Computational Modelling of Social Systems (2 semester hours, 6 ECTS)

David Garcia, Winter Semester 2022/23

Comment

This course is during the winter semester 2022/23 as an elective course in the SEDS programme (Module Social Science Applications)

All sessions will be on-site.

You can find more details under "Documents" in the syllabus of this course.

Content

This introductory course on computational modelling will introduce the students to the question of explaining human behavior across levels of analysis. Following a complexity science approach, the course will illustrate the basics of computational modelling with models that explain various kinds of human behavior.

The course will cover the following computational approaches to the modelling of social systems:

- Agent-based modelling: segregation and cultures

- Opinion dynamics: voter models bounded confidence

- Models of network formation and their application to social networks

- Models of social dynamics on networks

The course takes the form of a seminar in two phases:

  1- Lectures on basics of computational modelling (9 sessions)

  2- Student presentations on selected readings in computational modelling (5 sessions)

Students select a published article from a set of readings to present in the second part and to write a review of the article as final report. The course grade is based on the student presentation (50%), participation in discussions after each presentation (20%), and on the report (30%).

Objectives

Upon the completion of this course, students will be familiar with the following:

- Various approaches to model social interactions to bring the micro-macro gap

- General principles of agent-based modelling and network modelling

- The analytical approach to formalization, simulation, and analysis of comptuational models

- The role of empirical data in the calibration and validation of computational models

- The limitations and applications of computational modelling in the social sciences

Recommended prerequisites

This course does not have specific pre-requisites but is especially indicated for students beyond the first semester of their master studies, especially the SEDS programme.

Literature

Given the variety of modeling approaches covered by the course, there is no single reading source for the course. Each lecture will have one or two recommended readings as preparation and a more extensive readings list will be provided at the beginning of the course for students to choose a paper to present.