Course Descriptions None 2020-2021

Course Title	Mathematical Finance
Course Code	EBC4121
ECTS Credits	6,5
Assessment	Whole/Half Grades

Period

Period	Start	End	Mon	Tue	Wed	Thu	Fri
4	1-2-2021	26-3-2021		X			X

Level	Advanced
Coordinator	Antoon Pelsser For more information:a.pelsser@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	PLEASE NOTE THAT THE INFORMATION ABOUT THE TEACHING AND ASSESSMENT METHOD(S) USED IN THIS COURSE IS WITH RESERVATION. THE INFORMATION PROVIDED HERE IS BASED ON THE COURSE SETUP PRIOR TO THE CORONAVIRUS CRISIS. AS A CONSEQUENCE OF THE CRISIS, COURSE COORDINATORS MAY BE FORCED TO CHANGE THE TEACHING AND ASSESSMENT METHODS USED. THE MOST UP-TO-DATE INFORMATION ABOUT THE TEACHING/ASSESSMENT METHOD(S) WILL BE AVAILABLE IN THE COURSE SYLLABUS. The aim of the course is to provide students with an appreciation and understanding of the main ideas and concepts of mathematical finance. The core of mathematical finance concerns questions of pricing and hedging of financial derivatives such as options whose value depend on that of an underlying risky asset. We will discuss the general principles of continuous-time financial markets where the investor can buy and sell d+1 assets. As a special case we will consider the Black-Scholes model for a financial market. We will further point out the link between the no-arbitrage condition and certain probability measures, the so called equivalent martingale measures. In complete markets as well as in incomplete markets these measures allow to price financial derivatives in an arbitrage-free way. Moreover, we will consider probabilistic models for bond markets and apply the theory of equivalent martingale measures to the pricing of fixed income securities. Finally, we will address the issue of estimating the parameters of the probabilistic models from historical data.
Literature	Bingham, N.H., Kiesel, R. (2004). Risk-Neutral Valuation: Pricing and Hedging of Financial Derivatives, 2nd edition, Springer, London Berlin Heidelberg.
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	PBL / Presentation / Lecture / Assignment
Assessment methods	Participation / Written Exam
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	E&OR Electives
SBE Exchange Master	Master Exchange Courses
SBE Non Degree Courses	Master Courses