

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
Predmet:		Optimizacijske metode 2					
Course title:		Optimization methods 2					
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 ali 2		prvi ali drugi	
Interdisciplinary Masters study programme Computer Science and Mathematics		none		1 or 2		first or second	
Vrsta predmeta / Course type				izbirni			
Univerzitetna koda predmeta / University course code:				M2843			
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS	
30	15	30			105	6	
Nosilec predmeta / Lecturer:		prof. Emil Žagar, prof. Sergio Cabello Justo					
Jeziki / Languages:		Predavanja / Lectures:		slovenski/Slovene, angleški/English			
		Vaje / Tutorial:		slovenski/Slovene, angleški/English			
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:			
Vsebina:				Content (Syllabus outline):			
Polkolobarji in problem najkrajših poti.				Semirings and shortest path problem. Hard problems of combinatorial optimization.			

Zahtevnejši problemi kombinatorične optimizacije.	Integer optimization problems.
Celoštevilski optimizacijski problemi.	Interior point methods.
Metode notranje točke.	Calculus of variations.
Osnove variacijskega računa.	Software tools for optimization.
Programska orodja za optimizacijo.	Applications of optimization.
Uporabe optimizacijskih metod v praksi.	

Temeljni literatura in viri / Readings:

S. Boyd, L. Vandenberghe: Convex Optimization, Cambridge University Press, Cambridge, 2004.
B. van Brunt: The calculus of variations. Springer, Berlin, 2004.
B. H. Korte, J. Vygen: Combinatorial Optimization: Theory and Algorithms, 4. izdaja, Springer, Berlin, 2008.
D. Li, X. Sun: Nonlinear integer programming. Springer, Berlin, 2006.
Z. Michalewicz, D. B. Fogel: How to Solve It: Modern Heuristics, 2. izdaja, Springer, Berlin, 2004.
P. Pablo Pedregal: Introduction to optimization, Springer, Berlin, 2004.
A. Schrijver: Combinatorial optimization, Springer, Berlin, 2004.
M. Gendreau, J-Y. Potvin: Handbook of Metaheuristics. Springer, 2010.

Cilji in kompetence:

Študentje se bodo seznanili z novejšimi optimizacijskimi metodami in se usposobili za njih samostojno uporabo pri reševanju problemov iz prakse.
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Objectives and competences:

The goal of the course is to introduce some modern optimization methods and to enable the students to use these methods by themselves in solving practical problems.
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Predvideni študijski rezultati:

Znanje in razumevanje: Poznavanje in razumevanje pojmov in postopkov reševanja izbranih vrst

Intended learning outcomes:

Knowledge and understanding: Understanding of concepts and methods for solving the selected types of optimization problems.
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<p>optimizacijskih problemov.</p> <p>Poznavanje in usposobljenost za izbiro in uporabo ustreznih programskih orodij.</p> <p>Matematično modeliranje praktičnih problemov.</p>	<p>Ability to select the right optimization methods and perform them using appropriate software tools.</p> <p>Mathematical modeling of practical problems.</p>
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Metode poučevanja in učenja:

Predavanja, seminar, vaje, domače naloge, projektno delo, konzultacije, samostojni delo študentov.

Learning and teaching methods:

Lectures, seminar, exercises, homeworks, home reading, project, consultations, independent work by the students.

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</p>		<p>Type (examination, oral, coursework, project):</p>
<p>Sprotno preverjanje (domače naloge, kolokviji ali projektno delo)</p>		<p>Continuous assessment (homework, midterm exams, project work)</p>
<p>Končno preverjanje (pisni ali ustni izpit)</p>		<p>Final (written or oral exam)</p>
<p>Ocene: 6-10 pozitivno, 5 negativno (v skladu s Statutom UL)</p>	<p>50% 50%</p>	<p>Grading: 6-10 pass, 5 fail (according to the rules of University of Ljubljana)</p>

Reference nosilca / Lecturer's references:

Sergio Cabello:
 CABELLO, Sergio, DÍAZ-BÁÑEZ, José Miguel, PÉREZ LANTERO, Pablo. Covering a bichromatic point set with two disjoint monochromatic disks. Computational geometry, ISSN 0925-7721. [Print ed.], 2013, vol. 46, iss. 3, str. 203-212. [COBISS.SI-ID 16326233]
 CABELLO, Sergio, GIANNOPOULOS, Panos, KNAUER, Christian, MARX, Dániel, ROTE, Günter.

Geometric clustering: fixed-parameter tractability and lower bounds with respect to the dimension. ACM transactions on algorithms, ISSN 1549-6325, 2011, vol. 7, no. 4, article 43 (27 str.). [COBISS.SI-ID 16028761]

CABELLO, Sergio, ROTE, Günter. Obnoxious centers in graphs. SIAM journal on discrete mathematics, ISSN 0895-4801, 2010, vol. 24, no. 4, str. 1713-1730. [COBISS.SI-ID 15762265]

Emil Žagar:

JAKLIČ, Gašper, SAMPOLI, Maria Lucia, SESTINI, Alessandra, ŽAGAR, Emil. C [sup] 1 rational interpolation of spherical motions with rational rotation-minimizing directed frames. Computer Aided Geometric Design, ISSN 0167-8396, 2013, vol. 30, iss. 1, str. 159-173. [COBISS.SI-ID 16368729]

JAKLIČ, Gašper, KANDUČ, Tadej, PRAPROTNIK, Selena, ŽAGAR, Emil. Energy minimizing mountain ascent. Journal of optimization theory and applications, ISSN 0022-3239, 2012, vol. 155, is. 2, str. 680-693. [COBISS.SI-ID 4382935]

JAKLIČ, Gašper, ŽAGAR, Emil. Curvature variation minimizing cubic Hermite interpolants. Applied mathematics and computation, ISSN 0096-3003. [Print ed.], 2011, vol. 218, iss. 7, str. 3918-3924. [COBISS.SI-ID 16049241]