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| 1. Course title: Number theory | | | | | |
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| 2. Code: | | 3. Type (lecture, practice etc.): seminar | | | |
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| 4. Contact hours: 2 hoursper week | | 5. Number of credits (ECTS): 2 | | | |
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| 6. Preliminary conditions (max. 3): | | | | | |
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| 7. Announced:fall semester, spring semester, both | | | | | |
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| 8. Limit for participants: | | | | | |
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| 10. Responsible teacher (faculty, institute and department):  László Tóth, PhD (Faculty of Sciences, Institute of Mathematics and Informatics, Department of Mathematics) | | | | | |
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| 11. Teacher(s) and percentage: | | János Ruff, PhD | | 100 % | |
| László Tóth, PhD | | 100 % | |
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| 12. Language:English | | | | | |
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| 13. Course objectives and/or learning outcomes:  Objectives: It is intended to solve exercises and problems concerning basic concepts and properties of number theory.  Learning outcomes: students completing the seminar will have *knowledge* on number theory, and vocabulary in the topic. They will be *able* to apply the algebraic and number theoretic properties, to solve equations, they will have a *competence* of evaluating new mathematical results. Their positive *attitude* towards innovative methods in mathematics will increase significantly. | | | | | |
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| 14. Course outline   1. Divisibility in the ring of integers and the ring of polynomials over fields. 2. Divisibility of integers. The division algorithm. The Euclidean algorithm. 3. Greatest common divisor, least common multiple. Irreducible integers, prime integers. 4. Primes, sieve of Eratosthenes, Mersenne and Fermat primes. Fundamental theorem of arithmetic. 5. Congruences. Operations. Complete systems of residues. Reduced systems of residues. 6. Theorems of Euler, Fermat and Wilson. 7. Midterm exam 1. 8. Linear congruences, systems of linear congruences. Linear diophantine equations. 9. Other diophantine equations. The Pithagorean equation. 10. Arithmetic functions. d(n), ϕ(n), σ(n), perfect numbers. Multiplicative and és additive functions. 11. Elementary prime number theory. Number of primes, sum of reciprocicals of primes. 12. Approximation of irrational numbers, algebraic and transcendental numbers. Famous number theoretic problems. 13. Midterm exam 2. | | | | | |
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| 15. Mid-semester works  Two midterm exams. | | | | | |
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| 16. Course requirements and grading  Two midterm exams. Grades:  0–39% fail  40–54% acceptable  55–69% average  70–84% good  85–100% excellent | | | | | |
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| 17. List of readings   1. An electronic textbook is available from the lecturer. | | | | | |
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| 18. Recommended texts, further readings   1. T. M. Apostol, Introduction to analytic number theory, Springer, 1976. 2. Hua Loo Keng, Introduction to number theory, Springer, 1982. | | | | | |
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| **Date** | 8 May, 2017 | **Prepared by** |  | | |
| László Tóth, PhD  responsible teacher | | |
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| **Endorsed by** | | |  | | |
| László Tóth, PhD  program supervisor | | |