

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

Predmet:	UČINKOVITA RABA ENERGIJE
Course title:	EFFICIENT USE OF ENERGY

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Upravljanje podeželja, 1. stopnja	-	3.	5./6.
Landscape management, 1 st level	-	3.	5./6.

Vrsta predmeta / Course type izbirni / elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	-	30	-		90	5

Nosilec predmeta / Lecturer: Matjaž Glavič

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

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

Ni pogojev.

Prerequisites:

None.

Vsebina:

- Uvod:
Vsebina predmeta daje osnovno informacijo o tem, da energije in materiali niso samo po sebi dane dobrine. Z njimi moramo ravnati zavestno varčno, ker so zaloge energij in materialov v naravi končne in bodo v prihodnosti vse dražje, vplivi na okolje zaradi rabe energij in snovi za proizvode pa vse bolj intenzivni. Stroški za energije in materiale bodo obsegali vse večji delež v končni ceni izdelkov, tudi zaradi stroškov zmanjševanja škodljivih izpustov in odprave škod v okolju. Študenti osvojijo znanje o pripravah energij, o globalni in lokalni oskrbi z energijami, sistemih za oskrbo in kako uporaba energij in materialov vpliva na okolje. Znajo določiti količino in vrednost energij, ki so vložene v izdelke. Dobijo osnovne informacije o postopkih za zniževanje rabe energij, kako znižujemo energijsko intenzivnost procesov in proizvodov. ter razlogih za vplive na okolje zaradi izdelave in razgradnje izdelkov. Spoznajo procesne sisteme in okolje ter dolgoročno načrtovanje sistemov in metode dobre prakse. V nadaljnjem študiju morajo študenti znati uporabljati opisana dejstva in biti sposobni samostojno presojati o energetske intenzivnosti oz. URE pri procesih s katerimi se bodo spoznavali v študiju in pozneje v praksi. Vsako načrtovanje novih izdelkov v bodočnosti bo pogojeno s takimi presojami tem bolj v času zaostrovanja razmer na trgu razpoložljive energije in okoljevarstvenih

Content (Syllabus outline):

Introduction:
Course content provides basic information about the energy and materials not in itself made goods. They should act consciously economical, since stocks of energy and materials in the nature of the final and will in the future increasingly expensive, the environmental impacts of energy use and material for the products and all the more intense. Costs for energy and materials will include an increasing share of the final price of products, including the cost of reducing harmful emissions and eliminate damage to the environment. Students gain knowledge about the preparation energies of the global and local supply with energy supply systems and how to use energy and materials impact on the environment. They are able to determine the amount and value of the energy deposited into the products. Obtain basic information on the procedures for reducing energy use, how lowering the energy intensity of processes and products. and the reasons for the environmental impacts of production and decomposition products. Learn about the process systems and the environment and long-term planning systems and methods of good practice. In further studies, students are able to use the described facts and be able to independently assess the energy or intensity. WATCH the processes by which they learn about the study and later practice. Each design new products in the future



mednarodnih dogovorov in obvez.

- Učinkovita raba energije pri pretvorbah v industriji
- Učinkovita raba energije v stavbah
- Možnosti trajnostne oskrbe z energijo
- Racionalna raba snovi in ravnanje z odpadki
- Trajnostni razvoj - ekonomski, okoljski in socialni del
- Učinkovita raba snovi in energije v procesih - trajnostne tehnologije in LCA.
- učinkovita raba energije in njen vpliv na okolje (splošno) ter zakonodajni vidik (Globalne smernice, direktive EU in Uredbe v RS ter njihova uporaba v vsakdanji praksi)
- URE v povezavi s znanstvenimi spoznanji (metode in aplikacije) v gospodarskih panogah (gradnja objektov, sistemi toplote in rekupuracije, Smart grid in Smart metering v energetiki, energetska pregledi, energetska izkaznica, itd.)
- URE v kmetijski dejavnosti v povezavi z alternativnimi viri energije, SPTE, TČ...

Predstavitev rezultatov projektne dela:

Predstavitev rezultatov projektne dela v obliki timskega kreativnega dela na reševanju konkretnih tehničnih problemov s področja procesne tehnike.

will be subject to such assessments during the more aggravated situation on the market of available energy and environmental international agreements and commitments.

- Efficient use of energy transformations in the industry
- Efficient use of energy in buildings
- Options sustainable energy supply
- Rational use of materials and waste
- Sustainable development - economic, environmental and social works
- Efficient use of materials and energy in the process - sustainable technologies and LCA.
- Efficient use of energy and its impact on the environment (general) and legal aspects (Global Guidelines, the EU Directive and Regulation in the Republic of Slovenia and their use in daily practice)
- Efficient use of energy in conjunction with scientific knowledge (methods and applications) in the industry (construction of facilities, systems and heat recuperation, Smart Grid and Smart Metering in the Energy Sector, energy audits, energy performance certificate, etc.).
- Efficient use of energy in agricultural activities in conjunction with alternative energy sources, heat pumps ...

Presentation of the results of project work:

Presentation of the results of project work in the form of a creative team working on solving specific technical problems in the field of process engineering.

Temeljni literatura in viri / Readings:

- (1) Sašo Medved, Peter Novak: **Varstvo okolja in obnovljivi viri energije**, Fakulteta za strojništvo, Ljubljana, 2000
- (2) Peter Novak, Sašo Medved: **Energija in okolje**, Svet za varstvo okolja Republike Slovenije, 2000
- (3) Sašo Medved: **Gradbena fizika**, Fakulteta za arhitekturo, Ljubljana, 2010
- (4) Energetska učinkovitost in energetska izkaznica stavb

Cilji in kompetence:

Cilji: Cilj predmeta je seznaniti študenta z osnovami učinkovite rabe energije in ga seznaniti za načelno uporabo inženirskih orodij ob hkratnem utrjevanju zavestnega pristopa k reševanju problemov procesne tehnike. Razumevanje osnovnih operacij, ki temeljijo na energijskih tokovih ter fazno ravnovesnih pojavih.

Kompetence: Predmet razvija predmetno specifične sposobnosti samostojnega učenja in osebne ter profesionalne rasti, kreativnost, komunikativnost, sposobnost za timsko delo, sposobnost upoštevanja etičnega kodeksa ter profesionalne, etične in okoljske odgovornosti. Osvojene kompetence predstavljajo podlago za delo študenta v okolju . Študent spozna principe in osvoji metode za delo na področju uporabe metod, sistemov URE s ciljem dobiti učinkovite produkte.

Objectives and competences:

Objectives: The objective of this course is to acquaint students with the basics of energy efficiency and pair of principle using engineering tools, while strengthening conscious approach to problem solving, process engineering. Understanding the basic operations that are based on energy flows and phase equilibrium phenomena.

Competences: The course subject-specific skills for independent learning and personal and professional growth, creativity, communication skills, ability for teamwork, ability to consider a code of ethics and professional, ethical and environmental responsibility. Learned competencies form the basis for the work of the student in the environment. Students learn the principles and methods to win work in the field of application of the methods, systems Efficient use of energy in order to get efficient products.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Študenti pridobijo poglobljeno vedenje o URE ter pri tem prepoznajo principe delovanja različnih sistemov, ki vplivajo na kakovost bivanja v okolju.
- Študenti znajo praktično uporabljati pridobljene veščine v praksi (varčne sijalke, upravljanje z inverterskimi napravami, optimalne nastavitve...).
- Študenti se znajo vključiti v širše razprave in politike URE ter kompetentno predlagajo izboljšave v okolju, kjer delujejo.
- Študenti bodo po uspešno dokončanih študijskih obveznostih sposobni razumeti ter uporabiti in prenesti pridobljena znanja in veščine v prakso.

Intended learning outcomes:

Knowledge and understanding:

- Students gain in-depth knowledge of the time and in this identify operating principles of the various systems that affect the quality of life in the environment.
- Students are able to practically apply acquired skills in practice (energy-saving lamps, with inverter control devices, optimal settings ...).
- Students are able to integrate into the wider debates and policies HOURS competently and to suggest improvements in the environment in which they operate.
- Students will be successfully completed study obligations, able to understand and apply and transfer the acquired knowledge and skills into practice.

Metode poučevanja in učenja:

Predavanja z uporabo sodobnih multimedijских pripomočkov. Metode poučevanja bodo avditorne s poudarkom na vključevanju konkretnih naprednih industrijskih rešitev posameznih procesnih sistemov. Laboratorijske vaje so zasnovane na sodobnem prikazu osnovnih postopkov procesne tehnike ob uporabi laboratorijske opreme in tako omogočajo lažje praktično razumevanje in utrjevanje na predavanjih posredovanega znanja. V obliki timskega dela študentje rešujejo konkreten primer iz energetskega procesnega okolja s predstavitvijo.

- e-izobraževanje (e-predavanja in e-vaje se lahko izvajajo v virtualnem elektronskem učnem okolju ali s pomočjo posebej v ta namen didaktično pripravljenih e-gradiv v virtualnem elektronskem učnem okolju)

Learning and teaching methods:

Lectures using modern multimedia devices. Teaching the auditorium with an emphasis on the integration of advanced industrial concrete solutions to the various process systems. Laboratory exercises are designed in a modern display unit operations processing techniques using laboratory equipment and also facilitate a practical understanding and consolidate the class-mediated knowledge. In the form of teamwork students solve a concrete example from the energy process environment with the presentation.

- e-learning (e-lectures and e-tutorials may be held in a virtual electronic learning environment or with the help of specially designed e-material in a virtual electronic learning environment)

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
pisni izpit	70 %	examination,
projekt/seminarska naloga	30 %	project / seminarska naloga

Reference nosilca / Lecturer's references:

NEMČEK, Peter, BIZJAK, Mitja, MARINŠEK, Zoran, FILIPIČ, Bogdan, GAMS, Matjaž, ŠEF, Tomaž, PODBELŠEK, Igor, GLAVIČ, Matjaž, VOLF, Igor, KUNAVAR, Rado, KOPAČ, Jože, SABOL, Štefan. Razvoj e-storitev za optimiranje pretokov električne energije. *EGES : energetika, gospodarstvo, ekologija Slovenije*. 2008, letn. 12, št. 4, str. 58-61. ISSN 1408-2667. [COBISS.SI-ID [22470439](#)]

NEMČEK, Peter, BIZJAK, Mitja, MARINŠEK, Zoran, FILIPIČ, Bogdan, GAMS, Matjaž, ŠEF, Tomaž, PODBELŠEK, Igor, GLAVIČ, Matjaž, VOLF, Igor, KUNAVAR, Rado, KOPAČ, Jože, SABOL, Štefan. Razvoj e-storitev za optimiranje pretokov električne energije v distribucijskem omrežju s prilaganjem odjema in razpršene proizvodnje. V: ZAJC, Baldomir (ur.), TROST, Andrej (ur.). *Zbornik sedemnajste mednarodne Elektrotehniške in računalniške konference ERK 2008, 29. september - 1. oktober 2008, Portorož, Slovenija*. Ljubljana: IEEE Region 8, Slovenska sekcija IEEE, 2008. Zv. a, str. 287-290. Zbornik ... Elektrotehniške in računalniške konference ERK ... ISSN 1581-4572. [COBISS.SI-ID [22079527](#)]

OMAHEN, Gregor, SOUVENT, Andrej, KOSMAČ, Janko, PODBELŠEK, Igor, GLAVIČ, Matjaž. *Izdelava ocene optimalne tržne izrabe upravljanja s porabo industrijskih odjemalcev Elektra Ljubljana : študija št. 2052*. Ljubljana: Elektroinštitut Milan Vidmar, julij 2010. 41 str. [COBISS.SI-ID [36876549](#)]