Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Geometrija**
Course title:	**Geometry**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	5.	9.
Five-year master's degree program Subject Teacher	/		

Vrsta predmeta / Course type	Izbirni / Elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45	-	15	-	-	120	6

Nosilec predmeta / Lecturer:	Tanja Dravec

Jeziki / Predavanja / Lectures:	**slovenski / Slovene**
Vaje / Tutorial:	**slovenski / Slovene**

Languages:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
/	/

Vsebina:	**Content (Syllabus outline):**
Hilbertov aksiomatski sistem za absolutno geometrijo: aksiomi povezave, urejenosti, skladnosti in zveznosti. Aksiom o vzporednicah in njegovi ekvivalenti. Aritmetični model dvorazsežne evklidske geometrije. Afini prostori, afine transformacije, aksiomatsko definirana afina geometrija. Aksiomi projektivne geometrije, Desarguesov izrek. Harmonični elementi. Homogene in nehomogene koordinate v projektivni ravnini. Projektivne transformacije. Aksiom Lobačevskega. Hiperbolična razdalja in geodetke.	Hilbert's axiomatic system for absolute geometry: incidence axioms, ordering axioms, congruence axioms and continuity axioms. Parallel postulate and its equivalents. The arithmetic model of Euclidean plane. Affine spaces, affine transformations, axiomatic definition of affine geometry. Axioms of projective geometry, Desargues theorem. Harmonic elements. Homogeneous and non-homogeneous coordinate systems in the projective plane. Projective transformations. Lobachevski axiom. Hyperbolic distance and geodetic lines.

Temeljni literatura in viri / Readings:

H. S. M. Coxeter, The real projective plane, Springer 1993
M. Mitrović, Projektivna geometrija, DMFA-založništvo, Ljubljana 2009
R. Rosenbaum, Introduction to projective geometry and modern algebra, Addison-Wesley 1963
D. Pagon, Osnove evklidske geometrije, DZS, Ljubljana 1995
F. Ayres, Schaum's Outline of Theory and Problems of Projective Geometry, McGraw-Hill, 1967
M. Berger, Geometry I, Springer-Verlag Berlin Heidelberg, 1987

Cilji in kompetence:	**Objectives and competences:**
Študentje spoznajo aksiomatsko zasnovo evklidske geometrije ter osnove projektivne, afine in neevklidske geometrije.	Students get familiar with axiomatic approach to Euclidean geometry, the basic concepts of projective, affine and non-euclidean geometry.

Predvideni študijski rezultati:

Znanje in razumevanje:

- Razumevanje Hilbertovega aksiomatskega sistema za evklidsko geometrijo.
- Poznavanje osnovnih pojmov projektivne, afine in neevklidskih geometrij.
- Pridobljena znanja prispevajo k razumevanju vsebin drugih geometrijsko-topoloških predmetov.

Intended learning outcomes:

Knowledge and understanding:

- To understand the Hilbert axiomatic system for Euclidean geometry.
- To recognize the basic concepts of projective, affine and non-euclidean geometries.
- The obtained knowledge contributes to better understanding of the content of other subjects in the area of geometry and topology.

Metode poučevanja in učenja:

- Predavanja
- Seminarske vaje
- Individualno delo

Learning and teaching methods:

- Lectures
- Excersises
- Individual work

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Način (pisni izpit, ustno izpraševanje, naloge, projekt): Pisni izpit – praktični del Ustni izpit – teoretični del Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno. Pisni izpit – praktični del se lahko nadomesti z dvema delnima testoma (sprotni obveznosti). Pozitivna ocena pri pisnem testu je pogoj za pristop k ustnemu izpitu.	**50%** **50%**	Type (examination, oral, coursework, project): Written exam – practical part Oral exam – theoretical part Each of the mentioned commitments must be assessed with a passing grade. Written exam – practical part can be replaced by two partial tests (mid-term testing). Passing grade of the written test is required for taking the oral exam.

Reference nosilca / Lecturer's references:

1. BREŠAR, Boštjan, DRAVEC, Tanja, KLESZCZ, Elżbieta. Uniquely colorable graphs up to automorphisms. *Applied mathematics and computation*. [Print ed.]. Aug. 2023, vol. 450, art. 128007 (10 str.). ISSN 0096-

3003. https://www.sciencedirect.com/science/article/pii/S0096300323001765, DOI: 10.1016/j.amc.2023.128007.

2. DRAVEC, Tanja, TARANENKO, Andrej. Daisy Hamming graphs. *Discussiones mathematicae. Graph theory*. 2023, vol. 43, no. 2, str. 421-436. ISSN 1234-3099. DOI: 10.7151/dmgt.2373.
3. DRAVEC, Tanja, JAKOVAC, Marko, KOS, Tim, MARC, Tilen. On graphs with equal total domination and Grundy total domination numbers. *Aequationes mathematicae*. Feb. 2022, vol. 96, iss. 1, 137-146. ISSN 0001-9054. https://link.springer.com/article/10.1007/s00010-021-00776-z, DOI: 10.1007/s00010-021-00776-z.
4. BREŠAR, Boštjan, DRAVEC, Tanja, GORZKOWSKA, Aleksandra, KLESZCZ, Elżbieta. Graphs with a unique maximum independent set up to automorphisms. *Discrete applied mathematics*. [Print ed.]. Aug. 2022, vol. 317, str. 124-135. ISSN 0166-218X. https://www.sciencedirect.com/science/article/pii/S0166218X22001251, DOI: 10.1016/j.dam.2022.04.003.
5. DRAVEC, Tanja. On the toll number of a graph. *Discrete applied mathematics*. [Print ed.]. Nov. 2022, vol. 321, str. 250-257. ISSN 0166-218X. DOI: 10.1016/j.dam.2022.07.006.