanstvenega članka. Znanje študent uporablja in nadgrajuje pri vseh tehnoloških predmetih.	methods for research in the field of rheology of adhesives and bonding. *Transferable skill:* Student gets skills how to use scientific literature and prepare a scientific paper. Upgrade and transfer of gained knowledge at all technology related courses.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja (10 ur) in seminar (30 ur) v multimedijskih predavalnicah.	Lectures (10 hours) and seminar (30 hours) in multimedia equipped lecture rooms.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
- Pisni izpit	50,00 %	- Written exam
- Seminar	50,00 %	- Seminar

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Milan Šernek

1. ŽIGON, Jure, ŠEDA, Vit, ČERMÁK, Petr, ŠERNEK, Milan. Characterization of curing and bonding of wood with adhesive mixtures of liquefied wood and hexamethylenediamine. *Journal of renewable materials*. 2023, vol. 11, no. 2, str. 991-1001. ISSN 2164-6341. https://www.techscience.com/jrm/online/detail/18824, DOI: 10.32604/jrm.2022.023584. [COBISS.SI-ID 119635203]
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SISTEMATSKA IN EVOLUCIJSKA BIOLOGIJA

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Sistematska in evolucijska biologija
Course title:	Systematic and Evolutionary Biology
Članica nosilka/UL Member:	UL BF

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Bioznanosti, tretja stopnja, doktorski	Ni členitve (študijski program)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0037278
Koda učne enote na članici/UL Member course code:	3780

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
20	10	0	0	30	190	10

Nosilec predmeta/Lecturer:	Peter Trontelj
Izvajalci predavanj:	Cene Fišer, Božo Frajman, Nina Gunde Cimerman, Matjaž Kunter, Peter Trontelj
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	
Vrsta predmeta/Course type:	teoretični/theoretical
Jeziki/Languages:	Predavanja/Lectures: Angleščina, Slovenščina
	Vaje/Tutorial: Angleščina, Slovenščina

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisites:
Splošni pogoji za vpis na doktorski študij	General conditions to enroll in Doctoral Study Programme.

Vsebina:	Content (Syllabus outline):
Izbrane vsebine iz sistematske biologije, filogenetike in filogenomike, evolucijske biologije, biogeografije, biodiverzitetne informatike ter sorodnih in povezovalnih disciplin. Doktorand skupaj z mentorjem pripravi osebni načrt študija predmeta v okviru predpisanih kreditnih točk,	Selected topics in systematic biology, phylogenetics and phylogenomics, evolutionary biology, biogeography, biodiversity informatics and related disciplines. The studies proceed according to a personal study plan prepared by the student and his mentor. The

ki ga potrdi nosilec. Za posamezne točke iz načrta študija (npr. udeležba na delavnici, prisostvovanje predavanjem, aktivno sodelovanje na seminarjih, priprava znanstvenega članka, osvojitev laboratorijske veščine …) kandidat pridobi dokazilo. Naloga nosilca predmeta je, da spremlja doktorandovo izpolnjevanje načrta študija.	plan needs to be approved by the lecturer, to whom the student reports her/is advance. It can contain various activities like attendance at workshops, lectures, seminars, work on a scientific paper, gaining new laboratory skills, etc.

Temeljna literatura in viri/Readings:

- D. Futuyma, M. Kirkpatrick (2022) Evolution, 5th edition, 592 pages. Oxford University Press.
- Izbor znanstvenih člankov / Selected scientific papers
- Izbrana poglavja drugih učbenikov / Selected chapters in other textbooks

Cilji in kompetence:	**Objectives and competences:**
• Spodbuditi razvoj samostojnega znanstvenega mišljenja na področju sistematske in evolucijske biologije. • Razumevanje in kritično sprejemanje novih znanstvenih spoznanj in metod na področju doktorske disertacije. • Sposobnost jasnega izražanja znanstvenih problemov s področja predmeta.	• To develop independent scientific thinking in the fields of systematic and evolutionary biology. • Understanding and critical evaluation of new scientific findings in the area of candidate's PhD work • To foster the ability to clearly formulate complex scientific problem in systematics and evolutionary biology.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študent osvoji strokovno znanje iz sistematike in evolucije do te mere, da lahko v praksi preizkusi vsaj eno izmed osnovnih oblik znanstvene komunikacije na mednarodni ravni: aktivna udeležba na mednarodnem znanstvenem srečanju, objava izvirnega znanstvenega članka.	Knowledge and understanding: The student masters systematic and evolutionary knowledge to the degree where she or he can participate in scientific communication at the international level, e.g. by presenting her or his work at a scientific meeting or by writing a manuscript of a scientific paper.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Individualen program, sestavljen v dogovoru z mentorjem. Potrdi ga nosilec. Sestavljen je lahko iz: 1. študija izbranih evolucijskih in sistematskih vsebin v povezavi z doktorsko disertacijo; 2. praktičnega usposabljanja v laboratorijskem in terenskem raziskovalnem delu; 3. predavanj izbranih tujih in domačih predavateljev; 4. strokovnih seminarjev (diskusije člankov) v okviru posameznih raziskovalnih skupin; 5. aktivne udeležbe na znanstvenih srečanjih; 6. udeležbe na delavnicah, poletnih šolah in drugih posebnih oblikah izobraževanja.	The work proceeds according to an individually tailored study plan, approved by the lecturer. The plan may consist of: 1. studies of selected topics in evolutionary and systematic biology; 2. practical training in laboratory and field; 3. attending lectures of invited speakers from abroad and Slovenia; 4. participating in seminars, discussion groups, journal clubs; 5. participating at scientific meetings; 6. participating at workshops, summer schools and other forms of education.

Načini ocenjevanja:	**Delež/Weight**	**Assessment:**
Seminarji in aktivnosti na strokovnih srečanjih in delavnicah	100,00 %	Seminars and activities on scientific meetings, workshops and summer schools

Ocenjevalna lestvica:	**Grading system:**
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Peter Trontelj

Zakšek, V., Konec, M., Trontelj, P. (2018): First microsatellite data on Proteus anguinus reveal weak genetic structure between the caves of Postojna and Planina. Aquatic conservation, vol. 28, iss. 1, str. 241-246, ilustr. ISSN 1052-7613. http://dx.doi.org/10.1002/aqc.2822, DOI: 10.1002/aqc.2822.

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Trontelj, P. (2019). Adaptation and natural selection in caves. In: White, W. B. (ur.), Culver, D. C. (ur.), Pipan, T. (ur.). Encyclopedia of caves. 3rd ed. London [etc.]: Academic Press, Elsevier, str. 40-46, ilustr. ISBN 978-0-12-814124-3. DOI: 10.1016/B978-0-12-814124-3.00006-6.

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Cene Fišer

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Božo Frajman

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3. Stevanoski I., Kuzmanović N., Dolenc Koce J., Schönswetter P., Frajman B. (2020) Disentangling relationships between amphi-Adriatic *Euphorbia spinosa* and Balkan endemic *E. glabriflora* (Euphorbiaceae). Botanical Journal of the Linnean Society 194: 358–374. https://doi.org/10.1093/botlinnean/boaa032.
4. Caković D., Cresti L., Stešević D., Schönswetter P., Frajman B. (2021) High genetic and morphological diversification of the *Euphorbia verrucosa* alliance (Euphorbiaceae) in the Balkan and Iberian peninsulas. Taxon 70: 286–307. https://doi.org/10.1002/tax.12427
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Nina Gunde Cimerman

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DE GARCIA, Virginia, ZALAR, Polona, BRIZZIO, Silvia, GUNDE-CIMERMAN, Nina, VAN BROOCK, Maria. Cryptococcus species (Tremellales) from glacial biomes in the southern (Patagonia) and northern (Svalbard) hemispheres. FEMS microbiology, ecology, ISSN 0168-6496, 2012, vol. 82, iss. 2, str. 523-539. http://onlinelibrary.wiley.com/doi/10.1111/j.1574-6941.2012.01465.x/pdf, doi: 10.1111/j.1574-6941.2012.01465.x. [COBISS.SI-ID 2725199]

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Matjaž Kuntner

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