

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
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 Master's study programme Computer Science and Mathematics	none			1 or 2	first or second	
Vrsta predmeta / Course type				izbirni / elective		
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. dr. Sergio Cabello Justo, prof. dr. Emil Žagar		
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:		
Vpis v letnik študija.				Enrolment in the programme.		
Vsebina:				Content (Syllabus outline):		

Polkolobarji in problem najkrajših poti.	Semirings and shortest path problem.
Zahtevnejši problemi kombinatorične optimizacije.	Hard problems of combinatorial optimization.
Celoštevilski optimizacijski problemi.	Integer optimization problems.
Metode notranje točke.	Interior point methods.
Osnove variacijskega računa.	Calculus of variations.
Programska orodja za optimizacijo.	Software tools for optimization.
Uporabe optimizacijskih metod v praksi.	Applications of optimization.

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.

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.

Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje:
 Poznavanje in razumevanje pojmov in postopkov reševanja izbranih vrst optimizacijskih problemov.

Poznavanje in usposobljenost za izbiro in uporabo ustreznih programskih orodij.

Matematično modeliranje praktičnih problemov.

Knowledge and understanding:
 Understanding of concepts and methods for solving the selected types of optimization problems.

Ability to select the right optimization methods and perform them using appropriate software tools.

Mathematical modeling of practical problems.

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 %) / Weight (in %)	Assessment:
Načini ocenjevanja:			
Način (pisni izpit, ustno izpraševanje, naloge, projekt):			Type (examination, oral, coursework, project):Continuing (homework, midterm exams, project work)Final (written or oral exam)
Sprotno preverjanje (domače naloge, kolokviji ali projektno delo)			Grading: 6-10 pass, 1-5 fail (according to the rules of University of Ljubljana)
Končno preverjanje (pisni ali ustni izpit)	50%		
Ocene: 6-10 pozitivno, 1-5 negativno	50%		
(v skladu s Statutom UL)			

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]