## Syllabus

### Course description

<table>
<thead>
<tr>
<th>Course title</th>
<th>Quantitative Finance</th>
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<tbody>
<tr>
<td>Course code</td>
<td>27205</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>SECS-P/11</td>
</tr>
<tr>
<td>Degree</td>
<td>Bachelor in Economics and Management</td>
</tr>
<tr>
<td>Semester and academic year</td>
<td>1st semester, ay 2020/2021</td>
</tr>
<tr>
<td>Year</td>
<td>Optional</td>
</tr>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Modular</td>
<td>No</td>
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| Total lecturing hours | 36                  |
| Total lab hours       | -                   |
| Total exercise hours  | -                   |
| Attendance            | Strongly recommended|

**Prerequisites**

There are no prerequisites. It is advisable, however, that the students attended the course of Financial Analysis in order to properly follow these lectures.

**Course page**


**Specific educational objectives**

The course refers to the complementary educational activities chosen by the student and belongs to the scientific area of Economics.

The course provides coverage of important topics in modern Quantitative Finance at the advanced undergraduate level. Special interest is given to asset pricing theory and its empirical applications. Factor models, portfolio theory, fixed income analysis and option pricing are core elements of the course. All concepts and models are applied in R with real world data. Thus, students learn to implement financial models from start to finish.

As a result, students develop the theoretical knowledge and practical skills required for coping with various problems encountered in finance.

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**Lecturer**

Peter Schmid

**Office hours:** Zoom meetings. Fixed office hours via Zoom meetings can be announced.

e-mail: peter.alfons.schmid@outlook.de

Tel: 049 176 207 35606

https://www.unibz.it/it/faculties/economics-management/academic-staff/

**Scientific sector of the lecturer**

SECS-P/09

**Teaching language**

English
Office hours are scheduled as online meetings.

Lecturing assistant: Not foreseen

Teaching assistant: Not foreseen

Office hours: Not foreseen

List of topics covered:

Theory:
- Prices and Returns
- Risk-Return Trade-Off
- Factor Models
- Performance Measures
- Portfolio Theory
- Bond Valuation
- Option Pricing

Applications:
- Introduction to R
- Data exploration, estimation and simulation
- Time series analysis, Cross-sectional analysis

Teaching format:
Frontal lectures and applications in R

Learning outcomes:

Knowledge and understanding:
- Students shall excel at modern finance topics. They are able to use advanced quantitative methods.
- Based on the risk-return trade-off students understand asset pricing based on factor models. The efficient frontier as a result of mean-variance optimization is elaborated.
- Students are able to apply methods for bond valuation. Concepts like duration and convexity are discussed.
- Students are able to apply the Black-Scholes-formula for option pricing.

Applying knowledge and understanding:
- Students learn to apply the theoretical concepts and models to real world data.
- Therefore, students learn to program in R. The course covers all topics from the import of data to various applications and statistical challenges in time series and cross-sectional regression.

Making judgments:
- Students are able to choose the appropriate methods and techniques.
- As a result, students are able to make investment decisions under uncertainty.

Communication skills:
- Students are able to communicate their investment decisions based on empirical evidence.

Learning skills:
- Students understand financial problems and find solutions to these problems.
- Students apply analytical reasoning and empirical asset pricing.

Assessment:
- Closed-book written exam - 100%

Assessment language: English

Evaluation criteria and Relevant for exam assessment: Theoretical knowledge of
<table>
<thead>
<tr>
<th>criteria for awarding marks</th>
<th>models and concepts covered in the class as well as knowledge of their empirical applications.</th>
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