

| UČNI NAČRT PREDMETA / COURSE SYLLABUS | | | | | | |
|--|---|--------------------------------------|------------------------------|------------------------------------|---|-------------|
| Predmet: | | Elementarna teorija števil | | | | |
| Course title: | | Elementary number theory | | | | |
| Študijski program in stopnja Study programme and level | | Študijska smer Study field | | Letnik Academic year | Semester Semester | |
| Univerzitetni študijski program Matematika | | ni smeri | | 3 | prvi | |
| First cycle academic study programme Mathematics | | none | | 3 | first | |
| Vrsta predmeta / Course type | | | | izbirni | | |
| Univerzitetna koda predmeta / University course code: | | | | M0265 | | |
| Predavanja Lectures | Seminar Seminar | Vaje Tutorial | Klinične vaje work | Druge oblike študija | Samost. delo Individ. work | ECTS |
| 45 | | 30 | | | 105 | 6 |
| Nosilec predmeta / Lecturer: | | prof. Sašo Strle | | | | |
| Jeziki / Languages: | Predavanja / Lectures: | | slovenski/Slovene | | | |
| | Vaje / Tutorial: | | slovenski/Slovene | | | |
| Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti: | | | | Prerequisites: | | |
| Opravljen predmet Algebra 2. | | | | Completed course Algebra 2. | | |
| Vsebina: | | | | Content (Syllabus outline): | | |

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| <p>Naravna in cela števila, osnovni izrek aritmetike, multiplikativne funkcije, Moebiusova inverzna formula. Osnovne lastnosti in porazdelitev praštevil.</p> <p>Največji skupni delitelj, razširjeni Evklidov algoritem. Končni in neskončni verižni ulomki, izrek o najboljši aproksimaciji, periodični verižni ulomki.</p> <p>Kongruence, Eulerjeva funkcija, Eulerjev izrek, Wilsonov izrek. Šifriranje. Polinomske kongruence, kvadratni ostanki, Legendreov simbol, izrek o kvadratni recipročnosti.</p> <p>Diofantske enačbe: linearne, kvadratne (Pitagorejske trojice, Pellova enačba). Racionalne točke na stožnicah.</p> <p>Predstavitev števil z vsotami kvadratov, Lagrangeev izrek. Celoštevilske kvadratne forme dveh spremenljivk: kanonična oblika, avtomorfizmi, predstavitve števil.</p> | <p>Natural numbers and integers, fundamental theorem of arithmetic, multiplicative functions, Moebious inversion. Basic properties and distribution of primes.</p> <p>Greatest common divisor, extended Euclidean algorithm. Finite and infinite continued fractions, best approximations, periodic continued fractions.</p> <p>Congruences, Euler's function, Euler's theorem, Wilson's theorem. Encryption. Polynomial congruences, quadratic residues, Legendre symbol, quadratic reciprocity.</p> <p>Diophantine equations: linear, quadratic (Pythagorean triples, Pell's equation). rational points on conics.</p> <p>Sums of squares. Lagrange's theorem. Integer binary quadratic forms: reduced forms, automorphisms, representations of numbers.</p> |
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Temeljni literatura in viri / Readings:

J. Grasselli: Elementarna teorija števil, DMFA 2009.

H. Dörrie: 100 Great Problems of Elementary Mathematics : Their History and Solution, Dover Publications, New York, 1982.

K. H. Rosen: Elementary Number Theory and Its Applications, Addison-Wesley, Reading, London, Amsterdam, 2000.

J. J. Tattersall: Elementary Number Theory in Nine Chapters, 2nd edition, Cambridge Univ. Press, Cambridge, 2005.

Cilji in kompetence:

Objectives and competences:

Študent spozna osnove elementarne teorije števil. Ob reševanju elementarnih matematičnih problemov z elementarnimi sredstvi se uči matematičnega načina razmišljanja. Predmet po tematiki in načinu razmišljanja pogloblja temeljna matematična znanja, ki jih potrebuje učitelj matematike.

Students acquire the basic knowledge and skills in elementary number theory. Solving the elementary problems, students enhance their mathematical thinking and comprehension. The course by its content and methods of teaching deepens a prospective teacher's essential mathematical knowledge and skills.

Predvideni študijski rezultati:

Znanje in razumevanje:
Poznavanje in razumevanje osnovnih pojmov in definicij iz elementarne teorije števil ter uporaba konceptov pri reševanju elementarnih matematičnih problemov.

Intended learning outcomes:

Knowledge and understanding:
Knowledge and comprehension of essential concepts and definitions of elementary number theory and acquired ability to use these methods in elementary mathematical problems.

Metode poučevanja in učenja:

Predavanja, vaje, konzultacije

Learning and teaching methods:

Lectures, tutorial sessions, individual consultations

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)
Izpit iz vaj
Izpit iz teorije

Delež (v %) /
Weight (in %)

50 %
50 %

Assessment:

Type (examination, oral, coursework, project):
exercise test
theory exam

Reference nosilca / Lecturer's references:

Sašo Strle:

– STRLE, Sašo. Bounds on genus and geometric intersections from cylindrical end moduli spaces. Journal of differential geometry, ISSN 0022-040X, 2003, vol. 65, no. 3, str. 469-511 [COBISS.SI-ID 13135193]

– OWENS, Brendan, STRLE, Sašo. A characterization of the $Z[\sup]n[\oplus]Z([\delta])$ lattice and

definite nonunimodular intersection forms. American journal of mathematics, ISSN 0002-9327, 2012, vol. 134, no. 4, str. 891-913 [COBISS.SI-ID 16408153]

– PREZELJ, Katja. Binarne kvadratne forme in cela števila : magistrsko delo. Ljubljana: [K. Prezelj], 2016. VI, 106 str., ilustr. [COBISS.SI-ID 17851481]