

Academic Year: ( 2022 / 2023 )

Review date: 18/05/2022 20:22:30

Department assigned to the subject: Social Sciences Department

Coordinating teacher: LAHDELMA , ILONA ERZSÉBET

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 2

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Statistics and Data Science I (19140)  
Statistics and Data Science II (19141)

## OBJECTIVES

### Core Competences:

- Having and understanding the knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context
- Students know how to apply their acquired knowledge and problem-solving skills in new or unfamiliar settings within broader (or multidisciplinary) contexts related to their field of study.
- Students are able to integrate knowledge and to face the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the social and ethical responsibilities linked to the application of their knowledge and judgments.
- Students know how to communicate their conclusions and the knowledge and ultimate reasons behind them to specialised and non-specialised audiences in a clear and unambiguous way.
- Students have the learning skills that will enable them to continue studying in a way that will be largely self-directed or autonomous.

### General Competences:

- Ability to compile and analyze existing knowledge in the different areas of computational social sciences, and to propose possible solutions to the problems raised.
- Ability to apply theoretical and methodological knowledge of computational social sciences to the analysis and resolution of specific cases and empirical problems.
- Ability to communicate and present, in a clear, precise and rigorous manner, concepts and results related to computational social science activities to both specialized and non-specialized audiences.

### Specific Competences:

- Ability to understand and use the most relevant methods and techniques of statistical analysis for computational social sciences at an advanced level.

### Learning Outcomes:

- Ability to test hypotheses using data and the most appropriate tools.
- Ability to apply robustness tests to regression model estimates.
- Ability to describe the logic of causal inference and its application to regression models, distinguishing between causality and correlation.
- Ability to identify common problems of causal interpretation in linear models, as well as to evaluate and justify techniques to solve them.
- Ability to evaluate the validity and robustness of causal inference under a variety of assumptions

about data generation.

## DESCRIPTION OF CONTENTS: PROGRAMME

1. Why causality? Introduction to the potential outcome frameworks
2. The experimental benchmark
3. Observational data and the experimental benchmark: Matching
4. Quasi-experiments: Regression Discontinuity Designs
5. Quasi-experiments: Instrumental variables
6. Difference-in-differences and panel data
7. Causal inference applied: Policy evaluations

## LEARNING ACTIVITIES AND METHODOLOGY

Training Activities:

- Theoretical-practical classes
- Group work
- Individual student work

Teaching Methods:

- Presentations in the professor's lecture room with computer and audiovisual support, in which the main concepts of the subject are developed and a bibliography is provided to complement the students' learning.
- Critical reading of texts recommended by the subject professor: Press articles, reports, manuals and/or academic articles, either for later discussion in class, or to expand and consolidate knowledge of the subject.
- Resolution of practical cases, problems, etc. raised by the professor, either individually or in a group
- Presentation and discussion in class, under the moderation of the professor, of topics related to the content of the subject, as well as practical case studies.
- Developing pieces of work and reports, individually or in group.

## ASSESSMENT SYSTEM

<b>% end-of-term-examination/test:</b>	0
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	100
- Individual or group work done during the course (25%)	
- Knowledge of the main methods and techniques in computational social sciences (75%)	

## BASIC BIBLIOGRAPHY

- Angrist, J. D., Jorn-Steffen Pischke Mostlt Harmless Econometrics, Princeton University Press, 2009
- Guido W. Imbens, Donald B. Rubin Causal inference for Statistics, Social, and Biomedical Sciences: An introduction , Cambridge University Press, 2015
- Nick Huntington-Klein The Effect: An introduction to Research Design and Causality, Chapman and Hall, 2021

#### ADDITIONAL BIBLIOGRAPHY

- Judea Pearl, Dana MacKenzie The Book of Why, Penguin Random House, 2019
- Scott Cunningham The Causal Inference Mixtape, Yale University Press, 2021

#### BASIC ELECTRONIC RESOURCES

- Nick Huntington Klein . The Effect: Webpage: <http://https://theeffectbook.net/>
- Scott Cunningham . Tha Causal Inference Mixtape: Website: <http://https://mixtape.scunning.com/index.html>