

Course content for International Master program „Mathematical modeling, computation and optimization“

Course name	Quantitative Finance
Contents and Objectives	<p><u>Content:</u></p> <ul style="list-style-type: none"> • Essential components of probability theory, • Statistics, • Optimization, • Stochastic processes. • Wiener process, • Black Scholes differential equation • Hedging <p><u>Objectives of the course:</u> The course addresses essential tools to understand quantitative finance and its techniques first. These components are taken from probability theory, from stochastics and optimization. We then derive Black Scholes formula by various means, for example by employing geometric Brownian motions or by solving the corresponding differential equation directly. We further evaluate options available on stock markets we compare the prices with the mathematical model.</p>
Teaching	<p>This course consists of lectures and exercise classes.</p> <ul style="list-style-type: none"> • Lecture Quantitative Finance (4h/week) • Exercise class Quantitative Finance (2h/week)
Prerequisites	Probability theory, statistics and optimization
Examination	Oral exam (30 minutes)
Credits	8 ECTS points
Frequency	This course is given at least once in 2 years.
Workload	The estimated total working time for this course is 250 hours.
Duration	This course is given during one semester.