310613 - Fundamentals of Civil Engineering

Coordinating unit: 310 - EPSEB - Barcelona School of Building Construction
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2019
Degree: BACHELOR'S DEGREE IN GEOINFORMATION AND GEOMATICS ENGINEERING (Syllabus 2016).
ECTS credits: 4.5 Teaching languages: Spanish

Teaching staff
Coordinator: ANA M. TAPIA GOMEZ

Degree competences to which the subject contributes

Specific:
1. (ENG) Comprendre i analitzar els problemes de implantació en el terreny de les infraestructures, construccions i edificacions projectades des de l'enginyeria en topografia, analitzar els mateixos i procedir a la seva implantació.
2. (ENG) Planificació, projecte, direcció, execució i gestió de processos i productes d'aplicació a l'obra civil i l'edificació, dins l'àmbit geomàtic.
3. Knowledge about construction methods; analysis of structures; design, execution and control of infrastructures in the work with interdisciplinary teams, knowledge of hydraulics.
4. Knowledge about security, health and labour risks inside the scope of this engineering and its application and development.

Transversal:
5. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
6. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

Teaching methodology

The classes will be mainly theoretical, the student will have the index of contents itemised and the notes prepared by the profesor.
Support material will be facilitated by ATENEA: goals of learning by contents, concepts, examples and bibliography.

After each session, the content of the project to do will be discussed and also tasks outside of the class, that can be worked out individually or in group, and are the for the execution of the project.

The professor will do the follow-up of the projects by ATENEA.

In this projects, that will have to deliver, it is intended to incorporate some generic competences, like the competence of teamwork.
In addition it will be valued the the implication in the content of sustainability and social compromiso.

Learning objectives of the subject

At the end of the subject, the student must be capable of:
- Know the basic materials and the machinery used in construction.
- Know the different elements that form any civil work.
- Be capable of doing the follow-up and control inside of the constructive process.
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- Know how is projected and managed a construction.

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 112h 30m</th>
<th>Hours large group: 18h 16.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group: 27h 24.00%</td>
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<tr>
<td></td>
<td>Hours small group: 0h 0.00%</td>
</tr>
<tr>
<td></td>
<td>Self study: 67h 30m 60.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time: 150h</th>
</tr>
</thead>
</table>
| **- Materials and elements necessary for a construction**             | Theory classes: 21h  
Practical classes: 24h  
Laboratory classes: 15h  
Self study: 90h                                                                 |
| **Description:**                                                      | Make known the materials, from their properties, to how can they be improved, in the case, until the application in construction. Necessary auxilar elements for the correct geometric definition and for its positioning. The grounds and rocks. The materials used in the construction. The auxiliar materials necessary for the application in construction. Projection of related videos and circle table. This content will be carried out in the first lective weeks. |
| **Related activities:**                                               | An exam will be linked to the contents shown and worked until the momento. The documentation of support will be in ATENEA. |

<table>
<thead>
<tr>
<th>Topic</th>
<th>Learning time: 150h</th>
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</table>
| **- The principles of geotecnichs. The foundations. Concrete structures.** | Theory classes: 36h  
Practical classes: 12h  
Guided activities: 8h  
Self study: 94h                                                                 |
| **Description:**                                                      | It will be treated the main knowledge about the the ground mechanics and study of the soil, necessary for the definition of determinated foundations that can transmit the charges of the structure. It will also be defined the different types of foundation, the elements that form a structure and its implantation in the space. It will be done special emphasis on the bridges. Projection of related videos and circle table. This content will be made in the fourth, fifth and sixth week. |
| **Related activities:**                                               |  
- Research of bibliographic information and WEB pages. Realization of teamwork about the content shown until the moment and expanded for the autonomous learning.  
- It will be solved an exam linked to the explained and work contents. The support documentation will be in ATENEA. |
### Constructive processes of linear works

**Description:**
It will be treated the different fases of the construction in linear works, with emphasis in roads, railways and tunnels. It will be studied the adequate machinery in each case and how it is done the tracking, the topographic and geodesic control.

Projection of related videos and the circle table.

**Related activities:**
- An exam will be linked to the explained and worked contents. The support documentation will be in ATENEA.

**Learning time:** 147h
- Theory classes: 18h
- Practical classes: 24h
- Laboratory classes: 15h
- Self study: 90h

### Constructive processes of maritime works

**Description:**
It will be treated maritime and portuary works with a big surface and that also have specific conditions that affect the machinery to use and the constructive processes. It will be talked about ground consolidation, maritime machinery and phases in the construction. In each phase it will be talked about monitoring and topographic and geodesic control.

Projection of related videos and circle table.

**Related activities:**
- An exam will be linked to the explained and worked contents. The support documentation will be in ATENEA.
- Search of bibliographic information and WEB pages. Carrying out a project in group about the contents explained in class and the autonomous work.

**Learning time:** 150h
- Theory classes: 36h
- Practical classes: 12h
- Guided activities: 8h
- Self study: 94h

### Introduction to hydraulic

**Description:**
It will be treated the basic concepts of piping and canal hydraulics, beginning by the geometric notions that will define the hydraulic section to the aspects of fluid dynamics like speed, the volumen of water and flow.

It will be described the hydraulic infrastructures like pipes, canals and dams.

**Learning time:** 3h
- Theory classes: 3h
### Planning of activities

<table>
<thead>
<tr>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VISIT TO AN EXECUTION WORK</strong></td>
<td>3h</td>
</tr>
<tr>
<td>Practical classes: 3h</td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td>It will be visited a work in execution linked to the contents explained and worked. This activity will be carried out in the thirteenth week.</td>
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<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
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<tr>
<td>See in situ some of the contents explained in class.</td>
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</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ORAL EXPOSITION OF THE PROJECTS</strong></td>
<td>2h</td>
</tr>
<tr>
<td>Theory classes: 2h</td>
<td></td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td></td>
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<tr>
<td>The professor will choose one of the projects delivered by each group. The group will have got better, in this case, the project that had done. The teacher will decide which student will do the presentation.</td>
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<tr>
<td><strong>Specific objectives:</strong></td>
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<tr>
<td>Promote the teamwork.</td>
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### Qualification system

The final qualification is the addition of the following partial qualifications:

$$\text{Final mark} = 0.15 \times \text{mark exam content 1} + 0.15 \times \text{mark exam content 2} + 0.15 \times \text{mark content 3} + 0.15 \times \text{mark content 4} + 0.125 \times \text{mark Project contents 1 and 2} + 0.125 \times \text{mark Project contents 3 and 4} + 0.15 \times \text{mark project exposition}.$$  

Final exam for the students that haven't attended at the midterm exams: Resolution of a theoretical exam with 3 questions for each content that the student hasn't attended. There will be 30 minutes for each content, therefore, 2 hours if the student hasn't attended any of the 4 theoretical exams.

### Regulations for carrying out activities

- Only the non attendance to any of the theoretical midterm exams allows the student to attend at the final exam.
- The established period for the delivery of each one of the two projects will be a week after the end of theoretical explanation of the contents.
- The non attendance of a project in the period planned, will implicate the reduction of the mark in 1 point for each day passed.
Bibliography

Basic:


Complementary: