



**OPIS PREDMETA / SUBJECT SPECIFICATION**

<b>Predmet:</b>	<b>Mikrobiologija in genetika prokariotov</b>
<b>Subject Title:</b>	<b>Microbiology and Prokaryote Genetics</b>

<b>Študijski program</b> Study programme	<b>Študijska smer</b> Study field	<b>Letnik</b> Year	<b>Semester</b> Semester
Biologija/Biology	Biologija/Biology	3	5

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

<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Sem. vaje</b> Tutorial	<b>Lab. vaje</b> Lab. work	<b>Teren. vaje</b> Field work	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
45			30		105	6

**Nosilec predmeta / Lecturer:**

**Jeziki / Languages:** **Predavanja / Lecture:**   
**Vaje / Tutorial:**

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

**Vsebina:**  
V okviru predmeta bodo študentje spoznali tri osnovne skupine, ki so predmet obravnave v mikrobiologiji (virusi, bakterije, glive – deloma), značilnosti njihove zgradbe, osnove sistematike ter njihov ekološki pomen v različnih okoljih.  
Obnovili bodo osnove metabolnih reakcij (redoks reakcije, fermentacija, aerobna in anaerobna respiracija) ter spoznali metabolno raznolikost prokariotov - heterotrofni, avtotrofni in litotrofni metabolizem. Poudarek bo na nekaterih metabolnih posebnostih prokariotov (fiksacija dušika, redukcija sulfata, metanogeneza, razgradnja polimerov) in

**Contents (Syllabus outline):**  
Students will get familiar with the three large groups which are objectives of microbiology (viruses, bacteria, fungi – partially), their structure, basic systematic and ecological importance within different ecosystems.  
Basic metabolic reactions (redox reactions, fermentation, aerobic and anaerobic respiration) and the metabolic diversity of prokaryotes will be addressed (heterotrophic, autotrophic and litotrophic metabolism). Some specific types of metabolisms (nitrate fixation, sulfate reduction, methanogenesis and polymer degradation) which all have substantial role in primary production and in cycling of

njihov pomen v primarni produkciji ter pri kroženju snovi v okolju.

Spoznali bodo tudi interakcije bakterij s težkimi kovinami in ksenobiotiki ter možnosti za njihovo uporabo pri bioremediaciji.

Nadalje bodo obravnavali povezave prokariotov z višjimi organizmi, ki so lahko pozitivne (pomen normalnih mikrobov pri človeku, živalih in rastlinah, pomen mikrobnih simbiotov) ali negativne (nalezljive bolezni ter vpliv ekoloških sprememb na njihov razvoj in širjenje).

Spoznali bodo posebnosti zgradbe bakterijskega in virusnega genoma, mehanizme horizontalnih prenosov dednine in posebnosti pri načinu uravnavanja izražanja genov.

Pri praktičnem delu bodo študentje spoznali osnovne tehnike izolacije, gojenja ter identifikacije ekološko pomembnih mikroorganizmov iz različnih okolij.

elements will be studied into more detail.

Interactions of prokaryotes with heavy metals and xenobiotics as well as their potential use in bioremediation will be addressed.

Students will learn about mechanisms and the importance of interactions of microbes with higher organisms: the role of normal microbes in humans, animals and plants (positive effects) and effect of ecological changes on emergence and dispersion of infectious diseases (negative effects).

Students will learn the structure of bacterial and viral genome, the mechanisms of horizontal transfer of genetic information and examples of gene regulation in prokaryotes.

In practical work, students will learn the basic techniques of isolation, cultivation and identification of ecologically important microorganisms.

#### **Temeljni študijski viri / Textbooks:**

- Madigan, M. T., J. M. Martinko, J. Parker, 2003: Brock Biology of microorganisms. 10. izdaja, Prentice Hall.
- Tortora G.J., Funke, B.R., Case, .L., 2006: Microbiology: A Introduction. 9th Ed., Blackwell Publ., UK.
- Trun J.N., Trempy J.E., 2005: Fundamental Bacterial Genetics. Blackwell Publishing, UK.

#### **Cilji:**

- Predstaviti osnovne skupine mikroorganizmov, njihovo biologijo ter sistematiko
- Predstaviti vlogo mikroorganizmov pri naravnih procesih ter možnosti za njihovo uporabo v industriji in drugje
- Podati osnove in posebnosti prokariotske genetike

#### **Predvideni študijski rezultati:**

Znanje in razumevanje:

- ekološko pomembnih skupin mikroorganizmov
- njihove vloge pri naravnih procesih
- zgradbe in delovanja prokariotskega genoma

#### **Objectives:**

- Familiarity with the biology and systematic of main groups of microorganisms.
- To explain the role of microorganisms in natural processes and their potential use in industry and elsewhere.
- Understanding of prokaryote genetics.

#### **Intended learning outcomes:**

Knowledge and Understanding:

- of ecologically important groups of microorganisms
- of their role in natural processes
- of structure and function of prokaryote genome

Prenesljive/ključne spretnosti in drugi atributi:

- seznanjanje z osnovnimi pojmi v mikrobiologiji in prokariotski genetiki
- seznanjanje z osnovnimi mikrobiološkimi tehnikami

**Metode poučevanja in učenja:**

- Predavanja
- Seminar
- Laboratorijske vaje

**Načini ocenjevanja:**

- Pisni izpit

Transferable/Key Skills and other attributes:

- understanding of basic terms in microbiology and prokaryote genetics
- development of practical laboratory skills and basic microbiological techniques

**Learning and teaching methods:**

- Lectures
- Seminar
- Laboratory excersises

**Assessment:**

Delež (v %) /  
Weight (in %)

- written exam

**Materialni pogoji za izvedbo predmeta :**

- *Multimedijska predavalnica*
- *Laboratorij z mikroskopi, vodo in plinsko napeljavo*

**Obveznosti študentov:**

*(pisni, ustni izpit, naloge, projekti)*

- Pisni izpit

**Material conditions for subject realization**

- *Lecture hall for multimedia presentations*
- *Laboratory with microscopes, water and gas infrastructure*

**Students' commitments:**

*(written, oral examination, coursework, projects):*

- Written exam