



Univerza v Mariboru

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

Obvezni/Compulsory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	15	30			105	6

Nosilec predmeta / Lecturer:

Janja Trček

Jeziki /

Predavanja / Lectures:

Slovenski / Slovenian

Languages:

Vaje / Tutorial:

Slovenski / Slovenian

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

Jih ni.

Prerequisites:

No.

Vsebina:

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

Content (Syllabus outline):

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

sistemi) in metode filogenetskega raziskovanja v mikrobiologiji.

Študenti se bodo seznanili s praktičnimi pristopi za identifikacijo izbranih skupin mikroorganizmov 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.

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

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:

Priporočena literatura:

Madigan MT, Martinko JM, Bender KS, Buckley DH, Stahl DA. 2015. Brock Biology of Microorganisms. 14. izdaja, Pearson, 1130 str.

Slonczewski J in Foster JW. 2017. Microbiology: An Evolving Science. 4. izdaja, Norton WW & Company, 1376 str.

Cilji in kompetence:

- Slušatelje seznaniti z različnimi taksonomskimi skupinami prokariotskih in evkariotskih mikroorganizmov ter z njihovo vlogo v okolju;
- Predstaviti klasične in moderne molekulsko-biološke pristope za klasifikacijo in identifikacijo mikroorganizmov, pridobljenih po izolaciji, ter za njihovo neposredno sledenje v okolju;
- Predstaviti možnosti računalniške obdelave podatkov v mikrobni taksonomiji.

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;
- To present possibilities for computer processing analysis in microbial taxonomy.

Predvideni študijski rezultati:

Po uspešno opravljeni učni enoti naj bi bili študenti zmožni:

- razumeti in primerjati biokemijsko in fiziološko raznovrstnost mikroorganizmov iz različnih habitatov;
- pojasniti osnove bakterijske taksonomije;
- opisati metode za identifikacijo mikroorganizmov.

Intended learning outcomes:

By the end of this course students should be able to:

- understand and compare biochemistry and physiology of microorganisms from different habitats;
- explain basics on taxonomy of microorganisms;
- describe methods for identification of microorganisms.

Metode poučevanja in učenja:

Predavanja
Seminariji
Vaje

Learning and teaching methods:

Lectures
Seminars
Practical course

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

Način (pisni izpit, ustno izpraševanje,
naloge, projekt):

Pisni izpit

Predstavitve projekta

Kolokvij

45 %

25 %

30 %

Type (examination, oral, coursework,
project):

Written exam

Project presentation

Partial course

Reference nosilca / Lecturer's references:

1. Jelenko K., Cepec E., Nascimento F.X., **Trček J.** 2023. Comparative genomics and phenotypic characterization of *Gluconacetobacter entanii*, a highly acetic acid-tolerant bacterium from vinegars. *Foods* 12(1), 1-15.
2. Simonič M., Slapničar Š., **Trček J.**, Bogovič Matijašič B., Mohar Lorbeg P., Vesel A., Fras Zemljič L., Peršin Fratnik Z. 2023. Probiotic *Lactobacillus paragasseri* K7 nanofiber encapsulation using nozzle-free electrospinning. *Appl. Biochem. Biotechnol.* v tisku, 12 str.
3. Cepec E. and **Trček J.** 2022. Antimicrobial resistance of *Acetobacter* and *Komagataeibacter* species originating from vinegars. *Int. J. Environ. Res. Public Health* 19(1), str. 1-10.
4. Cetecioglu Z., Atasoy M., Cenian A., Sołowski G., **Trček J.**, Ugurlu A., Sedlakova-Kadukova J. 2022. Bio-based processes for material and energy production from waste streams under acidic conditions. *Fermentation* 8(3), str. 1-18.
5. **Trček J.**, Dogša I., Accetto T., Stopar D. 2021. Acetan and acetan-like polysaccharides: genetics, biosynthesis, structure, and viscoelasticity. *Polymers* 13(5), 1-16.