UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	**Izbrana poglavja iz funkcionalne analize**
Course title:	**Topics in Functional Analysis**

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Matematika, 3. stopnja		**1. ali 2.**	**1. ali 3 ali4.**
Mathematics, 3rd cycle		**1st or 2nd**	**1st or 3rd or 4th**

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
30					150	6

Nosilec predmeta / Lecturer: Matej Brešar

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

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

Poznavanje temeljnih konceptov funkcionalne analize.

Prerequisits:

Knowledge of basic concepts of functional analysis.

Vsebina:

Izbrana so posebna poglavja iz teorije linearnih topoloških prostorov, teorije operatorjev, topoloških algeber ali katerega drugega modernega področja funkcionalne analize. Izbira poglavij je odvisna od interesa in raziskovalne usmerjenosti študentov ter trendov v sodobni funkcionalni analizi. Spodaj navedena literatura praviloma služi le kot osnova in je nadgrajena z bolj specializiranimi teksti.

Content (Syllabus outline):

Special topics in linear topological spaces, operator theory, topological algebras or some other area of contemporary functional analysis are chosen. The choice depends on students' interests and their research orientation, as well as on trends in modern functional analysis. The literature below in principle serves only as a basis, and is combined with more specialized texts.

Temeljni literatura in viri / Readings:

- J. B. Conway, A course in functional analysis, Springer-Verlag, 1997.
- H. H. Schaefer, M. P. Wolff, Topological vector spaces, Springer-Verlag, 1999.

Dodatna literatura / Additional Readings:

- J. B. Conway, A course in operator theory, AMS, 2000.
- H. G. Dales, Banach algebras and automatic continuity, Oxford Science Publications, 2000.
- N. Dunford, J. T. Schwartz, Linear opeartors, I, II, III, John Wiley & Sons, 1988.
- R. V. Kadison, J. R. Ringrose, Fundamentals of the theory of operator algebras, I, II, AMS, 1997.
- P. D. Lax, Functional analysis, John Wiley & Sons, 2002.
- R. E. Megginson, An introduction to Banach space theory, Springer-Verlag, 1998.

Cilji in kompetence:

- študentu predstaviti moderno področje funkcionalne analize, kar lahko služi kot uvod v raziskovalno delo;
- Doseči poglobljeno razumevanje teoretskih in metodoloških konceptov s področja funkcionalne analize
- Razviti sposobnost za samostojno reševanje najzahtevnejših problemov iz funkcionalne analize
- Zmožnost razvijanja kritične refleksije na področju funkcionalne analize

Objectives and competences:

- to present a modern area of functional analysis, which can serve as an introduction to student's research work;
- To achieve a deeper understanding of theoretical and methodological concepts of functional analysis
- To develop the ability for solving the most challenging problems in functional analysis
- Ability to develop critical reflection in functional analysis

Predvideni študijski rezultati:

Znanje in razumevanje:

- poglobljeno znanje posebnega področja funkcionalne analize;
- poglobljeno razumevanje nekaterih posebnih pojmov funkcionalne analize.

Prenesljive/ključne spretnosti in drugi atributi:

- podlaga za raziskovalno delo na posebnem področju funkcionalne analize

Intended learning outcomes:

Knowledge and understanding:

- a deeper knowledge of basic of a special functional analysis topic;
- a deeper understanding of some special functional analysis concepts.

Transferable/Key Skills and other attributes:

- a basis for research in a special functional analysis area.

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:
Seminarska naloga Teoretični izpit	50 % 50 %	Seminar paper Theoretical exam

Reference nosilca / Lecturer's references:

1. BREŠAR, Matej. Jordan maps and zero Lie product determined algebras. *Turkish journal of mathematics*. 2022, vol. 46, no. si-2, str. 1691-1698. ISSN 1300-0098. https://journals.tubitak.gov.tr/math/vol46/iss5/5/, DOI: 10.55730/1300-0098.3226. [COBISS.SI-ID 123459843], [JCR]
kategorija: 1A3

2. BREŠAR, Matej. Functional identities and zero Lie product determined Banach algebras. *Quarterly Journal of Mathematics*. June 2020, vol. 71, iss. 2, str. 649-665. ISSN 0033-5606. https://doi.org/10.1093/qmathj/haz060, DOI: 10.1093/qmathj/haz060. [COBISS.SI-ID 23087363], [JCR]
kategorija: 1A3

3. BAJUK, Žan, BREŠAR, Matej. Two-sided zero product determined algebras. *Linear algebra and its applications*. [Print ed.]. June 2022, vol. 643, str. 125-136. ISSN 0024-3795. https://www.sciencedirect.com/science/article/pii/S0024379522000659, DOI: 10.1016/j.laa.2022.02.022. [COBISS.SI-ID 100272387], [JCR]
kategorija: 1A2

4. BREŠAR, Matej, GODOY, María Luisa Castillo, VILLENA, A. R. Maps preserving two-sided zero products on Banach algebras. *Journal of mathematical analysis and applications*. [Print ed.]. Nov. 2022, vol. 515, iss. 1, art. 126372 (16 str.). ISSN 0022-247X. https://www.sciencedirect.com/science/article/pii/S0022247X22003869, DOI: 10.1016/j.jmaa.2022.126372. [COBISS.SI-ID 110484227], [JCR]
kategorija: 1A1

5. BREŠAR, Matej. Commutators and images of noncommutative polynomials. *Advances in mathematics*. Nov. 2020, vol. 374, art. 107346 (21 str.). ISSN 0001-8708. https://doi.org/10.1016/j.aim.2020.107346, DOI: 10.1016/j.aim.2020.107346. [COBISS.SI-ID 24698115], [JCR]
kategorija: 1A1