

Academic Year: ( 2022 / 2023 )

Review date: 18/05/2022 20:17:17

Department assigned to the subject: Social Sciences Department

Coordinating teacher: VILLAMIL FERNANDEZ, FRANCISCO

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

## 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 understand and analyze the main global social theories and how they are changing with the application of computational tools.
- Ability to identify, define and formulate social science problems and solve them using computational techniques. This includes the ability to assess all the factors involved, not only technical but also legal.
- Ability to address issues raised under new or unfamiliar environments, within the context of computational social sciences.
- Ability to plan and carry out research in the field of computational social sciences in an autonomous way.

### Specific Competences:

- Ability to understand and analyze the main theoretical-methodological approaches of computational social sciences, their potentials and limitations, and to apply them to the analysis of specific social problems.
- Ability to develop an experimental/causal research design appropriate to the research questions.

### Learning Outcomes:

- Knowledge of the principles of scientific research.
- Ability to discern among refutation, confirmation and contrastation.
- Knowledge of different research designs: variable-based, case-based, comparative.
- Ability to combine different research designs.
- Be familiar with the different types of scientific evidence.
- Ability to explain the principles underlying statistical models for social networks.

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## DESCRIPTION OF CONTENTS: PROGRAMME

### 1. Introduction

- Importance of research design in social sciences
- What it means to answer a question with empirical evidence
- Types of empirical research

### 2. Research questions

- How to find them and how to work with them
- Description and explanation
- Variables and relationships between variables

### 3. Types of research design and empirical information

- Case studies, comparative studies, quantitative studies with large samples
- Advantages, disadvantages and complementarities
- Types of empirical evidence
- Unit of analysis and variability
- Measurement problems

4. Causality
  - Prediction, correlation, probability
  - Causal effects and causal mechanisms
  - Mechanism-based explanations
  - Levels of explanation: macro, meso, micro
  - Directed Acyclic Graphs
5. Problems in causal inference
  - Confounding, selection bias, collider bias, etc.
  - Problems of internal and external inference
  - Ecological fallacy, diffusion, external validity, etc.
6. Research design to identify causal relationships
  - Ideal of experimental method in natural sciences
  - Counterfactuals and how to approach them
  - Advantages and disadvantages of causal inference design
7. Introduction to the logic of causal inference methodology
  - Understanding the most common techniques: experiments, difference-in-differences, RDD, matching, etc.

## LEARNING ACTIVITIES AND METHODOLOGY

### Training Activities:

- Theoretical-practical classes
- Laboratory practical sessions
- Tutorials
- Group work
- Individual student work
- Partial and final examinations

### 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>	40
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	60
<ul style="list-style-type: none"> <li>- Participation in the class (20%)</li> <li>- Individual or group work done during the course (40%)</li> <li>- Final exam (40%)</li> </ul>	

## BASIC BIBLIOGRAPHY

- Ethan Bueno de Mesquita & Anthony Fowler Thinking clearly with data: A guide to quantitative reasoning and analysis, Princeton University Press, 2021
- Nick Huntington-Klein The Effect: An Introduction to Research Design and Causality, Chapman and Hall/CRC Publishing, 2021

- Scott Cunningham Causal Inference: The Mixtape, Yale University Press, 2021