

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Uvod v onesnaževanje okolja
Course title:	Introduction to Environmental Pollution

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekotehnologije, 2 stopnja	/	1	1
Ecotechnologies, 2 nd cycle	/	1	1

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: EKO2-865

Predavanja Lectures	Seminar Seminar	Druge oblike	Samostojno delo Individual work	ECTS
15	15	15	105	5

**Navedena porazdelitev ur velja, če je vpisanih vsaj 15 študentov. Drugače se obseg izvedbe kontaktnih ur sorazmerno zmanjša in prenese v samostojno delo. / This distribution of hours is valid if at least 15 students are enrolled. Otherwise the contact hours are linearly reduced and transferred to individual work.*

Nosilec predmeta in sodelavci Course leader and lecturers	Prof. dr. Milena Horvat Prof. dr. Radmila Milačič Prof. dr. Janez Ščančar Prof. dr. Ester Heath Prof. dr. Nives Ogrinc Prof. dr. Sonja Lojen
--	---

Jeziki / Languages:	Predavanja / Lectures: Slovenski ali angleški / Slovene or English
	Seminar: Angleški / English

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

Zaključen študij prve stopnje naravoslovne ali tehniške smeri ali zaključen študij drugih smeri z dokazanim poznavanjem osnov področja predmeta (pisna dokazila, pogovor).

Prerequisites:

Completed first level studies in natural sciences or engineering or completed second level studies in other fields with proven knowledge of fundamentals in the field of this course (certificates, interview).

Vsebina:

Predmet obsega naslednje:

- viri onesnaževal v okolju,
- razumevanje in prepoznavanje onesnaževanja biosfere, hidrosfere, litosfere in atmosfere,
- prepoznavanje, karakterizacija in remediacija kontaminiranih območij (poudarek na toksičnih kemijskih elementih, naravnih in umetnih radionuklidih ter organskih onesnaževalih),
- načrtovanje nadzornih meritev

Content (Syllabus outline):

The subject includes the following:

- sources of pollutants in the environment,
- understanding and recognizing pollution of biosphere, hydrosphere, lithosphere and atmosphere,
- identification, characterization and remediation of contaminated sites (emphasis on toxic chemical elements, natural and artificial radionuclides and organic pollutants),
- planning environmental monitoring,

(monitoring),

- uporaba zakonodaje in normativov pri reševanju izbranih okoljskih problemov,
- primeri bodo prilagojeni ciljem in vsebini raziskovalnega projekta podiplomca.

- application of legislation and norms in solving selected environmental problems
- examples will be tailored to the goals and content of the postgraduate research project.

Temeljni literatura in viri / Readings:

- I. Marsal, Soil Pollution: origin, monitoring&remediation, 2nd Edition, 2008, Springer.
- J. Riewerts, The elements of environmental pollution, Routledge, NY, 2015.
- G.I. Sunahara, A.Y. Renoux, C. Thallen, C.L. Gaudet, A. Pilon (eds.). Environmental Analysis of Contaminated Sites. New York: Wiley&Sons (2001), 465 p., ISBN 0-471-98669-0
- Izbrane informacije bodo podiplomci zajeli iz mednarodnih informacijskih sistemov/ Selected information will be taken by postgraduates from international information systems.

Cilji in kompetence:

Glavni cilj predmeta je doseči usposobljenost in čim večjo percepcijsko širino študentov pri obvladovanju in razumevanju onesnaževanja okolja, predvsem pri reševanju praktičnih problemov.

Študent bo ob zaključku sposoben:

- razumeti temeljne značilnosti onesnaževanja okolja,
- orisati rešitve za sanacijo degradiranih in onesnaženih okolij,
- razumeti orodja za nadzor kakovosti okolja.

Objectives and competences:

The main objective of the course is to achieve the qualification and maximum perception of students in the management and understanding of environmental pollution, especially in solving practical problems.

The student will be able to:

- Understand the basic characteristics of pollution of the environment
- Design solutions for the rehabilitation of degraded and contaminated environments
- Understand environmental quality control tools.

Predvideni študijski rezultati (izidi):

Znanje in razumevanje:

- Prepoznavanje in klasifikacija onesnaževal v okolju
- Razumevanje osnovnih fizikalnih in biogeokemijskih procesov v okolju (biosfera, atmosfera, litosfera, hidrosfera)
- Prepoznavanje in razumevanje postopkov za odstranjevanje onesnaževal iz industrijskih virov in remediacije starih bremen
- Razumevanje in načrtovanje nadzornih meritev v okolju
- Okoljska zakonodaja (nacionalna, evropska, svetovna)

Prenosljive/ključne spretnosti in drugi atributi:

- Uporaba domače in tuje literature
- Pridobivanje sposobnosti celovitega razumevanja okoljskega onesnaževanja

Intended learning outcomes:

Knowledge and Understanding:

- Identification and classification of pollutants in the environment
- Understanding the basic physical and biogeochemical processes in the environment (biosphere, atmospheric, lithosphere, hydrosphere)
- Identification and understanding of waste streams from industrial sources and remediation of legacy sites
- Understanding and planning control measurements in the environment
- Environmental legislation (national, European, global)

Transferable / Key Skills and other attributes:

- Use of national and international literature
- Acquiring the capability of a comprehensive understanding of environmental pollution
- Incorporation of knowledge into the construction of hypotheses for problem

<ul style="list-style-type: none"> - Vključevanje znanja v gradnjo hipotez za reševanje problemov, ciljano k temi magistrskega dela - Sposobnost razumevanja okoljske zakonodaje 	<p>solving, thematically linked to postgraduate thesis</p> <ul style="list-style-type: none"> - Ability to understand environmental legislation.
--	---

Metode poučevanja in učenja:

<p>Sistematična predavanja</p> <ul style="list-style-type: none"> - razgovor - reševanje problemov - eksperimentalno delo <p>Terensko delo</p> <ul style="list-style-type: none"> - praktični primeri

Learning and teaching methods:

<p>Systematic lectures</p> <ul style="list-style-type: none"> - conversation - problem solving - experimental work <p>Fieldwork</p> <ul style="list-style-type: none"> - practical examples.
--

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Seminarska naloga.	50 %	Seminar work.
Zagovor seminarske naloge, pri katerem dokaže osvojitve vseh študijskih izidov z vsaj po enim konkretnim primerom.	50 %	Defense of the seminar work where the student demonstrates the achievement of all learning outcomes with at least one specific case for each outcome.

Reference nosilca / Lecturer's references:

GUSTIN, Mae Sexauer, HORVAT, Milena, et al. Importance of integration and implementation of emerging and future mercury research into the Minamata convention. *Environmental science & technology*, ISSN 0013-936X. [Print ed.], 2016, vol. 50, no. 6, str. 2767-2770, doi: [10.1021/acs.est.6b00573](https://doi.org/10.1021/acs.est.6b00573).

HORVAT, Milena, DEGENEK, Nina, LIPEJ, Lovrenc, SNOJ TRATNIK, Janja, FAGANELI, Jadran. Trophic transfer and accumulation of mercury in ray species in coastal waters affected by historic mercury mining (Gulf of Trieste, northern Adriatic Sea). *Environmental science and pollution research international*, ISSN 0944-1344. [Print ed.], 2014, vol. 21, issue 6, str. 4163-4176.

KOČMAN, David, WILSON, Simon, AMOS, Helen M., TELMER, Kevin, STEENHUISEN, Frits, SUNDERLAND, Elsie M., MASON, Robert P., OUTRIDGE, Peter, HORVAT, Milena. Toward an assessment of the global inventory of present-day mercury releases to freshwater environments. *International journal of environmental research and public health*, ISSN 1660-4601, 2017, vol. 14, no. 2, str. 1-16, doi: [10.3390/ijerph14020138](https://doi.org/10.3390/ijerph14020138).

KOČMAN, David, HORVAT, Milena, WILSON, Simon, OUTRIDGE, Peter, TELMER, Kevin. Global releases of mercury to aquatic environments. V: BIEBER, Elke. *Technical background report for the global mercury assessment 2013*. Oslo: UNEP = United Nations Environment Programme. 2013, str. 69-81.

OUTRIDGE, Peter, MASON, Robert P., KOČMAN, David, HORVAT, Milena, MUNTHER, John. Aquatic pathways, transport and fate. V: BIEBER, Elke. *Technical background report for the global mercury assessment 2013*. Oslo: UNEP = United Nations Environment Programme. 2013, str. 82-94.

MILAČIČ, Radmila, ZULIANI, Tea, VIDMAR, Janja, OPRČKAL, Primož, ŠČANČAR, Janez. Potentially toxic elements in water and sediments of the Sava River under extreme flow events. *Science of the total environment*, ISSN 0048-9697, 2017, vol. 605/606, str. 894-905, doi: [10.1016/j.scitotenv.2017.06.260](https://doi.org/10.1016/j.scitotenv.2017.06.260).

GAMS PETRIŠIČ, Marinka, HEATH, Ester, OGRINC, Nives. Lipid biomarkers and their stable carbon isotopes in oxic and anoxic sediments of Lake Bled (NW Slovenia). *Geomicrobiology journal*, ISSN 0149-0451, 2017, vol. 34, no. 7, str. 606-617, doi: [10.1080/01490451.2017.1310332](https://doi.org/10.1080/01490451.2017.1310332).

DAGA, Romina, RIBEIRO GUEVARA, Sergio, PAVLIN, Majda, RIZZO, Andrea, LOJEN, Sonja, VREČA, Polona, HORVAT, Milena, ARRIBÉRE, Maria. Historical records of mercury in southern latitudes over 1600 years : Lake Futalaufquen, Northern Patagonia. *Science of the total environment*, ISSN 0048-9697, 2016, vol. 553, str. 541-550, doi: [10.1016/j.scitotenv.2016.02.114](https://doi.org/10.1016/j.scitotenv.2016.02.114).