



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

<b>Predmet:</b>	<b>Mikrobna ekologija</b>
<b>Course title:</b>	<b>Microbial Ecology</b>

<b>Študijski program in stopnja</b> Study programme and level	<b>Študijska smer</b> Study field	<b>Letnik</b> Academic year	<b>Semester</b> Semester
<b>Univerzitetni študijski program</b> <b>Ekologija z naravovarstvom, 1. stopnja</b>		<b>2. ali 3.</b>	<b>3. ali 4. ali 5. ali 6.</b>
<b>Undergraduate university programme</b> <b>Ecology with Nature Conservation, 1st degree</b>		<b>2nd or 3rd</b>	<b>3rd or 4th or 5th or 6th</b>

**Vrsta predmeta / Course type**

**Univerzitetna koda predmeta / University course code:**

<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike študija</b>	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
<b>30</b>	<b>-</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>135</b>	<b>6</b>

**Nosilec predmeta / Lecturer:**

<b>Jeziki /</b> <b>Languages:</b>	<b>Predavanja /</b>	<input type="text" value="Slovenski"/>
	<b>Lectures:</b>	<input type="text" value="Slovene"/>
	<b>Vaje / Tutorial:</b>	<input type="text" value="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 izpit

Delež (v %) /

Weight (in %) /

**Assessment:**

Type (examination, oral, coursework, project):

- Partial exam
- Written 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.