UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)			
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. Zahtevnejši problemi kombinatorične optimizacije. Celoštevilski optimizacijski problemi. Metode notranje točke. Osnove variacijskega računa. Programska orodja za optimizacijo. Uporabe optimizacijskih metod v praksi.	Semirings and shortest path problem. Hard problems of combinatorial optimization. Integer optimization problems. Interior point methods. Calculus of variations. Software tools for optimization. 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:	**Objectives and competences:**
Študentje se bodo seznanili z novejšimi optimizacijskimi metodami in se usposobili za njih samostojno uporabo pri reševanju problemov iz prakse.	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:	**Learning and teaching methods:**
Predavanja, seminar, vaje, domače naloge, projektno delo, konzultacije, samostojni delo študentov.	Lectures, seminar, exercises, homeworks, home reading, project, consultations, independent work by the students.

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

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]