

27020 - Partial Differential Equations

Syllabus Information

Academic year: 2023/24

Subject: 27020 - Partial Differential Equations

Faculty / School: 100 - Facultad de Ciencias

Degree: 453 - Degree in Mathematics

ECTS: 6.0

Year: 3

Semester: Second semester

Subject type: Compulsory

Module:

1. General information

The aim of this subject is to introduce partial differential equations to the students through typical examples of mathematical physics. They will study the method of characteristics for solving first order semilinear equations, as well as the method of separation of variables for solving second order linear partial differential equations. Finally, variational problems will be studied.

The approaches and objectives of this module are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda; the learning activities could contribute to some extent to the achievement of the goals 4 (quality education), 5 (gender equality), 8 (decent work and economic growth), and 10 (reducing inequality).

2. Learning results

- Apply the main methods for the solution of partial differential equations, in particular for solving classical physics equations.
- Reformulate some real problems in terms of partial differential equations.

3. Syllabus

1. Introduction to partial differential equations.
2. First order partial differential equations.
3. Sturm-Liouville problems and the method of separation of variables.
4. Hyperbolic equations.
5. Parabolic equations.
6. Elliptic equations.
7. Variational formulation.

4. Academic activities

Master classes: 45 hours.

Problem solving: 15 hours.

Project: 27 hours.

Study: 60 hours.

Assessment tests: 3 hours.

5. Assessment system

20% of the grade will be obtained through evaluation throughout the course. The student will have to solve exercises, questions and problems related to the subject during the duration of the course. Some of these activities will be evaluated by oral presentations. This percentage of the grade will be saved for the second call.

The remaining 80% of the grade will be obtained by a written exam which will take place during the official dates established by the Faculty. This part will be saved for the second call.

Without prejudice to the right that, according to current regulations, assists the student to pass the subject by taking a global exam.