| UČNI NAČRT PREDMETA / COURSE SYLLABUS | |
|---|---|
| **Predmet:** | Proseminar A |
| **Course title:** | Introductory seminar A |

| Študijski program in stopnja<br>Study programme and level | Študijska smer<br>Study field | Letnik<br>Academic year | Semester<br>Semester |
|---|---|---|---|
| Univerzitetni študijski program Matematika | ni smeri | 1 | prvi in drugi |
| First cycle academic study programme Mathematics | none | 1 | first and second |

| **Vrsta predmeta / Course type** | izbirni |
|---|---|

| **Univerzitetna koda predmeta / University course code:** | M0206 |
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| Predavanja<br>Lectures | Seminar<br>Seminar | Vaje<br>Tutorial | Klinične vaje<br>work | Druge oblike študija | Samost. delo<br>Individ.<br>work | | ECTS |
|---|---|---|---|---|---|---|---|
| 30 | | 60 | | | 30 | | 4 |

| **Nosilec predmeta / Lecturer:** | prof. Jakob Cimprič, prof. Peter Šemrl |
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| **Jeziki /**<br>**Languages:** | **Predavanja /**<br>**Lectures:** | slovenski/Slovene |
|---|---|---|
| | **Vaje / Tutorial:** | slovenski/Slovene |

| **Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:** | **Prerequisites:** |
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| **Vsebina:** | **Content (Syllabus outline):** |
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| Elementarne funkcije: pregled (polinomi, racionalne, algebraične, eksponentne in logaritemske, kotne in krožne, hiperbolične in area funkcije), lastnosti, računanje, risanje grafov, reševanje enačb in neenačb.<br><br>Analitična geometrija v ravnini: premice, stožnice, medsebojne lege, polarne koordinate.<br><br>Linearna algebra: vektorji v ravnini in prostoru, računske operacije, majhni sistemi enačb in neenačb.<br><br>Kompleksna števila: računanje, reševanje enačb in sistemov enačb, polarni zapis.<br><br>Algebra polinomov: računanje s polinomi, realna in kompleksna faktorizacija, parcialni ulomki. | Elementary functions: an overview (polynomials, rational, algebraic, exponential and logarithmic, trigonometric and inverse trigonometric, hyperbolic and inverse hyperbolic functions), properties, computation, graphing, solving equations and inequalities.<br><br>Analytic geometry in the plane: a straight line, conic sections, mutual position, polar coordinates.<br><br>Linear algebra: vectors in plane and space, computational operations, small systems of linear equations and inequalities.<br><br>Complex numbers: arithmetic, solving equations and systems of equations, polar form.<br><br>Algebra of polynomials: computation with polynomials, real and complex factorization, partial fractions. |

### Temeljni literatura in viri / Readings:

Srednješolski učbeniki matematike.

A. Cedilnik: Matematični priročnik, 2. izdaja, Didakta, Radovljica, 1997.

| Cilji in kompetence: | Objectives and competences: |
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| Študent ponovi in osvoji vsebine iz srednješolske matematike, ki so potrebne za normalno sodelovanje pri drugih predmetih 1. letnika. | Student revises and consolidates the contents of high school mathematics, which are necessary for following the courses in the first year. |

| Predvideni študijski rezultati: | Intended learning outcomes: |
|---|---|
| Znanje in razumevanje: Študent temeljito obvlada računanje z elementarnimi funkcijami, reševanje enačb in neenačb, računanje s kompleksnimi števili in osnove ravninske geometrije. | Knowledge and understanding: A thorough knowledge of calculus of elementary functions, solving equations and inequalities, calculating with complex numbers, and basic knowledge of plane geometry. |

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|---|---|---|
| Uporaba: Predmet je predpriprava za Analizo 1 in Algebro 1.<br><br>Refleksija: Razumevanje pojmov elementarne matematike, ki so nujni za nadaljnji študij.<br><br>Prenosljive spretnosti – niso vezane le na en predmet: Študent se nauči prebrati in razumeti matematično trditev, razločiti predpostavke od posledic in razumeti utemeljitev oziroma dokaz. | | Application: This is preparatory course for Analysis 1 and Algebra 1.<br><br>Reflection: Understanding of basic mathematical concepts that are necessary for further studies.<br><br>Transferable skills: Student learns to read and understand a mathematical statement, distinguish assumptions from conclusions, and understand the deduction or proof. |
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**Metode poučevanja in učenja:** | **Learning and teaching methods:**

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| Predavanja, skupinsko in seminarsko delo | Lectures, group and seminar work |

**Načini ocenjevanja:**  Delež (v %) / Weight (in %)  **Assessment:**

| Način (pisni izpit, ustno izpraševanje, naloge, projekt):<br>Končno preverjanje (izpit)<br><br>Ocene: 6-10 pozitivno, 1-5 negativno<br><br>(v skladu s Statutom UL) | | Type (examination, oral, coursework, project):<br>Final (exam)<br><br>Grading: 6-10 pass, 1-5 fail (according to the Statute of UL) |
|---|---|---|
| | 100% | |

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

Jakob Cimprič:

– CIMPRIČ, Jaka. Archimedean operator-theoretic Positivstellensätze. Journal of functional analysis, ISSN 0022-1236, 2011, vol. 260, iss. 10, str. 3132-3145 [COBISS.SI-ID 15997529]

– CIMPRIČ, Jaka, MARSHALL, Murray, NETZER, Tim. Closures of quadratic modules. Israel journal of mathematics, ISSN 0021-2172, 2011, vol. 183, no. 1, str. 445-474 [COBISS.SI-ID 15998041]

– CIMPRIČ, Jaka. Real algebraic geometry for matrices over commutative rings. Journal of algebra,

ISSN 0021-8693, 2012, vol. 359, str. 89-103 [COBISS.SI-ID 16315993]

Peter Šemrl:

– ŠEMRL, Peter. Applying projective geometry to transformations on rank one idempotents. Journal of functional analysis, ISSN 0022-1236, 2004, vol. 210, no. , str. 248-257 [COBISS.SI-ID 13012825]

– ŠEMRL, Peter. Comparability preserving maps on bounded observables. Integral equations and operator theory, ISSN 0378-620X, 2008, vol. 62, no. 3, str. 441-454 [COBISS.SI-ID 15005273]

– ŠEMRL, Peter. A characterization of normed spaces among metric spaces. Rocky Mountain journal of mathematics, ISSN 0035-7596, 2011, vol. 41, no. 1, str. 293-298 [COBISS.SI-ID 15865177]