

Academic Year: (2022 / 2023)

Review date: 02-09-2022

Department assigned to the subject: Mathematics Department

Coordinating teacher: SANCHEZ SANCHEZ, ANGEL

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Introduction to Programming with R (19151)

Basic Statistics (19152)

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 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 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.
- 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 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 identify the challenges of the digital society and propose specific solutions from an interdisciplinary approach, combining analytical tools from the social and computational sciences, to combat them.

Learning Outcomes:

- Ability to understand and identify the new challenges faced by the Social Sciences in the digital world.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction
 - What is computational social science (CSS)?
 - The paradigm of CSS
 - First examples
 - Society as a complex adaptive system
 - Main areas of CSS
2. Big data
 - Automatic information extraction and data mining
 - Analysis techniques
 - Examples
3. Social networks
 - Complex networks: basic definitions
 - Quantitative network analysis and software
 - Examples
4. Social complexity
 - Fundamentals and characteristics
 - Quantitative indicators
 - Laws of social complexity
5. Models and simulations
 - Model construction
 - The purpose of simulations
 - Basic software: NetLogo
 - Examples

LEARNING ACTIVITIES AND METHODOLOGY

Training Activities:

- Theoretical classes
- Theoretical-practical classes
- Tutorials
- 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.
- 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.
- Seminars/lectures by national and international experts, in face-to-face or remote synchronous sessions.

ASSESSMENT SYSTEM

- Participation in class (20%)
- Group assignment carried out during the course (40%)
- Individual assignment carried out during the course (40%)

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

BASIC BIBLIOGRAPHY

- Claudio Cioffi-Revilla Introduction to Computational Social Science: Principles and Applications, Springer, 2017