# Foundations of Computational Social Science

**Academic Year: ( 2023 / 2024 )** **Review date: 15-07-2023**

**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

- 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

| | |
|---|---|
| **% end-of-term-examination:** | 0 |
| **% of continuous assessment (assigments, laboratory, practicals…):** | 100 |

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

In the extraordinary call, the evaluation system will be as follows:
1) Exam: 100%

## BASIC BIBLIOGRAPHY

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