UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	Uvod v geometrijsko topologijo
Course title:	Introduction to geometric topology

Študijski program in stopnja **Study programme and level**	**Študijska smer** **Study field**	**Letnik** **Academic year**	**Semester** **Semester**
Univerzitetni študijski program Matematika	ni smeri	2	drugi
First cycle academic study programme Mathematics	none	2	second

Vrsta predmeta / Course type	izbirni

Univerzitetna koda predmeta / University course code:	M0220

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. Dušan Repovš, prof. Sašo Strle

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Opravljen predmet Splošna topologija.	Completed course Point-set topology.

Vsebina:	**Content (Syllabus outline):**

Kvocientna topologija, zvezne preslikave na kvocientih, zlepki. Delovanja grup in prostori orbit. Projektivni prostori.	Quotient topology, continuous maps on quotients, adjunction spaces. Group actions and orbit spaces. Projective spaces.
Brouwerjev izrek o negibni točki, Jordanov izrek, Brouwerjev izrek o invarianci odprtih množic.	Brouwer's fixed point theorem, the Jordan curve theorem, Brouwer's invariance of domain theorem.
Topološke mnogoterosti, konstrukcije mnogoterosti. Poliedrske ploskve, Eulerjeva karakteristika. Klasifikacija sklenjenih ploskev.	Topological manifolds constructions of manifolds. Polyhedral surfaces, Euler characteristic. Classification of closed surfaces.
Simplicialni kompleksi in poliedri.	Simplicial complexes and polyhedra.

Temeljni literatura in viri / Readings:

J. Dugundji: Topology, Allyn and Bacon, Boston, 1978.

W. S. Massey: Algebraic Topology: An Introduction, Springer, New York-Heidelberg, 1989.

J. R. Munkres: Topology : A First Course, Prentice Hall, Englewood Cliffs, 1975.

Cilji in kompetence: / Objectives and competences:

Cilji in kompetence:	Objectives and competences:
Študent spozna osnovne pojme topologije evklidskih prostorov in geometrijske topologije kot so Jordanov in Brouwerjev izrek, simplicialni kompleksi in poliedri ter mnogoterosti.	Student gets familiar with basic concepts of topology of Euclidian spaces and geometric topology, such as Jordan and Brouwer theorems, simplicial complexes and polihedra and manifolds.

Predvideni študijski rezultati: / Intended learning outcomes:

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Znanje in razumevanje: Razumevanje pojmov kvocientne topologije, osnovnih vprašanj topologije evklidskih prostorov ter odnosa med lokalno in globalno podobo geometrijskih objektov. Poznavanje osnovnih prijemov za delo z geometričnimi objekti.	Knowledge and understanding: Understanding of notions such as quotient topology, basic questions of topology of Euclidian spaces and relations between local and global picture of geometric objects. Knowledge of basic concepts of geometric objects.

Uporaba: V področjih matematike, ki delajo z geometričnimi objekti (kompleksna in globalna analiza, dinamični sistemi, numerična matematika, mehanika, teorija grafov), v računalništvu (grafika, prepoznavanje vzorcev), v fiziki, kemiji in drugih naravoslovnih in tehničnih vedah. Refleksija: Razumevanje teorije na podlagi primerov in uporabe. Prenosljive spretnosti – niso vezane le na en predmet: Formulacija problemov v primernem jeziku, reševanje in analiza doseženega na primerih, prehajanje iz lokalnih na globalne lastnosti.	Application: In the fields of mathematics, where geometric objects do appear (complex and global analysis, dynamic systems, numerical mathematics, mechanics, graph theory), in computing (graphics, pattern recognition), in physics, chemistry and other natural sciences and engineering. Reflection: Understanding of the theory from the applications. Transferable skills: Formulation of the problem in an appropriate language, the abilitiy to solve and analyze the progress on the cases, the transition from local to global properties.

Metode poučevanja in učenja: **Learning and teaching methods:**

Predavanja, vaje, domače naloge, seminarske naloge, konzultacije	Lectures, exercises, homework, seminar work, consultations

Načini ocenjevanja: Delež (v %) / Weight (in %) **Assessment:**

Način (pisni izpit, ustno izpraševanje, naloge, projekt): izpit iz vaj, izpit iz teorije ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)	50% 50%	Type (examination, oral, coursework, project): written exam oral exam grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)

Reference nosilca / Lecturer's references:

Dušan Repovš:

– BANAKH, Taras, REPOVŠ, Dušan. Direct limit topologies in the categories of topological groups and of uniform spaces. Tohoku mathematical journal, ISSN 0040-8735, 2012, vol. 64, no. 1, str. 1-24 [COBISS.SI-ID 16215897]

– CÁRDENAS, Manuel, LASHERAS, Francisco F., QUINTERO, Antonio, REPOVŠ, Dušan. On manifolds with nonhomogeneous factors. Central European Journal of Mathematics, ISSN 1895-1074, 2012, vol. 10, no. 3, str. 857-862 [COBISS.SI-ID 16241753]

– KARIMOV, Umed H., REPOVŠ, Dušan. On generalized 3-manifolds which are not homologically locally connected. Topology and its Applications, ISSN 0166-8641. [Print ed.], 2013, vol. 160, iss. 3, str. 445-449 [COBISS.SI-ID 16558681]

– CENCELJ, Matija, REPOVŠ, Dušan. Topologija, (Zbirka Pitagora). 1. ponatis. Ljubljana: Pedagoška fakulteta, 2011. XVI, 169 str., ilustr. ISBN 978-86-7735-051-2 [COBISS.SI-ID 254230528]

Sašo Strle:

– OWENS, Brendan, STRLE, Sašo. A characterisation of the n<1>[oplus]<3> form and applications to rational homology spheres. Mathematical research letters, ISSN 1073-2780, 2006, vol. 13, iss. 2, str. 259-271 [COBISS.SI-ID 13873241]

– 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 Z [sup] n [oplus] 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]