



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Mikrobna ekologija
Course title:	Microbial Ecology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program: Ekologija z naravovarstvom, 1. stopnja		2. ali 3.	3. ali 4. ali 5. ali 6.
Undergraduate university programme: Ecology with nature protection, 1st level		2nd or 3rd	3rd or 4th or 5th or 6th

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab. work	Druge oblike študija	Samost. delo Individ. work	ECTS
15	15	-	15	-	135	6

Nosilec predmeta / Lecturer:

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

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

Vsebina:

V okviru predmeta bodo študenti spoznali:

- Vlogo mikroorganizmov v različnih naravnih (vodna in talna okolja, ekstremna okolja, prebavila vretenčarjev in nevretenčarjev) in industrijskih okoljih
- Metode za preučevanje mikrobnih aktivnosti
- Mikrobno raznolikost in mikrobno aktivnost v različnih naravnih okoljih
- Uporabo mikroorganizmov v biotehnologiji in mikroorganizmi kot viri industrijsko uporabnih encimov in drugih snovi
- Z vidiki tveganja vnosa mikroorganizmov v okolje (patogenih, rekombinantnih in industrijskih sevov)
- Z interakcijami bakterij s težkimi kovinami in ksenobiotiki ter možnosti za njihovo uporabo pri bioremediaciji.
- Z mikrobiološkimi vidiki delovanja čistilnih naprav
- Pri praktičnem delu bodo študenti izolirali mikroorganizme iz vod, tal in hrane, ter si ogledali izbrane industrijske objekte (prehrambena industrija, čistilne naprave)

Content (Syllabus outline):

Students will get familiar with:

- The role of microorganisms in different natural (water, soil, extreme environments, gut of vertebrates and nonvertebrates) and industrial environments.
- The methods for studying microbial activity will be presented.
- The microbial diversity and activities in different natural environments.
- Possible application of microorganisms in biotechnology as well as with microorganisms as sources of industrially important enzymes and other substances.
- A risk of microbial release into environment (pathogenic, recombinant and industrial strains).
- Interactions of prokaryotes with heavy metals and xenobiotics as well as their potential use in bioremediation.
- The microbiological aspects in waste treatment systems will be presented.
- In practical work, students will perform isolation of microorganisms from water, soil and food. Besides, they will visit selected industrial installations (food industry, waste treatment plants).

Temeljni literatura in viri / Readings:

- Madigan M.T., Martinko J.M., Bender K.S., Buckley D.H., Stahl D.A. 2014. Brock Biology of Microorganisms, 14. izdaja, Benjamin Cummings, 1136 str.
- Kirchman D.L. 2012. Processes in Microbial Ecology, 1. izdaja, Oxford University Press, 328 str.
- Slonczewski J. in Foster J.W. 2013. Microbiology: An Evolving Science, 3. izdaja, Norton WW & Company, 1408 str.

Cilji in kompetence:

- Predstaviti raznolikost in vlogo mikroorganizmov v različnih okoljih.
- Predstaviti potencialno nevarnost vnosa mikroorganizmov v okolje.
- Predstaviti možno uporabo mikroorganizmov v industriji in drugih procesih.

Objectives and competences:

- Familiarity with diversity and role of microorganism in different environments.
- Presentation of a potential risk of uncontrolled release of microorganisms into environment.
- Presentation of possible applications of microorganism in industry and other processes.

Predvideni študijski rezultati:**Znanje in razumevanje:**

- Ekološko pomembne skupine mikroorganizmov ter razumevanje njihove pozitivne in negativne vloge v različnih okoljih
- Njihova vloga pri biotehnoloških procesih
- Metode v mikrobni ekologiji

Prenesljive/ključne spretnosti in drugi atributi:

- Praktično znanje metod, ki jih uporabljamo pri študiju okoljsko pomembnih mikroorganizmov

Intended learning outcomes:**Knowledge and Understanding:**

- Ecologically important groups of microorganisms and their potential positive or negative effects within environments
- Their role in biotechnological processes
- Methods used in microbial ecology

Transferable/Key Skills and other attributes:

- Practical knowledge of methods applicable for studying ecologically important groups of microorganisms

Metode poučevanja in učenja:

- Predavanja
- Laboratorijske vaje
- Individualno delo s študenti

Learning and teaching methods:

- Lectures
- Laboratory excersises
- Individual work with students

Načini ocenjevanja:

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

- Kolokvij
- Pisni ali ustni izpit

Delež (v %) /

Weight (in %)

Assessment:

Type (examination, oral, coursework, project):

- Partial exam
- Written or oral exam

Reference nosilca / Lecturer's references:

1. **TRČEK, Janja**. 2014. Oksalotrofne bakterije s tvorbo kalcita prispevajo k zniževanju koncentracije ogljikovega dioksida v ozračju. *Proteus*, april, 76, 8, str. 372-374.
2. PETRINIĆ, Irena, KORENAK, Jasmina, PLODER, Jana, **TRČEK, Janja**. 2014. Decolorization and biodegradation of azo dye within a sequencing batch reactor followed by ultrafiltration. *Magic world of textiles, book of proceedings, University of Zagreb, Faculty of Textile Technology, 2014*, str. 683-688.
3. **TRČEK, Janja**, MATSUSHITA, Kazunobu. 2013. A unique enzyme of acetic acid bacteria, PQQ-dependent alcohol dehydrogenase, is also present in *Frateuria aurantia*. *Applied microbiology and biotechnology*, 97, 16, str. 7369-7376.
4. SLAPŠAK, Nina, CLEENWERCK, Ilse, DE VOS, Paul, **TRČEK, Janja**. 2013. *Gluconacetobacter maltaceti* sp. nov., a novel vinegar producing acetic acid bacterium. *Systematic and applied microbiology*, 36, 1, str. 17-21.
5. **TRČEK, Janja**, FUCHS, Thilo M., TRÜLZSCH, Konrad. 2010. Analysis of *Yersinia enterocolitica* invasin expression in vitro and in vivo using a novel luxCDABE reporter system. *Microbiology*, 156, 9, str. 2734-2745.