

DOCTORAL (PHD) STUDIES
COURSE UNIT DESCRIPTION

Course unit title	Scientific areas	Faculty	Institute, department
Statistical Modelling and Stochastic Programming	Informatics, 09 P	Mathematics and Informatics faculty	Data Science and Digital Technologies Institute, Operations Research Group

Study method	Number of credits	Study method	Number of credits
Lectures	1	Consultations	1
Individual works	4	Seminars	1

Summary
The course is interdisciplinary, combining data science and informatics methods. It is desirable that a doctoral student choosing this subject would know the basics of probability theory and mathematical statistics, had the skills working with scientific literature and mathematical software (e.g., MATLAB, MathCad, Python). The main goal of the unit is to provide knowledge about statistical modeling and stochastic programming methods. The course acquaints doctoral students with the theory and applications of modern statistical modeling and computation methods. Subject topics: 1. Introduction to statistical modeling: definitions and methods. 2. Statistical models. 3. Estimation of the parameters of the statistical model. 4. Verification of the modeling. 5. Elements of stochastic optimization. 5.1. Linear and nonlinear problems of stochastic programming. 5.2. Applied problems of stochastic linear programming. 5.3. Two-stage stochastic linear programming problems. Practical tasks: 1. Selection of a statistical model and estimation of its parameters. 2. Verification of the adequacy of the modeling. 3. Solution of two-stage stochastic linear programming problem. The unit consists of 8 lectures, 3 seminars, 3 reports.
Literature
D. P. Kroese, J. C. C. Chan, Statistical Modeling and Computation, Springer, 2014
J. R. Birge, F. V. Louveaux, Introduction to Stochastic Programming, Springer Verlag, 2011 (2nd ed.)
D. Freedman, Statistical Models: Theory and Practice. Cambridge University Press, 2005

Lecturer(s) (name, surname)	Science degree	Main publications
Igoris Belovas	dr.	http://www.elaba.mb.vu.lt/mif/?aut=Igoris+Belovas
Martynas Sabaliauskas	dr.	http://www.elaba.mb.vu.lt/mif/?aut=Martynas+Sabaliauskas
Aidas Medžiūnas	dr.	http://www.elaba.mb.vu.lt/mif/?aut=Aidas+Medžiūnas