

INOVIRANJE V STROJNIŠTVU -PAP

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	Inoviranje v strojništvu -PAP
Course title:	Innovation in Mechanical Engineering - PAP
Članica nosilka/UL Member:	UL FS

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Energetsko strojništvo (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Industrijsko inženirstvo (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Konstruiranje industrijskih sistemov (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Konstruiranje strojev in naprav (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Mehatronika (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Procesno strojništvo (smer)	3. letnik	1. semester	izbirni
Strojništvo - projektno aplikativni program, prva stopnja, visokošolski strokovni	Proizvodne tehnologije (smer)	3. letnik	1. semester	izbirni

Univerzitetna koda predmeta/University course code:	0562737
Koda učne enote na članici/UL Member course code:	3031-V

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
15		15			45	3

Nosilec predmeta/Lecturer: Mojca Volk, Andrej Kos

Izvajalci predavanj:	
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type: Splošni izbirni predmet /Elective general course

Jeziki/Languages:

Predavanja/Lectures:	Slovenščina
Vaje/Tutorial:	Slovenščina

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

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Prerequisites:**Vsebina:**

<p>1. PREDAVANJE:</p> <ul style="list-style-type: none"> Pomen ustvarjalnosti in inovativnosti v sodobni družbi. Metode identifikacije inovacijskih priložnosti. <p>2. PREDAVANJE:</p> <ul style="list-style-type: none"> Ustvarjalno razmišljanje in kreativno reševanje izzivov. Razumevanje potreb trga in poslovnih priložnosti. Ocena izvedljivost in tržni potencial novosti. <p>3. PREDAVANJE:</p> <ul style="list-style-type: none"> Sodobni pristopi razvoja inovativnih rešitev. Raziskovalna in podjetniška okolja in priložnosti. Raziskovanje poslovnih strategij. <p>4. in 5. PREDAVANJE</p> <ul style="list-style-type: none"> Okolja za spodbujanje procesov inoviranja. Osnove komercializacije inovacij. Upravljanje, zaščita in uporaba znanja in intelektualne lastnine.

Content (Syllabus outline):

<p>1. LECTURE:</p> <ul style="list-style-type: none"> The importance of creativity and innovation in contemporary society. Methods for the identification of innovation opportunities. <p>2. LECTURE:</p> <ul style="list-style-type: none"> Creative thinking and creative problem solving. Understanding of the market and customer needs. Feasibility assessment and understanding of the market potential. <p>3. LECTURE:</p> <ul style="list-style-type: none"> Modern approaches to innovative development of solutions. Research and entrepreneurship ecosystems and opportunities. Research of business strategies. <p>4. and 5. LECTURE</p> <ul style="list-style-type: none"> Innovation communities. Basics of commercialization of innovations. Management, protection and exploitation of know-how and intellectual property.

Temeljna literatura in viri/Readings:

<ol style="list-style-type: none"> B. Likar <i>et al.</i> Management inovacijskih in RR procesov v EU. Inštitut za inovativnost in tehnologijo, Slovenija, izdaja, 2006, [COBISS.SI-ID 229668096]. https://www.researchgate.net/publication/283463376_Management_inovacijskih_in_RR_procesov_v_EU D. Kesič, B. Likar. 2018. Komercializacija novosti za neekonomiste. Založba Univerze na Primorskem, [COBISS.SI-ID 293915904]. http://www.hippocampus.si/ISBN/978-961-7023-88-6.pdf K. Košmrlj, K. Širok, B. Likar Borut. 2015. Veščina obvladovanja inovacijskih problemov in priložnosti. Koper: Fakulteta za management, [COBISS.SI-ID 280009728]. https://www.researchgate.net/publication/278404371_Vescina_obvladovanja_inovacijskih_problemov_in_priloznosti S. Fricker, R. Grau, A. Zwingli. 2015. Requirements Engineering: Best Practice. 10.1007/978-3-319-09798-5_2. E. Ries, The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business, 2011. https://ia800509.us.archive.org/7/items/TheLeanStartupErickRies/The%20Lean%20Startup%20-%20Erick%20Ries.pdf
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Cilji in kompetence:

<p>Cilji:</p> <ol style="list-style-type: none"> Spoznati temeljne pristope in metode za razumevanje problemov in potreb uporabnikov ter kreiranje inovativnih rešitev.
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Objectives and competences:

<p>Objectives:</p> <ol style="list-style-type: none"> Learn about the fundamental approaches and methods for understanding the customers'
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<ol style="list-style-type: none"> 2. Spoznati principe s področja identifikacije idej in kritične analize njihovega potenciala in izvedljivosti. 3. Razviti sposobnosti ustvarjalnega razmišljanja in kreativnega reševanja izzivov. 4. Spoznati metode inženirstva zahtev in sodobne pristope k uporabnikom usmerjenega načrtovanja in prototipiranja. 5. Spoznati raziskovalna in podjetniška okolja in priložnosti. 6. Spoznati principe upravljanja, zaščite in uporabe znanja in intelektualne lastnine. 7. Pridobiti izkušnje na področju sodelovalnega projektnega dela. 8. Uporabiti pridobljena znanja in veščine v praktični nalogi razvoja inovativne ideje. <p>Competence:</p> <ol style="list-style-type: none"> 1. Sposobnost analize in razumevanja problemov in potreb uporabnikov in kreiranje inovativnih rešitev (S4-PAP, S5-PAP). 2. Uporaba tehnik kreativnega razmišljanja (S1-PAP, S5-PAP). 3. Sposobnost analize potenciala in izvedljivosti idej (S4-PAP, S5-PAP, S9-PAP, S12-PAP, S13-PAP, P5-PAP). 4. Uporaba izbranih tehnik inženirstva zahtev (S1-PAP, S2-PAP, S6-PAP). 5. Izdelava prototipov ob interakciji z uporabniki (S1-PAP, S2-PAP, S6-PAP, S8-PAP, P3-PAP). 6. Sposobnost raziskave raziskovalnih in poslovnih priložnosti (S4-PAP, S5-PAP, S12-PAP, S13-PAP). 7. Sposobnost konceptualnega razvoja poslovnega modela (S1-PAP, S2-PAP, P3-PAP). 8. Poznavanje temeljnih postopkov in metod za raziskavo, zaščito in uporabo intelektualne lastnine (S12-PAP, S13-PAP). 9. Povezava znanja in veščin v zaključeno projektno nalogo (S1-PAP, S2-PAP, S3-PAP, S6-PAP, S7-PAP, S10-PAP, S11-PAP, P6-PAP, P9-PAP). 	<p>problems and needs, and for the design of creative solutions</p> <ol style="list-style-type: none"> 2. Gain knowledge about the principles of identifying creative ideas and critical analysis of their potential and feasibility. 3. Learn about the approaches of creative thinking and creative problem solving. 4. Learn about requirements engineering and modern approaches to user-centered design and prototyping. 5. Learn about research and entrepreneurship ecosystems and opportunities. 6. Understand the principles of know-how and intellectual property management, protection and exploitation. 7. Acquire practical experience in collaborative project work. 8. Use the acquired knowledge and skills to develop an innovative idea as part of a practical assignment. <p>Competencies:</p> <ol style="list-style-type: none"> 1. Ability to analyse and understand customers' problems and needs and develop creative solutions (S4-PAP, S5-PAP). 2. Use of creative thinking techniques (S1-PAP, S5-PAP). 3. Ability to analyse the potential and feasibility of ideas (S4-PAP, S5-PAP, S9-PAP, S12-PAP, S13-PAP, P5-PAP). 4. Use of selected requirements engineering techniques (S1-PAP, S2-PAP, S6-PAP). 5. Prototyping with end-user interactions (S1-PAP, S2-PAP, S6-PAP, S8-PAP, P3-PAP). 6. Ability to investigate research and business opportunities (S4-PAP, S5-PAP, S12-PAP, S13-PAP). 7. Ability to develop a conceptual business model (S1-PAP, S2-PAP, P3-PAP). 8. Understanding basic procedures and methods for intellectual property analysis, protection and exploitation (S12-PAP, S13-PAP). 9. Use of knowledge and skills in the practical assignment (S1-PAP, S2-PAP, S3-PAP, S6-PAP, S7-PAP, S10-PAP, S11-PAP, P6-PAP, P9-PAP).
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Predvideni študijski rezultati:

<p>Znanja (Z) in spretnosti (S):</p> <p>Z1. Poglobljeno strokovno teoretično in praktično poznavanje konceptov in pristopov k inoviranju.</p> <p>S1.1. Raziskovanje in razumevanje potreb uporabnikov ter razvoj inovativnih rešitev.</p> <p>S1.2. Analiza potenciala in izvedljivosti idej.</p> <p>S1.3. Načrtovanje in izdelava prototipov ob interakciji z uporabniki</p> <p>S1.4. Raziskovanje podjetniških priložnosti in iskanje možnosti komercializacije.</p> <p>S1.5. Zaščita in uporaba intelektualne lastnine.</p>

Intended learning outcomes:

<p>Knowledge (K) and skills (S):</p> <p>Z1: Thorough professional theoretical and practical knowledge of concepts and approaches in innovation.</p> <p>Skills:</p> <p>S1.1. Research and understanding of customer needs and innovative solution development.</p> <p>S1.2. Analysis of the potential and feasibility of ideas.</p> <p>S1.3. Design and prototyping with customer interaction.</p> <p>S1.4. Research of business opportunities and commercialization options.</p>
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Z2. Uporaba znanja in veščin v praksi. S2.1. Timsko delo in participacija v sodelovalnih projektnih aktivnostih. S2.2. Razvoj inovativne ideje v praksi.	S1.5. Intellectual property protection and exploitation. Z2. Use of knowledge and skills in practice. S2.1. Teamwork and participation in collaborative project activities. S2.2. Innovative idea development in practice.
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Metode poučevanja in učenja:	Learning and teaching methods:
P1. Interaktivna predavanja s primeri iz prakse in diskusijami. P2. Interaktivna avditorna predavanja in vaje z analizami in vajami reševanja problemov na izbranih teoretičnih in praktičnih primerih. P3. Skupinsko projektno in kolaborativno delo. P4. Simulacije izbranih procesov inoviranja (razprave, strukturirane diskusije, predstavitve in analize po metodah inženirstva zahtev, razvoj poslovnega modela itd.). P5. Razvoj in predstavitve inovativne ideje v praksi (projektno delo). P6. Strukturirana obravnava snovi po vnaprej predloženem programu.	P1. Interactive lectures with practical examples and discussions. P2. Interactive auditorial lectures and exercises with analyses and problem solving exercises of selected theoretical and practical examples. P3. Teamwork and collaborative project work. P4. Simulations of selected innovation processes (debates, structured discussions, presentations and analyses using requirements engineering methods, business model development, etc.). P5. Innovative idea development and presentation in practice (project work). P6. Structured subject matter study based on a predefined programme.

Načini ocenjevanja:	Delež/Weight	Assessment:
Pisni izpit	50,00 %	Written examination
Ocena praktičnega dela na vajah.	50,00 %	Practical assignment.

Ocenjevalna lestvica:	Grading system:
5 - 10, pri čemer velja, da je pozitivna ocena od 6 - 10	5 - 10, a student passes the exam if he is graded from 6 to 10

Reference nosilca/Lecturer's references:

Andrej Kos:

- CVAR, Nina, STOJANOVA, Simona, TRILAR, Jure, **KOS, Andrej**, STOJMENOVA DUH, Emilija. Transformative smart rural tourism in adversity of the COVID-19 pandemic and beyond. *Journal of infrastructure, policy and development*. 2024, vol. 8, iss. 6, article id 4065, 30 str., ilustr. ISSN 2572-7923. [COBISS.SI-ID [199101955](#)].
- STOJANOVA, Simona, CVAR, Nina, VERHOVNIK, Jurij, BOŽIČ, Nataša, TRILAR, Jure, **KOS, Andrej**, STOJMENOVA DUH, Emilija. Rural digital innovation hubs as a paradigm for sustainable business models in Europe's rural areas. *Sustainability*. 2022, iss. 21, 14620, str. 1-20, ilustr. ISSN 2071-1050. <https://www.mdpi.com/2071-1050/14/21/14620/htm>, DOI: [10.3390/su142114620](https://doi.org/10.3390/su142114620). [COBISS.SI-ID [128383491](#)].
- RABZELJ, Matej, BOHAK, Ciril, ŠTEFANIĆ JUŽNIČ, Leon, **KOS, Andrej**, SEDLAR, Urban. Cyberattack graph modeling for visual analytics. *IEEE access*. Aug. 2023, vol. 11, str. 86910-86944, ilustr. ISSN 2169-3536. <https://ieeexplore.ieee.org/document/10215511>, DOI: [10.1109/ACCESS.2023.304640](https://doi.org/10.1109/ACCESS.2023.304640). [COBISS.SI-ID [163717891](#)].
- STOJANOVA, Simona, LENTINI, Gianluca, NIEDERER, Peter, EGGER, Thomas, CVAR, Nina, **KOS, Andrej**, STOJMENOVA DUH, Emilija. Smart villages policies : past, present and future. *Sustainability*. 2021, iss. 4, 1663, str. 1-28, ilustr. ISSN 2071-1050. <https://www.mdpi.com/2071-1050/13/4/1663/htm>, [Repozitorij Univerze v Ljubljani – RUI](#), DOI: [10.3390/su13041663](https://doi.org/10.3390/su13041663). [COBISS.SI-ID [50342147](#)].
- GEC, Sandi, STANKOVSKI, Vlado, LAVBIČ, Dejan, KOCHOVSKI, Petar, **KOS, Andrej**, SEDLAR, Urban. Incentivised recommendation framework of Internet of Things data provision for scientific research. V: KRÜGER, Jens (ur.), GESING, Sandra (ur.). *Proceedings of the 15th International Workshop on Science Gateways (IWSG2023)* : [Eberhard Karls Universität, Tübingen, from June 13 to

15, 2023]. Tübingen: Tübingen University Press, 2024. Str. 49-57, ilustr. ISBN 978-3-98945-019-6. https://publikationen.uni-tuebingen.de/xmlui/bitstream/handle/10900/158990/IWSG_2023_OA.pdf?sequence=4&isAllowed=y. [COBISS.SI-ID [220609539](#)].

Mojca Volk:

1. RABZELJ, Matej, ŠTEFANIČ JUŽNIČ, Leon, **VOLK, Mojca**, KOS, Andrej, KREN, Matej, SEDLAR, Urban. Designing and evaluating a flexible and scalable HTTP honeypot platform : architecture, implementation, and applications. *Electronics*. Avg.-2 2023, vol. 12, iss. 16, [article no.] 3480, str. 1-26, ilustr. ISSN 2079-9292. <https://www.mdpi.com/2079-9292/12/16/3480>, DOI: [10.3390/electronics12163480](#). [COBISS.SI-ID [164271363](#)].
2. SEDLAR, Urban, WINTERBOTTOM, James, TAVČAR, Boštjan, STERLE, Janez, CIJAN, Jaka, **VOLK, Mojca**. Next generation emergency services based on the Pan-European Mobile Emergency Application (PEMEA) protocol : leveraging mobile positioning and context information. *Wireless communications & mobile computing*. 2019, vol. 2019, str. 1-10, ilustr. ISSN 1530-8677. <https://www.hindawi.com/journals/wcmc/2019/1408784/>, DOI: 10.1155/2019/1408784. [COBISS.SI-ID [12527956](#)].
3. **VOLK, Mojca**. A safer future : leveraging the AI power to improve the cybersecurity in critical infrastructures. *Elektrotehniški vestnik*. [Slovenska tiskana izd.]. 2024, letn. 91, št. 3, str. 73-94, ilustr. ISSN 0013-5852. <https://ev.fe.uni-lj.si/3-2024/Volk.pdf>, [Digitalna knjižnica Slovenije - dLib.si](#). [COBISS.SI-ID [201174019](#)].
4. DOBRUNA, Jeta, FAZLIU, Zana L., HUMAR, Iztok, **VOLK, Mojca**. On optimizing resource allocation : a comparative review of resource allocation strategies in HetNets. *Computer modeling in engineering & sciences*. [Online ed.]. 2025, vol. 142, no. 3, str. [2211]-2245, ilustr. ISSN 1526-1506. <https://www.techscience.com/CMES/online/detail/22484>, [Repozitorij Univerze v Ljubljani – RUL](#), DOI: [10.32604/cmes.2025.059541](#). [COBISS.SI-ID [226175235](#)].
5. STOJANOVA, Simona, **VOLK, Mojca**, BALKOVEC, Gregor, KOS, Andrej, STOJMENOVA DUH, Emilija. The future of vineyard irrigation : AI-driven insights from IoT data. *Sensors*. Jun.-2 2025, vol. 25, issue 12, [article no.] 3658, 19 str., ilustr. ISSN 1424-8220. <https://www.mdpi.com/1424-8220/25/12/3658>, [Repozitorij Univerze v Ljubljani – RUL](#), DOI: 10.3390/s25123658. [COBISS.SI-ID [239775491](#)].