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).

Prerequisits:

- 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:

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.

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.

Recknagel, Sprenger, Schramek, Čeperković (2012) *Grejanje i klimatizacija*. Vrnjačka Banja: Interklima.

Cilji in kompetence:	**Objectives and competences:**
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 sistemov z uporabo standardnih strokovnih metod in postopkov.	*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.

Predvideni študijski rezultati:	**Intended learning outcomes:**
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.	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:	**Learning and teaching methods:**
• *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.).	• 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:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): • pisni izpit • ustni izpit • projektno in seminarsko delo Ocenjevalna lestvica: ECTS.	 50% ocene 25% ocene 25% ocene	Type (examination, oral, coursework, project): • written exam • verbal exam • project and seminar work Grading scale: ECTS.