

## 27015 - Numerical Analysis II

### Syllabus Information

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**Academic year:** 2023/24

**Subject:** 27015 - Numerical Analysis II

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 453 - Degree in Mathematics

**ECTS:** 9.0

**Year:** 3

**Semester:** Annual

**Subject type:** Compulsory

**Module:**

### 1. General information

The main goal of this mandatory course is to familiarize the student with the most common methods and techniques to manipulate functions in numerical analysis and provide the necessary tools to develop algorithms in a programming language.

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

At the end of this course students should be able to:

- Know the basic techniques of numerical calculus, its application to problems of linear algebra and the approximation of functions and its translation into algorithms or constructive methods of solving these problems.
- Have criteria to assess and compare different methods based on the problems to be solved, the computational cost and the presence of errors.
- Evaluate the results and obtain conclusions after a calculation process.
- Approximate functions using interpolation techniques and obtain approximate values of derivatives and integrals, estimating the error made with these approximations.

### 3. Syllabus

1. Polynomial interpolation.
2. Spline interpolation.
3. Numerical differentiation.
4. Numerical quadrature.

### 4. Academic activities

Master classes: 60 hours.

Problem solving: 15 hours.

Computer classes: 15 hours.

Project: 40 hours.

Study: 90 hours.

Assessment tests: 5 hours.

### 5. Assessment system

- The final evaluation consists of written exams (80%) and problems/practical sessions and courseworks (20%).
- The courseworks contain the resolution of problems and/or theoretical-practical questions.
- The work in the classroom of the part of the computer practices will be evaluated and an exam of computer practices may be taken.
- The exams will consist of a first partial exam at the end of the first semester and a final exam.

- To pass the course, the theory and problems part and the computer practicals part must be passed independently.

The aforementioned procedure does not exclude the right, according to the current regulations, to a final exam which, by itself, allows to pass the course.