Fakulteta za industrijski inženiring
Faculty of Industrial Engineering

UČNI NAČRT PREDMETA / *COURSE SYLLABUS*	
Predmet:	Računalniško vodeni inženiring
Course title:	Computer aided engineering

Študijski program *Study program and level*	**Študijska smer** *Study field*	**Letnik** *Academic year*	**Semester** *Semester*
Inženiring in vozila	-	prvi	prvi
Engineering and Vehicles	-	first	first

Vrsta predmeta / *Course type* obvezni / obligatory

Univerzitetna koda predmeta / *University course code:* **VS_11025**

Predavanja *Lectures*	**Seminar** *Seminar*	**Sem. vaje** *Tutorials*	**Lab. vaje** *Laboratory work*	**Teren. vaje** *Fieldwork*	**Samost. delo** *Individ. work*	**ECTS**
60	-	15	30	-	105	7

Nosilec predmeta / Lecturer: dr. Ted Prodan, pred.

Jeziki / *Languages:*

Predavanja / *Lectures*:	**Vaje / *Tutorials:***
Slovenski / Slovenian	Slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	***Prerequisites:***
– Vpis v prvi letnik	– Enrolment in first year

Vsebina:	***Content (Syllabus outline):***
– Pregled, principi, pristopi, metode, in tehnike Računalniško vodenega inženiringa. – Geometrijsko modeliranje. – Uvod v sisteme CAD, CAE, CAM, PLM • Računalniško podprto konstruiranje (CAD) • Računalniško podprt inženiring (CAE) • Računalniško podprta izdelava (CAM) • Upravljanje podatkov skozi življenjski krog izdelka (PLM) • Nevtralni formati podatkov s poudarkom na STEP – Osnove MKE (FEA) v okolju CATIA <u>Vsebina vaj:</u> • Razvojno okolje CATIA • Konstruiranje kosa • Konstruiranje sestava • Risanje • MKE (FEA) v okolju CATIA	– Overview, principles, approaches, methods, and techniques of Computer Aided Engineering. – Geometrical modeling. – Introduction to CAD, CAM, CAE, PLM systems • Computer Aided Design (CAD) • Computer Aided manufacturing (CAM) • Computer Aided engineering (CAE) • Product Lifecycle Management (PLM) • Neutral data formats with emphasis on STEP – Fundamentals of FEA in the environment CATIA <u>Content of exercises:</u> • Development environment CATIA • Part design • Assembly design • Drafting • FEA in the environment CATIA

Temeljni literatura in viri / *Readings:*

– Muhič, M., Vrščaj, A.: Študijsko gradivo za predmet RVI, FINI,NM v spletni učilnici.
– Raphael, B., Smith,I. (2013). Engineering Informatics: Fundamentals of Computer-Aided Engineering, Second Edition, John Wiley & Sons, Ltd..
– Zamani, N.(2010). FEA Tutorials, CATIA V5 R19, University of Windsor, SDC Publications.
– Balič, J.(2002) CAD/CAM postopki, Fakulteta za strojništvo, Maribor.
– E-gradiva predmeta / E-Course material

Velja od: 1. 10. 2019	Sprejel: Senat FINI Novo mesto

Priporočljiva literatura / *Recommended literature:*

- Anupam, S., Birendra, S. (2010). Computer Aided Engineering Design, Springer Netherlands
- Hoschek,J., Lasser,D. (1996). Fundamentals of Computer Aided Geometric Design, Springer
- Zienkiewicz, C. (2010). The finite element method: its basis and fundamentals, Oxford, Butterworth-Heinemann
- http://www.3ds.com/products/simulia
- http://www.3ds.com/products-services/catia

Cilji in kompetence:	***Objectives and competences:***
Cilji Študent/-ka spozna in osvoji principe, pristope, metode in tehnike Računalniško vodenega inženiringa (CAE). ***Kompetence*** – sposobnost analize in sinteze dela na tehniškem področju, – samostojnost raziskovanja na tehničnem področju, – sposobnost uporabe pridobljenega znanja v praksi, – sposobnost obvladovanja sodobnih metod, – sposobnost povezovanja različnih strokovnih disciplin, – sposobnost analize in sinteze v procesu razvoja izdelkov, – uporaba orodij virtualnega modeliranja in inženiringa izdelkov, – izbira in uporaba ustreznih metod analize, modeliranja, simulacije in optimizacije, – praktična uporaba programskega orodja CATIA.	***Objectives*** Student learns and masters the principles and approaches of Computer Aided Engineering (CAE). ***Competences*** – ability to analyze and synthesize work in technical fields, – ability to perform independent research in the technical field, – ability to apply the acquired knowledge in practice, – ability to manage modern methods, – ability to link together various professional disciplines, – ability to analyze and synthesize the product development process, – use of tools for virtual modeling and engineering of products, – selection and use of appropriate methods for analysis, modeling, simulation and optimization, – practical application of the software tool CATIA.

Predvideni študijski rezultati:	***Intended learning outcomes:***
Študent/študentka: – pozna in razume računalniško voden inženiringa CAD / CAM / CAE, – pozna in razume računalniško modeliranje, konstruiranje, izdelovanje ter simulacije in analize z CAE (računalniško podprt inženiring) v procesu razvoja izdelka, – pozna in razume konstruiranje, modeliranje, simulacije in analize s programskim paketom CATIA.	*Student:* – knows and understand computer aided engineering CAD / CAM / CAE, – knows and understand computer aided modeling, design, manufacturing, simulation and analysis with CAE (Computer Aided Engineering) in the product development process, – knows and understand of modeling, design, simulation and analysis with the software package CATIA.

Metode poučevanja in učenja:	***Learning and teaching methods:***
– *predavanja* v obliki razlage in pogovora – *seminarske vaje*: aplikacija CAD/CAE sistemov – *laboratorijske vaje* z uporabo programskega paketa CATIA Predmet je oblikovan na kombinirani način študija, ki vključuje aktivnosti preko elektronskega (on-line) okolja: te aktivnosti so sestavljene iz samostojnih in skupinskih aktivnosti z uporabo učnega okolja Moodle in drugih elektronskih vsebin. Praviloma vključujejo diskusije v forumih, spletne strani, ogled posnetih predavanj in vaj, preverjanje znanja, odgovori na vprašanja, iskanje po spletu (bazah) itd.	– *lectures* with explanations and discussions – *tutorials:* application of CAD/CAE systems – *laboratory work* using a software the package CATIA The course is designed as blended learning that includes online activities: Online activities consist of independent and group activities using the LMS Moodle and other electronic or online content. Activities usually include discussions in forums, websites, viewing of recorded lectures and tutorials, assessments, answering questions, searching the web (databases), etc.

Načini ocenjevanja:	**Delež/*Weight (%)***	***Assessment:***
Pogoj za pristop k izpitu je pozitivno opravljena seminarska naloga. – seminarska naloga – pisni izpit Ocenjevalna lestvica je skladna z ECTS in Pravilnikom o preverjanju in ocenjevanju znanja FINI NM.	 40% 60%	To take the final exam, the student is required to successfully complete seminar work. – seminar work – written exam Evaluation scale in accordance with ECTS and the Rules on the Evaluation and Assessment of Knowledge FINI NM.

Reference nosilca / *Lecturer's references:*

- KRALJ, Aleš, PRODAN, Ted, EMRI, Igor. An apparatus for measuring the effect of pressure on the timedependent properties of polymers. Journal of rheology, ISSN 0148-6055, 2001, vol. 45, no. 4, str. 929-943. [COBISS.SI-ID 4847131]
- EMRI, Igor, PRODAN, Ted. A measuring system for bulk and shear characterization of polymers. Experimental mechanics, ISSN 0014-4851. Tiskana izd., 2006, letn. 46, št. 4, str. 429-439. [COBISS.SI-ID 9497627]
- RITUMS, J.E., HEDENQVIST, M.S., BERGMAN, Gunnar, PRODAN, Ted, EMRI, Igor. Sorption behavior in polymers above Tg : relations between mechanical properties and swelling in limonene. Polymer engineering and science, ISSN 0032-3888, 2005, letn. 45, št. 9, str. 1194-1202. http://dx.doi.org/10.1002/pen.20392. [COBISS.SI-ID 8413723]
- BLINC, Robert, APIH, Tomaž, JEGLIČ, Peter, EMRI, Igor, PRODAN, Ted. Proton NMR study of molecular motion in bulk and in highly drawn fiber polyamide-6. Applied magnetic resonance, ISSN 0937-9347, 2005, vol. 29, str. 577-588. [COBISS.SI-ID 19653671]
- PRODAN, Ted, ZELENIČ, Alenka. Projekt "PRIMe" (Primorsko podjetništvo) : primer uspešnega sodelovanja in razvoja inovativnosti na slovensko-italijanskem obmejnem območju. EIC novice, ISSN 1408-7235, Avg. 2006, str. 9, ilustr. [COBISS.SI-ID 29196293]
- PRODAN, Ted, EMRI, Igor. Pressure influence on mechanical properties of viscoelastic materials. V: ATEM '99: proceedings of the International Conference on Advanced Technology in Experimental Mechanics '99, Ube City, Japan, July 21 through 24, 1999. Tokyo: JSME. cop. 1999, vol. 1, str. 23-31. [COBISS.SI-ID 3544603]
- PRODAN, Ted, KRALJ, Aleš, EMRI, Igor. Apparatus for pressure and temperature material characterization. V: BINDING, David M. (ur.), et al. Proceedings of the XIIIth International Congress on Rheology, Cambridge, United Kingdom, 20th to 25th August 2000. Glasgow: British Society of Rheology. 2000, vol. 4, str. 73-75. [COBISS.SI-ID 4281115]
- PRODAN, Ted. Shape deposition manufacturing for building injection molding tools. V: KUZMAN, Karl (ur.), BALIČ, Jože (ur.). Conference proceedings, 2nd International Conference on Industrial Tools ICIT '99, Rogaška Slatina & Maribor, Slovenia, April 18-22, 1999. Celje: TECOS, Slovenian Tool and Die Development Centre. 1999, vol. 2, str. 468-473. [COBISS.SI-ID 3257115]
- PRODAN, Ted. Uporaba konstrukcijskega standarda ASME-X za kompozitne izdelke. V: ŠVETAK, Darko (ur.). Vir znanja in izkušenj za stroko : zbornik foruma, [9.] industrijski forum IRT, Portorož, 5. in 6. junij 2017. Škofljica: Profidtp. 2017, str. 251-254, ilustr. [COBISS.SI-ID 15614747]