



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

<b>Predmet:</b>	Izobraževalni eksperimenti v ekologiji
<b>Course title:</b>	Educational experiments in ecology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		1. ali 2.; 1st or 2nd	1. 2. ali 3. ; 1st, 2nd or 3rd
Doctoral Study Ecological Sciences, 3rd degree			

**Vrsta predmeta / Course type**

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

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
5	5				140	5

**Nosilec predmeta / Lecturer:**

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

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

**Prerequisites:**

**Vsebina:**

Znanstveno-raziskovalno in praktično delo, ki se nanaša na:

1. pomen laboratorijskega in eksperimentalnega dela v okoljskem izobraževanju;
2. načrtovanje okoljskega eksperimenta;
3. ravnanje z opremo in delo z organizmi;
4. varnost v laboratoriju in na terenskem delu;
5. metode in oblike laboratorijskega dela v izobraževanju;
6. podatki in njihovo pridobivanje: opazovanje, merjenje in eksperiment;
7. opazovanje;
8. meritve;

**Content (Syllabus outline):**

Scientific, research and practical work connected with:

1. importance of laboratory and experimental work in environmental education;
2. planning of environmental experiments;
3. manipulation with equipment and work with organisms;
4. safety in laboratory and field work;
5. methods and forms of laboratory work in education;

9. meritve in napake meritev;
10. umerjanje instrumentov;
11. analogno – digitalna pretvorba;
12. enote in preračuni enot;
13. vzorec in populacija;
14. urejanje in prikaz merskih podatkov;
15. laboratorijski eksperiment;
16. razmerja med spremenljivkami (odvisnost in neodvisnost);
17. testni in kontrolni poskus.
18. interpretacijo in prikaz rezultatov

6. data and data acquisition: observation, measurements, experiment.
7. observation:
8. measurements:
9. measurements and errors;
10. calibration;
11. analogue – digital conversion;
12. units and units conversions;
13. sample and population;
14. data handling and data presentation;
15. laboratory experiment:
16. relations among variables (dependent and independent variables, correlations);
17. test and control experiment.
18. analysis and presentation of results

#### Temeljni literatura in viri / Readings:

Handbook of research on science education / edited by Sandra K. Abell and. Mahwah, N.J. : Lawrence Erlbaum Associates, 2007.

International Handbook of Research on Environmental Education/ Edited by Robert B. Stevenson, Michael Brody, Justin Dillon, Arjen E.J. Wals. Routledge – 2012 – 592 pages

#### Cilji in kompetence:

Po zaključku predmeta bo študent usposobljen za:

- načrtovanje, pripravo, izvedbo ter ovrednotenje klasičnih ter računalniško podprtih eksperimentov s področja okoljskega izobraževanja;
- predstaviti svoje seminarsko delo v ustni in pisni obliki.

#### Objectives and competences:

After completing the course student will be able to:

- planning, preparation, implementation and assessment of classical and computer supported experiments from the field of environmental education;
- present seminaire work in oral and written form.

#### Predvideni študijski rezultati:

##### Znanje in razumevanje:

Poznavanje vsebin okoljskega eksperimentiranja;  
Razumevanje dilem okoljskega izobraževanja podprtega z eksperimenti,  
Kritična analiza izbranih primerov;  
Izbor ustreznega znanstvenega instrumentarija za razrešitev raziskovalnih vprašanj razrešljivih z eksperimentom.

##### Prenesljive/ključne spretnosti in drugi atributi:

Prenos pridobljenega vedenja ter raziskovalnih spretnosti na druga področja izobraževanja;

#### Intended learning outcomes:

##### Knowledge and understanding:

Knowledge about content of environmental experimentation;  
Comprehension of dilemmas of experiment-supported environmental education;  
Critical analysis of selected experiments;  
Selection of appropriate scientific inventory to solve research questions on environmental experimentation.

##### Transferable/Key Skills and other attributes:

Transfer of knowledge and research skills on other fields of education.

**Metode poučevanja in učenja:**

Predavanja  
Seminar  
Individualno delo

**Learning and teaching methods:**

Lectures  
seminaire  
Individual work

Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

Seminarsko delo z zagovorom

100

Seminaire with defence

**Reference nosilca / Lecturer's references:**

ŠORGO, Andrej, KAMENŠEK, Asja. Implementation of a curriculum for environmental education as education for sustainable development in Slovenian upper secondary schools. *Energy education science and technology. Part B, Social and educational studies*, 2012, vol. 4, iss. 2, str. 1067-1076. [COBISS.SI-ID [18644232](#)], [SNIP]

ŠORGO, Andrej, HAJDINJAK, Zdravka, BRIŠKI, Darko. The journey of a sandwich: computer-based laboratory experiments about the human digestive system in high school biology teaching. *Advances in physiology education*, ISSN 1043-4046, 2008, vol. 32, no. 1, str. 92-99, ilustr. <http://dx.doi.org/10.1152/advan.00035.2007>. [COBISS.SI-ID [15919368](#)], [JCR, SNIP]

ŠORGO, Andrej, KOCIJANČIČ, Slavko. False reality or hidden messages: reading graphs obtained in computerized biological experiments. *Eurasia*, ISSN 1305-8223, 2012, vol. 8, no. 2, str. 129-137. [http://www.ejmste.com/v8n2/EURASIA\\_v8n2\\_Sorgo.pdf](http://www.ejmste.com/v8n2/EURASIA_v8n2_Sorgo.pdf). [COBISS.SI-ID [19146248](#)], [SNIP]

ŠORGO, Andrej, KOCIJANČIČ, Slavko. Demonstration of biological processes in lakes and fishponds through computerised laboratory practice. *The international journal of engineering education*, ISSN 0949-149X, 2006, vol. 22, num. 6, str. 1224-1230, ilustr. [COBISS.SI-ID [512333691](#)], [JCR, SNIP]

ŠORGO, Andrej, ŠPERNJAK, Andreja. Practical work in biology, chemistry and physics at lower secondary and general upper secondary schools in Slovenia. *Eurasia*, ISSN 1305-8223, 2012, vol. 8, no. 1, str. 11-19. [http://www.ejmste.com/v8n1/EURASIA\\_v8n1\\_Sorgo.pdf](http://www.ejmste.com/v8n1/EURASIA_v8n1_Sorgo.pdf). [COBISS.SI-ID [18982408](#)], [SNIP]