Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	**Izbrana poglavja iz analize**
Course title:	**Selected Topics in 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. ali 4.**
Mathematics, 3rd cycle		**1st or 2nd**	**1st or 3rd ali 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: Brigita Ferčec

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

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Znanje osnovnih pojmov in rezultatov iz analize (zveznost, diferenciabilnost in integrabilnost; zaporedja in vrste).	Basic knowledge of fundamental notions and results of analysis (continuity, differentiability and integrability).

Vsebina:

Izbrana so posebna poglavja iz realne analize, teorije mere in integriranja, kompleksne analize, teorije potenciala, več kompleksnih spremenljivk, posebnih funkcij, zaporedij, vrst, sumabilnosti, Fourierjeve analize, analize na mnogoterostih ali katerega drugega modernega področja iz analize. Izbira poglavij je odvisna od interesa in raziskovalne usmerjenosti študentov. Spodaj navedena literatura praviloma služi le kot osnova in je nadgrajena z bolj specializiranimi teksti.

Content (Syllabus outline):

Special topics in real analysis, measure and integration theory, complex analysis, potential theory, several complex variables, special functions, sequences, series, summability, Fourier analysis, analysis on manifolds, or some other area of contemporary analysis are chosen. The choice depends on students' interests and their research orientation. The literature below in principle serves only as a basis, and is combined with more specialized texts.

Temeljni literatura in viri / Readings:

W. Rudin, Principles of mathematical analysis, McGraw-Hill, 1986
W. Rudin, Real and complex analysis, McGraw-Hill, 1987
R.C. Buck, E.F. Buck: Advanced calculus, McGraw-Hill, 1965
M. Spivak: Calculus on manifolds, W.A. Benjamin, 1968
W.H. Fleming: Functions of several variables, Springer, 1977
M. Protter, C. Morrey, A first course in real analysis, Springer, 1991
L.V. Ahlfors, Complex analysis, McGraw-Hill, 1979
Z. Nehari, Conformal mapping, McGraw-Hill, 1952
M.P. Do Carmo, Differential forms and applications, Springer, 1994
M.P. Do Carmo, Riemannian geometry, Birkhäuser, 1992
S. Lang, Differential and Riemannian manifolds, Springer, 1995
D.J. Struik, Lectures on classical differential geometry, Addison-Wesley, 1950
S.G. Krantz, Function theory of several complex variables, John Wiley, 1982

Cilji in kompetence:

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

Objectives and competences:

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

Predvideni študijski rezultati:

Znanje in razumevanje:

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

Prenesljive/ključne spretnosti in drugi atributi:

- podlaga za raziskovalno delo na posebnem področju iz analize.

Intended learning outcomes:

Knowledge and understanding:

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

Transferable/Key Skills and other attributes:

- a basis for research in a special area of analysis

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

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

Reference nosilca / Lecturer's references:

1. FERČEC, Brigita, GINÉ, Jaume. Blow-up method to compute necessary conditions of integrability for planar differential systems. *Applied mathematics and computation*, ISSN 0096-3003. [Print ed.], 2019, vol. 358, str. 16-24, doi: 10.1016/j.amc.2019.04.007. [COBISS.SI-ID 1024347996], [JCR,]
kategorija: 1A1

2. FERČEC, Brigita, GINÉ, Jaume. A blow-up method to prove formal integrability for some planar differential systems. *Journal of applied analysis and computation*, ISSN 2156-907X, 2018, vol. 8, no. 6, str. 1833-1850, doi: 10.11948/2018.1833. [COBISS.SI-ID 1024330076], [JCR]
kategorija: 1A2

3. FERČEC, Brigita, GINÉ, Jaume. Formal Weierstrass integrability for a Liénard differential system. *Journal of mathematical analysis and applications*. [Print ed.]. 2021, issue 1, art. 125016, 14 str. ISSN 0022-247X. DOI: 10.1016/j.jmaa.2021.125016. [COBISS.SI-ID 49998851], [JCR]
kategorija: 1A1

4. ŽULJ, Maja, FERČEC, Brigita, MENCINGER, Matej. On integrability and linearizability of persistent p: −q resonant systems. *Journal of mathematical analysis and applications*. [Print ed.]. Nov. 2022, vol. 515, iss. 1 (126369), 19 str. ISSN 0022-247X. DOI: 10.1016/j.jmaa.2022.126369. [COBISS.SI-ID 112287747], [JCR]
kategorija: 1A1

5. FERČEC, Brigita, ROMANOVSKI, Valery, TANG, Yilei, ZHANG, Ling. Integrability and bifurcation of a three-dimensional circuit differential system. *Discrete and continuous dynamical systems. Series B.* 2022, vol. 27, iss. 8, str. 4573-4588. ISSN 1531-3492. DOI: 10.3934/dcdsb.2021243. [COBISS.SI-ID 88277507], [JCR]
kategorija: 1A2