

SOČASNO INŽENIRSTVO

UČNI NAČRT PREDMETA/COURSE SYLLABUS

Predmet:	SOČASNO INŽENIRSTVO
Course title:	CONCURRENT ENGINEERING
Članica nosilka/UL Member:	UL FS

Študijski programi in stopnja	Študijska smer	Letnik	Semestri	Izbirnost
Strojništvo, tretja stopnja, doktorski (od študijskega leta 2022/2023 dalje)	Proizvodno inženirske znanosti, kibernetika in mehatronika (smer)		Celoletni	izbirni

Univerzitetna koda predmeta/University course code:	0033471
Koda učne enote na članici/UL Member course code:	7316

Predavanja /Lectures	Seminar /Seminar	Vaje /Tutorials	Klinične vaje /Clinical tutorials	Druge oblike študija /Other forms of study	Samostojno delo /Individual student work	ECTS
90					160	10

Nosilec predmeta/Lecturer:	Janez Kušar, Tomaž Berlec
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Izvajalci predavanj:	Tomaž Berlec, Janez Kušar
Izvajalci seminarjev:	
Izvajalci vaj:	
Izvajalci kliničnih vaj:	
Izvajalci drugih oblik:	
Izvajalci praktičnega usposabljanja:	

Vrsta predmeta/Course type:

Izbirni predmet /Elective course

Jeziki/Languages:

Predavanja/Lectures:

Angleščina, Slovenščina

Vaje/Tutorial:

Angleščina, Slovenščina

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

Prerequisites:

Veljajo splošni pogoji za doktorski študij.

General prerequisites for the third level studies.

Vsebina:

Content (Syllabus outline):

Cikel dobe trajanja izdelka, organizacijske strukture, reinženiring poslovnih procesov in sistemski inženiring.

Definicija sočasnega inženirstva ter prehod iz sekvenčnega na sočasno inženirstvo.

Strategije sočasnega inženirstva: paralelnost, standardizacija in integracija.

Proces sočasnega osvajanja izdelka: sestava timov sočasnega osvajanja izdelkov v velikem in majhnem podjetju, določitev števila članov timov s preizkusom timskih vlog (Belbinov test).

Prenos informacij med aktivnostmi sočasnega procesa osvajanja izdelka ter oblikovanje zank sočasnega osvajanja izdelka.

Cilji in orodja sočasnega inženirstva: razvoj funkcij kakovosti, metodika konstruiranja, analiza vrednosti, koristnosti in kakovosti, konstruiranje za proizvodnjo, montažo in demontažo, analiza možnih napak in njihovih učinkov.

Izgradnja kombiniranih računalniško podprtih sistemov za celovito ovrednotenje izdelkov, strojev in orodij ter iskanje optimalnih tehnoloških poti.

Integrirani informacijski sistem za podporo izvedbe sočasnega inženirstva.

The lifetime cycle of the product, organizational structure, re-engineering of business processes and systems engineering.

Definition of concurrent engineering and the transition from sequential to concurrent engineering.

Concurrent engineering strategy: parallelism, standardization and integration.

The process of concurrent product and process development: the composition of teams of concurrent product and process development in large and small company, determine the number of team members with the team roles test (Belbin's test).

The transfer of information between the activities of the concurrent product and process development and design of loops of concurrent product and process development.

Objectives and tools of concurrent engineering: the development of the functions of quality, design methodology, analysis of the value, usefulness and quality, design for manufacturing, assembly and disassembly, analysis of possible errors and their effects.

Construction of combined computerized systems for a comprehensive evaluation of products, machinery and tools, and

Projektni pristop pri sočasnem osvajanju izdelka.	<p>the search for optimal technological path.</p> <p>The integrated information system to support the implementation of concurrent engineering.</p> <p>The project approach in the concurrent product and process development.</p>
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Temeljna literatura in viri/Readings:

[1] Biren Prasad: Concurrent Engineering Fundamentals, Volume I, Prentice Hall PTR, 1996
[2] Biren Prasad: Concurrent Engineering Fundamentals, Volume II, Prentice Hall PTR, 1997.
[3] Michel Fleischer, Jeffrey K. Liker: Concurrent Engineering Effectiveness: Integrating Product Development Across Organisation, Hanser Gardner Publishings, 1997.
[4] W. Eversheim, W. Bochtler, L. Laufenberg: Simultaneous Engineering, Springer Verlag, 1995
[5] STARBEK, Marko, GRUM, Janez, BREZOVAR, Aleš, KUŠAR, Janez. Techniques and analyses of sequential and concurrent product development processes. V: LEONDES, Cornelius T. (ur.). Intelligent knowledge-based systems : business and technology in the new millennium. Vol. 2, Information technology. Kluwer Academic, 2005, str. 123-176.

Cilji in kompetence:

<p>Cilji:</p> <p>Študentu prikazati vlogo in pomen sočasnega inženirstva ter predstaviti razliko med sekvenčnim in sočasnim inženirstvom. Seznaniti jih s potekom izvedbe, zankami in orodji sočasnega inženirstva.</p> <p>Kompetence:</p> <p>Študent osvoji znanja o sočasnem inženirstvu, spozna osnovna orodja za njegovo izvedbo ter razume časovni, kakovostni in ekonomski učinek sočasnega inženirstva.</p>	<p>Objectives and competences:</p> <p>Goals:</p> <p>The principal goal is to introduce the role and importance of concurrent engineering and to present the difference between sequential and concurrent engineering, acquaint the students with course of realization, loops and tools of concurrent engineering.</p> <p>Competences:</p> <p>The student acquires basic knowledge of the concurrent engineering, learns the basic tools for its implementation and to understand the time, quality and economic impact of simultaneous engineering.</p>
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Predvideni študijski rezultati:

Študent osvoji znanja o sočasnem	The student acquires basic knowledge of
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inženirstvu, spozna osnovna orodja za njegovo izvedbo ter razume časovni, kakovostni in ekonomski učinek sočasnega inženirstva.	the concurrent engineering, learns the basic tools for its implementation and to understand the time, quality and economic impact of simultaneous engineering.
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Metode poučevanja in učenja:

Learning and teaching methods:

Predavanja, laboratorijske vaje, seminarsko delo, e-izobraževanje, konzultacije. Seminarsko delo v čim večji meri navezuje se na področje doktorskega raziskovanja. Študij z uporabo priporočene literature.	Lectures, laboratory practice & seminar work, e-education, consulting. The seminar work is related, as much as possible, to the student's doctoral research field. Study on a recommended literature basis.
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Načini ocenjevanja:

Delež/ Weight

Assessment:

Ustni izpit, poročilo o seminarskem delu. Pogoj za opravljanje ustnega izpita je uspešno izdelano in pozitivno ocenjeno seminarsko delo. Deleži pri končni oceni predmeta: • Seminarska naloga (40%) • Ustni izpit (60%)		Oral exam, report on seminar work. The condition for admission to oral exam is successful completion of seminar work, rewarded with a passing grade. Weights in the final course grade: • Seminar assignment (40%) • Oral exam (60%)
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Reference nosilca/Lecturer's references:

izr.prof.dr. Janez KUŠAR

KUŠAR, Janez, RIHAR, Lidija, DUHOVNIK, Jože, STARBEK, Marko. Concurrent realisation and quality assurance of products in the automotive industry. *Concurrent engineering*, ISSN 1063-293X, jun. 2014, vol. 22, no. 2, str. 162-171.

RIHAR, Lidija, KUŠAR, Janez, GORENC, Stanislav, STARBEK, Marko. Teamwork in the simultaneous product realisation. *Strojniški vestnik*, ISSN 0039-2480, sep. 2012, vol. 58, no. 9, str. 534-544.

DUHOVNIK, Jože, ŽARGI, Urban, KUŠAR, Janez, STARBEK, Marko. Project-driven concurrent product development. *Concurrent engineering*, ISSN 1063-293X, Sep. 2009, vol. 17, no 3, str. 225-236.

KUŠAR, Janez, RIHAR, Lidija, DUHOVNIK, Jože, STARBEK, Marko. Project management of product development. *Strojniški vestnik*, ISSN 0039-2480, 2008, letn. 54, št. 9, str. 588-606.

RIHAR, Lidija, KUŠAR, Janez, BERLEC, Tomaž, STARBEK, Marko. Team building for implementation of concurrent engineering loops. V: VOLOSENCU, Constantin (ur.). *New Technologies - trends, innovations and research*. Rijeka: InTech, cop. 2012, str. 299-326.

doc. dr. Tomaž Berlec

ŽUŽEK, Tena, GOSAR, Žiga, KUŠAR, Janez, BERLEC, Tomaž. A new product development model for SMEs : introducing agility to the plan-driven concurrent product development approach. Sustainability. 2021, vol. 13, iss. 21, str. 1-22, ilustr. ISSN 2071-1050. <https://www.mdpi.com/2071-1050/13/21/12159>, DOI: 10.3390/su132112159. [COBISS.SI-ID 83710979], [JCR, SNIP]

ŽUŽEK, Tena, RIHAR, Lidija, BERLEC, Tomaž, KUŠAR, Janez. Standard project risk analysis approach. Business systems research journal : international journal of the Society for Promotion of Business Information Technology (BIT). 2020, vol. 11, no. 2, str. 149-158, ilustr. ISSN 1847-8344. <http://www.bsrjournal.org/vol-11-no-2.html>, DOI: 10.2478/bsrj-2020-0021. [COBISS.SI-ID 32720643], [SNIP]

ŽUŽEK, Tena, KUŠAR, Janez, RIHAR, Lidija, BERLEC, Tomaž. Agile-concurrent hybrid : a framework for concurrent product development using scrum. Concurrent engineering : research and applications. Dec. 2020, vol. 28, iss. 4, str. 255-264, ilustr. ISSN 1063-293X.

<https://journals.sagepub.com/doi/full/10.1177/1063293X20958541>, DOI: 10.1177/1063293X20958541. [COBISS.SI-ID 32321027], [JCR, SNIP, WoS do 28. 11. 2021: št. citatov (TC): 2, čistih citatov (CI): 1, čistih citatov na avtorja (CIAu): 0,25, Scopus do 3. 1. 2022: št. citatov (TC): 4, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,75]

ŽUŽEK, Tena, GOSAR, Žiga, KUŠAR, Janez, BERLEC, Tomaž. Adopting agile project management practices in non-software SMEs : a case study of a slovenian medium-sized manufacturing company. Sustainability. 2020, vol. 12, iss. 21, str. 1-17, ilustr. ISSN 2071-1050. <https://www.mdpi.com/2071-1050/12/21/9245>, DOI: 10.3390/su12219245. [COBISS.SI-ID 36195331], [JCR, SNIP, WoS do 30. 11. 2021: št. citatov (TC): 4, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 0,75, Scopus do 22. 11. 2021: št. citatov (TC): 6, čistih citatov (CI): 5, čistih citatov na avtorja (CIAu): 1,25]