UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Izbrana poglavja iz tehnologij za okolje
Course title:	Environmental Technologies – Selected Topics

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekotehnologije, 3. stopnja	/	1	1
Ecotechnologies, 3rd cycle	/	1	1

Vrsta predmeta / Course type	Izbirni / Elective
Univerzitetna koda predmeta / University course code:	EKO3-744

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	**30**			**30**	**210**	**10**

**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 transfered to individual work.*

Nosilec predmeta / Lecturer:	Prof. dr. Peter Glavič

Jeziki / Languages:	**Predavanja / Lectures:**	Slovensko in angleško Slovenian and English
	Vaje / Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Znanje, ki je ekvivalentno izobrazbi druge stopnje ali univerzitetni izobrazbi s področja naravoslovja ali tehnologije.	Knowledge, which is equivalent to a second level or university degree from a natural science, engineering or technology

Vsebina:	**Content (Syllabus outline):**
• Pomen okoljske trajnosti v trajnostnem razvoju • Minimiranje odpadkov, ničelni odpadki (definicije, načrtovanje, organizacija, ovrednotenje alternativ, študija možnosti, izvajanje izbranega projekta) • Termodinamska metoda minimiranja porabe energije, snovi in voda (analiza uščipa, učinkovitost virov) • Virsko učinkovita in čistejša proizvodnja • Kritične surovine, industrijska ekologija, krožno gospodarstvo • Poznavanje in uveljavljanje ekotehnoloških zahtev za izbrane procese in opremo • Zasnova in kritična analiza masnih in energijskih bilanc procesov	• The role of environmental sustainability in the sustainable development • Minimizing wastes, zero waste (definitions, planning, organization, the evaluation of alternatives, study of possibilities, implementation of selected project) • Thermodynamic method of minimizing the consumption of energy, materials, and water (pinch analysis, resource efficiency) • Resource efficient and cleaner production • Critical raw materials, Industrial ecology, circular economy • Knowledge and enforcement of ecotechnological requirements for the selected processes and equipment

• Primerjalna analiza parametrov za ekonomsko oceno procesov, merjenje trajnostnega razvoja	• Concept and critical analysis of the mass and energy balances of processes • Comparative analysis of parameters for economic assessment of processes, sustainability metrics.

Temeljni literatura in viri / Readings:

- S. Fränzle, B. Markert, S. Wünschmann, Introduction to Environmental Engineering, Wiley-VCH Verlag, 2012
- Towards the Circular Economy, 1–3, Ellen McArthur Foundation, 2013–2014
- T. E. Graedel, B. R. Allenby, Industrial Ecology and Sustainable Engineering, Pearson, 2010
- C. Lancaster, Textbook of Energy and Environmental Engineering, Syrawood Publishing House, 2016
- Kubiszewski e tal., Beyond GDP: Measuring and achieving global genuine progress, Ecological Economics, 93 (2013) 57–68
- J. Fresner et al., Promoting resource efficiency in small and medium sized enterprises, UNEP, 2010
- Ad hoc Working Group, Report on critical raw materials for the EU, European Commission, 2014.

Cilji in kompetence:	**Objectives and competences:**
Cilj predmeta je omogočiti podiplomcem izbiro in obvladovanje izbranih tehnologij za zaščito okolja. <u>Splošne kompetence:</u> • obvladanje izbranih raziskovalnih metod, postopkov in procesov • razvoj kritične in samokritične presoje • sposobnost uporabe znanja v praksi • kooperativnost, delo v skupini • industrijska relevantnost	The aim of the course is to enable postgraduates to select and manage the selected environmental protection technologies. <u>General Competences:</u> • The student will master selected research methods, procedures and processes • The student will develop critical thinking and self-assessment • The student will develop communication skills to present research results in an international environment • The student will be able to cooperate in a team

Predvideni študijski rezultati:	**Intended learning outcomes:**
• Razumevanje predmetnega področja • Predmet pripravlja študente za delo na predmetnem področju.	• The student will understand this field of research • The course prepares students to work in this field of work.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Ustni izpit, v katerem kandidat dokaže poznavanje in razumevanje temeljnih vsebin predmeta in predstavi njihovo vključevanje v svoj raziskovalni projekt. K predstavitvi seminarske naloge so vabljeni vsi sodelavci pri predmetu in v projektu.	Seminar and oral exam, in which the candidate demonstrates his/her knowledge and understanding of the essential course content, and presents how this new knowledge can be included in his/her research project – in front of the course students and project colleagues.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Predstavitev seminarske naloge	60 %	Seminar work presentation
Uspešen ustni zagovor	40 %	Oral exam

Reference nosilca / Lecturer's references:

- J. Dlouha, P. Glavič, A. Barton, Higher education in Central European countries – Critical factor for sustainability transition, J. Clean. Prod., 151, 670–684, 2017, ISSN 0959-6526.
- J. Petek, P. Glavič, A. Kostevšek, Comprehensive approach to increase energy efficiency based on versatile industrial practice, J Clean Prod, 2016, 112, 2813–2821, ISSN 0959-6526.
- R. Kovačič Lukman, P. Glavič, A.Carpenter, P. Virtič, Sustainable consumption and production – Reasearch, experience, and development – The Europe we want, J Clean Prod, 2016, 138, 139–147, ISSN 0959-6526.
- P. Glavič, Chemical and Process Industries beyond Gross Domestic Product, Chemical Engineering Transactions, 45, 1801–1806, 2015, ISSN 2283-9216.
- P. Glavič, The 12 Key Issues of Sustainable Engineering, Proceedings of the 18th European Roundtable of Sustainable Consumption and Production, ERSCP 2017, Grafima Publications, Thessaloniki, ISBN 978-618-5271-14-4, 304–315