



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION

Predmet:	Alternativne energije in energetika
Subject Title:	Alternative Energy and Energetic

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Tehnika – področje izobraževanja, 3. stopnja		2	zimski / poletni <i>ali</i>
		3	poletni
Education in Engineering, 3 rd cycle		2	winter / summer <i>or</i>
		3	summer

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Labor work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
10	5				75	3

Nosilec predmeta / Lecturer:

Boris Aberšek

Jeziki /

Languages:

Predavanja / Lecture:

Vaje / Tutorial:

Slovenščina / Slovene

Pogoji za opravljanje študijskih obveznosti:

Osnovno znanja o energijah in energetiki

Prerequisites:

Basic knowledge of energy and energy production.

Vsebina:

Predavanja:

- Konvencionalni in alternativni viri energije;
- Konvencionalne in nekonvencionalne oblike pridobivanja energij;
- Energetika in okolje;
- usklajevanje želja, potreb in možnosti v energetske sektorju;
- Energetika v prihodnosti - scenariji;
- Uporaba sodobnih nano tehnologij na področju energetike,
- Energetika in transport;
- Energetika in planet zemlja.

Seminar:

Seminar aplikativno dopolnjuje vsebino predavanj z reševanjem praktičnih izzivov in problemov.

Content (Syllabus outline):

Lectures:

- Traditional and alternative source of energy;
- Traditional and alternative way of energy production;
- Energy and surrounding;
- reconciliation of wish and possibilities at the energetic sector;
- Energy in future - scenarios;
- Use of advance nano technologies at the energetic sector;
- Energy and the transport;
- Energy and the planet Earth.

Seminar:

Seminar work supplements the lectures with the solutions of the practical problems.

Temeljni literatura in viri / Textbooks:

Aberšek, B., *Energije in energetika*, Pedagoška fakulteta, Maribor, 1999
 Berinstein, P., *Alternative Energy: facts, Statistic, and Issue*, Oryx Press, 2007
 Myer Kutz, M. (2007). *Environmentally Conscious Alternative Energy Production*. John Wiley & Sons, Inc.
 Boyle, G., *Renewable Energy*, Oxford University Press, 2004
 Medved, s., Novak, P. *Varstvo okolja in obnovljivi viri energije*, Ljubljana, Fakulteta za strojništvo, 2000

Cilji:

analizirati in evalvirati znanja in informacij o sodobnih obnovljivih virih energije v tehnični praksi ter sodobnih tehnologijah, ki se danes vse pogosteje uporabljajo za pridobivanje in pretvarjanje in shranjevanje energij;
 analizirati poglobljeno teoretično znanje s področja vrednotenja in izbire posameznih energentov in njihovega izkoriščanja;
 analizirati praktično uporabo predhodno pridobljenih teoretičnih znanj na praktičnih primerih s posebnim poudarkom na varovanje okolja varnem in varčnem koriščenju energije;
 spodbujati študente k kreativnemu in samostojnemu razmišljanju in razvijanju sposobnosti za kreativno reševanje inženirskih problemov s področja energetike in ekologije.

Objectives:

To analyse and evaluate knowledge and information about new renewable energy sources used in technical praxes as modern technologies, used for production, transformation and accumulation of energies;
 to analyse detailed theoretical knowledge from area of assessment and selection of different energy sources and their exploitations;
 to analyse practical use of previously accumulated theoretical knowledge on the practical examples with specially stress on the ecology and .safe and economical use of energy;
 to encourage the students to creative and independent thinking for developing and solving different problems from power supplied and ecology.

Predvideni študijski rezultati:Znanje in razumevanje:

razumeti in evalvirati splošne napotke in pravil za izbiro energentov in ustreznih energetskega pretvornikov;
 razumevanje načinov za učinkovito načrtovanje energetskega procesa;
 razumevanje metod in smernic za tehnološki razvoj energetike;
 razumevanje in kritično presojanje soodvisnosti med proizvodnjo energije in varovanjem okolja;
 evalviranje sodobnih računalniških metod za tehnološko načrtovanje energetske proizvodnje;
 razumevanje sovisnosti različnih znanj in postopkov ter pomena uporabe strokovne literature in računalniških sistemov za učinkovito reševanje praktičnih problemov.

Prenesljive/ključne spretnosti in drugi atributi:

uporaba informacijske tehnologije: uporaba orodij za izdelavo predstavitev energetskega načrta;
 reševanje problemov: ocenjevanje obstoječih in lastnih tehnoloških rešitev;
 kombinirana uporaba različnih znanj za reševanje praktičnih problemov;

Intended learning outcomes:Knowledge and understanding:

understanding and evaluation of general instructions and rules for selecting energy sources and suitable power technologies;
 understanding for effective planning of power supplied technologies;
 understanding of methods and guidelines for technological power production development;
 Understanding about connection between energy production and environment prevention;
 evaluation of advanced computer aided methods for technological planning of the power production;
 understanding of relationships between different skills and procedures and importance of professional literature and computer systems for efficient solutions of practical problems.

Transferable/Key Skills and other attributes:

use of information technology: use of tools for creating and designing technological power process;
 problem solving: evaluation of existing and proper program solutions;
 combined use of different skills for solution of practical problems;

načrtovanje tehnologije za pridobivanje energij z uporabo sodobnih metod.

design of technology for production of energy using advanced approaches.

Metode poučevanja in učenja:

frontalna predavanja,
skupinsko delo;
izdelava seminarske naloge,
diskusije v elektronskem forumu,
e-učenje.

Teaching and learning methods:

frontal lectures,
work in small groups;
seminar work,
discussion in electronic forums,
e-learning.

Načini ocenjevanja:

Delež (v %) /
Weight (in %)

Assessment methods:

Način (pisni izpit, ustno izpraševanje, naloge, projekt):

diskusije v elektronskem forumu,
seminarska naloga,
pisni izpit,
ustni izpit.

20 %
40 %
20 %
20 %

Type (examination, oral, coursework, project):

discussion in electronic forums,
seminar work,
written examination,
oral examination.

Reference nosilca / Lecturer's references:

FIKSL, Majda, FLOGIE, Andrej, ABERŠEK, Boris. Innovative teaching/learning methods to improve science, technology and engineering classroom climate and interest. *Journal of Baltic science education*, ISSN 1648-3898, 2017, vol. 16, no. 6, str. 1009-1019,

ABERŠEK, Boris. Schola ludus. *Journal of Baltic science education*, ISSN 1648-3898, 2016, vol. 15, no. 5, str.

ABERŠEK, Boris, FLOGIE, Andrej. *Tehniško izobraževanje in inženirska pedagogika*. 1. izd. Maribor: Univerzitetna založba Univerze, 2019. IV, 204 str

ABERŠEK, Boris. *Problem-based learning and proprioception*. Newcastle upon Tyne: Cambridge Scholars Publishing, 2018. IX, 215 str.,