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, 3. stopnja		**1.**	**2.**
Mathematics, 3rd cycle		**1st**	**2nd**

Vrsta predmeta / Course type izbirni / elective

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
45					225	9

Nosilec predmeta / Lecturer: Iztok Banič

Jeziki / Languages:		
	Predavanja / Lectures:	Slovenski jezik; Slovene
	Vaje / Tutorial:	

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Znanje temeljnih pojmov in rezultatov iz topologije (topološki prostori, zvezne preslikave).

Prerequisits:

Basic knowledge of fundamental notions and results of topology (topological spaces, continuous mappings).

Vsebina:

Kategorije: osnovni pojmi in primeri.

Kategorija topoloških prostorov, homotopska kategorija topoloških prostorov.

Simplicialni kompleksi, poliedri, CW kompleksi.

Osnovni primeri funktorjev algebrske topologije (simplicialna, singularna in celična homologija, homotopske grupe). Homološka algebra.

Krovni prostori. Vlaknasti svežnji.

Posebne vrste prostorov in preslikav. Teorija kontinuumov.

Teorija dimenzij.

Mnogoterosti.

Nekatere izmed teh tem so obdelane podrobneje, druge pa le na osnovni ravni. Pri izboru se upoštevajo interesi in raziskovalne usmeritve študentov.

Content (Syllabus outline):

Categories: basic concepts and examples.

Category of topological spaces (and mappings), homotopy category of topological spaces.

Simplicial complexes, polyhedra, CW complexes.

Basic examples of algebraic topology functors (simplicial, singular and celular homology, homotopy groups). Homological algebra.

Covering spaces. Fiber bundles.

Special spaces and mappings. Continuum theory.

Dimension theory.

Manifolds.

Some of these topics are treated in greater detail, and some of them only at a basic level. The selection depends on students' interests and their research orientation.

Temeljni literatura in viri / Readings:

- A. Hatcher, Algebraic topology. Cambridge University Press, 2002
- S. B. Nadler, Jr., Continuum theory. An introduction. Marcel Dekker, 1992
- J. R. Munkres, Topology. A first course. Prentice-Hall, 1975
- C. R. F. Maunder, Algebraic topology. Dover Publications, 1980
- E. H. Spanier, Algebraic topology. McGraww-Hill, 1966
- J. Dugundji, Topology, Allyn and Bacon, 1966
- J. Nagata, Modern dimension theory, Helderman Verlag, 1983

Cilji in kompetence:

- Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja topologije
- Razviti sposobnost samostojnega razvijanja novega znanja s področja topologije
- Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz topologije
- Razviti sposobnost izboljševanja znanih in odkrivanja novih rezultatov s področja topologije
- Zmožnost razvijanja kritične refleksije na področju topologije
- Razviti zmožnost vodenja najzahtevnejših znanstvenoraziskovalnih projektov s širšega področja topologije.

Objectives and competences:

- To achieve a deeper understanding of theoretical and methodological concepts of topology
- To develop the ability to independently develop new knowledge in the field of topology
- To develop the ability for solving the most challenging problems in topology
- To develop the ability of improving known results as well as obtaining new results in topology
- Ability to develop critical reflection in topology
- To develop the ability to lead the most challenging scientific research projects in the wider field of topology

Predvideni študijski rezultati:	Intended learning outcomes:

Znanje in razumevanje: • poznavanje temeljnih topoloških področij; • razumevanje zahtevnejših pojmov iz topologije. Prenesljive/ključne spretnosti in drugi atributi: • podlaga za raziskovalno delo na področju topologije; • pridobljeno znanje za uporabo topologije na drugih matematičnih področjih.	Knowledge and understanding: • knowledge of fundamental topics in topology; • understanding complex concepts of topology. Transferable/Key Skills and other attributes: • a basis for research in topology; • knowledge needed for applying topology to other mathematical areas.

Metode poučevanja in učenja:	Learning and teaching methods:
• predavanja; • priprava seminarja; • konzultacije; • samostojni študij.	• lectures; • seminar work; • consultations; • self-study.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	Assessment:
Način (pisni izpit, ustno izpraševanje, naloge, projekt): • seminarsko predavanje; • domače naloge; • ustni izpit.	**20 %** **30 %** **50 %**	Type (examination, oral, coursework, project): • seminar talk; • homework; • oral examination.

Reference nosilca / Lecturer's references:

1. BANIČ, Iztok, ČREPNJAK, Matevž. Inverse component cropping sequences and connected inverse limits over intervals. *Glasnik matematički. Serija 3*. 2018, vol. 53, no. 2, str. 371-384. ISSN 0017-095X. https://web.math.pmf.unizg.hr/glasnik/53.2/53(2)-09.pdf, DOI: 10.3336/gm.53.2.09. [COBISS.SI-ID 24323848], [JCR,]
kategorija: 1A3

2. BANIČ, Iztok, KAC, Teja. Mapping theorems for rigid continua and their inverse limits. *Qualitative theory of dynamical systems*. 2022, vol. 21, iss. 4, str. 1-29. ISSN 1575-5460. DOI: 10.1007/s12346-022-00647-1. [COBISS.SI-ID 120844547], [JCR]
kategorija: 1A3

3. BANIČ, Iztok, GREENWOOD, Sina. A characterisation of the dimension of inverse limits of set-valued functions on intervals. *Fundamenta mathematicae*. 2020, vol. 249, no. 1, str. 1-19. ISSN 0016-2736. DOI: 10.4064/fm708-5-2019. [COBISS.SI-ID 24853768], [JCR]
kategorija: 1A3

4. BANIČ, Iztok, ERCEG, Goran, KENNEDY, Judy A. The Lelek fan as the inverse limit of intervals with a single set-valued bonding function whose graph is an arc. *Mediterranean journal of mathematics*. Jun. 2023, vol. 20, iss. 3, article no. 159, 24 str. ISSN 1660-5446. DOI: 10.1007/s00009-023-02323-3. [COBISS.SI-ID 148424195], [JCR]
kategorija: 1A2

5. BANIČ, Iztok, TARANENKO, Andrej. Span of a graph : keeping the safety distance. *Discrete mathematics & theoretical computer science*. 2023, vol. 25, no. 1, 19 str. ISSN 1365-8050. DOI: 10.46298/dmtcs.9859. [CO-BISS.SI-ID 148408835], [JCR]
kategorija: 1A3