Universidad Zaragoza

Year : 2019/20

27031 - Dynamical Systems

Syllabus Information

Academic Year: 2019/20
Subject: 27031 - Dynamical Systems
Faculty / School: 100 -

Degree: 453 - Degree in Mathematics

ECTS: 6.0
Year: 4
Semester: First semester
Subject Type: Optional
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures and problem-solving sessions.

4.2.Learning tasks

This course is organized as follows:

- **Lectures**.
- **Problem-solving sessions**. Problem-solving and case studies. The computer will be used to perform the calculations necessary to apply the theory. The student must study assiduously the results explained and solve the proposed problems. Autonomous and group work. Oral presentation of the results.

4.3.Syllabus

This course will address the following topics:

- **Topic 1**. Dynamical Systems.

- **Topic 2**. Linear Dynamical Systems.
- **Topic 3**. Equilibrium points.
- **Topic 4**. Periodic orbits.
- **Topic 5**. Bifurcations
- **Topic 6**. Chaotic systems.
- **Topic 7**. Applications.

4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

4.5.Bibliography and recommended resources

- Verhulst, Ferdinand. Nonlinear Differential Equations and Dynamical Systems: Springer, 1996.
- Perko, Lawrence. Differential equations and dynamical systems- 3rd ed. New York: Springer, 2001
- Strogatz, Steven H.. Nonlinear dynamics and chaos : with applications to physics, biology, chemistry, and engineering: Perseus Books, 2000
- Meiss, James D.. Differential dynamical systems: Society for Industrial and Applied Mathematics, cop. 2007
- Hirsch, Morris W.. Differential equations, dynamical systems, and an introduction to chaos- 2nd. ed. Amsterdam: Elsevier Academic Press, 2004.
- Wiggins, Stephen. Introduction to applied nonlinear dynamical systems and chaos- 2nd ed. New York: Springer, 2010

http://biblos.unizar.es/br/br_citas.php?codigo=27031&year=2019