

UČNI NAČRT PREDMETA / COURSE SYLLABUS						
Predmet:		Računalniški sistemi				
Course title:		Computer systems				
Študijski program in stopnja Study programme and level		Študijska smer Study field		Letnik Academic year	Semester Semester	
Interdisciplinarni magistrski študijski program Računalništvo in matematika		ni smeri		1 in 2	drugi	
Interdisciplinary Masters study programme Computer Science and Mathematics		none		1 in 2	second	
Vrsta predmeta / Course type				obvezni		
Univerzitetna koda predmeta / University course code:				63509		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45		30			105	6
Nosilec predmeta / Lecturer:		Branko Šter				
Jeziki / Languages:		Predavanja / Lectures:		slovenski/Slovene		
		Vaje / Tutorial:		slovenski/Slovene		
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:		
Poznavanje osnov arhitekture računalniških sistemov						
Vsebina:				Content (Syllabus outline):		

<p>Linearna električna vezja: enosmerna analiza, prehodni pojavi.</p> <p>Električne linije: linijske enačbe, odboji, presluhi.</p> <p>Vodila: principi, zgodovina, PCI, PCI Express.</p> <p>Računalniški porti: serijski port, USB, FireWire, Bluetooth.</p> <p>Avdio sistem (digitalni avdio, zvočne kartice, transduktorji) in video sistem (video adapter, vmesniki, monitorji)</p> <p>Magnetni diski in vmesniki (ATA/IDE, SATA), SSD diski (Flash), optični diski (CD, DVD, Blu-ray)</p> <p>Uporaba periferije v mikrokontrolerih: GPIO, časovniki, prekinitve, flash. Gonilniki. RTOS.</p> <p>Porazdeljeni sistemi in kiber-fizični sistemi. Porazdeljeno računanje, komunikacija in interakcija med heterogenimi vgrajenimi napravami.</p> <p>Aplikacije brezžičnih računalniških sistemov</p>	<p>Linear electrical circuits: DC analysis, transient analysis.</p> <p>Electrical transmission lines: line equations, reflections, crosstalk.</p> <p>Buses: principles, history, PCI, PCI Express.</p> <p>Computer ports: serial port, USB, FireWire, Bluetooth.</p> <p>Audio system (digital audio, sound cards, transducers) and video system (video adapter, video interfaces, displays)</p> <p>Magnetic disks and interfaces (ATA/IDE, SATA), SSD disks (Flash), optical disks (CD, DVD, Blu-ray)</p> <p>Using peripherals in microcontrollers: GPIO, timers, interrupts, flash. Device drivers. RTOS.</p> <p>Distributed and cyber-physical systems. Distributed computation, communication and interaction among heterogeneous embedded devices.</p> <p>Applications of wireless computing systems</p>
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Temeljni literatura in viri / Readings:

<p>S. Mueller: Upgrading and repairing PCs, 21st ed., Que Publishing, 2013.</p> <p>W.L. Rosch: Hardware Bible, Que Publishing, 2003.</p> <p>J. Mlakar: Elektromagnetno valovanje, Založba FE in FRI, 2002.</p> <p>E.A. Lee, S.A. Seshia: Introduction to embedded systems: A cyber-physical systems approach. MIT Press, 2016.</p> <p>D.P. Agrawal, Q.A. Zeng: Introduction to wireless and mobile systems. Cengage learning, 2015.</p> <p>C.A. Varela, G. Agha: Programming Distributed Computing Systems: A Foundational Approach. MIT Press, 2013.</p>

Cilji in kompetence:

Objectives and competences:

Cilj predmeta je študentom, ki so končali 1. stopnjo študija, predstaviti vhodno-izhodne oz. periferne naprave v računalniških sistemih.

Kompetence:

Razvoj veščin kritičnega, analitičnega in sintetičnega mišljenja.

Zmožnost definiranja, razumevanja in reševanja ustvarjalnih profesionalnih izzivov v računalništvu in informatiki.

Zmožnost profesionalne komunikacije v materinem in v tujem jeziku.

Zmožnost uporabe pridobljenega znanja pri samostojnem delu pri reševanju tehničnih in znanstvenih problemov v računalništvu in informatiki, zmožnost nadgradnje pridobljenega znanja.

Osnovne veščine v računalništvu in informatiki.

Praktično znanje in veščine, potrebne za uspešno profesionalno delo v računalništvu in informatiki.

Zmožnost samostojne izvedbe inženirskih in organizacijskih nalog v določenih ozkih področjih in samostojnega reševanja specifičnih dobro definiranih nalog v računalništvu in informatiki.

The course aims to present to graduate students input/output or peripheral devices in computer systems.

Competences:

Developing skills in critical, analytical and synthetic thinking.

The ability to define, understand and solve creative professional challenges in computer and information science.

The ability of professional communication in the native language as well as a foreign language.

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.

Basic skills in computer and information science.

Practical knowledge and skills necessary for successful professional work in computer and information science.

The ability to independently perform engineering and organisational tasks in certain narrow areas and independently solve specific well-defined tasks in computer and information science.

Predvideni študijski rezultati:

Po uspešno opravljenem predmetu naj bi bili študenti zmožni:

- razložiti osnovne principe delovanja različnih vrst perifernih naprav v računalniških sistemih
- poznavanja in vrednotenja široke palete perifernih naprav
- uporabiti to znanje pri načrtovanju računalniških sistemov, kakor tudi pri

Intended learning outcomes:

After the completion of the course a student will be able to:

- explain basic principles of operation of different types of peripherals in computer systems
- know and evaluate wide variety of computer peripherals
- apply this knowledge directly in computer

administraciji le-teh

- posredno uporabiti znanje o perifernih napravah tudi pri načrtovanju in izdelavi sistemske in uporabniške programske opreme
- razumevanja, uporabe in načrtovanja porazdeljenih računalniških sistemov

systems design, as well as in their administration

- apply this knowledge indirectly also in design and making of systems software and application software
- understand, apply and design of distributed computing systems

Metode poučevanja in učenja:

Predavanja, računske vaje, laboratorijske vaje, domače naloge.

Learning and teaching methods:

Lectures, calculation exercises, laboratory exercises, homeworks.

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

<p>Sprotno preverjanje: laboratorijske vaje, domače naloge, kolokviji. Končno preverjanje: pisni in teoretični izpit.</p> <p>Ocene: 6-10 pozitivno, 5 negativno (v skladu s Statutom UL).</p>	<p>1/3 1/3 + 1/3</p>	<p>Midterm work: laboratory exercises, homeworks, midterm exams. Final exam: written and theoretical exam.</p> <p>Grading: 6-10 pass, 5 fail (according to the rules of University of Ljubljana).</p>
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Reference nosilca / Lecturer's references:

Branko Šter:

- ŠTER, Branko, DOBNIKAR, Andrej. Adaptive radial basis decomposition by learning vector quantization. Neural processing letters, ISSN 1370-4621. [Print ed.], 2003, vol. 18, no. 1, str. 17-27, ilustr [COBISS.SI-ID 3971668]
- ŠTER, Branko. An integrated learning approach to environment modelling in mobile robot navigation. Neurocomputing, ISSN 0925-2312. [Print ed.], 2004, vol. 57, str. [215]-238, ilustr

[COBISS.SI-ID 4318548]

– ŠTER, Branko, DOBNIKAR, Andrej. Modelling the environment of a mobile robot with the embedded flow state machine. *Journal of intelligent & robotic systems*, ISSN 0921-0296, Jun. 2006, vol. 46, no. 2, str. [182]-199, ilustr [COBISS.SI-ID 5492820]

– DOBNIKAR, Andrej, ŠTER, Branko. Structural properties of recurrent neural networks. *Neural processing letters*, ISSN 1370-4621. [Print ed.], 2009, vol. 29, no. 2, str. 75-88, graf. prikazi [COBISS.SI-ID 7085652]

– ŠTER, Branko, ŠUŠTERIČ, Zoran, LOTRIČ, Uroš. Combined application of theoretical modeling and neural networks in vulcametry. *Kautschuk-Gummi-Kunststoffe*, ISSN 0948-3276, 2009, jg. 62, nr. 6, str. 313-318, ilustr [COBISS.SI-ID 7138644]