

## UČNI NAČRT PREDMETA / COURSE SYLLABUS

**Predmet:** Tehnologije aditivne proizvodnje  
**Course title:** Technologies of Additive Manufacturing

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Sonaravne tehnologije in sistemi v strojništvu - 3. stopnja	/	1./2.	zimski/letni
Sustainable technologies and systems in mechanical engineering - 3 <sup>rd</sup> cycle	/	first/second	winter/summer

**Vrsta predmeta / Course type**

izbirni/elective

**Univerzitetna koda predmeta / University course code:**

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Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
10	30	10		/	250	10

**Nosilec predmeta / Lecturer:**

**Jeziki /**

**Languages:**

**Predavanja /**

**Lectures:**

angleški/english

**Vaje / Tutorial:**

angleški/english

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

- Vpis v doktorski študijski program.
- Dodatnih pogojev ni.

**Prerequisites:**

**Vsebina:**

**Content (Syllabus outline):**

- General overview on the meaning and role of additive manufacturing, comparison with conventional manufacturing technologies advantages and drawbacks. Classification of methods for additive manufacturing, according to ISO 17296 and ASTM F2792 - Vat photopolymerization, Powder bed fusion, Material extrusion, Material jetting, Binder jetting, Sheet lamination, Directed energy deposition (DED). General process flow in additive manufacturing.
- Methods for generation of digital 3-D model as the basic input information for additive manufacturing. Vat photopolymerization - laser stereolithography (SLA), and photopolymerization by controlled area light source (DLP-SLA, LCD-SLA). Bed powder fusion - laser-based (SLS, SLM, DMLS), and Electron beam-based (EBM). Material extrusion (FDM). Material jetting (PolyJet, PolyJet Matrix). Binder jetting (3DP, slurry-based 3DP). Sheet lamination (LOM, PSL). Directed energy deposition (DED).
- STL file for data exchange - structure of STL file. Key differences between 3-D model representation in STL and CAD format. Typical errors in STL data files and their impact on the generation of curing paths in layers.

#### **Temeljni literatura in viri / Readings:**

1. Bártolo, P. J. (Ed.). (2011) Stereolithography: materials, processes and applications. Springer Science & Business Media.
2. Dahotre, N. B., & Harimkar, S. (2008) Laser fabrication and machining of materials. Springer Science & Business Media.
3. Gibson, I., Rosen, D. W., & Stucker, B. (2010) Additive manufacturing technologies. New York: Springer.
4. Liou, F. W. (2007) Rapid prototyping and engineering applications: a toolbox for prototype development. CRC Press.

**Cilji in kompetence:**

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**Objectives and competences:**

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| <ul style="list-style-type: none"> <li>• Provide detailed knowledge of the principles of additive manufacturing (AM) technologies;</li> <li>• Provide required techniques and skills for application of specialized softwares in the AM-specific domain;</li> <li>• Develop ability in students to apply theoretical knowledge to solving practical engineering problems in the domain of additive manufacturing;</li> </ul> |
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**Predvideni študijski rezultati:**

Znanje in razumevanje:

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**Intended learning outcomes:**

Knowledge and understanding:

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| <ul style="list-style-type: none"> <li>• Understanding of key AM technologies and physical/chemical mechanisms in the background of particular processes;</li> <li>• Knowledge to prepare input data for AM;</li> <li>• Ability to select most appropriate AM technology for the given problem;</li> <li>• Ability to work with the software applications required to solve practical AM-related problems.</li> </ul> |
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**Metode poučevanja in učenja:**

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**Learning and teaching methods:**

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| <ul style="list-style-type: none"> <li>• Lectures;</li> <li>• Computer-interactive and laboratory practice;</li> <li>• Term paper.</li> </ul> |
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Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt)	Delež (v %) / Weight (in %)	Assessment: Type (examination, oral, coursework, project):
	25%	<ul style="list-style-type: none"> <li>• Term paper</li> </ul>
	60%	<ul style="list-style-type: none"> <li>• Tests</li> </ul>
	15%	<ul style="list-style-type: none"> <li>• Oral examination</li> </ul>