# Syllabus

## Course description

| Course title | Statistics for the Public Sector  
M2 Economic Statistics - M1 Introduction to statistical methods |
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<tbody>
<tr>
<td><strong>Course code</strong></td>
<td>27066 - other students code --- (M1)/--- (M2) Erasmus</td>
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<tr>
<td><strong>Scientific sector</strong></td>
<td>SECS-S/03 (M2) – SECS-S/01 (M1)</td>
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<tr>
<td><strong>Degree</strong></td>
<td>Master in Public Policies and Administration</td>
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<tr>
<td><strong>Semester and academic year</strong></td>
<td>1st semester 2019/2020 (M2) - 2nd semester 2019/2020 (M1)</td>
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<tr>
<td><strong>Year</strong></td>
<td>1</td>
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<tr>
<td><strong>Credits</strong></td>
<td>12 (6+6)</td>
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<td><strong>Modular</strong></td>
<td>Yes</td>
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| **Total lecturing hours** | 72 (36 + 36) |
| **Total lab hours** | |
| **Total exercise hours** | 42 - M2: 20 (Preparatory Course) + 6; M1: 16 |
| **Attendance** | Suggested, but not required |

**Prerequisites**

Students without a background in Statistics are encouraged to actively attend the Preparatory Course in Statistics for the Public Sector. It is scheduled at the beginning of the first semester, before Module M2 starts. At the end of the Preparatory Course, a final exam is scheduled. The final exam aims at checking the basic requirements to success the course of Statistics for the Public Sector. Therefore, the final exam will have no-negative impacts on students’ path, as it is aimed at making aware students of their quantitative knowledge. In case of “not passed” outcome, the student will be got in touch with the Lecturing Assistant and the Principal Lecturer in order to properly bridge her/his knowledge gaps. In case of “pass with distinction” outcome, students are awarded up to an additional point for the final mark.

**Course page**


**Specific educational objectives**

**M2 Economic Statistics**

The course refers to the typical educational activities and belongs to the scientific area of Applied Statistic. By the end of the study of this course the student should be able to

- understand and use the most relevant economic statistics;
- interpret and use the main tools from the index number theory.
- develop the ability to perform basic quantitative economic analysis by means of the R software.

**M1 Introduction to statistical methods**
The course refers to the typical educational activities and belongs to the scientific area of Statistic. By the end of the study of this course the student should be able to:
- understand the logical reasoning underlying the construction of a sampling distribution and the implications for statistical inference; know the criteria for constructing good estimates of parameters; compute estimates of parameters from sample data; understand the philosophy and scientific principles underlying the hypothesis testing; carry out hypothesis tests for a variety of statistical problems;
- understand and use descriptive and inferential statistics when i) there is a single quantitative response variable and a single explanatory variable and ii) there is a single quantitative response variable and a set of explanatory variables;
- address statistical issues concerning concrete problems;
- develop the ability to perform basic statistical data analysis by means of the R software.

**Module 1**

**M2 Economic Statistics**

**Lecturer**
Enrico Foscolo
Office O304
e-mail: enrico.foscolo@unibz.it
Tel: 0471/013499

**Scientific sector of the lecturer**
SECS-S/03

**Teaching language**
English

**Office hours**
Please refer to the lecturer’s web page

**Lecturing assistant**
Not foreseen

**Teaching assistant**
Not foreseen

**Office hours**
Please refer to the Faculty Timetable

**List of topics covered**
**Economic Statistics**
Economic data: Concepts, definitions and classification of economic statistics; Statistical indices.
Introduction to the R software.

**Teaching format**
Classroom-based lectures, Labs

**Module 2**

**M1 Introduction to statistical methods**

**Lecturer**
Francesca Marta Lilja Di Lascio
Office E510a
e-mail: Marta.DiLascio@unibz.it
Tel: 0471/013285
<table>
<thead>
<tr>
<th>Scientific sector of the lecturer</th>
<th>SECS-S/01</th>
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<tbody>
<tr>
<td>Teaching language</td>
<td>English</td>
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<tr>
<td>Office hours</td>
<td>Please refer to the lecturer's web page</td>
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| Lecturing assistant             | Enrico Foscolo  
Office E208  
e-mail: enrico.foscolo@unibz.it  
Tel: 0471/013499  
https://www.unibz.it/en/faculties/economics-management/academic-staff/person/32407-enrico-foscolo |
| Teaching assistant              | not foreseen |
| Office hours                     | Please refer to the lecturer's web page |
| List of topics covered          | **Probability**  
| **Statistical Inference**        | Inductive process under uncertainty. Sampling and sampling distributions of the mean, variance and proportion. Statistics, estimators and their properties. Choice of an estimator. Point estimation and confidence intervals for the mean, the variance and the proportion. Hypothesis testing. Type I error and type II error. Significance level and p-value. Hypothesis tests for the mean of a normal population and for a proportion. Hypothesis testing for two means of normal populations and in the case of large samples. Test of independence. |
| **Statistical Models**           | Correlation, regression and causation. The simple linear regression model. The multivariate regression model. Inference for regression. |
| **R software**                   | Statistical data analysis by R. |
| Teaching format                  | Frontal lectures, exercises, lectures with computers |
| Learning outcomes                | M2 Economic Statistics |
### M1 Introduction to statistical methods

**Knowledge and understanding:** Knowledge of the basics of the inferential statistical theory, from the estimation to the test of hypothesis. Knowledge of the procedure of simple and multivariate linear statistical modelling. Understanding of the R code in which a statistical problem is translated.

**Applying knowledge and understanding:** Ability to perform statistical analysis of socio-economic data through both the descriptive and the inferential statistical tools as well as linear regression models. Ability to apply statistical techniques by using an appropriate statistical software.

**Making judgments:** on the appropriateness of statistical tools to analyse data and on the results of a statistical analysis of concrete cases.

**Communication skills:** to present in a consistent and precise way the results obtained from a statistical analysis of observed data.

**Learning skills:** Ability to i) understand the logic of the statistical reasoning, ii) interpret the results of statistical analysis, and iii) address statistical issues concerning concrete problems.

### Assessment

**M2 Economic Statistics**

Project work on a case study (no written exam expected). Expected outcome: A technical report based on a quantitative analysis of economic data. Students are
M1 Introduction to statistical methods
Written exam on a case study: students will have to solve theoretical, practical and computational issues concerning a given concrete problem.

The assessment method indicated is valid for both attending and non-attending students.

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Tabular representation of assessment and readings:

### M2 Economic Statistics
To pass the M2 module exam students must obtain a positive evaluation on the Project work. It is relevant for Project work: correctness and clarity of the Report, ability to interpret R outputs and to correctly write formal R code.

### M1 Introduction to statistical methods
To pass the M1 module exam students must obtain a positive evaluation on the written exam. It is relevant for written exam: correctness and clarity of answers, ability to interpret R outputs and to correctly write formal R code.

Pass with distinction in the Preparatory class: up to 1 point.

#### Required readings
- Lecture notes and R code of the labs will be provided.

#### M1 Introduction to statistical methods
- Lecture notes and R code of the labs will be provided.

#### Supplementary readings
- Further readings will be announced during the course.

#### M2 Economic Statistics