

Incoming student mobility

Name of UNIOS University Unit: DEPARTMENT OF MATHEMATICS

COURSES OFFERED IN FOREIGN LANGUAGE FOR ERASMUS+ INDIVIDUAL INCOMING STUDENTS

Department or Chair within the UNIOS Unit	Department of Mathematics
Study program	<i>Graduate university study programme in mathematics (Master level)</i> Branches: <ul style="list-style-type: none"> • <i>Financial Mathematics and Statistics</i>
Study level	Graduate (Master)
Course title	Selected applications of probability
Course code	M125
Language of instruction	English
Brief course description	<p>Syllabus.</p> <p>Each year several topics are selected by considering applications in other scientific areas. Topics are chosen from the list below or new topics are defined.</p> <ol style="list-style-type: none"> 1. Extreme value distributions and applications. Heavy-tailed distributions. Limiting behaviour of partial maxima. Frechet, Gumbel and Weibull distribution. Generalized extreme value distribution. Statistical methods for analysing extreme events and parameter estimation. Applications in insurance, finance and natural sciences. 2. Insurance risk models. Claims and claim size distributions. Cramer-Lundberg model. Computing and approximating ruin probability. Distribution of ruin related quantities. Generalizations of Cramer-Lundberg model. 3. Stochastic models in sports. Modelling football match outcomes. Poisson regression. Models in other sports. 4. Dividends optimization problem. Barrier strategies- Dividend problem for Brownian motion. 5. Counterparty credit risk. Structural models (firm-value models). Intensity models. Credit value adjustment risk. 6. Stochastic models in biology. Growth models. Models for DNA sequences evolution.

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	7. Monte Carlo simulations. Generating pseudorandom numbers. Generating numbers from probability distributions. Monte Carlo methods. Metropolis-Hastings algorithm. Applications.
Form of teaching	Consultative teaching.
Form of assessment	Lectures and seminars are mandatory. The final exam is taken upon the completion of lectures and exercises and it consists of two parts, a written and an oral part. Acceptable mid-term exam scores replace the written examination. Students may influence their final grade by doing homework or preparing a seminar paper.
Number of ECTS	4
Class hours per week	2+0+1
Minimum number of students	
Period of realization	Summer semester
Lecturer	Nenad Šuvak, Danijel Grahovac