

## Course title: Mathematical Foundations for Finance

Course Basic Information	
Academic Unit: (University/Department)	ETH Zürich, Department of Mathematics
Course title:	Mathematical Foundations for Finance
Level:	Master of Science UZH ETH in Quantitative Finance
Course Status:	Core MF
Year of Study:	<b>Fall Semester</b>
Number of Classes per Week:	3h (lectures) + 2h (exercises)
ECTS Credits:	<b>4 ECTS</b>
Time /Location:	According to the timetable in ETH course catalogue
Lecturer:	Prof. Dr. Martin Schweizer
Content	
Content of the course	<p>Topics to be covered include</p> <ul style="list-style-type: none"> <li>- financial market models in finite discrete time</li> <li>- absence of arbitrage and martingale measures</li> <li>- valuation and hedging in complete markets</li> <li>- basics about Brownian motion</li> <li>- stochastic integration</li> <li>- stochastic calculus: Itô's formula, Girsanov transformation, Itô's representation theorem</li> <li>- Black-Scholes formula</li> </ul>
Course's objectives:	<p>This course gives a first introduction to the main modelling ideas and mathematical tools from mathematical finance. It aims mainly at non-mathematicians who need an introduction to the main tools from stochastics used in mathematical finance. However, mathematicians who want to learn some basic modelling ideas and concepts for quantitative finance (before continuing with a more advanced course) may also find this of interest. The main emphasis will be on ideas, but important results will be given with (sometimes partial) proofs.</p>
The expected outcomes:	<p>On successful completion of this module, students should have a solid grasp of the fundamental ideas from hedging and valuation in mathematical finance based on the principle of absence of arbitrage. They should be able to read, understand and further develop research ideas in the area of continuous-time finance based on advanced stochastic methods.</p>