



OPIS PREDMETA / SUBJECT SPECIFICATION

<b>Predmet:</b> Subject Title:	<b>Izbrana poglavja iz metod znanstvenoraziskovalnega dela v biologiji in ekologiji</b> <b>Selected Topics in Methods of Scientific Research in Biology and Ecology</b>
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Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Doktorski študij Ekološke znanosti / Doctoral Study Ecological Sciences		1	1

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab. work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
10	10				130	5

Nosilec predmeta / Lecturer:

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

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

Poznavanje biologije in ekologije na ravni univerzitetnega programa

Prerequisites:

Knowledge of biology and ecology at graduate level

Vsebina:

Contents (Syllabus outline):

Obravnavana so izbrana poglavja iz naslednjih sklopov.

- Metode znanstveno-raziskovalnega dela v biologiji in ekologiji so vsebinsko ciljno zasnovane glede na predvideno usmeritev posamezne/ga študenta/tke in obsegajo predstavitev temeljnih raziskovalnih metod v biologiji in ekologiji, ter pregled podrobne metodologije, ki jo bo študent/ka uporabil/a pri svojem raziskovalnem delu.
- Glede na vsebinsko usmeritev študenta/ke so selektivno obravnavane metode in tehnike z naslednjih področij: svetlobna in elektronska mikroskopija, citologija in histologija, izbrana biokemijska, biometrijska, fiziološka ter ekološka področja.
- "Izbrane tehnike izolacije in identifikacije naravnih substanc" obsegajo predstavitev aparatov, pripomočkov in kemikalij za izolacijo proteinov z gelsko in ionsko izmenjevalno kromatografijo ter njihovo analizo s pomočjo fotospektrometrije in elektroforeze.
- Izolacija in identifikacija lipidov in živalskih pigmentov s tankoplastno kromatografijo in s kemijsko in fluorescenčno detekcijo.
- Izbrane metode v morfometriji in statistična analiza enorazsežnih spremenljivk.
- Geometrijske morfometrične metode in statistična analiza dvorazsežnih spremenljivk.
- "Izbrane metode v nevrofiziologiji" ter

Selected topics in the following chapters are discussed.

- Methods of scientific research in biology are based upon the prospective individual student research. They are dealing with the selected themes on general research methods, and with an overview of the special methodologies in use by a student during his/her research work.
- In accordance with the selected scientific field of investigation, the consideration of methods is focused on the following areas: light and electron microscopy, cytology and histology, and selected domains of biochemistry, biometry, physiology and ecology.
- The chapter "Selected techniques for isolation and identification of natural substances" includes the presentation of the equipment and chemicals used in protein gel plate and column chromatography, and the protein analysis using photospectrometry and electrophoresis.
- The use of thin layer chromatography with a chemical and fluorescent detection is discussed in the context with the isolation and identification of lipids and animal pigments.
- Selected methods in morphometry, and statistical analysis of one-dimensional parameters.
- Geometrical morphometrical methods, and statistical analysis of two-dimensional parameters.
- "Selected methods in neurophysiology", and

"Bioakustične meritve in analiza" so tematsko prirejeni pregledi metod in tehnik.

- Metode vzorčenja in numerične analize biodiverzitete (favne, flore in vegetacije).
- Morfološke metode na nivoju osebka obsegajo standardno zajemanje in obdelavo biometrijskih podatkov različnih vegetativnih, reproduktivnih in drugih znakov osebkov.
- "Izbrane metode v ekologiji" so pregledna obravnava standardnih metod ekološkega vzorčevanja in obdelave podatkov s poudarkom na terestričnih habitatih.
- Predstavitve metod v fitocenologiji, njena tipološka obravnava na krajinskem nivoju in obdelava v GIS.
- "Izbrane metode iz biotehnologije rastlin" se osredotoča na tehniko rastlinskih tkivnih kultur in njeno uporabo v biotehnologiji.

"Bioacoustic recordings and analysis" represent an overview of the topic methods and techniques.

- Methods of sampling and numerical analysis of biota (fauna, flora and vegetation) are discussed in the chapter of "Biodiversity".
- Morphological methods on the individual level comprehend standard capture and treatment of biometrical data concerning different vegetative, reproductive and other traits of the specimens.
- "Selected methods in ecology" is an overview of standard methods of ecological sampling and data treatment, with an emphasis on terrestrial habitats.
- The presentation of methods in phytocoenology, its topological treatise on the landscape-level, and the elaboration in GIS.
- "Selected plant biotechnological techniques" are focuses on plant tissue culture techniques and its use in biotechnology.

#### Temeljni študijski viri / Textbooks:

- Alberts, B., A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter, 2002: Molecular biology of the cell, 4th Edition, Garland Science, New York.
- Boulton A. A., G. B. Baker, C. H. Vanderwolf, 1990: Neurophysiological Techniques, I. Basic Methods and Concepts. Humana Press, Totowa.
- Cutler, P., 2003: Protein purification protocols. Humana Press, New York.
- Glauert, A. M., 1988: Practical methods in electron microscopy. North-Holland Publishing Company, Amsterdam, New York, Oxford.
- Kates, M., 1986: Techniques of lipidology. Elsevier, Amsterdam.
- Krebs, C. J., 1999: Ecological methodology. Addison Wesley, Boston.
- Legendre, R. A. Legendre, 2005: Numerical Ecology. Elsevir. Amsterdam.
- Sokal, R. R., F. J. Rohlf, 1995: Biometry: the principles and practice of statistics in biological research. W. H. Freeman and Com. San Francisco.
- Southwood, T. R. E. & P. A. Henderson, 2000: Ecological methods. Blackwell, Oxford.

#### Cilji:

- Podrobna seznanitev z izbranimi biološkimi in ekološkimi raziskovalnimi metodami in tehnikami
- Študenti se podrobno usposobijo za samostojno delo in uporabo ustreznih metod in tehnik na izbranem raziskovalnem področju
- Poglobljeno se seznanijo z metodami z znanstvenega področja, na katerem bodo opravili svojo raziskavo

#### Objectives:

- A advanced knowledge of selected biological and ecological methods and techniques
- Student learn in detail to make an appropriate selection of methods and techniques required in their topic field of investigation
- Students get in detail knowledge of methods within the topic field of their investigation

#### Predvideni študijski rezultati:

Znanje in razumevanje:

- Študent/ka dobi podroben pregled o znanstveno-raziskovalnih metodah in tehnikah v biologiji in ekologiji
- Študent/ka se podrobno usposobi za uporabo ustreznih raziskovalnih metod in tehnik pri reševanju konkretnih znanstvenih problemov na izbranem področju

Prenesljive/ključne spretnosti in drugi atributi:

- Študent/ka se vrhunsko usposobi za ustrezno vzorčevanje oziroma zajemanje podatkov ter izpeljavo konkretnih raziskovalnih metod in

#### Intended learning outcomes:

Knowledge and Understanding:

- Student gets advanced knowledge about the research methods and techniques in biology and ecology
- Student qualifies for selecting appropriate research methods and techniques, respectively, concerning concrete scientific problems within the topic field of investigation

Transferable/Key Skills and other attributes:

- Student qualifies at top-level to make an appropriate sampling or data capture, respectively, and for carrying out concrete

tehnik	investigation methods and techniques
<b>Metode poučevanja in učenja:</b>	<b>Learning and teaching methods:</b>
<ul style="list-style-type: none"> <li>• Predavanja</li> <li>• Seminar</li> <li>• Individualno eksperimentalno delo</li> </ul>	<ul style="list-style-type: none"> <li>• Lectures</li> <li>• Seminar</li> <li>• Individual experimental work</li> </ul>
<b>Načini ocenjevanja:</b>	<b>Assessment:</b>
	Delež (v %) / Weight (in %)
<ul style="list-style-type: none"> <li>• Projekt</li> </ul>	100 %
	Project

**Materialni pogoji za izvedbo predmeta :**

- *Multimedijska predavalnica*
- *Ustrezni laboratoriji in praktikumi*

**Material conditions for subject realization**

- *Lecture hall for multimedia presentation*
- *Corresponding laboratories and practicum*

**Obveznosti študentov:**

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

- Projekt: predstavitev in zagovor izbranih metod in tehnik v okviru predstavitve dispozicije magistrske naloge

**Students' commitments:**

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

- Project: Presentation and defense of the chosen methods and techniques in the course of the MA thesis disposition presentation