



Univerza v Mariboru



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Fakulteta za naravoslovje in
matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Mikrobiologija
Course title:	Microbiology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Biologija in ekologija z naravovarstvom 2. stopnja	-	1	1
Biology and Ecology with Nature Conservation 2nd level	-	1	1

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30	15		30		105	6

Nosilec predmeta / Lecturer:

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

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

V okviru predmeta bodo predstavljene reprezentativne skupine bakterij, arhej in gliv, iz normalnih in ekstremnih habitatov s poudarkom na posebnostih fizioloških in biokemijskih karakteristik izbranih taksonov. Predstavljena bo njihova vloga (pozitivna in negativna).

Predstavljene bodo teoretične osnove taksonomije mikroorganizmov (vrsta kot osnovna taksonomska enota, taksonomski sistemi) in metode filogenetskega raziskovanja v mikrobiologiji.

Študentje se bodo seznanili s praktičnimi pristopi za identifikacijo določenih skupin mikroorganizmov iz okolja po izolaciji in gojenju v laboratorijskih razmerah (metode za ugotavljanje fenotipskih znakov, molekulske biološke pristopi).

Nadalje bodo predstavljene tehnike shranjevanja mikroorganizmov v laboratorijskih razmerah in metode revitalizacije mikroorganizmov.

Seznani se bodo tudi z računalniškimi orodji za taksonomsko obdelavo pridobljenih podatkov.

Students will get familiar with the representative groups of bacteria, archaea and fungi 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.

Temeljna literatura in viri / Readings:

Madigan MT., Martinko JM., Stahl D., Clark D. 2010. Brock Biology of Microorganisms. 13. izdaja. Benjamin Cummings.

Logan, N.A., 1994: Bacterial Systematics, Blackwell Scientific Publications.

Slonczewski J., Foster JW. 2010. Microbiology: An Evolving Science. 2. izdaja. Norton WW & Company.

Cilji in kompetence:

- Slušatelje seznaniti z različnimi taksonomskimi skupinami prokariotskih in evkariotskih mikroorganizmov ter z njihovo vlogo v okolju
- Predstaviti klasične in moderne molekulske biološke pristope za klasifikacijo in identifikacijo mikroorganizmov, pridobljenih po izolaciji, ter za njihovo neposredno sledenje v

Objectives and competences:

- To present different taxonomical groups of prokaryotic and eukaryotic microorganisms and their role within an environment
- To present classical as well as modern molecular-biological approaches for classification and identification of microorganisms after their isolation, and methods of tracing them in environments

okolju

- Predstaviti možnosti računalniške obdelave podatkov v mikrobni taksonomiji

- To present possibilities for computer analysis

Predvideni študijski rezultati:

Znanje in razumevanje:

- Biokemijska in fiziološka raznovrstnost mikroorganizmov iz različnih habitatov
- Taksonomija mikroorganizmov
- Poznavanje metod za identifikacijo mikroorganizmov.

Intended learning outcomes:

Knowledge and Understanding:

- Biochemistry and physiology of microorganisms from different habitats
- Taxonomy of microorganisms
- Methods for identification of microorganisms

Metode poučevanja in učenja:

Predavanja
Seminarji
Vaje

Learning and teaching methods:

Lectures
Seminars
Practical course

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Pisni izpit	45 %	Written exam
Predstavitev projekta	25 %	Project presentation
Kolokvij	30 %	Partial course

Reference nosilca / Lecturer's references:

1. **Trček, J.**, Fuchs, T.M., and K. Trülsch. 2010. Analysis of *Yersinia enterocolitica* invasion expression *in vitro* and *in vivo* using a novel *luxCDABE* reporter system. **Microbiology**, 156, 2734-2745.
2. **Trček, J.**, Toyama, H., Czuba, J., Misiewicz, A., and K. Matsushita. 2006. Correlation between acetic acid resistance and characteristics of PQQ-dependent ADH in acetic acid bacteria. **Appl. Microbiol. Biotechnol.** 70, 366-373.
3. **Trček, J.** 2005. Quick identification of acetic acid bacteria based on nucleotide sequences of the 16S-23S rDNA internal transcribed spacer region and of the PQQ-dependent alcohol dehydrogenase gene. **Syst. Appl. Microbiol.** 28, 735-745.
4. **Trček, J.**, Wilharm, G., Jacobi, C.A., and J. Heesemann. 2002. *Yersinia enterocolitica* YopQ: strain dependent cytosolic accumulation and post-translational secretion. **Microbiology**, 148, 1457-1465.