

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)						
<b>Predmet:</b>		Izbrana poglavja iz matematike				
<b>Course title:</b>		Topics in mathematics				
<b>Študijski program in stopnja</b> Study programme and level		<b>Študijska smer</b> Study field		<b>Letnik</b> Academic year	<b>Semester</b> 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	
<b>Vrsta predmeta / Course type</b>				obvezni / compulsory		
<b>Univerzitetna koda predmeta / University course code:</b>				27209		
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike študija</b>	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
30		30			90	5
<b>Nosilec predmeta / Lecturer:</b>				prof. dr. Sergio Cabello Justo, prof. dr. Primož Potočnik		
<b>Jeziki / Languages:</b>		<b>Predavanja / Lectures:</b>		slovenski / Slovene		
		<b>Vaje / Tutorial:</b>		slovenski / Slovene		
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Vpis v letnik študija.				Enrolment in the programme.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		

<p>Predavatelj izbere nekaj od naslednjih tem:</p> <p>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),</p> <p>Izbrane teme iz teorije števil z uporabami (modularna aritmetika, Eulerjeva fi funkcija, RSA, testiranje praštevilskosti)</p> <p>Izbrane teme iz algebre (polgrupe in avtomati, končni obsegi)</p> <p>Izbrane teme iz diskretne matematike (ekstremalna kombinatorika in teorija grafov, latinski kvadrati, algebraična kombinatorika),</p> <p>druge matematične teme po predavateljevem izboru.</p>	<p>Lecturer chooses amongst the following topics:</p> <p>Selected topics in analysis (oscillator and resonance, continuous and discrete Fourier transform with applications, signal analysis, heat and wave equation, image compression),</p> <p>Selected topics in number theory with applications (modular arithmetics, Euler totient, RSA, testing primality),</p> <p>Selected topics in algebra (semigroups and automata, finite fields),</p> <p>Selected topics in discrete mathematics (extremal combinatorics, latin squares, algebraic combinatorics)</p> <p>Other mathematical topics of lecturer's choosing.</p>
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#### **Temeljni literatura in viri / Readings:**

<p>E. Kreyszig: Advanced Engineering Mathematics, 9th ed., Wiley (2006)</p> <p>S. Coutinho: The Mathematics of Ciphers: Number Theory and RSA Cryptography, A.K. Peters Ltd., 1999</p> <p>T. W. Judson: Abstract Algebra Theory and Applications (2013), <a href="http://abstract.ups.edu/">http://abstract.ups.edu/</a></p>
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#### **Cilji in kompetence:**

<p>Študent se spozna z izbranimi matematičnimi problemi in se jih nauči samostojno reševati.</p>
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#### **Objectives and competences:**

<p>Students familiarise with the selected mathematical problems and learn how to independently solve them.</p>
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#### **Predvideni študijski rezultati:**

#### **Intended learning outcomes:**

Znanje in razumevanje:

Študent se nauči in razume predstavljeno snov.

Knowledge and understanding:

Students learns and understands the topic of the course.

**Metode poučevanja in učenja:**

Predavanja in vaje.

**Learning and teaching methods:**

Lecture and exercises.

**Načini ocenjevanja:**

Pisni izpit z usntim zagovorom

Delež (v %) /  
Weight (in %)

100%

**Assessment:**

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]