

Syllabus Course description

Course title	Advanced Quantitative Methods
Course code	29054
Scientific sector	SECS/S-06
Degree	PhD in Economics and Finance
Semester and academic year	1/2
Year	1 st
Credits	2
Modular	3
Total lecturing hours	14
Total office hours	Not foreseen
Total exercise hours	Not foreseen
Attendance	required
Prerequisites	-
Course page	-
Specific educational objectives	<p>The first part of the course is focused on the price or value of claims to uncertain payments. We introduce the concept of a stochastic discount factor (or alternatively an equivalent martingale measure) in a simple Lucas economy. The model framework provides an economic intuition risk-neutral pricing.</p> <p>The second part of the course refers to typical educational activities and belongs to the scientific area of financial risk management and regulation.</p>
Lecturer	<p>Prof. Dr. rer. nat. habil. Andreas Hamel, Email: Andreas.Hamel@unibz.it, Phone: 0474 013651 Campus, Bruneck- Brunico, Office 1.11</p> <p>Prof. Dr. Alex Weissensteiner, Email: alex.weissensteiner@unibz.it, Phone: 0471 013496, Campus Bozen - Bolzano, Office E2.06</p>
Scientific sector of the lecturer	SECS/S-06
Teaching language	English
Office hours	Not foreseen
Lecturing assistant	-
List of topics covered	<ul style="list-style-type: none"> • Lucas Economy (one-period model) • Stochastic discount factor (SDF) • Risk-neutral pricing • General equilibrium models (multi-period models) • Risk as a subjective concept, attitude towards risk,

	<p>decisions under risk,</p> <ul style="list-style-type: none"> • Axiomatic approach to risk quantification, risk measures and acceptance sets • Dual representation of convex risk measure • Applications: from value-at-risk to average value-at-risk and the Basel accord
Teaching format	Frontal lectures

Learning outcomes	<p>Knowledge and Understanding: SDF, risk-neutral pricing, getting basic knowledge on modern risk quantification; developing an understanding of axiomatic approaches to risk management.</p> <p>Applying Knowledge and Understanding: pricing uncertain claims, taking optimal inter-temporal consumption and investment decision, applying concepts from probability theory to risk management and financial regulation in practice (Basel accord).</p> <p>Making Judgements: ability to understand decision making processes under risk.</p> <p>Communication skills: develop basic abilities for communication on quantitative risk management.</p> <p>Learning skills: learn how to design and formulate an appropriate axiomatic approach for decision making problems.</p>
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Assessment	Quiz at the end of each of the two parts.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Active course participation and successful completion of the quizzes result in a pass/fail.

Required readings	<ul style="list-style-type: none"> • Cochrane, John H. <i>Asset pricing: Revised edition</i>. Princeton university press, 2009. • Dumas, Bernard, and Andrew Lyasoff. "Incomplete-Market Equilibria Solved Recursively on an Event Tree." <i>The Journal of Finance</i> 67.5 (2012): 1897-1941. • Artzner, Delbaen, Eber, Heath, "Coherent Measures of Risk", <i>Mathematical Finance</i> 9(3), 1999
Supplementary readings	Will be announced during the course.