

Course guide 310619 - 310619 - Global Satellite Positioning Systems

Last modified: 04/04/2025

Unit in charge: Teaching unit:	Barcelona School of Buildir 751 - DECA - Department	ng Construction of Civil and Environmental Engineering.
Degree:	BACHELOR'S DEGREE IN G (Compulsory subject).	GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016).
Academic year: 2024	ECTS Credits: 6.0	Languages: Catalan, Spanish

LECTORER			
Coordinating lecturer:	Nuñez Andres, Maria Amparo		
Others:	Nuñez Andres, Maria Amparo Gracia Gomez, Carlos		

PRIOR SKILLS

Knowledge of geometric geodesy, geophysics, adjustment of observations and topographic methods.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. (ENG) Planificació, projecte, direcció, execució i gestió de processos de mesura, sistemes d'informació, explotació d'imatges, posicionament i navegació; modelització, representació i visualització de la informació territorial en, sota i sobre la superfície terrestre.

2. (ENG) Reunir i interpretar informació del terreny i tota aquella relacionada geogràficament i econòmicament amb ell.

3. Knowledge and application of the methods and techniques of the physics ans spacial geodesy; geomagnetism; sismology and seismic engineering; gravimetry.

Transversal:

4. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.

TEACHING METHODOLOGY

Theoretical classes Practical classes Exams Field practices

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the study of this subject, the student should be able to: - Apply the methods and techniques of spatial geodesy.



STUDY LOAD

Туре	Hours	Percentage
Hours large group	24,0	16.00
Hours medium group	36,0	24.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

General structure of a GNSS system

Description: Reference systems System architecture

Full-or-part-time: 6h Theory classes: 3h Self study : 3h

GNSS observations

Description: Observables Errors DGPS

Related activities: Activity 1

Full-or-part-time: 10h Theory classes: 3h Practical classes: 2h Self study : 5h

Phase observations

Description: Phase differential Observation equations Resolution of ambiguities Accuracy of results Combination of observables

Related activities: Acrivity 2

Full-or-part-time: 19h Theory classes: 4h Practical classes: 5h Self study : 10h



Instruments and methods

Description:

Geodetic receivers Geodesic antennas Observation methods

- Static
- Kinematic
- Post-Process
- RTK
- PPP

Related activities: Activity 3

Full-or-part-time: 19h

Theory classes: 4h Practical classes: 5h Self study : 10h

GPS data processing

Description:

Data preparation Vector calculation Analysis of results Network setting

Full-or-part-time: 17h Theory classes: 4h Practical classes: 6h Self study : 7h

GPS system applications

Description: Applications Navigation Sensor integration Geodesy and surveying with GPS

Full-or-part-time: 4h Theory classes: 2h Practical classes: 2h

ACTIVITIES

EXAM 1

Full-or-part-time: 12h Self study: 10h Theory classes: 2h



EXAM 2

Full-or-part-time: 12h Self study: 10h Theory classes: 2h

PRACTICE 1

Description: Planification comprobation through data taking with navigation receivers

Material: Navigation receptor or mobile phone

Delivery: Practice report

Full-or-part-time: 8h Self study: 7h Practical classes: 1h

PRACTICE 2

Description: Field activity. Phase GPS data collection with static method vector calculation network adjustment

Material: Phase GPS Receivers practice script calculation software

Delivery: Practice memory

Full-or-part-time: 15h Self study: 9h Practical classes: 6h

PRACTICE 3

Description: Field activity. Phase GPS data collection with kinematic method

Material: Phase GPS Receivers Practice script Calculation software

Delivery: Practice memory

Full-or-part-time: 16h Self study: 7h Practical classes: 9h



PRACTICE 4

Full-or-part-time: 6h Self study: 4h Practical classes: 2h

GRADING SYSTEM

If the mark in the continuous assessment exams is \geq 4 Continuous assessment exams 70% Practice development and report 25%, with oral assessment Classroom activities 5% The submission of all the practices before the deadline established in Atenea is mandatory.

If mark in Continuous assessment exams is < 4 Continuous assessment exams 85% Practice development and report 15%, with oral assessment Classroom activities 5% The submission of all the practices before the deadline established in Atenea is mandatory.

EXAMINATION RULES.

Only those students who, having taken all the exams and submitted all the practices before the deadline, have a grade higher than 3.5, may attend the re-evaluation.

BIBLIOGRAPHY

Basic:

- Leick, Alfred. GPS satellite surveying. 4th ed. New York: John Wiley & sons, 2015. ISBN 9781118675571.
- Seeber, Günter. Satellite geodesy. 2nd ed. Berlin, New York: Walter de Gruyter, 2003. ISBN 3110175495.