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

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: 2022 ECTS Credits: 4.5 Languages: Catalan, Spanish

LECTURER
Coordinating lecturer: MARIA AMPARO NUÑEZ ANDRES
Others: MARIA AMPARO NUÑEZ ANDRES
Gracia Gomez, Carlos

PRIOR SKILLS
Knowledge acquired in Satellite System Positioning course.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Knowledge, use and application of instruments and topographic methods appropriate for the fulfillment 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 resources to the achievement of the planned goals according to the quality requirements. Use of the teams, in adequate conditions, with professional efficiency and taking into account the limitations of the instruments and its context of use, in relation with the required precisions.

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>18,0</td>
<td>16.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>27,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

**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:**
- Calculation and adjustment of a network

**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

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### 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
- Practical classes: 5h
- Laboratory classes: 4h 30m
- Self study: 8h

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### 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

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### 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
Practical classes: 2h
Laboratory classes: 4h 30m
Self study: 3h 30m

GRADING SYSTEM

Individual tests 30%
Delivery of practices 50%
Group work and presentation 20%

EXAMINATION RULES.

All the practices have to be carried out to obtain the average mark.

BIBLIOGRAPHY

Basic:

Complementary:
- GIM : international for geomatics. Lemmer: GITC,

RESOURCES

Hyperlink:
- www.icc.es.