Universitat de les Illes Balears

Teaching guide

Academic year	2012-13
Subject	11008 - Non equilibrium collective phenomena
Group	Group 1, 2S
Teaching guide	A
Language	English

Subject identification

Subject	11008 - Non equilibrium collective phenomena
Credits	0.75 in-class (18.75 hours) 2.25 distance (56.25 hours) 3 totals (75 hours).
Group	Group 1, 2S
Teaching period	2nd semester
Teaching language	English

Lecturers

Lecturers	Timetable for student attention					
	Starting time	Finishing time	Day	Start date	Finish date	Office
Cristóbal López Sánchez	There are no defined sessions					

Degrees where the subject is taught

Degree	Character	Academic year	Studies
Master's Degree in Physics of Complex Systems	Optional		Postgraduate degree

Contextualisation

This is one of the courses of the Specific Module of the master of Physics of Complex Systems.

Requirements

Recommendable

The concepts and methods needed have been previously acquired in the courses of the Structural Module of the master, in particular in *Cooperative and Critical Phenomena: applications*.

Skills

Specific

1. E4: To understand the critical and cooperative phenomena from the perspective of cross-disciplinary physics and complex systems..

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2. E5: To understand the meaning of concepts like scaling laws, and to apply the techniques of the renormalization group..
3. E7: To know the main concepts of non equilibrium statistical physics, including reticular models and growth..

Generic

1. TG2: To acquire the capability to develop a research plan covering from the bibliographic research and strategy to the conclusions..
2. TG3: To be able to write in a clear and precise way the different steps of the research work and to present the results to an expert audience..
3. TG6: To develop the capability to understand and to apply knowledge of high perfomance computation and advanced numerical methods to the field of complex systems..

Content

Theme content

Chapter 1.. Introduction: stochastic many particle systems.

Chapter 2.. Absorbing phase transitions.

Chapter 3.. Noise-induced transitions.

Chapter 4.. Dynamic renormalization group.

Teaching methodology

In-class work activities

Modality	Name	Typ.Gr.	Description
Theory classes	Lectures	Large group (G)	Explanation of theoretical concepts by the professor.
Assessment	Oral presentation	Large group (G)	Oral presentation to the whole class of an assigned problem.

Distance education work activities

Modality	Name	Description
Individual self-study	Autonomous work	The students have to apply the concepts and techniques learned during the lectures to solve assigned exercises, and present the solutions in written form.

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Riscs especifics i mesures de protecció

Les activitats d'aprenentatge d'aquesta assignatura no comporten riscs específics per a la seguretat i salut de l'alumnat i, per tant, no cal adoptar mesures de protecció especials.

Workload estimate

Modality	Name	Hours	ECTS	%
In-class work activities		**18.75**	**0.75**	**25**
Theory classes	Lectures	17.75	0.71	23.67
Assessment	Oral presentation	1	0.04	1.33
Distance education work activities		**56.25**	**2.25**	**75**
Individual self-study	Autonomous work	56.25	2.25	75
	Total	**75**	**3**	**100**

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.

Student learning assessment

Oral presentation

Modality	Assessment
Technique	Objective tests **(Non-recoverable)**
Description	Oral presentation to the whole class of an assigned problem.
Assessment criteria	Quality and accuracy of the presented work, as well as the clarity in the oral exposition.

Percentage of final qualification: 50% following path A

Autonomous work

Modality	Individual self-study
Technique	Papers and projects **(Non-recoverable)**
Description	The students have to apply the concepts and techniques learned during the lectures to solve assigned exercises, and present the solutions in written form.
Assessment criteria	Quality and accuracy of the presented work.

Date of publication: 18/07/2012

Percentage of final qualification: 50% following path A

Resources, bibliography and additional documentation

Basic bibliography

1. Marro and Dickmann, *Non-Equilibrium Phase transitions in Lattice Models*, Cambridge University Press, 1999.
2. W. Horsthemke and R. Lefever, *Noise induced transitions: Theory and Applications in Physics, Chemistry, and Biology,* Springer, 2007.
3. A. L. Barabasi and E. Stanley, *Fractal Concepts in Surface growth*, Cambridge University Press, 1995.
4. M. Kardar, *Statistical Physics of Fields*, Cambridge University Press, 2007.
5. G. Odor, *Universality in Nonequilibrium Lattice Systems: Theoretical Foundations*, Wordl Scientific, 2008.
6. M. Henkel, H. Hinrichsen, S. Lubeck, *Nonequilibrium Phase Transitions*, Springer, 2009.

Complementary bibliography

Other resources

The lecture notes, presentations and other additional material will be available at the master's webpage.

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