UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	VIRTUALNE TEHNOLOGIJE
Course title:	VIRTUAL TECHNOLOGIES

Študijski program Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Inženiring in vozila		2	4
Engineering and vehicles		2	4

Vrsta predmeta / Course type	Izbirni/optional
Univerzitetna koda predmeta / University course code:	VS_11031

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45		**30**	**15**		**90**	**6**

Nosilec predmeta / Lecturer:	doc. dr. Gorazd Hren

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / Slovene
	Vaje / Tutorial:	slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisits:
Informacijsko komunikacijske tehnologije	Information and communication technology

Vsebina:	**Content (Syllabus outline):**
• Uvod v CAD sisteme in zgodovina razvoja. • Podpora in vloga CAD v življenjskem ciklu izdelka s poudarkom na procesu geometrijskega modeliranja. • Metode geometrijskega modeliranja teles in predstavitve modelov s teoretskimi osnovami iz računalniške grafike. • Uvod v virtualne tehnologije, aplikacije in trendi razvoja. – Vloga virtualnih prototipov in navidezne resničnosti v strojništvu. • Navidezna resničnost, VRML in X3D. • Standardi za prenos podatkov med CAD sistemi (virtualna okolja).	• Introduction and historical developement of CAD systems. – The role and support of the CAD technologies in product life-cycle focused on modeling process. – Geometrical modeling and model representation with theoretical background of computer graphics. – Introduction to virtual technologies, applications and development trends. – The role of virtual prototypes and virtual reality in mech.eng. – Virtual reality, VRML and X3D. – Standard data transfer between CAD applications (virtual environment)

Temeljni literatura in viri / Readings:

- Chang, Kuang-Hua: Product design modeling using CAD/CAE, Elsevier Academic Press, 2014
– S.M.LaValle: Virtual reality, University of Illinois, 2016 (dosegljivo: http://vr.cs.uiuc.edu/)
– M. Mihelj, D.Novak, S. Beguš: Virtual Reality Technology and Applications, Springer, 2014
– Klajnšek, G., Žalik, B.: Standard VRML : skripta, FERI, 2002
– http://www.web3d.org/x3d/documentation
– Jezernik A, Hren G. "Uvod v virtualne tehnologije" FINI 2012

Cilji in kompetence:	**Objectives and competences:**
Študenti osvojijo temeljna znanja o CAD sistemih, sistemih virtualnih tehnologij in njihovo vlogo ter namen Razvijejo ustvarjalno mišljenje za simuliranje in analize v prostoru. Spoznajo trende razvoja virtualnih aplikacij v industriji in pomen spremljanja razvoja ter novosti na tem področju.	Students acquire basic knowledge of CAD systems and virtual technologies and their role and purpose. They develop creative thinking for the modeling and analysis in 3D. Learning about trends in the development of virtual applications in industry and the importance of monitoring developments and innovations in this field.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Študenti poznajo prednosti in slabosti CAD in virtualnih tehnologij in njihovo vlogo pri razvoju in načrtovanju izdelka. Spoznajo programska orodja v virtualnem inženiringu.	Knowledge and understanding: Students recognize the advantages and disadvantages of CAD and virtual technologies and their role in the development and product planning. They learn about software tools in a virtual engineering.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Klasična predavanja, praktični primeri, Praktično delo v računalniški učilnici, predstavitve študentov	Frontal lectures, case studies, Practical work in computer room, students presentation

Načini ocenjevanja:	**Delež (v %) / Weight (in %)**	**Assessment:**
• Način (pisni izpit, ustno izpraševanje, naloge, projekt) • seminarska naloga (pogoj za pristop k izpitu) • ustni izpit (kviz)	50% 50%	• Type (examination, oral, coursework, project): • seminar work (required before examination) • oral examination (questionnaire)

Reference nosilca / Lecturer's references:

– HREN, Gorazd, JEZERNIK, Anton. Računalniške tehnologije za podporo konstruiranju : CAx in PxM : zbrano gradivo. Maribor: Fakulteta za strojništvo, 2005. 120 str., ilustr. ISBN 86-435-0704- 0. http://lates.fs.uni-mb.si/gradivo. [COBISS.SI-ID 54832385]

– HREN, Gorazd. Web-based environment for mechanism simulation integrated with CAD system. Engineering with computers, ISSN 0177-0667, 2010, vol. 26, no. 2, str. 137-148, doi: 10.1007/s00366-009-0146-1. [COBISS.SI-ID1024017244], [JCR, SNIP, WoS do 26. 4. 2010: št. citatov (TC): 0, čistih citatov (CI): 0, normirano št. čistih citatov (NC): 0, Scopus do 17. 4. 2013: št. citatov (TC): 1, čistih citatov (CI): 1, normirano št. čistih citatov (NC): 1]

– JEZERNIK, Anton, HREN, Gorazd. A solution to integrate computer-aided design (CAD) and virtual reality (VR) databases in design and manufacturing processes. The international journal of advanced manufacturing technology, ISSN 0268-3768, Dec. 2003, vol. 22, no 11/12, str. 768-774. [COBISS.SI-ID 8517398], [JCR, SNIP, WoS do 13. 6. 2015: št. citatov (TC): 14, čistih citatov (CI): 13, normirano št. čistih citatov (NC): 25, Scopus do 13. 5. 2015: št. citatov (TC): 37, čistih citatov (CI): 36, normirano št. čistih citatov (NC): 71]

– HREN, Gorazd, PREDIN, Andrej, ŽAGAR, Ivan. Generic model of wind turbine blades = Generični model lopatic vetrne turbine. Journal of energy technology, ISSN 1855-5748. [Tiskana izd.], feb. 2013, vol. 6, iss. 1, str. 61-68, ilustr. http://www.fe.um.si/en/jet.html. [COBISS.SI-ID 1024133468]

– GOLOB, Borut, JEZERNIK, Anton, HREN, Gorazd. A feature based approach for conceptual design. V: MARJANOVID, Dorian (ur.). Proceedings of the 7th International Design Conference DESIGN 2002, Cavtat, Dubrovnik, Croatia, May 14-17, 2002. Zagreb: Faculty of Mechanical Engineering and Naval Architecture; Glasgow: The Design Society, cop. 2002, str. 483-488. [COBISS.SIID 7112726]