



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	Teorija števil
<b>Course title:</b>	Number Theory

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester
Enovit magistrski študijski program druge stopnje Predmetni učitelj	/	2.	4.
Five-year master's degree program Subject Teacher	/		

**Vrsta predmeta / Course type**

**Univerzitetna koda predmeta / University course code:**

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
45		45			150	8

**Nosilec predmeta / Lecturer:**

**Jeziki / Predavanja / Lectures:**   
**Languages: Vaje / Tutorial:**

**Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:**   
**Prerequisites:**

**Vsebina:**

Deljivost celih števil. Največji skupni delitelj. Evklidov algoritem. Najmanjši skupni večkratnik. Linearne diofantske enačbe.

Praštevilca. Osnovni izrek aritmetike.

Kongruence. Kriteriji deljivosti. Linearne kongruence. Kitajski izrek o ostankih. Reševanje polinomskih kongruenc. Wilsonov izrek. Fermatov mali izrek in psevdopraštevilca. Eulerjev izrek.

Aritmetične funkcije. Multiplikativne funkcije. Möbiusova formula inverzije.

Red celega števila in primitivni koreni. Kvadratični zakon recipročnosti.

Pitagorejske trojke.

**Content (Syllabus outline):**

Divisibility of integers. Greatest common divisor. Euclidean algorithm. Least common multiple. Linear Diophantine equations.

Primes. Fundamental Theorem of Arithmetic.

Congruences. Special divisibility tests. Linear congruences. Chinese Remainder Theorem. Solving polynomial congruences. Wilson's Theorem. Fermat's Little Theorem and pseudoprimes. Euler's Theorem.

Arithmetic functions. Multiplicative functions. Möbius inversion.

The Order of an Integer and Primitive roots. The law of quadratic reciprocity.

Pythagorean Triples.

**Temeljni literatura in viri / Readings:**

D. M. Burton: Elementary Number Theory. New York [etc.] : McGraw-Hill, 1998.

K. H. Rosen: Elementary number theory and its applications. Boston: Pearson/Addison Wesley, cop. 2005.

J. Grasselli: Elementarna teorija števil. Ljubljana: DMFA, 2009.

J. Grasselli: Diofantske enačbe. Ljubljana: DMFA, 1984.

J. Grasselli: Osnove teorije števil. Ljubljana: DMFA, 1975.

**Cilji in kompetence:**

Proučiti temeljne koncepte in rezultate elementarne teorije števil.

**Objectives and competences:**

To study the fundamental concepts and results of elementary number theory.

**Predvideni študijski rezultati:**

Znanje in razumevanje pojmov in rezultatov elementarne teorije števil.

Prenesljive/ključne spretnosti in drugi atributi:

- Pridobljena znanja se dopolnjujejo z znanji s področja algebre, kombinatorike, kriptografije, teorije kodiranja, analize, računalništva, ...

**Intended learning outcomes:**

Knowledge and understanding of notions and results of elementary number theory.

Transferable/Key Skills and other attributes:

The obtained knowledge supplements with the knowledge of algebra, combinatorics, cryptography, coding theory, analysis, computer science, ...

**Metode poučevanja in učenja:**

- Predavanja
- Seminarske vaje
- Individualno delo

**Learning and teaching methods:**

- Lectures
- Tutorial
- Individual work

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

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

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

- EREMITA, Daniel. Biderivations and commuting linear maps on current Lie algebras. *Journal of Lie theory*. 2021, vol. 31, no. 1, str. 119-126. ISSN 0949-5932.  
<http://www.heldermann.de/JLT/JLT31/JLT311/jlt31006.htm>. [COBISS.SI-ID 100444419]
- EREMITA, Daniel. Biderivations on tensor products of algebras. *Communications in algebra*, ISSN 0092-7872, 2018, vol. 46, iss. 4, str. 1722-1726. <http://doi.org/10.1080/00927872.2017.1355375>, doi: 10.1080/00927872.2017.1355375.
- EREMITA, Daniel. Behfar, Roonak (IR-UKURDS-M); Ghahramani, Hoger (IR-UKURDS-M): Lie maps on triangular algebras without assuming unity. (English summary). - *Mediterr. J. Math.* 18 (2021), no. 5, Paper No. 215, 28 pp. MathSciNet : Mathematical Reviews on the Web. [Spletna izd.]. 2022, 1 spletni vir (mr4309523). ISSN 2167-5163. <http://www.ams.org/mathscinet/pdf/MR4309523.pdf>. [COBISS.SI-ID 132959235]
- EREMITA, Daniel. Jabeen, Aisha (6-JMI-SHU); Ahmad, Musheer (6-JMI-SHU): Multiplicative Lie triple derivation of triangular 3-matrix rings. (English summary). - *Ann. Univ. Ferrara Sez. VII Sci. Mat.* 67 (2021), no. 2, 293–308. MathSciNet : Mathematical Reviews on the Web. [Spletna izd.]. 2022, 1 spletni vir (mr4334719). ISSN 2167-5163.  
<http://www.ams.org/mathscinet/pdf/MR4334719.pdf>. [COBISS.SI-ID 132953347]
- EREMITA, Daniel. Di Vincenzo, Onofrio M. (I-BASI-MIE); Nardoza, Vincenzo (I-BARI): Differential polynomial identities of upper triangular matrices under the action of the two-dimensional metabelian Lie algebra. (English summary). - *Algebr. Represent. Theory* 25 (2022), no. 1, 187–209. MathSciNet : Mathematical Reviews on the Web. [Spletna izd.]. 2022, 1 spletni vir (mr4368582). ISSN 2167-5163. <http://www.ams.org/mathscinet/pdf/MR4368582.pdf>. [COBISS.SI-ID 132949763]

