Course guide
310641 - 310641 - High-Precision Processing of Gnss Data

Last modified: 03/07/2024

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). (Optional subject).

Academic year: 2024 **ECTS Credits:** 4.5 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MARIA AMPARO NUÑEZ ANDRES

Others: MARIA AMPARO NUÑEZ ANDRES
CARLOS GRACIA GOMEZ

PRIOR SKILLS

Knowledge acquired in Satellite System Possitioning course.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Knowledge, use and application of instruments and topographic methods appropiate for the fullfilment of raisings and surveyings.
2. (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.

Generical:
4. Use of teams and instrumental: Capacity to select the necessary ressources to the achievement of the planned goals according to the quality requirements. Use of the teams, in adequated conditions, with professional efficiency and taking into account the limitations of the instruments and its context of use, in relation with the required precissions.

Transversal:
3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.

TEACHING METHODOLOGY

Participatory lecture classes
Internships with specialized software
Field practices

LEARNING OBJECTIVES OF THE SUBJECT

Develop with enough time, a complete GPS topographic project. Complete the knowledge acquired in Space Geodesy

STUDY LOAD

Type	Hours	Percentage
Hours large group	18,0	16.00
Self study	67,5	60.00
Hours medium group	27,0	24.00

Total learning time: 112.5 h

CONTENTS

-Work with permanent stations

Description:
Work with observation files of permanent national and regional networks

Specific objectives:
Download and work with data from observations of autonomic networks and precise ephemeris.

Related activities:
Practice 1

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

-Calculation of vectors

Description:
Calculation of vectors with different observation time, constallations and ephemeris data

Specific objectives:
Calculation of vectors with different conditions.
Analysis of the obtained results.

Related activities:
Practice 2

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

-Work with permanent international networks

Description:
Working with the IGS data

Specific objectives:
Downloading files from permanent international networks
Calculations of vectors at long distances

Related activities:
Practice 3

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

-Calculation and adjustment of a network

Description:
Observation, calculation and adjustment of a network with GPS techniques

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

ACTIVITIES

PRACTICE 1

Specific objectives:
I work with data from permanent stations and precise ephemeris.

Material:
Observation and navigation data.
Specific software

Delivery:
Memory of the practice carried out

Full-or-part-time: 11h
Theory classes: 1h
Practical classes: 4h
Self study: 6h

PRACTICE 2

Description:
I work with different observation time and vector length.

Material:
Observation and navigation data file

Delivery:
Practice memory

Full-or-part-time: 12h
Theory classes: 1h
Practical classes: 4h
Self study: 7h

PRACTICE 3

Description:
Work with permanent stations of the IGS network

Specific objectives:
Working with data from permanent international networks

Material:
Observations and navigation archive

Delivery:
Practice memory

Full-or-part-time: 10h
Theory classes: 1h
Practical classes: 4h
Self study: 5h

PRACTICE 4

Description:
Observation of a network with GNSS techniques.
Calculation of the vectors and fitting of the network with linearly independent vectors

Specific objectives:
Calculate and interpret vector calculation reports and network adjustment.

Delivery:
Practice memory

Full-or-part-time: 18h 30m
Theory classes: 1h
Laboratory classes: 4h 30m
Practical classes: 5h
Self study: 8h

GROUP WORK

Description:
Preparation of a group work on the assigned topic and presentation

Delivery:
Work memory

Full-or-part-time: 27h
Theory classes: 3h
Self study: 24h

EVALUATION

Full-or-part-time: 15h
Theory classes: 2h
Self study: 13h

PRACTICE 5

Description:
Observing a network with the RTK method

Material:
GPS receivers

Delivery:
Practice memory

Full-or-part-time: 11h
Theory classes: 1h
Laboratory classes: 4h 30m
Self study: 3h 30m
Practical classes: 2h

GRADING SYSTEM

Delivery and defense of practices 70%
Class activities 20%
Group work and presentation 10%

EXAMINATION RULES.

All practicals must be completed in order to obtain the average grade. There is no re-evaluation as it is a practical subject.

BIBLIOGRAPHY

Basic:
- Leick, Alfred. GPS satellite surveying [on line]. 4th ed. New York: John Wiley & sons, 2015 [Consultation: 19/05/2020]. Available on: https://onlinelibrary.wiley.com/doi/book/10.1002/9781119018612. ISBN 9781118675571.

Complementary:
- Inside GNSS [on line]. Eugene, OR: Aster Pub. Corp., 2006 - [Consultation: 09/06/2020]. Available on: https://insidegnss.com/all-digital-edition/.- GIM : international for geomatics. Lemmer: GITC,
- Survey review [on line]. Wiltshire: W. M. Barnes, 1931- [Consultation: 11/07/2013]. Available on: http://www.swetswise.com/link/access_db?issn=1752-2706.

RESOURCES

Hyperlink:
- http://igscb.jpl.nasa.gov/.
- www.icc.es.
- http://www.ign.es/ign/main/index.do.