## Syllabus

### Course title
Advanced Quantitative Methods - module 2

### Course code
29054

### Scientific sector
Secs-S/01

### Degree
PhD in Economics and Finance

### Semester and academic year
1st Semester

### Year
2021/22

### Credits
2

### Modular
3

<table>
<thead>
<tr>
<th>Total lecturing hours</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>Total office hours</td>
<td>Not foreseen</td>
</tr>
<tr>
<td>Total exercise hours</td>
<td>Not foreseen</td>
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### Attendance
required

### Prerequisites
N/A

### Course page
- 

### Specific educational objectives
The course refers to the typical educational activities and belongs to the scientific area of statistics.

This course introduces advanced econometric tools for making inferences and predictions from high-dimensional and complex data. The course will focus particularly on regression and supervised methods. All the methods covered in class are illustrated using real data sets commonly found in business and finance within the R statistical computing environment.

At the end of the course, the students will be able to implement and apply statistical learning and forecasting tools that are appropriate for high-dimensional data. They will be also able to draw conclusions from their analyses in the context of real data.

### Lecturer
Davide Ferrari
Office E205
e-mail: Davide.Ferrari2@unibz.it

### Scientific sector of the lecturer
SECS-S/01

### Teaching language
English

### Office hours
TBA

### Lecturing assistant
N/A

### List of topics covered
Linear models for high-dimensional data: inference and hypothesis testing
Model selection and post-selection inference.
Instrumental variables in a high-dimensional setting.

### Teaching format
Frontal lectures, exercises and computer labs.
### Learning outcomes

- Knowledge and ability to apply high-dimensional econometric models in a variety of situations.
- Knowledge and ability to apply inference and hypothesis testing methods in the high-dimensional setting.
- Knowledge and ability to apply quantitative methods for model selection and post-model selection inference.

### Assessment

<table>
<thead>
<tr>
<th>Assessment language</th>
<th>English</th>
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<tr>
<th>Evaluation criteria and criteria for awarding marks</th>
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<td>The homework assignments consists of several exercises and review questions. The data analysis project involves statistical analyses on real data related to the contents of the course using the statistical software R. To receive a passing grade in the course, students must obtain a positive evaluation in both homework assignments and data analysis project.</td>
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### Required readings

| Lecture notes with references will be provided during lectures. |

### Supplementary readings

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