

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet	Sodobne izdelovalne tehnologije in sistemi
Course title	Contemporary Manufacturing Technologies and Systems

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Tehnologije in sistemi v strojništvu/ 2. stopnja	Ni smeri študija	1. letnik	1.
Technologies and systems in mechanical engineering/ 2 nd Cycle	No study field	1 st year	1 st

Vrsta predmeta/Course type obvezni/core

Univerzitetna koda predmeta/University course code TSS 1 UN 5

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30			30		120	6

Nosilec predmeta/Lecturer: doc. dr. Elvis Hozdić

Jeziki/ Languages:	Predavanja/Lectures:	slovenski/Slovenian
	Vaje/Tutorial:	slovenski/Slovenian

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

Prerequisites:

<ul style="list-style-type: none"> Vpis v prvi letnik študijskega programa. Študent mora pred izpitom pripraviti in predstaviti ter zagovarjati projektno seminarsko nalogo. 	<ul style="list-style-type: none"> A prerequisite for inclusion is enrolment in the first year of study. Student has to prepare, present and defend a project seminar before the exam.
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Vsebina:

Content (Syllabus outline):

<ul style="list-style-type: none"> <i>Uvod</i> Osnovni pojmi in definicije: tehnologija, proizvodnja, obdelovalni proces, obdelovalni sistem, računalniško integrirana proizvodnja (CIM), proizvodno integrirani merilni sistemi, regulacijski krogi (zanke) kakovosti. <i>Sodobne tehnologije in sistemi preoblikovanja</i> Osnovna načela preoblikovanja in razvrstitev preoblikovalnih postopkov. 	<ul style="list-style-type: none"> <i>Introduction</i> Basic concepts and definitions: technology, production, manufacturing process, manufacturing system, computer integrated manufacturing (CIM), production integrated measuring systems, quality control circuits (loops). <i>Modern forming technologies and systems</i> Basic principles of forming and classification of forming processes.
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<p>Značilni postopki preoblikovanja. Sodobni preoblikovalni stroji in sistemi.</p> <ul style="list-style-type: none"> • <i>Sodobne tehnologije in sistemi odrezovanja</i> Osnove rezanja, razdelitev in značilnost postopkov. Postopki z vrtilnim glavnim gibanjem. Postopki s premočrtnim glavnim gibanjem. Abrazivni postopki obdelave. Sodobni obdelovalni stroji in sistemi. • <i>Sodobne tehnologije in sistemi spajanja</i> Razdelitev postopkov spajanja. Osnovni postopki varjenja, spajkanja in lepljenja. Mehanski postopki spajanja. • <i>Nekonvencionalne tehnologije in sistemi</i> Razdelitev in značilnost postopkov. Kombinirani postopki. • <i>Implementacija načel trajnostnega razvoja v izdelovalnih tehnologijah.</i> 	<p>Typical forming processes. Modern forming machines and systems.</p> <ul style="list-style-type: none"> • <i>Modern cutting technologies and systems</i> Basics of cutting, classification and characteristics of cutting processes. Processes with rotational primary movement. Processes with translatory primary movement. Abrasive machining processes. Modern machine tools and systems. • <i>Modern joining technologies and systems</i> Classification of joining processes. Basic welding, soldering and gluing processes. Mechanical joining processes. • <i>Nonconventional technologies and systems</i> Classification and characteristics of processes. Combined processes. • <i>Implementation of the principles of sustainable development in manufacturing technologies.</i>
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Temeljna literatura in viri/Readings:

Obvezna:

- KALPAKJIAN, Serope in Stefan SCHMID. *Manufacturing engineering and technologies*, Sixth edition, 2014. ISBN 978-981-06-9406-7
- TUŠEK, Janez. *Varjenje in sorodne tehnike spajanja materialov v neločljivo zvezo*, 1. ponatis. Ljubljana: Fakulteta za strojništvo, 2015.
- VALENTINČIČ, Joško, Henri ORBANIČ, Davorin KRAMAR, in Mihael JUNKAR. *Alternativne tehnologije*. Ljubljana: Fakulteta za strojništvo, 2012. ISBN 978-961-6536-63-9.

Priporočljiva:

- GRZESIK, Wit. *Advanced Machining Processes of Metallic Materials –Theory, Modelling, and Applications*, Second Edition. Elsevier: Amsterdam, 2017. ISBN: 978-0-444-63711-6.
- KLOCKE, Fritz. *Manufacturing Processes 4 – Forming*. Berlin: Springer-Verlag, 2013. ISBN 978-3- 642-36771-7
- SCHULER. *Metal Forming Handbook*. Berlin, Heidelberg: Springer-Verlag, 1998. ISBN 3-540-61185-1.

Cilji in kompetence:

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

- sposobnost samostojnega spremljanja in kritične presoje najnovejših dosežkov s področja strojništva in širše,
- sposobnost samostojnega raziskovalno-razvojnega dela na področju strojništva,
- sposobnost razumevanja, analize, sinteze in uporabe teoretičnih in aplikativnih znanj o sodobnih izdelovalnih tehnologijah in sistemih,
- sposobnost aktivnega reševanja problemov na področju izdelovalnih tehnologij v delovnem okolju,
- seznanitev s sodobnimi razvojno-raziskovalnimi metodami in procesi za učinkovito uveljavljanje proizvodnih tehnologij v strojništvu,
- sposobnost prenosa znanja s področja sodobnih izdelovalnih tehnologij v proizvodne organizacije,
- sposobnost timskega dela s strokovnjaki z različnih področij,
- sposobnost učinkovite uporabe informacijsko-komunikacijske tehnologije,
- seznanitev z načeli trajnostnega razvoja pri izdelovalnih tehnologijah.

Objectives and competences:

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

- ability to independently monitor and critically assess the latest achievements in the field of mechanical engineering and beyond,
- ability of independent R&D work in the field of mechanical engineering,
- ability to understand, analyze, synthesize and apply theoretical and applied knowledge of modern manufacturing technologies and systems,
- ability to actively solve problems in the field of manufacturing technologies in the work environment,
- acquaintance with modern R&D methods and processes for the effective implementation of production technologies in mechanical engineering,
- ability to transfer knowledge from the field of modern manufacturing technologies to production organizations,
- ability to work in teams with experts from different fields,
- ability to effectively use information and communication technology,
- acquaintance with the principles of sustainable development in manufacturing technologies.

Predvideni študijski rezultati:

Študent/študentka:

- pozna osnovne pojme povezane s proizvodnjo in nastajanjem izdelka,
- spozna sodobne trende v proizvodnih tehnologijah,
- spozna sodobne konvencionalne in nekonvencionalne postopke obdelave, ki so prisotni v sodobnem industrijskem okolju,
- razume, obvlada in zna predstaviti teoretične in strokovne pojme in znanja

Intended learning outcomes:

Student:

- knows the basic concepts related to the production and creation of the product,
- learns about modern trends in production technologies,
- learns about modern conventional and unconventional manufacturing processes that are present in the modern industrial environment,
- understands, masters and is able to present theoretical and professional concepts and knowledge for individual

<p>za posamezne primere izdelovalnih tehnologij in sistemov,</p> <ul style="list-style-type: none"> • obvlada ustrezne metode in tehnike za učinkovito uporabo različnih izdelovalnih tehnologij v praksi, • spozna in razume načela trajnostnega razvoja pri izdelovalnih tehnologijah v strojništvu. 	<p>examples of manufacturing technologies and systems,</p> <ul style="list-style-type: none"> • masters appropriate methods and techniques for the effective use of various manufacturing technologies in practice, • learns and understands the principles of sustainable development in manufacturing technologies in mechanical engineering.
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Metode poučevanja in učenja:

Learning and teaching methods:

<ul style="list-style-type: none"> • <i>predavanja</i> z aktivno udeležbo študentov (razlaga, diskusija, vprašanja, primeri, reševanje problemov), • <i>avditorne vaje</i>: reševanje problemov, študije primerov, kritično presojanje, diskusija, refleksija izkušenj, vrednotenje, projektno delo, timsko delo, • <i>laboratorijske vaje</i>: laboratorijske vaje ter ogledi proizvodnih tehnologij v uspešnih podjetjih v JV regiji. • <i>seminar</i>: priprava, predstavitev in uspešen zagovor projektne/raziskovalne naloge, (reševanje problemov, študije primera, kritično presojanje, diskusija, refleksija izkušenj, vrednotenje, projektno delo, timsko delo). 	<ul style="list-style-type: none"> • <i>lectures</i> with active student participation (explanation, discussion, questions, examples, problem solving), • <i>tutorial</i>: problem solving, case studies, methods of critical thinking, discussion, reflection of experience, evaluation, project work, team work, • <i>laboratory work</i>: laboratory exercises and visits to production technologies in successful companies in the SE region. • <i>seminar tutorial</i>: presentation and defence of project/research work (problem solving studies, critical thinking, discussion, reflection of experience, evaluation, project work, team work).
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Delež (v %)

Načini ocenjevanja:

Weight (in %)

Assessment:

<p>Načini:</p> <ul style="list-style-type: none"> • pisni izpit • ustni izpit • projektno seminarsko delo <p>Ocenjevalna lestvica: ECTS.</p>	<p>40 %</p> <p>20 %</p> <p>40 %</p>	<p>Types:</p> <ul style="list-style-type: none"> • written exam • oral examination • project seminar <p>Grading scheme: ECTS.</p>
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