Universidad Zaragoza

Year : 2019/20

28721 - Cartography, Geographical Information Systems and Remote Sensing

Syllabus Information

Academic Year: 2019/20
Subject: 28721 - Cartography, Geographical Information Systems and Remote Sensing
Faculty / School: 175 -

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0
Year: 3
Semester: First semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

The subject and its expected results respond to the following approaches and objectives:

Cartography, S.I.G. and Remote Sensing are basic tools that allow us to know and manage the terrain on which civil engineering projects are executed. They are indispensable instruments to be able to design and execute the activities that the engineer must undertake in relation to the terrain

1.2.Context and importance of this course in the degree

The degree of Civil Engineering works on the territory. That is why you need an instrumental subject that allows you to take data from that territory, as well as graphically represent them for proper use. With the subject of Topography, taken in the previous course, and the geographic information technologies (TIG) that are integrated in this subject, it is intended to know all the territorial variables that allow us to generate models on which to work on projects of Engineering.

The course aims to complement the Topography, which takes place in the third semester, thus being able to integrate in the cartography the topographic information, the geotechnical characteristics and any other variables related to the terrain that we need to geo-reference.

1.3.Recommendations to take this course

To take this subject with use, it is recommended to have previous knowledge of:

- Methods and systems of representation of the environment.
- Concept and management of projection systems.
- CAD application.
- Topography.

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)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process that has been designed for this subject is based on the following:

The subject consists of 6 ECTS credits, which represents 150 hours of student work in the subject during the semester. 40% of this work (60 h.) Will be face-to-face activities, supervised by the teachers of the subject, and the rest will be autonomous. One semester will consist of 15 academic weeks, so that 4 hours / week of face-to-face classes (theory, practical exercises and field practices) are programmed for each group.

To make the temporary distribution, the teaching week is used as a measure, in which the student must dedicate 10 hours to the study of the subject.

A summary of the orientative time distribution of a teaching week can be seen in the following table. These values ??are obtained from the tab of the subject of the Verification Report of the degree.

Degree of Experimentality: High

- Theoretical classes : 2 hours
- Practical classes : 2 hours
- Autonomous activities : 6 hours

4.2.Learning tasks

The teaching methodology is based on a strong teacher / student interaction. This interaction is materialized through a distribution of work / responsibilities between students and teachers.

1.- Face-to-face activities:

Theoretical classes: The theoretical concepts of the subject will be explained and problems and practical examples will be developed.

Practical exercises: Students will develop examples and perform practical cases in the classroom referring to the theoretical concepts studied.

Field practices: The students, organized in working groups, will make data collection with the teams in the field, processing the data with the software and later writing the report and / or transposing the results to the field.

Autonomous supervised activities: These activities will be supervised by the teachers of the subject through individual or group physical tutorials and open forums on the Moodle platform.

Reinforcement activities: Through a virtual teaching portal (Moodle) various activities will be directed to reinforce the basic contents of the subject, as well as the disposition of the corresponding forum of the subject moderated by the teacher. These activities will be personalized and their realization will be controlled through it.

2.- Organization of teaching:

Expositive classes: Theoretical activities and / or practices taught in a fundamentally expository manner by the teacher.

Classroom practices and seminars: theoretical discussion activities or preferably practices carried out in the classroom and which require high student participation.

Field practices and computer classroom: Practical activities carried out in the field and in the computer classroom directed by the practical teacher.

Group tutorials: Programmed learning follow-up activities in which the teacher meets with a group of students to guide their autonomous learning tasks and guardianship of work directed or requiring a very high degree of advice from the teacher.

Individual tutorials: they can be face-to-face or virtual through the Moodle platform.

4.3.Syllabus

In the following table, the contents to be taught are shown. These correspond to the topics presented in the content of the subject.

Week	Content
1	Topic 1: Cartography: Basic notions
2	Topic 1: Cartography: Applications
	Practice 1: management of cartographic resources in IDEs
3	Topic 2: Maps and coordinate systems: General concepts and scales.
	Practice 2: handling of physical maps

4	Topic 2: Maps and coordinate systems
	Practice 3: Work on cartographic information
5	Topic 2: Maps and coordinate systems
	Practice 4: GIS, options and environments
6	Topic 3: S.I.G. : Basic principles
	Practice 5: SIG I
7	Topic 3: S.I.G. : Characteristics, components and functionality
	Practice 6: SIG II
8	Evaluation of topics 1 and 2
	Practice 7: SIG III
9	Topic 3: S.I.G. : Structure and analysis of information
	Practice 8: SIG IV
10	Topic 3: S.I.G.
	Practice 9: SIG
11	Topic 4: Remote sensing: Basic principles.
	Practice 10: SIG VI
12	Topic 5: Remote sensing: Interpretation of images.
	Practice 11: Aerial photogrammetry
13	Topic 5: Remote Sensing: Georeferencing
	Practice 12: SIG VII
14	Practice 13: Integrated mapping work with GIS.
15	Individual tests for practical evaluation.

Theoretical Theory

Topic 1 : Mapping

1.1. The Cartography Types of maps

1.2. Centers of cartographic production.

1.3. Digital cartography

Topic 2 : Maps: Coordinates.

2.1. Cartographic projection systems. The U.T.M.

2.2. Conventional representation and Digital modeling.

Topic 3 : S.I.G

3.1. Basic concepts of a Geographic Information System

3.2. Characteristics of a GIS, components, functionality. Metadata Vector and raster models.

3.3. Applicable criteria in the design of the components of a GIS.

3.4. Structuring the information.

3.5. Analysis of information, spatial analysis procedures.

3.6. Disclosure of information.

Topic 4 : Basic principles of remote sensing.

4.1. Remote sensing concept. Physical principles Systems and resolutions. Types of platforms.

4.2. Interpretation of images. Visual and digital analysis.

4.3. Geometric correction of images. Georeferencing

4.4.Course planning and calendar

Calendar of face-to-face sessions and presentation of works

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3	Topic 2: Maps and coordinate systems: General concepts and scales.
	Practice 2: handling of physical maps
4	Topic 2: Maps and coordinate systems
	Practice 3: Work on cartographic information
5	Topic 2: Maps and coordinate systems
	Practice 4: GIS, options and environments
6	Topic 3: S.I.G. : Basic principles
	Practice 5: SIG I
7	Topic 3: S.I.G. : Characteristics, components and functionality
	Practice 6: SIG II
8	Evaluation of topics 1 and 2
	Practice 7: SIG III
9	Topic 3: S.I.G. : Structure and analysis of information
	Practice 8: SIG IV
10	Topic 3: S.I.G.
	Practice 9: SIG V
11	Topic 4: Remote sensing: Basic principles.
	Practice 10: SIG VI
12	Topic 5: Remote sensing: Interpretation of images.
	Practice 11: Aerial photogrammetry
13	Topic 5: Remote Sensing: Georeferencing

Practice 12: SIG VI

14 Practice 13: Integrated mapping work with GIS.

15 Individual tests for practical evaluation.

The teaching methodology is based on a strong teacher / student interaction. This interaction is materialized through a distribution of work / responsibilities between students and teachers.

1.- Class activities:

Theoretical classes: The theoretical concepts of the subject will be explained and problems and practical examples will be developed.

Practical exercises: Students will develop examples and perform practical cases in the classroom referring to the theoretical concepts studied.

Practices: The students, organized in working groups, will make data collection of the public bases available, processing the data with the software and later writing the report and, in some cases, checking the results in the field.

2.- Autonomous activities: These activities will be supervised by the teachers of the subject through individual or group physical tutorials and open forums on the Moodle platform.

3.- Reinforcement activities: Through a virtual teaching portal (Moodle) you can organize various activities that reinforce the basic contents of the subject, as well as the disposition of the corresponding forum of the subject moderated by the teacher. These activities will be personalized and their realization will be controlled through it.

The weekly schedule of the subject will be published, preferably before enrollment, and in any case before the start of the course, on the center's website and on the Moodle platform.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28721&year=2019