

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
<b>Predmet:</b>		Elementarna geometrija					
<b>Course title:</b>		Elementary geometry					
<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
Univerzitetni študijski program Matematika		ni smeri			3		drugi
First cycle academic study programme Mathematics		none			3		second
<b>Vrsta predmeta / Course type</b>					izbirni		
<b>Univerzitetna koda predmeta / University course code:</b>					M0247		
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike</b> študija	<b>Samost. delo</b> Individ. work	<b>ECTS</b>	
45		30			105	6	
<b>Nosilec predmeta / Lecturer:</b>		Damjan Kobal, prof. Sašo Strle					
<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>			
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>			

<p>Evklidovi elementi. Hilbertov sistem aksiomov geometrije – pregled osnovnih idej in rezultatov evklidske in hiperbolične ravninske geometrije. Osnove sferne geometrije. Izometrije, simetrije, podobnost in skladnost. Talesovi izreki. Evklidovi izreki o krogu. Tetivni in tangenti štirikotnik. Potenca točke na krožnico. Inverzija. Poincarejeva modela hiperbolične ravnine. Hiperbolična trigonometrija. Apolonijeva krožnica in Apolonijev problem. Simsonova premica. Cevov in Stewartov izrek. Eulerjeva premica. Krožnica devetih točk. Menelajev, Pappusov in Desarguesov izrek. Fagnanov problem. Trilinearne koordinate. Morleyev izrek. Pravilni večkotniki in trisekcija kota. Platonska telesa. Poliedri in Eulerjeva formula.</p>	<p>Euklid's Elements. Hilbert's axioms – overview of basic ideas of Euclidean and Hyperbolic (plane) geometry. Basics of Spheric geometry. Isomerics, symetries, symilarity and congruency. Tales theorems. Euclid's circle theorems. Chord and tangent quadrilaterals. Power of a point. Inversion. Poincaré models of the hyperbolic plane. Hyperbolic trigonometry. Apollonian circle and Apollonian problem. Simson's line. Stewart's and Ceva's theorems. Euler's line. Nine point circle. Menelaus, Pappus and Desargues theorems. Fagnano's problem. Trilinear coordinates. Morley's theorem. Equilaterals and angle trisection. Platon's solids. Polyhedron's and Euler's formula.</p>
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#### Temeljni literatura in viri / Readings:

<p>N. Altshiller-Court: College Geometry, 2nd edition, Dover Publications, Mineola, New York, 2007.  B. Artmann: Euclid - The Creation of Mathematics, Springer, New York, 2001.    H. S. M. Coxeter: Introduction to Geometry, 2nd edition, John Wiley &amp; Sons, New York, 1989.    H. Dörrie: 100 Great Problems of Elementary Mathematics : Their History and Solution, Dover Publications, New York, 1982.    M. J. Greenberg: Euclidean and Non-Euclidean Geometries: development and history, Freeman, New York, 1973.    S.Lang, G. Murrow: Geometry: a high school course, Springer, New York, 1983.    D. Pagon: Osnove evklidske geometrije, DZS, Ljubljana, 1995.</p>
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#### Cilji in kompetence:

<p>Študent spozna osnove elementarne geometrije. Ob reševanju elementarnih matematičnih problemov z elementarnimi sredstvi se uči matematičnega načina razmišljanja. Predmet po tematiki in načinu razmišljanja pogloblja temeljna matematična znanja, ki jih potrebuje učitelj matematike.</p>
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#### Objectives and competences:

<p>Student acquires the basic knowledge and skills in elementary geometry. Solving the elementary problems, student enhances his or her mathematical thinking and comprehension. The course by its content and methods of teaching deepens a prospective teacher's essential mathematical knowledge and skills.</p>
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**Predvideni študijski rezultati:**

Znanje in razumevanje:  
 Poznavanje in razumevanje osnovnih pojmov in definicij iz elementarne geometrije ter uporaba konceptov pri reševanju elementarnih matematičnih problemov.

**Intended learning outcomes:**

Knowledge and understanding:  
 Knowledge and comprehension of essential concepts and definitions of elementary geometry and acquired ability to use these methods in elementary mathematical problems.

**Metode poučevanja in učenja:**

Predavanja, vaje, konzultacije

**Learning and teaching methods:**

Lectures, tutorial sessions, individual consultations

Delež (v %) /

Weight (in %) **Assessment:**

**Načini ocenjevanja:**

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Izpit iz vaj	50 %	exercise test
Izpit iz teorije	50 %	theory exam

**Reference nosilca / Lecturer's references:**

Damjan Kobal:

- KOBAL, Damjan. Iluzija objektivnosti ali objektivnost odgovornosti. Obzornik za matematiko in fiziko, ISSN 0473-7466, 2007, letn. 54, št. 1, str. 18-28 [COBISS.SI-ID 14302297]
- KOBAL, Damjan. Technology and simple math ideas inspire teaching. V: ICME - 12 : the 12th International Congress on Mathematical Education, July 8-15, 2012, COEX, Seoul, Korea. Cheongju: Korea National University of Education, 2012, 7 str [COBISS.SI-ID 17151577]
- KOBAL, Damjan, et al. Integrating algebra and geometry with complex numbers. V: International Seminar in Mathematics Education 2011. Park City: Park City Mathematics Institute - Institute for Advanced Study, cop. 2013, 9 str [COBISS.SI-ID 17152345]

Sašo Strle:

– STRLE, Sašo. Bounds on genus and geometric intersections from cylindrical end moduli spaces. *Journal of differential geometry*, ISSN 0022-040X, 2003, vol. 65, no. 3, str. 469-511 [COBISS.SI-ID 13135193]

– GRIGSBY, J. Elisenda, RUBERMAN, Daniel, STRLE, Sašo. Knot concordance and Heegaard Floer homology invariants in branched covers. *Geometry & topology*, ISSN 1364-0380, 2008, vol. 12, iss. 4, str. 2249-2275 [COBISS.SI-ID 14892121]

– OWENS, Brendan, STRLE, Sašo. A characterization of the  $\mathbb{Z}^n \oplus \mathbb{Z}(\Delta)$  lattice and definite nonunimodular intersection forms. *American journal of mathematics*, ISSN 0002-9327, 2012, vol. 134, no. 4, str. 891-913 [COBISS.SI-ID 16408153]