UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)				
Predmet:	Izbrana poglavja iz matematike				
Course title:	Topics in mathematics				

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	2	drugi
Interdisciplinary first cycle academic study programme Computer Science and Mathematics	none	2	second

Vrsta predmeta / Course type	obvezni / compulsory

Univerzitetna koda predmeta / University course code: 27209

Predavanja **Lectures**	**Seminar** **Seminar**	**Vaje** **Tutorial**	**Klinične vaje** **work**	**Druge oblike študija**	**Samost. delo** **Individ. work**		**ECTS**
30		30			90		5

Nosilec predmeta / Lecturer:	prof. dr. Sergio Cabello Justo, prof. dr. Primož Potočnik

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):**

Predavatelj izbere nekaj od naslednjih tem: Izbrane teme iz analize z uporabami (oscilator in resonanca, zvezna in diskretna Fourierova transformacija z uporabami, toplotna in valovna enačba, analiza signala, kompresija slike itd), Izbrane teme iz teorije števil z uporabami (modularna aritmetika, Eulerjeva fi funkcija, RSA, testiranje praštevilskosti) Izbrane teme iz algebre (polgrupe in avtomati, končni obsegi) Izbrane teme iz diskretne matematike (ekstremalna kombinatorika in teorija grafov, latinski kvadrati, algebraična kombinatorika), druge matematične teme po predavateljevem izboru.	Lecturer chooses amongst the following topics: Selected topics in analysis (oscillator and resonance, contiuous and discrete Fourier transform with applications, sygnal analysis, heat and wave equation, image compression), Selected topics in number theory with applications (modular arithmetics, Euler totient, RSA, testing primality), Selected topics in algebra (semigrupus and automata, finite fields), Selected topics in discrete mathematics (extremal combinatorics, latin squares, algebraic combinatorics) Other mathematical topics of lecturer's choosing.

Temeljni literatura in viri / Readings:

E. Kreyszig: Advanced Engineering Mathematics, 9th ed., Weiley (2006)

S. Coutinho: The Mathematics of Ciphers: Number Theory and RSA Cryptography, A.K. Peters ltd.,1999

T. W. Judson: Abstract Algebra Theory and Applications (2013), http://abstract.ups.edu/

Cilji in kompetence: **Objectives and competences:**

Študent se spozna z izbranimi matematičnimi problemi in se jih nauči samostojno reševati.	Students familiarise with the selected mathematical problems and learn how to idependently solve them.

Predvideni študijski rezultati: **Intended learning outcomes:**

Znanje in razumevanje:	Knowledge and understanding:
Študent se nauči in razume predstavljeno snov.	Students learns and understands the topic of the course.

Metode poučevanja in učenja:	**Learning and teaching methods:**
Predavanja in vaje.	Lecture and exercises.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pisni izpit z usntim zagovorom	100%	Written exam with oral defense

Reference nosilca / Lecturer's references:

Sergio Cabello:

CABELLO, Sergio. Many distances in planar graphs. Algorithmica, ISSN 0178-4617, 2012, vol. 62, no. 1-2, str. 361-381. [COBISS.SI-ID 15702873]

CABELLO, Sergio. Finding shortest contractible and shortest separating cycles in embedded graphs. V: 20th Annual ACM-SIAM Symposium on Discrete Algorithms, January 4-6, New York. SODA 2009 : special issue, (ACM transactions on algorithms, ISSN 1549-6325, Vol. 6, iss. 2). New York: Association for Computing Machinery, 2010, article No.: 24 (18 str.). [COBISS.SI-ID 15572057]

CABELLO, Sergio, KNAUER, Christian. Algorithms for graphs of bounded treewidth via orthogonal range searching. Computational geometry, ISSN 0925-7721. [Print ed.], 2009, vol. 42, iss. 9, str. 815-824. [COBISS.SI-ID 15160409]

Primož Potočnik:

POTOČNIK, Primož. Tetravalent arc-transitive locally-Klein graphs with long consistent cycles. European journal of combinatorics, ISSN 0195-6698, 2014, vol. 36, str. 270-281. [COBISS.SI-ID 16862041]

POTOČNIK, Primož, SPIGA, Pablo, VERRET, Gabriel. Cubic vertex-transitive graphs on up to 1280 vertices. Journal of symbolic computation, ISSN 0747-7171, 2013, vol. 50, str. 465-477. [COBISS.SI-ID 16520537]

POTOČNIK, Primož. Edge-colourings of cubic graphs admitting a solvable vertex-transitive group of automorphisms. Journal of combinatorial theory. Series B, ISSN 0095-8956, 2004, vol. 91, no. 2, str. 289-300. [COBISS.SI-ID 13087321]