Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz raznovrstnosti in identifikacije mikroorganizmov**
Course title:	**Selected Topics in Diversity and Identification of Microorganisms**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti		**1. ali 2.; 1st or 2nd**	**1. 2. ali 3. ; 1st, 2nd or 3rd**
Doctoral Study Ecological Sciences			

Vrsta predmeta / Course type Izbirni/Elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
5	**-**	**5**	**-**	**-**	**140**	**5**

Nosilec predmeta / Lecturer: Janja TRČEK

Jeziki / Languages:		
	Predavanja / Lectures:	**Slovenski Slovene**
	Vaje / Tutorial:	**Slovenski/Slovene**

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisits:
Osnovanja znanja iz mikrobiologije, citologije in histologije na ravni drugostopenjskega programa.	Knowledge of basic microbiology, citology and histology at master level.

Vsebina:	Content (Syllabus outline):
Obravnavana bodo izbrana poglavja iz naslednjih sklopov: • Predstavljene bodo reprezentativne skupine bakterij, arhej, gliv, alg in praživali iz normalnih in ekstremnih habitatov s poudarkom na posebnostih v fizioloških in biokemijskih karakteristikah izbranih taksonov. Predstavljena bo njihova vloga v okolju (pozitivne in negativne posledice) • Predstavljene bodo teoretične osnove taksonomije mikroorganizmov (vrsta kot osnovna taksonomska enota, taksonomski sistemi) in metode filogenetskega raziskovanja v mikrobiologiji • Študentje se bodo seznanili s praktični pristopi za identifikacijo določenih skupin mikroorganizov iz okolja po izolaciji in gojenju v laboratorijskih razmerah (metode za ugotavljanje fenotipskih znakov, molekulsko-biološki pristopi) • Nadalje bodo predstavljene tehnike shranjevanja mikroorganizmov v laboratorijskih razmerah in metode revitalizacije mikroorganizmov • Seznanili se bodo tudi z računalniškimi orodji za taksonomsko obdelavo pridobljenih podatkov	Selected topics in the following chapters will be discussed: • Students will get familiar with the representative groups of bacteria, arhea, algae and protozoa from normal and extreme habitats. Focus will be on physiological and biochemical characteristics of selected taxons. Their role in the environment will be presented (positive and negative) • Theoretical basis of microbial taxonomy will be discussed (concept of species as a basic taxonomic unit, taxonomic systems) and the methods used for inferring the microbial phylogeny • Students will get familiar with practical approaches for identification of certain groups of microorganisms previously isolated and cultivated under laboratory conditions (methods for identification of phenotypic characters, molecular-biological approaches) • Further on, techniques for preservation of microorganisms under the laboratory conditions will be presented as well as the methods for their revitalization • Students will get familiar also with computer tools for performing taxonomical analysis of data obtained in the laboratory

Temeljni literatura in viri / Readings:

- Madigan MT, Martinko JM, Bender KS, Buckley DH, Stahl DA 2014. Brock Biology of Microorganisms, Benjamin Cummings.
- Bergey's manual of determinative microbiology
- Bergey's manual of systematic bacteriology
- Logan NA 1994. Bacterial Systematics, Blackwell Scientific Publications.
- Willey J, Sherwood L, Woolverton C 2013. Prescott's Microbiology. McGraw-Hill Higher Education.

Cilji in kompetence:	Objectives and competences:
• Slušatelje podrobno seznaniti z različnimi taksonomskimi skupinami prokariotskih in evkariotskih mikroorganizmov ter z njihovo vlogo v okolju • Podrobno predstaviti klasične in moderne molekulsko-biološke pristope za klasifikacijo in identifikacijo mikroorganizmov, pridobljenih	• To present in detail different taxonomical groups of prokaryotic and eukaryotic microorganisms and their role within an environment • To present in detail classical as well as modern molecular-biological approaches for classification and identification of

po izolaciji, ter za njihovo neposredno sledenje v okolju • Podrobno predstaviti možnosti računalniške obdelave podatkov v mikrobni taksonomiji	microorganisms after their isolation, and methods of tracing them in environments • To present in detail possibilities for computeral analysis in microbial taxonomy

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: • Natančno razumevanje biokemijske in fiziološke raznovrstnosti mikroorganizmov iz različnih habitatov • Razumevanje taksonomske razvrstitve mikroorganizmov • Natančno poznavanje metod za identifikacijo mikroorganizmov **Preneslijve/ključne spretnosti in drugi atributi:** • Podrobna seznanjenost z raznovrstnostjo mikroorganizmov v okolju	**Knowledge and understanding:** • A detailed understanding of biochemistry and physiology of microorganisms from different habitats • Advanced taxonomy of microorganisms • Advanced methods for identification of microorganisms **Transferable/Key Skills and other attributes:** Getting familiar with the microbial diversity within environments in details

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Laboratorijske vaje	• Lectures • Laboratory excersises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Type (examination, oral, coursework, project):
• Kolokvij	30 %	• Partial exam
• Seminarska naloga	30 %	• Seminar essay
• Pisni izpit	40 %	• Written exam

Reference nosilca / Lecturer's references:

1. **Trček J.** 2014. Plasmid analysis of high acetic acid-resistant bacterial strains by two-dimensional agarose gel electrophoresis and insights into the phenotype of plasmid pJK2-1. Ann. Microbiol. in press.
2. **Trček J.,** Matsushita K. 2013. A unique enzyme of acetic acid bacteria, PQQ-dependent alcohol dehydrogenase is also present in *Frateuria aurantia*. Appl. Microbiol. Biotechol. 97, 7369-7376.
3. Slapšak N., Cleenwerck I., De Vos P., **Trček J.** 2013. *Gluconacetobacter maltaceti*, a novel vinegar producing acetic acid bacterium. Syst. Appl. Microbiol. 36, 17-21.
4. Castro C., Cleenwerck I., **Trček J.**, Zuluaga R., De Vos P., Caro G., Aguirre R., Putaux J.L., Gañán P. 2013. *Gluconacetobacter medellinensis* sp. nov., cellulose- and non-cellulose producing acetic acid bacteria isolated from vinegar. Int. J. Syst. Evol. Microbiol. 63, 1119-1125.
5. **Trček J.**, Fuchs T.M., Trülzsch K. 2010. Analysis of *Yersinia enterocolitica* invasin expression *in vitro* and *in vivo* using a novel *luxCDABE* reporter system. Microbiology, 156, 2734-2745.