

27022 - Mathematical Modelling

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	453 - Degree in Mathematics
ECTS	6.0
Course	4
Period	Half-yearly
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

Techniques and illustrative examples on Mathematical Modeling are provided. The student should be able to apply mathematics to other fields and to analyze and interpret mathematical models. Magistral classes, problems classes and practical sessions will be provided.

5.2. Learning activities

Magistral theoretical classes, with the development of practical cases.

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Problems class that help students to solve problems.

There will be several practical sessions using the computer to illustrate mathematical models.

5.3.Program

1. Mathematical Modeling: phases, types of models and techniques
2. Finite difference equations and discrete dynamic systems.
3. Positive matrices, Perron-Frobenius Theorem and applications to Economy and to Markov and Leslie processes.
4. Graph techniques, equilibrium models and applications to hydrocarbons.
5. Geometric Modeling and representation and fitting techniques for the models construction.
6. Evolution continuous models and applications to populations growth.

5.4.Planning and scheduling

Theoretical classes: 2 hours per week

Problems: 1 hour per week

Practical sessions: 1 hour per week

Tutorized groups: at least one session

5.5.Bibliography and recommended resources

- Adam, John A.: Mathematics in nature : Modeling Patterns in the natural world / John A. Adam . Princeton [etc.] : Princeton University Press, cop. 2003
- Gershenfeld, Neil A.: The nature of mathematical modeling / Neil Gershenfeld . - 1st ed., reprinted with corrections Cambridge : Cambridge University Press, 2003
- Mooney, Douglas D.: A course in mathematical modeling / Douglas D. Mooney and Randall J. Swift [Washington] : The mathematical Association of America, cop. 1999
- Ruth, M. and Hannon, B.: Modeling Dynamic Economic Systems, Springer, New York, 2012.
- Yang, X.-S.: Mathematical Modeling with Multidisciplinary Applications, John Wiley and Sons, Chichester, 2013.