UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	**Topologija**
Course title:	Topology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 1. stopnja		**3.**	**5.**
Mathematics, 1st cycle		**3.**	**5.**

Vrsta predmeta / Course type | obvezni/compulsory

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		45			120	7

Nosilec predmeta / Lecturer: | Iztok BANIČ

Jeziki / Languages:	Predavanja / Lectures:	SLOVENSKO/SLOVENIAN
	Vaje / Tutorial:	SLOVENSKO/ALOVENIAN

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	Prerequisits:
Jih ni.	There are none.

Vsebina:	Content (Syllabus outline):
Matematika kot teorije struktur. Grupe, vektorski prostori, kolobarji, delno urejene množice, linearno urejene množice, metrični prostori. Kategorije in funktorji. Izomorfizmi. Topološki prostori in zvezne preslikave - osnovni pojmi. Baza in podbaza prostora. Osnovne operacije: zaprtje, notranjost, rob, odvod. Osnovne konstrukcije: inducirane in koinducirane topologije, produkti, vsote, relativna topologija, kvocientni prostori, zlepki. Prostori funkcij. Urejeni topološki prostori.	Mathematics as theories of structures. Groups, vector spaces, rings, partially ordered sets, linearly ordered sets, metric spaces. Categories and functors. Isomorphisms. Topological spaces and continuous mappings. Basis and subbasis for a topology. Basic operations: closure, interior, boundary, derived set. Basic constructions: induced and coinduced topologies, products, sums, relative topology, quotient topology, attaching of spaces. Spaces of mappings. Ordered topological spaces.

Separacijski aksiomi. Kompaktnost. Lokalna kompaktnost. Kompaktifikacije. Povezanost. Povezanost s potmi. Lokalna povezanost. Kontinuumi. Števnost v topologiji.	Separation axioms. Compactness. Local compactness. Compactifications. Connectedness. Local connectedness. Continua. Countability in topology.

Temeljni literatura in viri / Readings:

J.R.Munkres: Topology: a first course,Englewood Cliffs, NJ, Prentice-Hall, 1975
S.Lipschutz: Schaum's outline of theory and problems of general topology, New York (etc.), McGraw-Hill, 1965
P.Pavešić, A.Vavpetič: Rešene naloge iz topologije, Ljubljana, Društvo matematikov, fizikov in astronomov Slovenije, 1997
M.Cencelj, D.Repovš: Topologija, Ljubljana, Pedagoška fakulteta, 2001

Cilji in kompetence:	**Objectives and competences:**
Cilj in kompetence tega predmeta so, da študentje usvojijo osnovne pojme in metode topologije, in jih uporabljajo pri nadaljnjem študiju matematike. Cilj je tudi seznaniti se s pristopom k matematiki preko struktur in obvladati osnovne tehnike dela s topološkimi prostori.	The objectives and competences of this course are for students to acquire basic knowledge of topology, and to apply it in the study of mathematics. Another objective is for students to learn about approach to mathematics via structures as well as to learn how to use the basic techniques of work with topological spaces.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanje in razumevanje: Po zaključku tega predmeta bo študent sposoben • razumeti osnovne pojme topologije. • razložiti in uporabljati osnovne izreke topologije in osnovnih tehnik dela s topološkimi prostori. • za reševanje problemov uporabiti topologijo. Prenosljive/ključne spretnosti in drugi atributi: • Spretnosti komuniciranja: ustni zagovor izpita, pisno izražanje pri pisnem izpitu. • Uporaba informacijske tehnologije: uporaba računala ali računalniških aplikacij pri reševanju problemov.	Knowledge and understanding: On completion of this course the student will be able to • understand basic concepts of topology. • explain and use basic theorems from topology and to use the basic techniques of work with topological spaces, • apply topology for problem solving. Transferable/Key skills and other attributes: • Communication skills: oral exam, manner of expression at written examination. • Use of information technology: use of a calculator or computer applications for problem solving.

• Reševanje problemov: reševanje problemov s pomočjo metod iz topologije (topologija, posebej v obliki pojma zveznosti, je prisotna pri večini drugih matematičnih predmetov).		• Problem solving: problem solving using methods from topology (topology, especially in the form of continuity, is present in most other mathematical subjects).

Metode poučevanja in učenja:

Learning and teaching methods:

• Predavanja • Teoretične vaje	• Lectures • Theoretical exercises

Načini ocenjevanja:

Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, projekt) Izpit:	Delež (v %) / Weight (in %)	Type (examination, oral, coursework, project):
Pisni izpit – problemi	50%	Written exam – problems
Ustni izpit – teorija	50%	Oral exam – theory
Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.		Each of the mentioned commitments must be assessed with a passing grade.
Opravljen pisni izpit – problemi je pogoj za pristop k ustnemu izpitu – teorija.		Passing grade of written exam – problems is required to take the oral exam – theory.

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš, SOVIČ, Tina. The closed subset theorem for inverse limits with upper semicontinuous bonding functions. Bulletin of the Malaysian Mathematical Society, ISSN 0126-6705, 2019, vol. 42, iss. 3, str. 835-846, doi: 10.1007/s40840-017-0517-5.

2. BANIČ, Iztok, GOODWIN, Simon, LOCKYER, Michael. Extending bonding functions in generalized inverse sequences. Topology and its Applications, ISSN 0166-8641. [Print ed.], March 2019, vol. 254, str. 85-100. https://doi.org/10.1016/j.topol.2018.12.004, doi: 10.1016/j.topol.2018.12.004.

3. BANIČ, Iztok, ČREPNJAK, Matevž. Inverse component cropping sequences and connected inverse limits over intervals. Glasnik matematički. Serija 3, ISSN 0017-095X, 2018, vol. 53, no. 2, str. 371-384. https://web.math.pmf.unizg.hr/glasnik/53.2/53(2)-09.pdf, doi: 10.3336/gm.53.2.09.

4. BANIČ, Iztok, ČREPNJAK, Matevž. Markov pairs, quasi Markov functions and inverse limits. Houston journal of mathematics, ISSN 0362-1588, 2018, vol. 44, no. 2, str. 695-707. https://www.math.uh.edu/~hjm/restricted/pdf44(2)/16banic.pdf.

5. BANIČ, Iztok, ČREPNJAK, Matevž, MERHAR, Matej, MILUTINOVIĆ, Uroš. The (weak) full projection property for inverse limits with upper semicontinuous bonding functions. Mediterranean journal of mathematics, ISSN 1660-5446, Aug. 2018, vol. 15, iss. 4, str. 1-21, doi: 10.1007/s00009-018-1209-6.