

| UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2016/17)                  |                           |                                      |                              |                                    |                                      |                             |
|--|---------------------------|--------------------------------------|------------------------------|------------------------------------|--------------------------------------|-----------------------------|
| <b>Predmet:</b>  |                           | Elementarna geometrija               |                              |                                    |                                      |                             |
| <b>Course title:</b>   |                           | Elementary geometry                  |                              |                                    |                                      |                             |
| <b>Študijski program in stopnja</b><br>Study programme and level             |                           | <b>Študijska smer</b><br>Study field |                              | <b>Letnik</b><br>Academic year     |                                      | <b>Semester</b><br>Semester |
| Univerzitetni študijski program<br>Matematika                                |                           | ni smeri                             |                              | 3                                  |                                      | drugi                       |
| First cycle academic study<br>programme Mathematics                          |                           | none                                 |                              | 3                                  |                                      | second                      |
| <b>Vrsta predmeta / Course type</b>  |                           |                                      |                              | izbirni / elective                 |                                      |                             |
| <b>Univerzitetna koda predmeta / University course code:</b>                 |                           |                                      |                              | M0247                              |                                      |                             |
| <b>Predavanja</b><br>Lectures  | <b>Seminar</b><br>Seminar | <b>Vaje</b><br>Tutorial              | <b>Klinične vaje</b><br>work | <b>Druge oblike</b><br>študija     | <b>Samost. delo</b><br>Individ. work | <b>ECTS</b>                 |
| 45   |                           | 30                                   |                              |                                    | 105                                  | 6                           |
| <b>Nosilec predmeta / Lecturer:</b>  |                           | prof. dr. Boris Lavrič               |                              |                                    |                                      |                             |
| <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> |                                      |                             |

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| <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. Isomerisms, symmetries, similarity 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:**

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

**Objectives and competences:**

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.

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.

**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

**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:**

LAVRIČ, Boris. The isometries of certain maximum norms. Linear Algebra and its Applications, ISSN 0024-3795. [Print ed.], 2005, vol. 405, str. 249-263. [COBISS.SI-ID 13679961]

LAVRIČ, Boris. Vsote praštevil in vsote njihovih kvadratov. Obzornik za matematiko in fiziko, ISSN 0473-7466, 1996, let. 43, št. 5, str. 161-167. [COBISS.SI-ID 7003737]

LAVRIČ, Boris. Parketiranje ravnine s konveksnimi mnogokotniki. Obzornik za matematiko in fiziko, ISSN 0473-7466, 1980, let. 27, št. 4, str. 97-101, graf. prikazi. [COBISS.SI-ID 8007513]