Universidad Zaragoza

Academic Year/course: 2024/25

28721 - Cartography, Geographical Information Systems and Remote Sensing

Syllabus Information

Academic year: 2024/25
Subject: 28721 - Cartography, Geographical Information Systems and Remote Sensing
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 423 - Bachelor's Degree in Civil Engineering
ECTS: 6.0
Year: 3
Semester: First semester
Subject type: Compulsory
Module:

1. General information

The objective of this subject is that the student is able, after an analysis of the theoretical principles of cartographic projections, to be able to mapp, to effectively handle essential tools in civil engineering such as G.I.S. and remote sensing.

These two tools are fundamental in the knowledge and management of the terrain in engineering projects.

2. Learning results

- Ability to prepare significant cartographic documents for civil engineering problems, Ability to elaborate and interpret the graphic documentation of a project, referring to the cartography that can be used in it the same.
- Ability to work with the different types of cartographic materials currently used in civil engineering.
- Ability to evaluate the usefulness and quality of cartographic documents.
- Principles, concepts and elements of geographic information modeling for incorporation and management of geographic information in the GIS, describing the analysis functions of this technology in a reasoned manner
- Ability to explain the conceptual aspects of remote sensing as a tool for geographic analysis in relation to planning and land management.

3. Syllabus

Unit 1: Geodesy.

1.1 Concept and definition of Geodesy

1.2 Geometry of the Ellipsoid and the Geoid

1.3 Geodetic Networks

1.4 Reference and Coordinate Systems. Datum and fundamental point

Unit 2: Cartographic Projections

2.1 Mathematical concept of projection

2.2 Classification of projections

2.3 Most commonly used projections

2.4 UTM projection

Unit 3: Geographic Information Systems

3.1 Concept of G.I.S. Computer applications

3.2 Mapping resources

3.3 Data types in G.I.S. and computer file formats.

3.4 Vector and Raster Analysis Tools.

Unit 4: Remote sensing.

4.1 Concept and classification of remote sensing

4.2 Nature of electromagnetic radiation

4.3 Characteristics of satellites and sensors.

4.4 Raster analysis tools applied to remote sensing.

4. Academic activities

Lectures: 24 hours
Practical classes: 20 hours
Evaluation Tests: 6 hours.
Preparation of individual work: 90 hours

5. Assessment system

The subject will be assessment through two possible modalities to be chosen by the student by means of the following activities.
In both modalities it will be necessary to obtain a 5 to pass the subject.

Modality 1. Continuous Assessment.

Theoretical exams (50% of the grade).
Partial exam 1 - (25% of the grade). Topics 1 and 2.
Partial exam 2 - (25% of the grade). Topics 3, and 4.
Practice (50% of the grade)
Practice Report - (20% of the grade)
QGIS Final Project Report - (25% of the grade).
Practical Reports of talks and technical visits (5% of the grade).

This modality implies MANDATORY attendance to all practices.
Maximum of two DULY EXCUSED absences
Theory and practical parts are independent, if one of them is passed it is kept during the term.
A minimum of 3 must be obtained in each of the two parts, as well as in each of the two exams.

Modality 2. Non-Continuous Assessment.

Final theoretical exam (50% of the grade). Topics 1, 2, 3 and 4.
QGIS practical final exam (50% of the grade).

Theory and practical parts are independent, if one of them is passed it is kept during the term.
A minimum of 3 must be obtained in each of the two parts.

6. Sustainable Development Goals

5 - Gender Equality
6 - Clean Water and Sanitation
7 - Affordable and Clean Energy