UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
Predmet:	Zanesljivost in zmogljivost računalniških sistemov		
Course title:	Computer systems reliability and performance		

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	drugi
Interdisciplinary first cycle academic study programme Computer Science and Mathematics	none	3	second

Vrsta predmeta / Course type		izbirni / elective	

Univerzitetna koda predmeta / University course code:	63262

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

Nosilec predmeta / Lecturer:	prof. dr. Miha Mraz

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):**

Predavanja:	Lectures:
1. Zanesljivost rač. sistemov	1. Reliability of computer systems
Osnovni pojmi (napaka, odpoved, redundanca, MTBF, MTTR, MTTF, degradirano delovanje, nedelujoče stanje sistema, itd.)	Basic terms (error, failure, redundancy, MTBF, MTTR, MTTF, performance degradation, system failure, etc.)
Matematično teoretične osnove zanesljivosti	Mathematical theory in reliability estimation
Modeliranje zanesljivosti	Modelling the reliability
Zanesljivost elektronskih komponent – pregled standardov	Reliability assessment of electronic components – overview of the standards available
Zanesljivost programske opreme	Software reliability
Osnove sistemske zanesljivosti	Basics of system reliability
Diagnostika v računalniških sistemih	Computer diagnostics
Pregled konkretnih metod za določevanje zanesljivosti (FMEA, FTA, itd.)	Overview of selected methods for reliability assessment (FMEA, FTA, etc.)
Pregled programskih orodij za določevanje zanesljivosti	Overview of software tools for reliability assessment
2. Zmogljivost rač. sistemov	2. Performance of computer systems
Metrike za ocenjevanje zmogljivosti	Metrics for performance evaluation
Bremena v računalniških sistemih	Work-loads in computer systems
Metode za ocenjevanje zmogljivosti (analitični, simulacijski ali meritveni pristop)	Methods for performance evaluation (analytical, simulational and measurement approach)
Monitorji	Computer system performance monitoring
Koncepti določanja zmogljivosti: meritve, simulacije, analitični pristop	Performance evaluation concepts: measurements, simulations, analytical approach
Postopki za pohitritev programske opreme	Methods for improving the system performance
	Memory hierarchies

Pomnilniške hierarhije Zmogljivost računalniških omrežij Vaje: Namen vaj pri navedenem predmetu je predvsem v predstavitvi uporabe zgoraj navedenih metod in pristopov na praktičnih primerih iz realnega sveta. V ta namen se bodo uporabljala na vajah ustrezna programska orodja (npr. Relex, Reliability Workbench itd.).	Capabilities of computer systems Laboratory courses: Methods and approaches presented during the lectures will be demonstrated on practical real-world examples during the laboratory courses. Different software tools will be used for the demonstrations, such as Relex, Reliability Workbench etc.

Temeljni literatura in viri / Readings:

1. M. L Shooman: Reliability of computer systems and networks, J. Wiley &, Sons, New York 2002.

2. N. Zimic, M. Mraz: Temelji zmogljivosti računalniških sistemov, Fakulteta za rač. in informatiko, Ljubljana, 2006.

Cilji in kompetence: / Objectives and competences:

Cilji in kompetence:	Objectives and competences:
Cilj predmeta je študentom računalništva in informatike predstaviti osnovne metode in pristope na področjih računalniške zanesljivosti in zmogljivosti. Obe sta ključni za uspešnost delovanja kakršnegakoli računalniškega sistema. Predmet naj bi študentom podal tako teoretične osnove in metode obeh področij, kot tudi skušal čim boljše predstaviti uporabo teoretičnih osnov in metod na konkretnih problemih načrtovanja in vzdrževanja računalniških sistemov. Ostale kompetence: Razvoj spretnosti v analitičnem in sinteznem razmišljanju. Sposobnost razumevanja in reševanja profesionalnih problemov Zmožnost profesionalne komunikacije v materinem in tujem jeziku.	Objective of the course is to present the basic methods and approaches from the field of reliability and performance of computer systems assessment to the students of computer and information science. Reliability and performance of computer system are bital for its effectivity. Students will comprehend theoretical knowledge from both disciplines and will also learn their practical values from the examples of real-life problems. Other competences: Developing skills in critical, analytical and synthetic thinking. The ability to understand and solve professional challenges in computer and information science. The ability of professional communication in the native language as well as a foreign language.

Zmožnost uporabe in nadgradnje znanja pri samostojnem delu Zmožnost timskega dela v profesionalnem okolju, upravljanje manjših delovnih enot	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. The ability of teamwork within the professional environment, management of a small professional team.
Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Poznavanje metod, tehnik in orodij poslovne inteligence. Uporaba: Uporaba tehnik poslovne inteligence v informacijski sistemih in spletnih okoljih. Refleksija: Sposobnost prepoznavanja priložnosti in niš, kjer lahko s tehnikami poslovne inteligence pridobimo konkurenčno prednost. Razumevanje primernosti teoretičnih pristopov s področja inteligentnih sistemov za reševanje praktičnih primerov v poslovnem okolju. Prenosljive spretnosti - niso vezane le na en predmet: Veščine skriptnega programiranja. Odkrivanje znanj iz podatkov. Kognitivni aspekti odločanja.	Knowledge and understanding: Having the theoretical and methodological knowledge from the field of computer reliability and performance. Understanding the importance of both disciplines. Knowing the practical values of both disciplines. Application: Application of methodological knowledge in design and support of various computer systems. Reflection: Understanding the relations among theoretical knowledge and methodologies and practical problems from the field of reliability and performance of computer systems. Transferable skills – are not bound only to this course: Students gain a new perspective as designers or supports of a computer system (application). This perspective opens new viewpoints such as critical analysis, synthesis, team work and social skills.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja bodo potekala ustno, vaje v obliki projektnega dela na konkretnih aplikativnih zgledih.	Lectures and oral presentations of the subject. Seminal work on real-life examples and problems.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt):		Homeworks.
		Written exam.
Sprotno preverjanje (domače naloge, kolokviji in projektno delo)	50%	Grading: 6-10 pass, 1-5 fail.
Končno preverjanje (pisni in ustni izpit)	50%	
Ocene: 6-10 pozitivno, 1-5 negativno		
(v skladu s Statutom UL)		

Reference nosilca / Lecturer's references: