DOCTORAL (PHD) STUDIES
COURSE DESCRIPTION

Course title	Field of science	Faculty	Institute
Algebraic Number Theory	Mathematics (N 001)	Faculty of Mathematics and Informatics	Institute of Mathematics

Study method	Number of credits	Study method	Number of credits
Lectures	0	Consultations	1
Individual work	4	Seminars	0

Course summary
Rings of algebraic integers. Norm and trace. Discriminant. Integral basis. Algorithms for finding the integral basis.   **Dedekind domains.** Discret valuation rings. Unique factorization of ideals. Ideal class group. Factorization in extensions. Prime ideals that ramify.   Ideal class number.   **Units.** The group of units. Fundamental units in quadratic extensions. Units in cubic extensions with negative discriminant.   **Valuations. Local fields.** Archimedean and nonarchimedean valuations. Valuations of the field of rational numbers. Completions.

Main literature
1. Narkiewicz W. *Elementary and analytic theory of algebraic numbers.* 3rd ed., Springer, 2004.
2. Milne J. S. *Algebraic number theory.* Lecture notes   URL: https://www.jmilne.org/math/CourseNotes/ANTc.pdf
3. Murty M. R., Esmonde J. *Problems in algebraic number theory.* 2nd ed., Springer, 2005.

Consulting teacher	Scientific degree	Pedagogical name	Main publications in the field of science of the last 5 year period
Artūras Dubickas	Habil. dr.	Prof.	1. A. Dubickas, Small discs containing conjugate algebraic integers, Annales Academiae Scientiarum Fennicae Mathematica 41 (1) (2020), 601-606. 2. A. Dubickas, On the distance between two algebraic numbers, Bulletin of the Malaysian Mathematical Sciences Society 43 (4) (2020), 3049-3064. 3. A. Dubickas, Pillai's equation in polynomials, Mediterranean Journal of Mathematics 18 (2) (2021), Paper No. 63, 10 pp.
Paulius Drungilas	Dr.	Prof.	1. P. Drungilas, R. Garunkštis, A. Novikas, On Second Moment of Selberg Zeta-Function for sigma=1, Results in Mathematics 76 (4) (2021) DOI 10.1007/s00025-021-01492-5 2. P. Drungilas, A. Dubickas, Multiplicative dependence of two integers shifted by a root of unity, Proceedings of the American Mathematical Society 147 (2) (2019), 505-511. 3. P. Drungilas, J. Jankauskas, J. Šiurys, On Littlewood and Newman polynomial multiples of Borwein polynomials, Mathematics of Computation, Vol. 87, No. 311 (2018), 1523-1541.

Approved by the Board of Faculty of Mathematics and Informatics 10/12/2021. Resolution No. (1.5 E) 110000-TPN-42
Board Chairman – assoc. prof. dr. Kristina Lapin