

## Course Descriptions Exchange 2023-2024

Course Title Mathematical Finance

Course Code EBC4121

ECTS Credits 6,5

Assessment Whole/Half Grades

Period	Start	End	Mon	Tue	Wed	Thu	Fri
2	30-10-2023	15-12-2023		X			X

Level Advanced

Coordinator Antoon Pelsner For more information: [a.pelsner@maastrichtuniversity.nl](mailto:a.pelsner@maastrichtuniversity.nl)

Language of instruction English

Goals The principal aim of this course is to provide students with an appreciation and understanding of how the application of mathematics, particularly stochastic mathematics, to the field of finance may be used to illuminate this field and model its randomness, resulting in greater understanding and quantification of investment returns and security prices.

Description The principal aim of this course is to provide students with an appreciation and understanding of how the application of mathematics, particularly stochastic mathematics, to the field of finance. The course aims to provide a clear understanding of the intuition behind derivatives pricing, how models are implemented, and how they are used and adapted in practice. Strengths and weaknesses of different models, e.g., Black-Scholes, interest rate models, stochastic volatility, are examined. Both the theory and the implementation of the industry-standard models are considered in detail. Pricing problems are approached using multiple techniques including the well-known PDE, Monte-Carlo and martingale approaches. Students should have knowledge of stochastic processes, in particular Brownian Motion, geometric Brownian motion and the underlying stochastic differential equations. Moreover, students should be familiar with the Ito integral and the Ito formula. Computer programming skills are required for all the cases, as these involve numerical calculations.

Literature Joshi, M (2008) The Concepts and Practice of Mathematical Finance, 2nd ed, Cambridge University Press. ISBN: 978-0-521-51408-8

Prerequisites Students should have knowledge of stochastic processes, in particular Brownian motion, geometric Brownian motion and the underlying stochastic differential equations. Moreover, students should be familiar with the Ito integral and the Ito formula. Knowledge of the Girsanov transformation is helpful, but not required.

Teaching methods Lecture / Assignment / Groupwork

Assessment methods Assignment

Evaluation in previous academic year For the complete evaluation of this course please click <http://iwio-sbe.maastrichtuniversity.nl/rapporten.asp?referrer=codeUM>

This course belongs to the following programme / specialisation

Master Econometrics and Operations Research	Elective Course(s)
SBE Exchange Master	Master Exchange Courses
SBE Non Degree Courses	Master Courses