



Academic year	2016-17
Subject	11015 - Collective Phenomena in Social Dynamics
Group	Group 1, 2S
Teaching guide	C
Language	English

## Subject identification

<b>Subject</b>	11015 - Collective Phenomena in Social Dynamics
<b>Credits</b>	0.75 de presencials (18.75 hours) 2.25 de no presencials (56.25 hours) 3 de totals (75 hours).
<b>Group</b>	Group 1, 2S
<b>Teaching period</b>	Second semester
<b>Teaching language</b>	English

## Professors

Lecturers	Horari d'atenció als alumnes					
	Starting time	Finishing time	Day	Start date	Finish date	Office
José Javier Ramasco Sukia <a href="mailto:jramasco@ifisc.uib-csic.es">jramasco@ifisc.uib-csic.es</a>	09:30	10:30	Monday	01/10/2016	28/02/2017	104 Científico técnico
Maximino San Miguel Ruibal <a href="mailto:msr260@uib.es">msr260@uib.es</a>	You need to book a date with the professor in order to attend a tutorial.					

## Contextualisation

This course provides an introduction to the research area of collective social phenomena and socio-technical systems using the concepts and methods of statistical and nonlinear physics.

## Requirements

Concepts needed in this course can be acquired in the compulsory courses of the Structural Module

## Skills

### Specific

- \* E3: Capacity for analysis and visualization of numerical data and knowledge of interactive interfaces.

### Generic

- \* TG1: To be able to describe, both mathematically and physically, complex systems in different situations.
- \* TG3: To write and describe rigorously the research process and present the conclusions to an expert audience..
- \* TG4: To acquire the ability to ask questions, read and listen critically and participate actively in seminars and discussions..



- \* TG6: To acquire high power computation skills and advanced numerical methods capabilities in applications to problems in the context of complex systems..
- \* TG7: To acquire skills making possible the dialogue and cooperation with researchers with different backgrounds, including social scientists..

### Basic

- \* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: [http://estudis.uib.cat/master/comp\\_basiques/](http://estudis.uib.cat/master/comp_basiques/)

## Content

### Theme content

1. Physics and Social Sciences. Social Consensus
2. Consensus by imitation: Voter Model
3. Language competition dynamics
4. Axelrod model for dissemination of culture
5. Schelling's segregation model
6. Threshold's models: Bounded confidence and Granovetter model
7. Game Theory. Cooperation
8. Minority game. El Farol problem
9. Diffusion and contagion processes
10. Sociotechnical systems. Big Data

## Teaching methodology

### In-class work activities

Modality	Name	Typ. Grp.	Description	Hours
Theory classes	Lectures	Large group (G)	Students will be exposed to the basic concepts and methodologies in the description and modelling of collective social phenomena.	15
Assessment	Oral presentation	Large group (G)	Oral presentations of numerical simulations and a specific follow-up of subjects explained in the lectures	3.75

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Campus Extens platform.

## Distance education work activities

Modality	Name	Description	Hours
Group or individual assignments self-study		Numerical simulations of results described and explained in the lectures.	20
Group or individual self-study	Preparation of oral presentation	The student will learn about a specific follow-up subject of the theoretical lectures	36.25

## Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

## Student learning assessment

### Lectures

Modality	Theory classes
Technique	Other methods ( <b>non-retrievable</b> )
Description	Students will be exposed to the basic concepts and methodologies in the description and modelling of collective social phenomena.
Assessment criteria	Participation and questions during the lectures

Final grade percentage: 15%

### Oral presentation

Modality	Assessment
Technique	Oral tests ( <b>non-retrievable</b> )
Description	Oral presentations of numerical simulations and a specific follow-up of subjects explained in the lectures
Assessment criteria	Quality of contents
	Presentation
	Answer to questions

Final grade percentage: 40%

### assignments

Modality	Group or individual self-study
Technique	Oral tests ( <b>non-retrievable</b> )
Description	Numerical simulations of results described and explained in the lectures.
Assessment criteria	Quality of contents
	Presentation



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Answer to questions

Final grade percentage: 35%

### Preparation of oral presentation

Modality	Group or individual self-study
Technique	Oral tests ( <b>retrievable</b> )
Description	The student will learn about a specific follow-up subject of the theoretical lectures
Assessment criteria	Initiative and search for material in the subject

Final grade percentage: 10%

### Resources, bibliography and additional documentation

#### Basic bibliography

- C. Castellano, S. Fortunato, V. Loretto, *Statistical Physics of social dynamics*, Rev. Mod. Phys. 81, 509 (2009)
- P. Sen and B. Chakrabarti, *Sociophysics*, Oxford Univ. Press 2014
- Journal of Statistical Physics **151**, 1-783 (2013): *Statistical Mechanics and Social Sciences*
- R. Axelrod, *The complexity of cooperation: Agent based models of competition and collaboration*, Princeton Univ. Press (1997)
- N. Boccara, *Modeling Complex Systems*, Springer-Verlag 2nd ed. 2010. Ch. 6.8, 6.9
- P. Ball:  
*Critical Mass: How one thing leads to the other* (2004)  
*The physical modelling of human social systems*, Complexus **1**, 190-206 (2003)  
*Why society is a complex matter*, Springer (2012)

#### Complementary bibliography

[http://ifisc.uib-csic.es/research/research\\_social.php](http://ifisc.uib-csic.es/research/research_social.php)  
Interactive computer simulations in [http://ifisc.uib-csic.es/research/research\\_complex.php](http://ifisc.uib-csic.es/research/research_complex.php)

