

**DOCTORAL (PHD) STUDIES
COURSE DESCRIPTION**

Course title	Field of science	Faculty	Institute
Modular Forms and Elliptic Curves	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

1. Modular group and its subgroups.
2. Elliptic functions.
3. Eisenstein series, Klein invariant, structure of the space of modular forms.
4. Elliptic curves, the group law, Mordell-Weil theorem.
5. Hecke theory, L -functions of modular forms, zeta-functions of elliptic curves.

Main literature

1. F. Diamond and J. Shurman, *A First Course in Modular Forms*. Springer, Berlin, 2005.
2. R. Garunkštis, *Ivadas į modulinės formas*. TEV, 2007.
3. L. C. Washington, *Elliptic curves. Number theory and cryptography*. Chapman and Hall/CRC, 2003.

Consulting teacher	Scientific degree	Pedagogical name	Main publications in the field of science of the last 5 year period
Ramūnas Garunkštis	Dr. (HP)	Prof.	<ol style="list-style-type: none"> 1. R. Garunkštis, Zeros of the extended Selberg class zeta-functions and of their derivatives. <i>Turkish J. Math.</i> 43 (2019), no. 6, 2921–2930. 2. P. Drungilas, R. Garunkštis, A. Novikas, On second moment of Selberg zeta-function for $\sigma=1$. <i>Results Math.</i> 76 (2021), no. 4, Paper No. 184, 18 pp. 3. R. Garunkštis, Selberg zeta-function associated to compact Riemann surface is prime, <i>Rev. Un. Mat. Argentina</i> 62 (2021), 213–218.
Antanas Laurinčikas	Habil. dr.	Prof.	<ol style="list-style-type: none"> 1. A. Laurinčikas, Discrete universality of the Riemann zeta-function in short intervals. <i>Appl. Anal. Discrete Math.</i> 14 (2020), no. 2, 382–405. 2. A. Laurinčikas, Approximation of analytic functions by an absolutely convergent Dirichlet series. <i>Arch. Math. (Basel)</i> 117 (2021), no. 1, 53–63. 3. A. Laurinčikas, Approximation by generalized shifts of the Riemann zeta-function in short intervals. <i>Ramanujan J.</i> 56 (2021), no. 1, 309–322.

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Board Chairman – assoc. prof. dr. Kristina Lapin