250306 - GEOTOPEXG - Geomatics, Topography and Graphic Expression

Coordinating unit: 250 - ETSECCPB - Barcelona School of Civil Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2017
Degree: BACHELOR'S DEGREE IN GEOLOGICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: CAROLINA PUIG POLO
Others: FRANCISCO JAVIER MUÑOZ CAPILLA, CAROLINA PUIG POLO

Opening hours
Timetable: Monday to Friday, hours to be arranged by email or ATENEA messages. The timetable with the availability of the teacher assistant will be posted at ATENEA.

Degree competences to which the subject contributes

Specific:
4042. General and detailed topography
4049. Capacity for spatial vision and knowledge of graphic representation techniques based on both traditional metric geometry and descriptive geometry methods, and computer-assisted design applications
4061. Knowledge of topography, photogrammetry and cartography

Transversal:
592. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.
595. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
599. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
602. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.
584. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
Teaching methodology

The course consists of 4 hours a week of classes. In general, 2 hours in the classroom (large group) and 2 hours with half the students (small group).

- 2 hours per week in large group, in which the teacher explains the concepts and basic materials of the subject, presents examples and exercises.

- 2 hours per week (small group) to undertake practical work. Practices are on the field or in the computer room, and are essential to consolidate the general and specific learning objectives.

The calendar of activities and the teaching materials will be delivered through ATENEA (weekly activities, deliverables, etc).

Learning objectives of the subject

Students will develop their capacity for spatial vision and acquire an understanding of traditional graphical representation techniques (line drawing and freehand drawing) and more complex varieties (descriptive geometry). They will also become familiar with computer-assisted design software, fundamental topography techniques and geographic information systems, and learn how these tools can be used to solve basic and applied technological problems.

Upon completion of the course, students will be able to:

1. Produce floor plans and use computer-assisted design software to solve simple problems;
2. Conduct land surveys and interpret aerial photographs;
3. Synthesise different types of topographic information in the context of a geological engineering project, from the results of land surveys to the data from GIS analyses.

Technical drawing; Basic tools of metric and descriptive geometry; Floor plans; Numerical geometry, including specialist software: Application to layout, rendering and 3D modelling; Geodesy, cartography and topography; Representation of maps and plans; Instruments for measuring distance and elevation; Altimetric and planimetric methods for representing topographic information; Aerial photogrammetry, production of maps and orthophoto maps; Satellite positioning systems; Post-processing techniques for cartographic and topographic data, areas, volumes and layout; Geographical information systems and their application in engineering; Basic programming for specific tasks.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Theory classes:</th>
<th>22h</th>
<th>14.67%</th>
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<tbody>
<tr>
<td>Practical classes:</td>
<td>0h</td>
<td>0.00%</td>
<td></td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>38h</td>
<td>25.33%</td>
<td></td>
</tr>
<tr>
<td>Guided activities:</td>
<td>6h</td>
<td>4.00%</td>
<td></td>
</tr>
<tr>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
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</table>
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### Content

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Learning time</th>
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</table>
| **1. Introduction** | Introduction to the course, to Geomatics, to Surveying and Visualization techniques | Theory classes: 2h  
Self study : 2h 48m |
Laboratory classes: 3h  
Self study : 9h 48m |
| **3. Classical Surveying** | How to organize a survey. Surveying instruments (Total Stations, Levels ...). Major surveying methods: geometric leveling; Intersection (triangulation ...); Itineraries (traversing); radiation. | Theory classes: 8h  
Laboratory classes: 13h  
Self study : 29h 24m |
Laboratory classes: 7h  
Self study : 12h 36m |
### 5. Introduction to Earth Observation techniques (Remote Sensing)

**Description:**

**Learning time:** 12h
- Theory classes: 2h
- Laboratory classes: 3h
- Self study: 7h

### 6. Processing and visualization of Geographical Information. Visualization Techniques

**Description:**

**Learning time:** 38h 24m
- Theory classes: 6h
- Laboratory classes: 10h
- Self study: 22h 24m
Qualification system

The final mark (Nfinal) is the average between the exams (Ne) and the continuous assessment mark (Nac)

# exam mark, Ne:

\[ N_{peg} = \text{‘Expressió Gràfica’ exam} \]
\[ N_{pac1} = \text{continuous assessment exam} \#1 \text{ (mid semester)} \]
\[ N_{pac2} = \text{continuous assessment exam} \#2 \text{ (end of semester)} \]

\[ Ne: \text{If } (N_{peg} \geq 4 \text{ and } N_{pac1} \geq 4 \text{ and } N_{pac2} \geq 4) \text{ then} \]
\[ Ne = N_{peg} \times 0.2 + N_{pac1} \times 0.4 + N_{pac1} \times 0.4 \]
\[ \text{Otherwise, } Ne = \text{min}(N_{peg}, N_{pac1}, N_{pac2}) \]

# Continuous assessment mark, Nac:

Nac includes all Continuous assessment activities throughout the year (reports, questionnaires, homeworks, partial submissions along the practical survey work, other exercises, etc.)

# Final mark:

\[ N_f = Ne \times 0.9 + Np \times 0.1 \]
\[ \text{ara bé si } Ne \geq 5 \text{ i } Np \geq 5 \text{ llavors} \]
\[ N_f = \text{max}(Ne, Np) \times 0.9 + \text{min}(Ne, Np) \times 0.1 \]

# Special Assessment:

The week devoted to this, students with low marks are invited to this Special Assessment to increase the Npeg, Npac1 and / or Npac2.
You can also take the exam to improve your mark (this will not decrease your previous mark).

Criteria for re-evaluation qualification and eligibility: Students that failed the ordinary evaluation and have regularly attended all evaluation tests will have the opportunity of carrying out a re-evaluation test during the period specified in the academic calendar. Students who have already passed the test or were qualified as non-attending will not be admitted to the re-evaluation test. The maximum mark for the re-evaluation exam will be five over ten (5.0). The non-attendance of a student to the re-evaluation test, in the date specified will not grant access to further re-evaluation tests. Students unable to attend any of the continuous assessment tests due to certifiable force majeure will be ensured extraordinary evaluation periods.

These tests must be authorized by the corresponding Head of Studies, at the request of the professor responsible for the course, and will be carried out within the corresponding academic period.

Regulations for carrying out activities

The part of 'Continuous Assessment and Learning "will tend to recognize the effort of the student along the semester. In this sense, it is essential to deliver all the proposed activities
Bibliography

Basic:


Complementary:
