



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS						
<b>Predmet:</b>	<b>Številске množice in zaporedja</b>					
<b>Course title:</b>	Number sets and sequences					
<b>Študijski program in stopnja</b> <b>Study programme and level</b>	<b>Študijska smer</b> <b>Study field</b>			<b>Letnik</b> <b>Academic year</b>	<b>Semester</b> <b>Semester</b>	
Matematika				1.	1.	
Mathematics				1.	1.	
<b>Vrsta predmeta / Course type</b>						
<b>Univerzitetna koda predmeta / University course code:</b>						
<b>Predavanja</b> <b>Lectures</b>	<b>Seminar</b> <b>Seminar</b>	<b>Sem. vaje</b> <b>Tutorial</b>	<b>Lab. vaje</b> <b>Laboratory work</b>	<b>Teren. vaje</b> <b>Field work</b>	<b>Samost. delo</b> <b>Individ. work</b>	<b>ECTS</b>
45		45			120	7
<b>Nosilec predmeta / Lecturer:</b> Boštjan BREŠAR						
<b>Jeziki /</b> <b>Languages:</b>	<b>Predavanja /</b> <b>Lectures:</b>		SLOVENSKO/SLOVENE			
	<b>Vaje / Tutorial:</b>		SLOVENSKO/SLOVENE			
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>		
Jih ni.				There are none.		
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>		
Osnovni matematični pojmi. Množice. Funkcije.  Realna števila: aksiomi, supremum, maksimum; potence, koreni; iracionalna števila; intervali; absolutna vrednost.  Kompleksna števila: osnovne lastnosti; polarni zapis.  Zaporedja: konvergenca, operacije z zaporedji; monotona zaporedja, število $e$ ;				Basic mathematical concepts. Sets. Functions.  Real numbers: axioms, supremum, maximum; powers, roots; irrational numbers; intervals; absolute value.  Complex numbers: basic properties; trigonometric form.  Sequences: convergence, operations on sequences; monotone sequences, the number $e$ ; subsequences, accumulation		

<p>podzaporedja, stekališča; Cauchyjeva zaporedja; potence z realnimi eksponenti.</p> <p>Vrste: konvergenca; geometrijska vrsta; vrste s pozitivnimi členi, kriteriji za konvergenco; alternirajoče vrste; absolutna in pogojna konvergenca; vsota in produkt vrst.</p>	<p>points; Cauchy sequences; powers with real exponents.</p> <p>Series: convergence; geometric series; series of positive terms, convergence criteria; alternating series; absolute and conditional convergence; addition and multiplication of series.</p>
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### Temeljni literatura in viri / Readings:

M. Dobovišek, M. Hladnik, M. Omladič, Rešene naloge iz analize, DMFA, Ljubljana, 1980.  
 J. M. Howie, Real analysis, Springer, 2001.  
 B. Hvala, Zbirka izpitnih nalog iz analize, DMFA, Ljubljana, 1996.  
 F. Morgan, Real analysis, AMS, 2005.  
 M. A. Robdera, A concise approach to mathematical analysis, Springer, 2003.  
 W. Rudin, Principles of mathematical analysis, McGraw Hill Book Co., 1976.  
 T. Tao, Analysis 1, 3rd edition, Hindustan Book Agency, New Delhi, 2014.  
 I. Vidav: Višja matematika I, Ljubljana, DZS, 1974.

### Cilji in kompetence:

Obvladati teorijo realnih in kompleksnih števil ter zaporedij, vrst in njihovih lastnosti in ob tem usvojiti osnovne matematične koncepte

### Objectives and competences:

Students learn the theory of real and complex numbers as well as sequences, series and their properties, and along the way acquire basic mathematical concepts.

### Predvideni študijski rezultati:

Znanje, razumevanje ter uporaba:

- Številskih množic.
- Zaporedij.
- Vrst.

Prenosljive/ključne spretnosti in drugi atributi:

- Spretnosti komuniciranja: pisno izražanje pri pisnem izpitu, ustni zagovor izpita.
- Pridobljena znanja so osnova za vse druge matematične predmete.

### Intended learning outcomes:

Knowledge, understanding, and application of:

- Number sets.
- Sequences.
- Series.

Transferable/Key Skills and other attributes:

- Communication skills: writing skills at written exams, oral exam.
- The obtained knowledge forms a foundation for all the other mathematical courses.

### Metode poučevanja in učenja:

- Predavanja
- Teoretične vaje

### Learning and teaching methods:

- Lectures
- Theoretical exercises

### Načini ocenjevanja:

### Assessment:

	Delež (v %) / Weight (in %)	
<p><u>Izpit:</u> Pisni izpit – problemi Ustni izpit – teorija</p> <p>Vsaka izmed naštetih obveznosti mora biti opravljena s pozitivno oceno.</p> <p>Opravljen pisni izpit – problemi je pogoj za pristop k ustnemu izpitu – teorija. Pisni izpit – problemi se lahko nadomesti z dvema do tremi delnimi testi (sprotne obveznosti).</p>	<p>50% 50%</p>	<p><u>Exam:</u> Written exam – problems Oral exam – theory</p> <p>Each of the mentioned assessments must be assessed with a passing grade.</p> <p>Passing grade of written exam – problems is required to take the oral exam – theory.</p> <p>Written exam – problems can be replaced with two to three mid-term tests.</p>

**Reference nosilca / Lecturer's references:**

1. BREŠAR, Boštjan, KLAJŽAR, Sandi, RALL, Douglas F., WASH, Kirsti. Packing chromatic number versus chromatic and clique number. *Aequationes mathematicae*, ISSN 0001-9054, 2018, vol. 92, iss. 3, str. 497-513. <https://doi.org/10.1007/s00010-017-0520-9>.
2. BONOMO, Flavia, BREŠAR, Boštjan, GRIPPO, Luciano, MILANIČ, Martin, SAFE, Martin Dario. Domination parameters with number 2 : interrelations and algorithmic consequences. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], Jan. 2018, vol. 235, str. 23-50. <http://doi.org/10.1016/j.dam.2017.08.017>.
3. BREŠAR, Boštjan, MOVARRAEI, Nazanin. On the number of maximal independent sets in minimum colorings of split graphs. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], Oct. 2018, vol. 247, str. 352-356. <https://doi.org/10.1016/j.dam.2018.03.083>, doi: [10.1016/j.dam.2018.03.083](https://doi.org/10.1016/j.dam.2018.03.083).
4. BREŠAR, Boštjan, HARTINGER, Tatiana Romina, KOS, Tim, MILANIČ, Martin. 1-perfectly orientable  $K_4$ -minor-free and outerplanar graphs. *Discrete applied mathematics*, ISSN 0166-218X. [Print ed.], 2018, vol. 248, 33-45. <https://doi.org/10.1016/j.dam.2017.09.017>, doi: [10.1016/j.dam.2017.09.017](https://doi.org/10.1016/j.dam.2017.09.017).
5. BREŠAR, Boštjan, FERME, Jasmina. An infinite family of subcubic graphs with unbounded packing chromatic number. *Discrete Mathematics*, ISSN 0012-365X. [Print ed.], Aug. 2018, vol. 341, iss. 8, str. 2337-2342. <https://doi.org/10.1016/j.disc.2018.05.004>, doi: [10.1016/j.disc.2018.05.004](https://doi.org/10.1016/j.disc.2018.05.004).