

Academic Year/course: 2022/23

## 27020 - Partial Differential Equations

### Syllabus Information

**Academic Year:** 2022/23

**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

### 1.1. Aims of the course

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), in such a way that the acquisition of the learning outcomes of the module provides training and competence to contribute to some extent to their achievement: (4) Quality education, (5) Gender equality, (8) Decent work and economic growth, (9) Industry, innovation and infrastructure, (10) Reducing inequality, (17) Partnerships for the goals.

## 2. Learning goals

## 3. Assessment (1st and 2nd call)

## 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, problem-solving sessions and tutorials.

### 4.2. Learning tasks

This course is organized as follows:

- **Lectures.**
- **Problem-solving sessions.** Small groups sessions in which concepts are trained.
- **Tutorials / autonomous work and study.** Individual study, complemented with tutorials are fundamental in the learning process.

The teaching activities and assessment tasks will take place in a face-to-face mode, except in the case that, due to the health situation, the dispositions emitted by the competent authorities and by the University of Zaragoza compel to take them to a greater or lesser extent in a telematic form.

### 4.3. Syllabus

- **Topic 1.** Introduction to partial differential equations.
- **Topic 2.** First order partial differential equations.

- **Topic 3.** Sturm-Liouville problems and the method of separation of variables.
- **Topic 4.** Hyperbolic equations.
- **Topic 5.** Parabolic equations.
- **Topic 6.** Elliptic equations.
- **Topic 7.** Variational formulation.

#### 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

- Asmar, N.H.. Partial Differential Equations. Pearson International Edition
- Evans, Gwynne. Analytic methods for partial differential equations / G. Evans, J. Blackledge and P. Yardley . - 2nd. printing
- Strauss, Walter A.. Partial differential equations : an introduction / Walter A. Strauss New York [etc] : John Wiley and Sons, cop.1992
- Logan, J. David. Applied Partial differential equations / J. David Logan . - 2nd ed. New York [etc.] : Springer, cop. 2004
- Tikhonov, Andrei Nikolaevich. Equations of mathematical physics / by A.N. Tikhonov and A.A. Samarskii ; translated by A.R.M. Robson and P. Basu ; translation edited by D.M. Brink New York : Dover Publications, 1990

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=27020>