

UČNI NAČRT PREDMETA / COURSE SYLLABUS								
Ime predmeta:		Inteligentna analiza podatkov v medicini						
Course title:		Intelligent Data Analysis in Medicine						
Študijski program in stopnja Study programme and cycle		Študijska smer Study option			Letnik Year of study	Semester Semester		
Biomedicinska tehnologija/3. stopnja					2	3 ali 4		
Biomedical Technology/3rd Degree								
Vrsta predmeta (obvezni ali izbirni) / Course type (compulsory or elective)				Izbirni				
				Elective				
Univerzitetna koda predmeta / University course code:								
Predavanja Lectures	Seminar Seminar	Vaje Tutorial			Klinične vaje Clinical training	Druge oblike študija Other forms of study	Samost. delo Individual work	ECTS
15	30	AV	LV	RV			135	6
Nosilec predmeta / Course coordinator:		Prof. dr. Milan Zorman						
Jeziki /Languages:		Predavanja / Lectures:		Slovenščina/Slovene				
		Vaje / Tutorial:		-				
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:					Prerequisites for enrolling in the course or for performing study obligations:			
Vsebina (kratek pregled učnega načrta):					Content (syllabus outline):			
<ul style="list-style-type: none"> • Uvod v inteligentne sisteme • Osnove zbirk podatkov • Priprava podatkov za inteligentno analizo • Delo z manjkajočimi podatki • Metode nadzorovanega strojnega učenja: <ul style="list-style-type: none"> o Metoda podpornih vektorjev o Ansambelske metode o Hibridne metode • Metode nenadzorovanega strojnega učenja: <ul style="list-style-type: none"> o Razvrščanje • Evalvacija pridobljenega znanja 					<ul style="list-style-type: none"> • Introduction to intelligent systems • Basics of data sets • Data pre-processing for intelligent analysis • Working with missing data • Methods for supervised machine learning: <ul style="list-style-type: none"> o Support Vector Machines o Ensemble methods o Hybrid methods • Methods for unsupervised machine learning: <ul style="list-style-type: none"> o Clustering • Evaluation of acquired knowledge 			
Temeljni literatura in viri / Reading materials:								
Zorman Milan, Podgorelec Vili, Lenič Mitja, Povalej Petra, Kokol Peter in Tapajner Alojz: Inteligentni sistemi in profesionalni vsakdan, Univerza v Mariboru, Center za Interdisciplinarne in multidisciplinarne raziskave in študije UM, Maribor, 2003								
J. Han, M. Kamber: Data Mining: Concepts and Techniques, Second Edition, Elsevier, Morgan Kaufmann Publishers, 2006.								

I. H. Witten, E. Frank, M. A. Hall: Data Mining, Practical Machine Learning Tools and Techniques, Third Edition, Morgan Kaufmann Publishers, 2011.		
Cilji in kompetence:		Objectives and competences:
Seznani študente s postopki iskanja novega znanja v bazah podatkov. Naučiti študente dela z inteligentnimi metodami za avtomatski zajem in evaluacijo znanja iz podatkovnih zbirk.		To introduce students to knowledge acquisition from data sets. To teach students about intelligent methods for automatic acquisition and evaluation of knowledge.
Predvideni študijski rezultati:		Intended learning outcomes:
Znanje in razumevanje: Zajemanja podatkov Shranjevanja podatkov Priprave podatkov za obdelavo z inteligentnimi metodami Uporaba naprednih inteligentnih metod Evalvacije rezultatov inteligentnih metod Uporabe pridobljenega znanja.		Knowledge and understanding: Data acquisition Storing data. Data pre-processing for analysis with intelligent methods. Usage of advanced intelligent methods. Evaluation of results of intelligent methods. Usage of acquired knowledge.
Prenosljive/ključne spretnosti in drugi atributi: Sposobnost učinkovitejšega zajema, shranjevanja in uporabe podatkov. Znanje za uporabo podatkovnega rudarjenja in iskanja novega znanja na poljubnih področjih. Poznavanje naprednih inteligentnih metod.		Transferable/key competences and other abilities: Capability to more efficiently acquire, store and use data. Knowledge about data mining and knowledge acquisition in various areas. Familiarity with advanced intelligent methods.
Metode poučevanja in učenja:		Learning and teaching methods:
Predavanja Seminar (razgovor, demonstracija, računalniške vaje) Samostojno delo		Lectures Seminars (discussion, demonstration, computer exercises) Individual work
Načini ocenjevanja:	Delež (v %) / Share (in %)	Assessment methods:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Method (written or oral exam, coursework, project):
Seminarska naloga	60 %	Seminar work
Ustni izpit	40 %	Oral examination
Reference nosilca / Course coordinator's references:		
"STROPNIK, Ambrož, VUHERER, Tomaž, SAMARDŽIĆ, Ivan, ZORMAN, Milan. Application of semantic technology for calculation of welding time in the development of new products = Primjena semantičke tehnologije za izračun vremena zavarivanja u razvoju novih proizvoda. Tehnički vjesnik : znanstveno-stručni časopis tehničkih fakulteta Sveučilišta u Osijeku, ISSN 1330-3651, 2017, vol. 24, no. 4, str. 1235-1242. http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=273524 . [COBISS.SI-ID 20699414], [JCR, SNIP, WoS do 27. 8. 2017: št. citatov (TC): 0, čistih citatov (CI): 0, čistih citatov na avtorja (CIAu): 0] kategorija: 1A4 (Z); uvrstitev: SCI, Scopus, MBP; tip dela je verificiral OSICT točke: 15, št. avtorjev: 4"		
PLOJ, Bojan, HARB, Robert, ZORMAN, Milan. Border Pairs Method-constructive MLP learning classification algorithm. V: CORCHADO, Emilio (ur.). Recent trends in intelligent data analysis : Online Data Processing - Selected papers of the The 6th International Conference on Hybrid Artificial Intelligence Systems (HAIS 2011) Including a selection of papers from the International Conference on Adaptive and Intelligent Systems 2011		

(ICAIS 2011), (Neurocomputing, ISSN 0925-2312, Vol. 126, str. 180-187 (27 Feb. 2014)). Oxford: Elsevier. 2014, vol. 126, str. 180-187, doi: 10.1016/j.neucom.2013.03.026. [COBISS.SI-ID 17332246], [JCR, SNIP, WoS do 19. 4. 2017: št. citatov (TC): 3, čistih citatov (CI): 3, čistih citatov na avtorja (CIAu): 1.00, Scopus do 27. 5. 2018: št. citatov (TC): 6, čistih citatov (CI): 6, čistih citatov na avtorja (CIAu): 2.00] tipologija 1.08 -> 1.01, kategorija: 1A2 (Z, A1/2);

"PODGORELEC, Vili, ZORMAN, Milan. Decision tree learning. V: MEYERS, Robert A. (ur.). Encyclopedia of complexity and systems science, (SpringerLink). New York: Springer, 2015, str. 1-28, doi: 10.1007/978-3-642-27737-5_117-2. [COBISS.SI-ID 18606102] kategorija: 3D (Z); tip dela je verificiral OSICN točke: 5, št. avtorjev: 2"