Universidad Zaragoza

Academic Year/course: 2022/23

28716 - Topography

Syllabus Information

Academic Year: 2022/23
Subject: 28716 - Topography
Faculty / School: 175 - Escuela Universitaria Politécnica de La Almunia
Degree: 423 - Bachelor's Degree in Civil Engineering
ECTS: 6.0
Year: 2
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:
- The topography allows us to know and manage the land on which the civil engineering projects are executed. It is an essential tool to be able to design and manage the activities that the civil engineer must undertake in relation to the terrain.
- This subject must ensure that the student is able to know:
- The forms of representation of our planet.
- How to obtain the necessary information to manage a territory.
- What methodology and equipment can we use to acquire this information.
- How to process and manage the terrain data to elaborate civil engineering projects.
- How to rethink such projects on the ground.
- These approaches and objectives are in line 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 course learning outcomes provides training and competence to contribute to their achievement to some degree: Objective 4: Quality education; Objective 5: Gender equality.

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 their proper use, or for their use through spreadsheets and databases. It must also achieve the skills of the definition and design of the works that the engineer designs on the territory and rethink them, at the same time as managing the territory.

The Topography signature takes place in the third semester, after having acquired the competences provided by subjects from the area of knowledge of graphic expression and other basic subjects.

Likewise, the Topography must be considered as an essential tool for the acquisition of a significant number of competences that the Civil Engineering student must acquire through other subjects of this degree, which the student must take in the following semesters. We must consider that this subject will provide the student with the necessary skills to represent our planet, obtain information from the territory using the most appropriate methodologies and equipment to be able to process this information in the elaboration of projects and their subsequent execution, by means of a correct rethinking.

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 environment representation, bounded systems and level curves.
Trigonometry.
Concept and management of scales.
CAD application.

2. Learning goals

2.1. Competences

Upon passing the subject, the student will be more competent to ...

Organizational and planning capacity (G01).

Ability to solve problems (G01).

Ability to make decisions (G03).

Aptitude for oral and written communication in the native language (G04).

Analysis and synthesis capacity (G05).

Information management capacity (G06).

Ability to work in a team (G07).

Ability for critical reasoning (G08).

Ability to work in an interdisciplinary team (G09)

Ability to work in an international context (G10)

Improvisation and adaptation capacity to face new situations (G11).

Leadership skills (G12)

Positive social attitude towards social and technological innovations (G13).

Ability to reason, discuss and present ideas (G14).

Ability to communicate through words and images (G15).

Ability to search, analyze and select information (G16).

Ability for autonomous learning (G17).

Know and understand respect for fundamental rights, equal opportunities between women and men, universal accessibility for people with disabilities, and respect for the values ??of the culture of peace and democratic values ??(G23).

Promote entrepreneurship (G24).

Knowledge of information and communication technologies (G25).

That the students have demonstrated to possess and understand knowledge in an area of ??study that begins at the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge from the forefront of their field of study (CB1).

That the students know how to apply their knowledge to their work or vocation in a professional way and possess the competences that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of ??study (CB2)

That students have the ability to collect and interpret relevant data (usually within their area of ??study) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature (CB3)

That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized audience (CB4)

That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy (CB5)

Knowledge of the essential topographic techniques to obtain measurements, form plans, establish layouts, take defined geometries to the ground or control movements of structures or earthworks (C01).

2.2. Learning goals

The student, to pass this subject, must demonstrate the following results ...
Knowledge and analysis capacity for the application of topographic methods.
Ability to prepare and interpret the graphic documentation of a project, referring to the topography of the terrain.
Ability to work with the different types of surveying instruments currently used in civil engineering.
Aptitude to carry out the graphical survey of the land, as well as for the rethinking on it of civil works projects.
Ability to control the work units that define the execution of a civil work.
Knowledge of the use of some specific computer-aided topography program.

2.3. Importance of learning goals

GITs are not simple computational tools, nor are they reduced to skills in the management of computing resources, since they require a solid training in "spatial thinking". This requires a critical understanding of the theoretical and conceptual foundations. In this course the foundations are laid for the modeling of geographic information and the acquisition of basic

skills in the management of computer resources, for the correct interpretation of satellite images and for the application of cartographic principles. Together, these capacities allow evaluating and offering solutions to land-use planning problems. The learning achieved in the subject responds to the instrumental training of the graduate who works in the various facets of Civil Engineering

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities
At the beginning of the course the student will choose one of the following two assessment methodologies:
? Continuous Assessment System: characterized by the obligation to take and pass practical tests, partial exams and academic work proposed in the subject, within the deadlines established for this purpose. To opt for the Continuous Assessment system, you must attend at least 80% of the face-to-face activities (practices, technical visits, classes, etc.).
? Non-continuous evaluation system: The student must compulsorily take a global test, being able to voluntarily carry out individual academic assignments in the continuous evaluation methodology.
The deadline and mode of delivery of practical tests and academic work will be indicated in the planning of the subject.
In the continuous assessment model, the teacher will evaluate the student's participation in the theoretical classes, the demonstration of the knowledge acquired and the ability to solve problems that the teacher will observe in the practical classes.
Likewise, the work / projects carried out by the student will be evaluated.
Lastly, the student must take several written or practical tests ("continuous assessment exams") for each part of the subject.
The following table summarizes the indicative weights of the parts mentioned in the evaluation process.
Oral tests in theory classes 5%
Oral tests in practical classes 5%
Theoretical exams 45%
Practical work 20%
Practical test 25%
All students, who do not exceed the necessary minimum required of the practical tests, exams or academic work proposed in the subject, or voluntarily renounce the model in the course, will automatically go to the non-continuous evaluation model.
However, the student will always be able to present themselves to improve their grade by taking the global test, with the final grade being the one that is the highest obtained, be it from the elimination tests carried out during the course or from the global test.
Non-continuous evaluation system.
The student must opt for this modality when, due to their personal situation, they cannot adapt to the pace of work required in the continuous evaluation mode, they voluntarily choose this evaluation mode or are excluded from the continuous evaluation mode.
The student may choose one of the two non-continuous assessment models, the general characteristics of which are:
? Absolutely non-continuous evaluation, in which the evaluation consists of a global test of theory and practice of the contents of the subject, on the dates set by the center, for each of the two official calls.
? quasi-continuous evaluation in which the student will carry out the individual works proposed in the continuous evaluation, in addition to taking the global theory and practice test, on the dates set by the center, for each of the two official calls.
Throughout the course, the evaluation system may be varied, depending on the evolution of your personal situation.
The following table summarizes the maximum indicative weights of the parts mentioned in the evaluation process.

Oral tests in class 0%
Jobs 0% (30%)
Continuous assessment exams 0%
Global Test 100% (70%)

Absolutely non-continuous (quasi-continuous) evaluation process weights.

Note: In any case, the evaluation method must comply with what is regulated in the Regulation of Learning Evaluation Standards, approved by Agreement of 22/12/2010 of the Governing Council of the U.Z.
Assessment calendar.
The dates of the continuous assessment partial exams will be published in the Notices forum of the subject's Moodle virtual platform
The dates of global exams and validation will be the official dates published at
https://eupla.unizar.es/asuntos-academicos/examenes

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 theory sessions, practice sessions, and autonomous work and study.

The course consists of 6 ECTS credits, which represent 150 hours of student work in the course
during the semester. 40% of this work (60 h.) Will be on-site activities, supervised by the teachers
of the course, and the rest will be autonomous. One term will consist of 15 academic weeks, so that
4 hours/week of on-site classes (theory, practical exercises and field work) 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 course.

A summary of the orientative time distribution of a teaching week can be seen below. These values

are obtained from the Verification Report of this course.

Degree of Experimentality: High

- Theory sessions. 2 hours
- Practice sessions. 2 hours
- Autonomous activities. 6 hours

The approach, methodology and assessment of this guide are intended to be the same for any teaching scenarios. They will be adapted to the social-health situation at any particular time, as well as to the instructions given by the authorities concerned.

4.2. Learning tasks

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

A.- On-site activities:
1. Theoretical classes: The theoretical concepts of the subject will be explained and problems and practical examples will be developed.
2. Practical exercises: Students will develop examples and carry out practical cases in the classroom referring to the theoretical concepts studied.
3. Field practices: The students, organized in work groups, will carry out data collection with the teams in the field, data processing with the software and subsequent writing of the report and / or transposition of the results in the field.
B.- Autonomous tutored activities:
1. These activities will be tutored by the teachers of the subject through individual or group physical tutorials and open forums on the Moodle platform.
C.- Reinforcement activities:
1. Through a virtual teaching portal (Moodle) various activities will be directed to reinforce the basic contents of the subject, as well as the provision of the corresponding subject forum moderated by the teacher. These activities will be personalized and controlled through the virtual portal system.

ORGANIZATION OF TEACHING
? **Expository classes**: Theoretical and / or practical activities taught fundamentally expositively by the teacher.
? **Classroom practices and seminars:** Activities of theoretical discussion or preferably practical ones carried out in the classroom and that require high student participation.
? **Field practices and computer room:** Practical activities carried out in the field and in the computer room directed by the practical teacher.
? **Group tutorials**: Scheduled learning follow-up activities in which the teacher meets with a group of students to guide their autonomous learning tasks and to supervise directed work or that require a very high degree of advice from the teacher.
? **Individual tutoring:** they can be face-to-face or virtual through the Moodle platform.

4.3. Syllabus

The program offered to the student to help him achieve the expected results includes the following activities:
These activities involve the active participation of the students, in such a way that, in order to achieve the learning results, the following activities will be carried out, without wishing to result in the aforementioned:

- Generic face-to-face activities:

Theoretical classes: The theoretical concepts of the subject will be explained and illustrative practical examples will be developed to support the theory when necessary.
Practical classes: Problems and practical cases will be carried out as a complement to the theoretical concepts studied.
Practices: The students will be divided into several groups of no more than 20 students, being tutored by the teacher.

- Non-contact generic activities:
Study and assimilation of the theory exposed in the master classes.
Understanding and assimilation of problems and practical cases solved in practical classes.
Preparation of seminars, resolution of proposed problems, etc.
Preparation of the practices, preparation of the scripts and corresponding reports.
Preparation of written tests for continuous evaluation and final exams.

- **Autonomous tutored activities:** Although they will rather have a face-to-face character, they have been taken into account apart from their idiosyncrasy, they will be mainly focused on seminars and tutorials under the supervision of the teacher.
- **Reinforcement activities**: Of marked non-presential nature, various activities that reinforce the basic contents of the subject will be conducted through a virtual teaching portal (Moodle). These activities may be personalized or not, controlling their performance through it.
The course consists of 6 ECTS credits, which represents 150 hours of student work in the course during the semester, that is, 10 hours per week for 15 school weeks.
A summary of the indicative time distribution of a teaching week can be seen in the following table. These values are obtained from the file of the subject of the Verification Report of the degree title, bearing in mind that the degree of experimentality considered for said subject is low.

Activity Hours of teaching week
Master classes 2
Practice 2
Other activities 6

However, the previous table may be more detailed, taking into account the following global distribution:
- 26 hours of master class, with 40% of theoretical exposition and 60% of type problem solving.
- 30 hours of practice, in 2-hour sessions.

- 4 hours of written evaluation tests, at the rate of two hours per test.
- 6 Hours of seminars and group tutorials.
- 32 hours of exercises and supervised work, spread over the 15 weeks of the semester.
- 50 hours of personal study, spread over the 15 weeks of the semester.

The following table shows the indicative schedule that shows the development of the activities presented previously, and may vary depending on the development of the teaching activity.

Block Content

1 ?Topic 1: Graphic expression and Topography
?Practice 1: Sketching; Practice 2: Orientation from the national geodesic network
? Executions topic 1

2 ? Topic 2: Notions of geodesy: Coordinates.
? Practice 3: Cartographic resources in IDEs
? Practice 4: Identification of topographic equipment
? Exam topics 1 and 2

3 ? Topic 3: Instruments and measurement elements in surveys and stakeouts.
? Practice 5: Equipment management: Parking
? Practice 6: Equipment management: Establishment of a local reference system
? Practice 7: Equipment management: Lifting with ET

4 ? Unit 4: Topographical methods in surveys and stakeouts.
? Practice 8: Importing data for digital terrain modeling.
? Practice 9: Generation of surfaces with survey data

5 ? Topic 5: Topographical applications in building works with GNSS systems.
? Practice 10: Generation and export of stakeout files from a modified digital model.
? Practice 11: Leveling

6 ? Topic 6: Stakeouts
? Practice 12: Staking with ET
? Practice 13: Stakeouts with Level
? Practice 14: Survey and stakeout with GNSS

7 Practical evaluation tests.

The dates of the continuous assessment partial exams will be published in the Notices forum of the subject's Moodle virtual platform and the global tests will be officially published at:
https://eupla.unizar.es/asuntos-academicos/examenes

4.4. Course planning and calendar

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

The following table shows the indicative schedule that shows the development of the activities presented previously, and may vary depending on the development of the teaching activity.

Week	Content
1	Topic 1: Graphic expression and Topography
	Practice 1: Sketching
2	Topic 1: Graphic expression and Topography
	Practice 2: Orientation from the national geodesic network
3	Executions topic 1
	Practice 3: Cartographic resources in IDEs
4	Topic 2: Notions of geodesy: Coordinates.
	Practice 4: Identification of topographic equipment
5	Topic 2: Notions of geodesy: Coordinates.
	Practice 5: Equipment management: Parking
6	Exam topics 1 and 2
	Practice 6: Equipment management: Establishment of a local reference system
7	Topic 3: Instruments and measurement elements in surveys and stakeouts.
	Practice 7: Equipment management: Lifting with ET
8	Topic 3: Instruments and measurement elements in surveys and stakeouts. problems
	Practice 8: Importing data for digital terrain modeling.
9	Topic 4: Topographical methods in surveys and stakeouts.
	Practice 9: Generation of surfaces with survey data.
10	Topic 4: Topographical methods in surveys and stakeouts. Examples and problems

	Practice 10: Generation and export of stakeout files from a modified digital model.
11	Topic 5: Topographical applications in building works with GNSS systems. Practice 11: Leveling.
12	Topic 5: Topographical applications in building works with GNSS systems. Practice 12: Staking with ET
13	Topic 6: Stakeouts Practice 13: Stakeouts with Level
14	Topic 6: Stakes: problems Practice 14: Survey and stakeout with GNSS
15	practical evaluation tests

The dates of the continuous assessment partial exams will be published in the Notices forum of the subject's Moodle virtual platform and the global tests will be officially published in: https://eupla.unizar.es/asuntos-academicos/examenes
The weekly schedule of the subject will be delivered to the students in the presentation of the subject and will be kept updated in the virtual classroom of the Moodle teaching platform. The dates of the final exams will be those officially published on the EUPLA website

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28716