27007 - Numerical Analysis I

Syllabus Information

Academic Year: 2019/20
Subject: 27007 - Numerical Analysis I
Faculty / School: 100 -

Degree: 453 - Degree in Mathematics

ECTS: 9.0
Year: 2
Semester: Annual
Subject Type: Compulsory
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)

The evaluation consists on:

1. Active participation in magistral and problems sessions (10%).
2. A written test in January-February and a written test in June (90%).
3. Active participation in practical sessions (required to pass the course, but with no influence in the final calification).

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, tutorials and autonomous work and study.

4.2.Learning tasks

This course is organized as follows:
- **Lectures**. Exposition of the theory and some practical exercises by the teacher.
- **Problem-solving sessions**. Exposition of the solution of exercises and theoretical questions by the students in small groups and discussion about them. Computer problem-solving sessions in small groups. Programming in a

computer language of the algorithms studied in the course.
- **Tutorials**.
- **Autonomous work and study**. Individual study of exercises and theoretical questions by the students.

4.3.Syllabus

This course will address the following topics:

- **Topic 1.** Direct methods for the numerical solution of linear systems.
- **Topic 2.** Iterative methods for the solution of linear systems.
- **Topic 3.** Approximated computation of eigenvalues and eigenvectors.
- **Topic 4**. Numerical methods for the solution of nonlinear systems.

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

- Notes of the course (available at Moodle platform)
- Burden, Richard L.. Análisis numérico / Richard L. Burden, J. Douglas Faires . - 6a ed.,rev. México [etc.] : International Thomson, cop. 1998
- Deuflhard, Peter. Numerical analysis in modern scientific computing : an introduction / Peter Deuflhard, Andreas Hohmann . - 2nd ed. New York : Springer, cop. 2003
- Gander, Walter. Scientific computing : an introduction using Maple and MATLAB / Walter Gander, Martin J. Gander, Felix Kwok . Cham : Springer, 2014
- Gasca, Mariano. Cálculo numérico : resolución de ecuaciones y sistemas / Mariano Gasca Zaragoza : Librería Central, 1987
- Gasca, Mariano. Cálculo numérico : unidad didactica 1 / preparada por Mariano Gasca González. - [6a. ed.] Madrid : Universidad Nacional de Educación a Distancia, 1991
- Quarteroni, Alfio. Méthodes numériques : algorithmes, analyse et applications / Alfio Quarteroni, Riccardo Sacco, Fausto Saleri Milan : Springer, 2007
- Stoer, Joseph. Introduction to numerical analysis / J. Stoer, R. Bulirsch ; translated by R. Bartels, W. Gautschi, and C. Witzgall . 3rd ed. New York [etc] : Springer, 2002
- Watkins, David S.. Fundamentals of matrix computations / David S. Watkins . - 2nd ed. New York [etc.] : John Wiley & Sons, cop. 2002

At the web page of the course in the Anillo Digital Docente de la Universidad (https://moodle2.unizar.es/add/), there is more information and teaching material.

http://biblos.unizar.es/br/br_citas.php?codigo=27007&year=2019