Course guide
310619 - 310619 - Global Satellite Positioning Systems

Last modified: 15/01/2024

Unit in charge: Barcelona School of Building Construction
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering.

Degree: BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Nuñez Andres, Maria Amparo

Others: Nuñez Andres, Maria Amparo

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 INFORMATI0N 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

Type	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

GPS 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

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
Theory classes: 2h
Self study: 10h

EXAM 2

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

PRACTICE 1

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

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
Practical classes: 6h
Self study: 9h

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
Practical classes: 9h
Self study: 7h

PRACTICE 4

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

GRADING SYSTEM

Continuous assessment exams 70%
Practice Report 30%
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.