

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	OKOLJSKA TVEGANJA IN NARAVNE NESREČE
<b>Course title:</b>	ENVIRONMENTAL RISKS AND NATURAL DISASTERS

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Varstvo okolja in ekotehnologije, 2. stopnja	Modul: Okolje in človek	1. in 2.	/
Environmental Protection and Eco-technologies, 2 <sup>nd</sup> level	Module: Environment and a human	1 <sup>st</sup> and 2 <sup>nd</sup>	/

**Vrsta predmeta / Course type** Modularni predmet / Modular course

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

Predavanja Lectures	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
20	20	/	/	80	4

**Nosilec predmeta / Lecturer:** doc. dr. Samar Al Sayegh Petkovšek; viš. pred. Klemen Kotnik

<b>Jeziki / Languages:</b>	<b>Predavanja / Lectures:</b> Slovenščina / Slovenian
	<b>Vaje / Tutorial:</b> Slovenščina / Slovenian

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

Pogojev ni.

**Prerequisites:**

No formal prerequisites.

**Vsebina:**

Predmet bo osredotočen na pridobitev temeljnih znanj s področja okoljskih tveganj in naravnih nesreč.

**Poglavitne teme**

**Okoljska tveganja:**

- opredelitev okoljskega tveganja in škodljivih dejavnikov tveganj v okolju;
- seznanitev s postopkom za ocenjevanje tveganj;
- študije primerov za ocenjevanja okoljskih tveganj in tveganj za zdravje ljudi.

**Naravne in okoljske nesreče:**

- predstavitev pravnih podlag za varstvo pred naravnimi nesrečami;
- seznanitev z vrstami naravnih nesreč;
- študije primerov naravnih in okoljskih nesreč na globalnem in nacionalnem nivoju;
- strategije zmanjšanja tveganj;
- protokoli ravnanja ob naravnih in okoljskih nesrečah;
- ocene zmožnosti obvladovanja naravnih nesreč na nacionalnem nivoju;

**Content (Syllabus outline):**

The course will focus on acquiring fundamental knowledge in the field of environmental risks and natural disasters.

**Main topics:**

**Environmental risks:**

- presentation and definition of environmental risk and harmful risk factors in the environment;
- introduction to the risk assessment process;
- case studies on environmental risk assessment and human health risk assessment.

**Natural and environmental disasters:**

- overview of the legal framework for protection against natural disasters;
- introduction to the different types of natural disasters;
- case studies of natural and environmental disasters at both global and national levels;
- mitigation strategies for natural disaster and environmental risk reduction;

- analiza izpostavljenosti in ranljivosti območij;
- metode in kazalniki ocenjevanja tveganj;
- komuniciranje različnih deležnikov ob naravnih in okoljskih nesrečah.

- response protocols and emergency procedures for natural and environmental disasters;
- assessment of national capacities for disaster management;
- analysis of regional exposure and vulnerability;
- risk assessment methodologies and indicators;
- stakeholder communication during natural and environmental disasters.

### Temeljna literatura in viri / Textbooks:

#### Obvezna / Required:

1. Relevantna zakonodaja s področja varstva pred naravnimi nesrečami/ Relevant legislation in the field of protection against natural disasters.
2. Študijsko gradivo v obliki izročkov/ Study materials provided as PowerPoint slides.
3. Praktične smernice za mejne vrednosti za nevarne kemične snovi. Ministrstvo za delo, družino in socialne zadeve, 2006.

#### Priporočena / Recommended:

1. Suter II, G. W., et al., 2016. Ecological Risk Assessment (2nd Edition). CRC Press.
2. Likar, M., 1998. Vodnik po onesnaževalcih okolja. Zbornica sanitarnih tehnikov in inženirjev Slovenije.
3. Guidelines for Ecological Risk Assessment, 1998. EPA/630/R-95/002F.

### Cilji in kompetence:

#### Predmetno specifični cilji in kompetence:

- seznanitev z nekaterimi najpomembnejšimi škodljivimi dejavniki v okolju;
- seznanitev z metodami za ocenjevanje okoljskih tveganj;
- poznavanje zakonodaje, ki obravnava naravne nesreče;
- poznavanje različnih vrst naravnih nesreč;
- razumevanje vzrokov za naravne nesreče;
- seznanitev z metodami za ocenjevanje možnosti pojavljanja naravnih nesreč;
- seznanitev s primeri iz prakse za ocenjevanje tveganj za naravne nesreče;
- seznanitev s primeri iz prakse za obvladovanja naravnih nesreč na lokalnem nivoju (npr. občine).

#### Splošne kompetence:

- sposobnost analize domače in tuje literature;
- prepoznavanje okoljskih tveganj in ogroženosti za naravne nesreče;
- sposobnost kritičnega razmišljanja pri obvladovanju naravnih in okoljskih nesreč.

### Objectives and competences:

#### Subject-Specific Learning Objectives and Competencies:

- to acquaint with the most harmful environmental factors;
- to acquaint with the principal methods used for environmental risk assessment;
- knowledge of the legislative framework governing natural disasters;
- comprehensive knowledge of the various types of natural disasters;
- understanding of the underlying causes and driving factors of natural disasters;
- to acquaint with the methods for assessing the likelihood and potential occurrence of natural disasters;
- to acquaint with risk assessment methods through practical case studies of natural disasters;
- to acquaint with case studies of natural disaster management at the local level (eg., municipalities).

#### General Competencies:

- ability to critically analyse national and international scientific literature;
- ability to identify and assess environmental risks and vulnerabilities related to natural disasters;
- ability to apply critical thinking in the management of natural and environmental disasters.

**Predvideni študijski rezultati:****Znanje in razumevanje:**

Študent bo ob zaključku predmeta sposoben:

- prepoznati najpomembnejše škodljive dejavnike okolja;
- opisati različne vrste naravnih nesreč;
- razumeti in razložiti vzroke za naravne nesreče;
- izdelati osnovni protokol ravnanja ob naravnih in okoljskih nesrečah.

**Prenosljive/ključne spretnosti in drugi atributi:**

- sposobnost uporabe relevantne nacionalne in evropske zakonodaje;
- sposobnost analize, sinteze in obvladovanja metodologije za ocenjevanje okoljskih tveganj in za nevarnost pojavljanja okoljskih nesreč.

**Intended learning outcomes:****Knowledge and understanding:**

At the end of the subject, student will be able:

- to recognize the most harmful environmental factors;
- to identify and classify different types of natural disasters;
- to analyze and explain the underlying causes of natural disasters;
- to design a basic response protocol for natural and environmental disasters.

**Transferable/key skills and other attributes:**

- students will be able to apply relevant national and European legislation;
- students will be able to critically analyze, synthesize, and apply appropriate methodologies for environmental risk assessment and for evaluating the likelihood of environmental disasters.

**Metode poučevanja in učenja:**

- Predavanja
- Seminarske vaje

**Learning and teaching methods:**

- Lectures
- Seminar work

**Načini ocenjevanja:**

Delež (v %) /

Weight (in %)

**Assessment:**

Končno oceno pri predmetu predstavlja ocena pisnega izpita.

100

The final grade for the course is determined by the grade of the written exam.

Ocenjevalna lestvica:

- zadostno 6: 60–67 %
- dobro 7: 68–75 %
- prav dobro 8: 76–83 %
- prav dobro 9: 84–90 %
- odlično 10: 91–100 %

Grading scale:

- Sufficient D (6): 60–67%
- Good C (7): 68–75%
- Very good B (8): 76–83%
- Very good B+ (9): 84–90%
- Excellent A (10): 91–100%

**Materialni pogoji za izvedbo predmeta :**

- Predavalnica z multimedijско opremo.

**Material conditions for subject realization:**

- Classroom with multimedia facilities.

**Obveznosti študentov:**

- Obvezna prisotnost na seminarskih vajah.

**Student's commitments:**

- Obligatory presence on seminar work.

**Reference nosilca predmeta:****Pedagoško delo:**

- Nosilka predmetov »Okoljska tveganja in varstvo pri delu« in »Okoljski projektni praktikum« ter soizvajalka predmetov »Okoljski monitoring« in »Bioindikacija in biomonitoring«, ki se izvajajo na *Fakulteti za varstvo okolja*.
- Nosilka dveh predmetov magistrskega študija: »Projektno delo v biologiji in ekologiji« in »Bioindikacija in biomonitoring« na Univerzi v Mariboru (*Fakulteta za naravoslovje in matematiko, (FNM), Oddelek za biologijo*).
- Soizvajalka predmeta »Biološki monitoring«, ki se izvaja na Univerzi na Primorskem (*Fakulteta za*

**Lecturer's references:****Pedagogic activities:**

- Holder of the subjects: "Ecological risks and work safety", "Environmental project practicum« and co-holder of subjects: "Environmental monitoring" and "Bioindication and biomonitoring" at *Faculty of Environmental Protection*.
- Holder of two subjects (master's degree programme): "Bioindication and biomonitoring" and "Project work in biology and ecology" at the University of Maribor (*The Faculty of Natural sciences and Mathematics, Department of Biology (FNM)*).
- Co-holder of subjects: "Biomonitoring" at the University of Primorska (*The Faculty of Mathematics, Natural*

matematiko, naravoslovje in informacijske tehnologije, (Famnit), Varstvo narave, II. stopnja) Univerze na Primorskem.

#### Znanstveno-raziskovalno in strokovno delo:

Osnovna področja so:

- ocene tveganja za okolje z uporabo receptorskih organizmov (npr. mali sesalci, ptice pevke);
- raziskave vplivov vojaške dejavnosti na okolje;
- analiza tveganj zaradi okoljskih in naravnih nesreč na območjih delovanja Slovenske vojske,
- vpliv linijske infrastrukture na prostoživeče živali;
- okoljski monitoringi ob prometnicah;
- monitoringi učinkovitosti ukrepov za zmanjšanje povoza divjadi;
- bioindikacija onesnaženosti vodnih in kopenskih ekosistemov z uporabo izbranih bioindikatorskih organizmov;
- raziskave vpliva onesnaženega zraka (prašnih delcev) na zdravje ljudi.

#### Strokovno delo in izbrane strokovne publikacije:

- Kotnik K., Al Sayegh Petkovšek, S., 2025. Ocena ranljivosti območij na katerih so prisotna vojaška skladišča z vidika potencialnih incidenčnih dogodkov s skladiščnimi snovmi; DP-FVO-209-01/2025. Fakulteta za varstvo okolja, Velenje.
- Kotnik K., Al Sayegh Petkovšek, S., 2025. Protokol ravnanja ob nesrečah na območjih delovanja Slovenske vojske; DP-FVO-03/2025, Fakulteta za varstvo okolja, Velenje.
- Špeh N., Kotnik K., Mrak I., 2025. Prostorsko in okoljsko degradirana območja zaradi pridobivanja in rabe premoga. Fakulteta za varstvo okolja, Velenje.
- Kotnik K., Al Sayegh Petkovšek, S., 2024. Kartografski prikaz in ocena verjetnosti pojavljanja naravnih nesreč na območjih delovanja Slovenske vojske; DP-FVO-209-04/2024. Fakulteta za varstvo okolja, Velenje.
- Al Sayegh Petkovšek, S., Mazej Grudnik, Z., Orešnik, K., Jelenko, I., Iršič A., 2012. Ocena ranljivosti za okolje Šaleške doline. ERICo Velenje, DP 17/02/12.

Sciences and Information Technologies (Famnit); Nature Conservation, master's).

#### Scientific–research and professional work:

Main research fields are:

- environmental risk assessments using receptor organisms (e.g., small mammals, songbirds);
- studies on the environmental impacts of military activities;
- risk assessments due to environmental and natural disasters in areas impacted by military activities of Slovenian Army;
- assessment of the effects of linear infrastructure on wildlife;
- environmental monitoring along transportation routes;
- evaluation of the effectiveness of measures aimed at reducing wildlife-vehicle collisions;
- bioindication of pollution in aquatic and terrestrial ecosystems through selected bioindicator species;
- studies on the effects of air pollution (particulate matter) on human health.

#### Professional work and selected professional publications:

- Kotnik K., Al Sayegh Petkovšek, S., 2025. Assessment of the vulnerability of areas containing military storage facilities with respect to potential accidental incidents involving stored materials. DP-FVO-209-01/2025. Faculty of Environmental protection, Velenje.
- Kotnik K., Al Sayegh Petkovšek, S., 2025. Protocol for action in case of accidents in areas of operation of the Slovenian Armed Forces; DP-FVO-03/2025 Faculty of Environmental protection, Velenje.
- Špeh N., Kotnik K., Mrak I., 2025. Spatially and environmentally degraded areas due to coal extraction and use. Faculty of Environmental protection, Velenje.
- Kotnik K., Al Sayegh Petkovšek, S., 2024. Cartographic representation and assessment of the likelihood of natural disasters in areas of operation of the slovenian armed forces; DP-FVO-209-04/2024. Faculty of Environmental protection, Velenje.
- Al Sayegh Petkovšek, S., Mazej Grudnik, Z., Orešnik, K., Jelenko, I., Iršič A., 2012. Vulnerability assessment of the Šalek Valley. ERICo Institute, Velenje, DP 17/02/12.

#### Izbrani znanstveni članki / Selected scientific papers:

Al Sayegh Petkovšek, S., Kopušar, N., Pokorny, B., Tome, D., Kryštufek, B., 2017. Prehod kovin iz tal v tkiva izbranih vrst prostoživečih živali: primer Velikega Vrha. *Acta silvae et ligni*, 114: 1-20.

Al Sayegh Petkovšek, S., Kopušar, N., Tome, D., Kryštufek, B., 2015. Risk assessment of metals and PAHs for receptor organisms in differently polluted areas in Slovenia. *Science of the Total Environment*, vol. 532, str. 404-414.

Al Sayegh Petkovšek, S., Mazej Grudnik Z., Pandics T., Paldy, A., 2014. Assessment of health effects of ozone, PM2.5 and PM10 in the Šalek Valley (Slovenia) in comparison with selected Central European areas. *Central European Journal of Occupational and Environmental Medicine*, vol. 20 (1-2): 103-118.

Al Sayegh Petkovšek, S., Kopušar, N., Kryštufek, B., 2014. Small mammals as biomonitors of metal pollution: a case study in Slovenia. *Environmental monitoring and assessment*, vol. 186, iss. 7, str. 4261-4274.

Al Sayegh Petkovšek, S., Mazej, Z., Pokorny, B., 2012. Heavy metals and arsenic concentrations in ten fish species from the Šalek lakes (Slovenia): assessment of potential human health risk due to fish. *Environmental monitoring and assessment*, vol. 184, no. 5, str. 2647-2662.