UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
Predmet:	Sistemska programska oprema		
Course title:	System software		

Študijski program in stopnja Study programme and level	**Študijska smer Study field**	**Letnik Academic year**	**Semester Semester**
Interdisciplinarni univerzitetni študijski program Računalništvo in matematika	ni smeri	3	prvi
Interdisciplinary first cycle academic study programme Computer Science and Mathematics	none	3	first

Vrsta predmeta / Course type	izbirni / elective

Univerzitetna koda predmeta / University course code:	63264

Predavanja Lectures	**Seminar Seminar**	**Vaje Tutorial**	**Klinične vaje work**	**Druge oblike študija**	**Samost. delo Individ. work**		**ECTS**
45	10	20			105		6

Nosilec predmeta / Lecturer:	doc. dr. Tomaž Dobravec

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Vpis v letnik študija.	Enrolment in the programme.
Vsebina:	**Content (Syllabus outline):**

osnova zbirnih in strojnih jezikov,	basics about machine and assembly languages
vsebina in organizacija objektnih datotek,	content and organization of object files
zbirnik, nalagalnik in povezovalnik,	assembler, linker, loader
statično in dinamično povezovanje	static and dynamic linking
makro procesorji,	macro processors
sistemski klici in prekinitve,	system calls and interrupts
implementacija vhoda in izhoda ter orodja datotečnega sistema,	input/output implementation and file system tools
upravljanje s pomnilnikom	memory management
razhroščevalniki,	debugging
jedro operacijskega sistema Linux,	linux kernel
navidezni stroji.	virtual machines
nalaganje, povezovanje in izvajanje v javanskem navideznem stroju	loading, linking and running in java virtual machine

Temeljni literatura in viri / Readings:

Leland L. Beck: System software: An Introduction to Systems Programming (3. izdaja). Addison-Wesley, 1997.

K. Robbins and S. Robbins: UNIX Systems Programming: Communication, Concurrency and Threads (2.izdaja). Prentice Hall, 2003.

Damjan Zazula, Mitja Lenič: Principi sistemske programske opreme. Založba FERI 2008

Cilji in kompetence:　　　　　　　　　　**Objectives and competences:**

Cilj:	Objectives:
Cilj predmeta je študentom računalništva in informatike predstaviti sistemske programe, orodja in standarde sistemske programske opreme, ter prikazati podobnosti in razlike med pristopi, ki se uporabljajo v aktualnih operacijskih sistemih.	The main goal of this course is to introduce the concepts, tools and standards of system programming and to show the current implementations in the actual operating systems.
Kompetence:	Competences:
Razvijanje sposobnosti kritičnega, analitičnega in sintetičnega razmišljanja.	Developing skills in critical, analytical and synthetic thinking.
Sposobnost razumevanja in reševanja strokovnih izzivov na področju računalništva in informatike.	The ability to understand and solve professional challenges in computer and information science.
Sposobnost opredelitve, razumevanja in reševanja poklicnih izzivov.	The ability to define, understand and solve creative professional challenges in computer and information science,
Sposobnost za uporabo pridobljenega znanja pri samostojnem reševanju tehničnih in znanstvenih problemov v računalništvu in informatiki, sposobnost nadgradnje pridobljenega znanja.	The ability to apply acquired knowledge in independent work for solving technical and scientific problems in computer and information science, the ability to upgrade acquired knowledge.
Osnovna znanja iz računalništva in informatike, ki vključujejo osnovne teoretične spretnosti, praktična znanja in spretnosti, ki so pomembne za področje računalništva in informatike.	Basic skills in computer and information science, which includes basic theoretical skills, practical knowledge and skills essential for the field of computer and information science,
Praktično znanje in poznavanje računalniške strojne opreme, programske opreme in informacijske tehnologije, ki je potrebno za uspešno strokovno delo na področju računalništva in informatike.	Practical knowledge and skills of computer hardware, software and information technology necessary for successful professional work in computer and information science.

Predvideni študijski rezultati:	**Intended learning outcomes:**

Znanje in razumevanje: Poznavanje metod in orodij umetnega zaznavanja in umetne inteligence, njihove soodvisnosti ter načinov za njihovo integracijo v delujoče sisteme. Uporaba: Uporaba metod in orodij umetnega zaznavanja in umetne inteligence, načrtovanje integriranih inteligentnih sistemov ter implementacija teh sistemov za reševanje praktičnih problemov. Refleksija: Razumevanje primernosti teoretičnih metod za reševanje praktičnih primerov ter njihovih omejitev, sposobnost analitičnega razmišljanja, sposobnost analize in reševanja praktičnih problemov z razvojem inteligentnih sistemov. Prenosljive spretnosti: Kombiniranje znanj pridobljenih pri predmetih s področja umetnega zaznavanja in inteligence, multidisciplinarni pristopi, spretnosti iskanja in uporaba literature, uporaba primerne (predvsem odprtokodne) programske opreme, identifikacija in reševanje kompleksnih problemov.	Knowledge and understanding: The knowledge of the basic terms of system programming, operating systems and tools with implementation. Understanding the principles of system programs and some other basic building blocks of the operating system. Application: Use and development of system software. Reflection: Knowledge of the basic concepts of system software is crucial to understanding how a computer system works. Knowledge is useful both in application and development of user software, as well as in the design and manufacture of hardware. Transferable skills: The knowledge of the basic building blocks of a computer system helps us to find the limits of computer system and therefore contributes to higher quality work in virtually all areas of computer use and development of software and hardware.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja, laboratorijske vaje, domače naloge.	Lectures, exercises and home work

	Delež (v %) /	
Načini ocenjevanja:	Weight (in %)	**Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt): Sprotno preverjanje (domače naloge, kolokviji in projektno delo) Končno preverjanje (pisni in ustni izpit) Ocene: 6-10 pozitivno, 1-5 negativno (v skladu s Statutom UL)	 50% 50%	Type (examination, oral, coursework, project): Continuing (homework, project work) Final (project and oral exam) Grading: 6-10 pass, 1-5 fail.

Reference nosilca / Lecturer's references:

MIHELIČ, Jurij, DOBRAVEC, Tomaž. SicSim : a simulator of the educational SIC/XE computer for a system-software course. Computer applications in engineering education, ISSN 1061-3773. [Print ed.], Jan. 2015, vol. 23, no. 1, str. 137-146, ilustr. , doi: . [COBISS.SI-ID 10241620]

ČEŠNOVAR, Rok, RISOJEVIĆ, Vladimir, BABIĆ, Zdenka, DOBRAVEC, Tomaž, BULIĆ, Patricio. A GPU implementation of a structural-similarity-based aerial-image classification. The journal of supercomputing, ISSN 0920-8542, Aug. 2013, vol. 65, no. 2, str. 978-996, ilustr. , doi: . [COBISS.SI-ID 9619028]

BULIĆ, Patricio, DOBRAVEC, Tomaž. An approximate method for filtering out data dependencies with a sufficiently large distance between memory references. The journal of supercomputing, ISSN 0920-8542, 2011, vol. 56, no. 2, str. 226-244, ilustr. [COBISS.SI-ID 7412820]

DOBRAVEC, Tomaž, ŽEROVNIK, Janez, ROBIČ, Borut. An optimal message routing algorithm for circulant networks. Journal of Systems Architecture, ISSN 1383-7621. [Print ed.], 2006, vol. 52, no. 5, str. [298]-306, ilustr. [COBISS.SI-ID 5323348]

DOBRAVEC, Tomaž, ROBIČ, Borut. Restricted shortest paths in 2-circulant graphs. Computer communications, ISSN 0140-3664. [Print ed.], March 2009, vol. 32, no. 4, str. 685-690, ilustr. [COBISS.SI-ID 6966356]