

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet: Prenos toplote in snovi
Course title: Heat and mass transfer

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi – prva stopnja	Tehnologije in sistemi	tretji	peti
Technologies and systems – 1st cycle	Technologies and systems	third	fifth

Vrsta predmeta / Course type

modularni/modular

Univerzitetna koda predmeta / University course code:

TS M1 UN1

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Laboratorijske vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		15	15		100	6

Nosilec predmeta / Lecturer:

prof. dr. Ivan Bajsić

**Jeziki /
Languages:**

**Predavanja /
Lectures:** slovenski/Slovenian

Vaje / Tutorial: slovenski/Slovenian

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

- vpis v tretji letnik študija,
- znanje vsaj enega tujega jezika (angleščina),
- študent(ka) naj pripravi vsaj eno seminarsko nalogo, ki jo predstavi pred občinstvom (študenti, profesorji).

Prerequisites:

- enrollment in the third year of study,
- knowledge of at least one foreign language (English),
- the student should prepare at least one seminar assignment to present in front of the audience (students, professors).

Vsebina:

- zakoni ohranitve mase in energije,
- mehanizmi prenosa toplote (prevod, prestop, sevanje),
- stacionarni in nestacionarni prenos toplote,
- prenos toplote skozi konstrukcijske elemente,
- prenosniki toplote,

Content (Syllabus outline):

- laws of mass and energy conservation,
- mechanisms of heat transfer (conduction, transmission, radiation),
- stationary and non-stationary heat transfer,
- heat transfer through structural elements,
- heat exchangers,

- analogija prenosa toplote in prenosa snovi,
- prenos snovi (difuzivni, konvektivni).

- analogy of heat transfer and substance transfer,
- substance transfer (diffusive, convective).

Temeljni literatura in viri / Readings:

Temeljna literatura/Basic literature

Muhič, S. (2017) *Prenos toplote in snovi v stavbah. 1. izd.* Novo mesto: Fakulteta za tehnologije in sisteme.

Incropera, Frank (2007): *Fundamentals of heat and mass transfer*: Hoboken : J. Wiley, cop. 2007

Koloini, T. (1999) *Prenos toplote in snovi*. Ljubljana: Založba FKKT.

Recknagel, Sprenger, Schramek, Čeperkovič (2011) *Grejanje i klimatizacija*. Vrnjačka Banja: Interklima.

Priporočljiva literatura/Recommended literature

Welty, J., Wicks, C. E., Rorrer, G. L., Wilson, R. E. (2008) *Fundamentals Of Momentum, Heat And Mass Transfer, 5th Edition*. New York: Wiley.

Schwister, K. (2000) *Taschenbuch der Verfahrenstechnik*. Leipzig: Fachbuchverlag Leipzig Carl Hanser Verlag.

Grossmann, P. F., Widmer, H. Sinn (1997) *Einführung in die thermische Verfahrenstechnik. 3 Auflage*. Berlin: De Gruyter.

Seader, J. D., Henley, E. J. (1998) *Separation process principles*. New York: John Wiley and Sons.

Vogel, G. H. (2005) *Process Development*. Weinheim: Wiley-VCH Verlag.

Perry, H. R., Green Don, W. (2007) *Perry's Chemical Engineer's Eandbook. Eight edition*. New York: McGraw-Hill.

ASHRAE *Handbook Fundamentals* (2013) Atlanta: Ashrae.

Cilji in kompetence:

Učna enota prispeva predvsem k razvoju naslednjih splošnih in specifičnih kompetenc:

- sposobnost obvladovanja standardnih razvojnih metod, postopkov in procesov,
- sposobnost uporabe pridobljenega teoretičnega znanja v praksi,
- sposobnost obvladovanja razvoja in napredka,
- kooperativnost, usposobljenost za timsko delo,
- sposobnost razumevanja in uporabe sodobnih teorij s področja tehniških, tehnoloških in naravoslovnih ved,
- sposobnost interdisciplinarnega povezovanja znanja,
- sposobnost reševanja konkretnih delovnih problemov na področju tehnologij in

Objectives and competences:

The learning unit mainly contributes to the development of the following general and specific competences:

- the ability to master standard development methods, procedures and processes,
- the ability to use acquired theoretical knowledge in practice,
- the ability to manage development and progress,
- willingness to cooperate and work in a team,
- the ability to understand and apply modern theories in the fields of technical, technological and natural sciences,
- the ability to integrate knowledge in an interdisciplinary manner,
- the ability to solve specific work problems in the field of technologies and systems using standard professional methods and procedures.

sistemov z uporabo standardnih strokovnih metod in postopkov.

Predvideni študijski rezultati:

Znanje in razumevanje:

Študent/študentka:

- spozna in razume zakone in pomen prenosa toplote,
- spozna in razume zakone in pomen prenosa snovi,
- razume analogijo med prenosom toplote in snovi,
- znanje aplicira na konkretnih primerih (prenos toplote in snovi skozi konstrukcijske strojne in gradbene elemente),
- spoznava in doumeva odnose med osnovnimi in aplikativnimi raziskavami, njihovo medsebojno prepletenost in povezanost znanosti s sodobno tehniko.

Intended learning outcomes:

Knowledge and understanding:

Student:

- learns and understands the laws and significance of heat transfer,
- learns the laws and understands the significance of the transfer of matter,
- understands the analogy between the transfer of heat and matter,
- applies knowledge to specific examples (transfer of heat and matter through structural, mechanical and building elements),
- knows and understands the relationships between basic and applied research, their interconnectedness and the relationship between science and modern technology.

Metode poučevanja in učenja:

- *predavanja* z aktivno udeležbo študentov (razlaga, diskusija, problematika, razvijanje ustvarjalnosti),
- *seminarske naloge in vaje*, vezane na problematiko okoljskih tehnologij,
- uvajanje samostojnosti razmišljanja in osebnega ukrepanja pri širokem izboru ustvarjalnega in inovativnega dela,
- *uporaba spletnih virov* in seznanjanje s široko strokovno literaturo ter praktično uporabo dosegljive dokumentacije (knjig, revij, arhivov itd.).

Learning and teaching methods:

- lectures with active participation of students (explanation, discussion, problems, development of creativity),
- *seminar assignments* and exercises related to the issue of environmental technologies,
- introduction of independent thinking and personal action in a wide selection of creative and innovative work,
- *use of online resources* and familiarization with wide professional literature and practical use of available documentation (books, magazines, archives, etc.).

Načini ocenjevanja:

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

- pisni izpit

Delež (v %) /

Weight (in %) **Assessment:**

50% ocene

25% ocene

25% ocene

Type (examination, oral, coursework, project):

- written exam

<ul style="list-style-type: none">• ustni izpit• projektno in seminarsko delo Ocenjevalna lestvica: ECTS.		<ul style="list-style-type: none">• verbal exam• project and seminar work Grading scale: ECTS.
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