

27031 - Dynamical Systems

Syllabus Information

Academic year: 2024/25

Subject: 27031 - Dynamical Systems

Faculty / School: 100 - Facultad de Ciencias

Degree: 453 - Degree in Mathematics
647 - Degree in Mathematics

ECTS: 6.0

Year: 4

Semester: First semester

Subject type: Optional

Module:

1. General information

The purpose of this course is for the student to acquire the necessary knowledge to qualitatively study the systems that evolve with respect to a *time* variable and that present different parameters. Discrete and continuous dynamical systems will be studied, and the basic tools for their analysis, both theoretical and numerical, will be given.

2. Learning results

- Recognize a dynamical system both in discrete and continuous time.
- Extract information about the qualitative behavior of a dynamical system.
- Analyze the stability of equilibrium points and periodic orbits of a dynamical system.
- Identify and classify bifurcations.
- Determine when the behavior of a dynamical system is chaotic.
- Model dynamical systems that come from physics, biology or engineering.

3. Syllabus

1. Dynamical systems.
2. Linear dynamical systems.
3. Equilibrium points.
4. Periodic orbits.
5. Bifurcations.
6. Chaotic systems.
7. Applications.

4. Academic activities

Master classes: 30 hours.

Problem solving: 15 hours.

Computer classes: 15 hours.

Study: 87 hours.

Assessment tests: 3 hours.

5. Assessment system

- Delivery of exercises (theoretical-practical) resolved on the scheduled dates and/or writing and oral presentation of a paper (20%).
- Carrying out exercises in class on the blackboard (20%).
- Delivery of reports with the results obtained in the practical sessions with the computer, suitably written (60%).

If the number of students were very high, the evaluation would consist of a test that would account for 50% of the mark and the previous activities the remaining 50%. All this without prejudice to the right that, according to current regulations, assists the student to present himself and, where appropriate, pass the subject by taking an overall test.

6. Sustainable Development Goals

4 - Quality Education

5 - Gender Equality

8 - Decent Work and Economic Growth