

## 28716 - Topography

### Syllabus Information

**Academic year:** 2023/24

**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

The main goal of this subject is that the student learns the basic concepts and methodologies of topographic work, both at a theoretical and experimental level, always taking into account the real practical application to surveying and topographic stakeout situations and the use of topographic devices of all types.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the 2030 Agenda of United Nations (<https://www.un.org/sustainabledevelopment/es/>), to the extent that thematic mapping is a tool that allows to visualize the information and spatial distribution of different phenomena that can reflect and analyze the degree of achievement of all SDG targets.

### 2. Learning results

- Knowledge and analytical skills for the application of surveying methods.
- Ability to elaborate 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 graphic survey of the terrain, as well as for the staking out on the same of projects of civil works.
- Ability to control the work units that define the execution of a civil work.

### 3. Syllabus

Unit 1: Graphic expression and Topography

1.1 Main objectives of Topography: Surveying, stakeout and measurements

1.2 Graphical representation

1.3 Units, measurements and errors.

Unit 2: Basic principles of Geodesy.

2.1 Introduction.

2.2 Geometry of the ellipsoid and the geoid.

2.3 Reference systems and coordinates

2.4 Geodetic networks.

2.5 UTM projection

Unit 3: Planimetry and Theodolite (Total Station)

3.1 Angle Measuring Devices → TEODOLITO

3.2 Distance measuring devices → DISTANCE METER

3.3 Radiation

3.4 Polygonation

Unit 4: Altimetry and Level.

4.1 Apparatus for measuring unevenness, the LEVEL.

4.2 Geometric Leveling → Horizontal Visuals → LEVEL  
Simple Leveling Methods (Two Point, One Station)  
Composite Leveling Methods (Two points, more than one station)  
Altimetric itineraries  
4.3 Trigonometric Leveling. → Visual inclined → TACHOMETER

Unit 5: Surveying and Topographic GPS.

5.1 Stakeout Methods  
5.1.1 Polar Coordinate Stakeout  
5.1.2 Stakeout by abscissae and ordinates  
5.1.3 Stakeout by Intersection  
5.2 GNSS system  
5.2.1 GPS System Architecture  
5.2.2 Topographic GPS  
5.3 Measurements applied to building and civil works.

#### **4. Academic activities**

Lectures: 15 days - 30 hours  
Theoretical master classes 12 hours  
Lectures-problems and practicals 14 hours

Field Practices: 11 days - 22 hours  
Practice 1: Sketch - 1 day, 2 hours .  
Practice 2: Parking and readings - Sketches - 1 day, 2 hours.  
Practice 3: Radiation - 1 day, 2 hours.  
Practice 4: Planimetric Itinerary - 2 days, 4 hours.  
Practice 5: Leveling - 1 day, 2 hours.  
Practice 6: Final Practice, topographic survey - 3 days, 6 hours.  
Unfulfilled practice reserve - 2 days, 4 hours

Assessment tests. 6 hours.

Autonomous work 90 hours  
Problems: 30 hours.  
Preparation of practices reports: 30 hours.  
Personal Study: 30 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 assessment modalities it will be necessary to obtain a 5 to pass.  
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, 4 and 5.  
Practice (50% of the grade)  
Practical Report 1, 2, 3, 4 and 5 (20% of the Grade)  
Final Practical Report - (30% 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.

Theoretical final exam (50% of the grade)

Final practical 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