

UČNI NAČRT PREDMETA / COURSE SYLLABUS							
<b>Predmet:</b>		Proseminar B					
<b>Course title:</b>		Introductory seminar B					
<b>Študijski program in stopnja</b> Study programme and level		<b>Študijska smer</b> Study field			<b>Letnik</b> Academic year		<b>Semester</b> Semester
Univerzitetni študijski program Matematika		ni smeri			1		prvi in drugi
First cycle academic study programme Mathematics		none			1		first and second
<b>Vrsta predmeta / Course type</b>					izbirni		
<b>Univerzitetna koda predmeta / University course code:</b>					M0207		
<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Klinične vaje</b> work	<b>Druge oblike</b> študija	<b>Samost. delo</b> Individ. work	<b>ECTS</b>	
30		60			30	4	
<b>Nosilec predmeta / Lecturer:</b>		prof. Emil Žagar, prof. Matej Brešar					
<b>Jeziki /</b> Languages:		<b>Predavanja /</b> Lectures:		slovenski/Slovene			
		<b>Vaje / Tutorial:</b>		slovenski/Slovene			
<b>Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:</b>				<b>Prerequisites:</b>			
<b>Vsebina:</b>				<b>Content (Syllabus outline):</b>			

<p>Polinomi: deljivost, Evklidov algoritem, ničle, kubična enačba, osnovni izrek algebre, Sturmov izrek.</p> <p>Geometrija končno razsežnih evklidskih prostorov: izometrije, grupa translacij in grupa rotacij.</p> <p>Metrični prostori: primeri, odprte in zaprte množice, stekališča, kompaktnost, povezanost, polnost. Banachov skrčitveni izrek. Povezava z geometrijo evklidskih prostorov. Heine-Borelov izrek.</p>	<p>Polynomials: divisibility, Euclidean algorithm, roots, cubic equation, fundamental theorem of algebra, Sturm theorem.</p> <p>Geometry of finite dimensional Euclidean spaces: isometries, translation group, and rotation group.</p> <p>Metric spaces: examples, open and closed sets, cluster points, compactness, connectedness, completeness. Banach fixed-point theorem. Relation to the geometry of Euclidean spaces. Heine-Borel theorem.</p>
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### Temeljni literatura in viri / Readings:

J. Vrabec: Metrični prostori, DMFA-založništvo, Ljubljana, 1990.

### Cilji in kompetence:

Proseminar B dopolnjuje predmeta Analiza 1 in Algebra 1 z nekaterimi dodatnimi vsebinami ter utrjuje razumevanje snovi teh predmetov s konkretnimi primeri.

### Objectives and competences:

Proseminar B complements courses Analysis 1 and Algebra 1 with some additional content and strengthens the understanding of these courses by concrete examples.

### Predvideni študijski rezultati:

Znanje in razumevanje: Razumevanje obnašanja polinomov, geometrije Evklidskih prostorov ter pojma metričnega prostora.  
Uporaba: Uporaba v geometriji, naravoslovju in drugih področjih znanosti.

Refleksija: Razumevanje teorije na podlagi primerov in uporabe.

Prenosljive spretnosti – niso vezane le na en predmet: Postavitev problema, izbira metode, reševanje problema, analiza rezultata na

### Intended learning outcomes:

Knowledge and understanding: Understanding the behavior of polynomials, geometry of Euclidean spaces, and the concept of the metric space.

Application: Application in geometry, natural science and other field of science.

Reflection: Understanding of the theory from the applications.

Transferable skills: The ability to design the problem, select an appropriate method, solve

primerih. Formulacija problemov v matematičnem jeziku. Spretnost uporabe literature.

the problem, and analyse the results on test cases. The ability to formulate a problem in mathematical language. Skills in using the literature.

**Metode poučevanja in učenja:**

Predavanja, vaje, domače naloge, konzultacije

**Learning and teaching methods:**

Lectures, exercises, homework, consultations

Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

<p>Način (pisni izpit, ustno izpraševanje, naloge, projekt): 2 kolokvija namesto izpita iz vaj, izpit iz vaj, izpit iz teorije ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)</p>	<p>50% 50%</p>	<p>Type (examination, oral, coursework, project): 2 midterm exams instead of written exam, written exam oral exam grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)</p>
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**Reference nosilca / Lecturer's references:**

Matej Brešar:  
 – BREŠAR, Matej. Near-derivations in Lie algebras. Journal of algebra, ISSN 0021-8693, 2008, vol. 320, no. 10, str. 3765-3772 [COBISS.SI-ID 14945113]  
 – BAHTURIN, Jurij Aleksandrovič, BREŠAR, Matej, ŠPENKO, Špela. Lie superautomorphisms on associative algebras, II. Algebras and representation theory, ISSN 1386-923X, 2012, vol. 15, no 3, str. 507-525 [COBISS.SI-ID 16299353]  
 – BREŠAR, Matej. A unified approach to the structure theory of PI-rings and GPI-rings. Serdica mathematical journal, ISSN 1310-6600, 2012, vol. 38, no 1-3, str. 199-210 [COBISS.SI-ID 16355673]

Emil Žagar:

- KOZAK, Jernej, ŽAGAR, Emil. On geometric interpolation by polynomial curves. SIAM journal on numerical analysis, ISSN 0036-1429, 2004, vol. 42, no. 3, str. 953-967 [COBISS.SI-ID 13398617]
- JAKLIČ, Gašper, VITRIH, Vito, ŽAGAR, Emil. Closed form formula for the number of restricted compositions. Bulletin of the Australian Mathematical Society, ISSN 0004-9727, 2010, vol. 81, iss. 2, str. 289-297 [COBISS.SI-ID 15540569]
- JAKLIČ, Gašper, KOZAK, Jernej, KRAJNC, Marjetka, VITRIH, Vito, ŽAGAR, Emil. Hermite geometric interpolation by rational Bézier spatial curves. SIAM journal on numerical analysis, ISSN 0036-1429, 2012, vol. 50, no. 5, str. 2695-2715 [COBISS.SI-ID 16449369]