

UČNI NAČRT PREDMETA / SUBJECT SPECIFICATION

Predmet:	Energetsko varčna gradnja
Subject Title:	Economical energetic building

Študijski program Study programme	Letnik Year	Semester Semester
Varstvo okolja in ekotehnologije	2	2 ali 3

Predavanja Lectures	Sem. vaje Tutorial	Lab. vaje Lab. work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
20	15	15		130	6

Nosilec predmeta / Lecturer: izr. prof. dr. Željko Vukelič / Željko Vukelič, Ph.D., Associate Prof.

Jeziki / SL Languages:	Predavanja /	20
	Lectures:	
	Vaje / Tutorial:	30

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

Osnovna znanja iz srednješolske fizike (toplote in termodinamike)

Prerequisites:

Basic knowledge from high-school physics (heat and thermodynamics)

Vsebina:

Content (Syllabus outline):

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- OSNOVNI GRADBENI POSTOPKI
- ENERGETSKA PORABA STAVBE
- FIZIKALNI PRINCIPI PRENOSA TOPLOTE V ZGRADBAH
- IZOLACIJA ZGRADB IN MATERIALI
- SISTEMI OGREVANJA IN HLAJENJA
- AKTIVNA IN PASIVNA ZGRADBA
- REVERZIBILNI SISTEMI
- KOMBINIRANI SISTEMI
- ENERGETSKA IZKAZNICA ZGRADBE
- TRAJNO VARČEVANJE Z ENERGIJO V ZGRADBAH

- Basic construction procedures
- Energy consumption of a building
- Physical principles of heat transfer in buildings
- Heat isolation of buildings and isolation materials
- Heating and cooling systems
- Active and passive construction
- Reversible systems
- Combined systems
- Energy card of a building?
- Permanent energy saving at buildings

Temeljni literatura in viri / Textbooks:

1. NOVAK, P. : Energetsko varčna gradnja, Gradbena založba Ljubljana, 2007;
2. BORUTA, A.: Energetska izkaznica zgradbe, TZS, Ljubljana, 2008;
3. SALOBIR, Boris. Warming with geothermal energy.. *Šolski center Velenje*, 2008.
4. SALOBIR, Boris. Consumption of Dry Geothermal Energy, -, *Krško, februar*, 2009.
5. SALOBIR, Boris. *Izraba geotermalne energije za ogrevanje : Primorje d.d. Ajdovščina.*, 2006.
6. SALOBIR, Boris. *Trajnostni in sonaravni razvoj: Šolski center Velenje*, 2007.

Cilji:

- Študenti se seznanijo z vrstami modernih in starejših gradenj in podrobneje spoznajo fizikalne principe porabe energije in prenosa toplote.
- Spoznajo postopke in metode doseganja energetske varčne zgradbe, usposobijo se za preračun energetske porabe stavbe in znajo izbrati ustrezne sisteme ogrevanja in hlajenja.
- Zavedajo se pomena varčevanja z energijo v zgradbah.

Objectives:

- Students get acquainted with kinds of older and newer kinds of constructions and get thoroughly acquainted with energy and heat transmission
- They get acquainted with procedures and methods of achieving energy efficient structures, qualify for calculating a buildings' energy consumption and can select appropriate heating and cooling systems
- They are aware of the purpose of saving energy in buildings

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent naj bo ob zaključku tega predmeta sposoben izdelati energetska elaborat stavbe, z upoštevanjem vhodnih in izhodnih parametrov ogrevanja, hlajenja in uporabe drugih virov energije, vključevanja v širše sisteme ali samostojne pasivne objekte in znati analizirati postopke, ter argumentirati in sintetizirati svoje odločitve, ter jih energetske in finančno ovrednotiti.

Prenesljive/ključne spretnosti in drugi atributi:

- Uporaba literature kot virov podatkov,
- Uporaba in razumevanje priročnikov za izolacije in porabo energije,
- Analiza in interpretacija dobljenih podatkov,
- Prikaz podatkov s preglednicami in diagrami,
- Uporaba računskih postopkov kot dokazov pravilne izbire energetske rešitve.

Intended learning outcomes:

Knowledge and Understanding:

At the end of the subject, the student should be able to create an energy elaborate of a building, taking into account incoming and outgoing parameters of heating, cooling and using other sources of energy, taking part of bigger systems or standalone passive objects and can analyze procedures, plus argument and synthesise their decisions, which they must also be able to energetically and financially evaluate.

Transferable/Key Skills and other attributes:

- Use of literature as a source for data
- Use and understanding of manuals for isolation and energy consumption
- Analysis and interpretation of accumulated data
- Display of data with charts and diagrams
- Use of math procedures as proof of the right choices of energy solutions

Metode poučevanja in učenja:

- Frontalni način predavanja,
- Prikaz z vizualnimi sredstvi,
- Ogledi na terenu in vaje
- Izvajanje osnovnih meritev,
- Delo v skupinah pri seminarских nalogah,

Learning and teaching methods:

- Frontal teaching
- Display of visual sources
- On-terrain experience and exercises
- Basic measuring exercises
- Group work on term papers

Načini ocenjevanja:**Način (pisni izpit, ustno izpraševanje, naloge, projekt)**

- 50% pisni izpit
- 40% projektna ali seminarska naloga
- 10 % terenske vaje in meritve

Delež (v %) /

Weight (in %)

Assessment:

- Type (examination, oral, coursework, project):
- Written exam
- Term paper
- Terrain exercises and measurements

Materialni pogoji za izvedbo predmeta :

- Predavalnica z multimedijško opremo,
- Merilni inštrumenti (infrardeči termometer, po možnosti termična kamera na izposojlo za vaje,

Material conditions for subject realization:

- Multimedia equipped classroom
- Measure instruments (infrared thermometer, thermal imaging camera for terrain exercises)

Obveznosti študentov:

(pisni, ustni izpit, naloge, projekti)

- Vsaj 80 % prisotnost na predavanjih
- 100 % prisotnost na vajah,
- Izdelana in pozitivno ocenjena seminarska naloga

Student's commitments:

(written, oral examination, coursework, projects):

- At least 80% attendancy
- 100% attendancy of field exercises
- A completed and succesfully marked term paper

Sestavlil: doc. dr. Boris Salobir, 7.7.2009