310416 - Diagnosis Technology and Characterization of Materials

Coordinating unit: 310 - EPSEB - Barcelona School of Building Construction
Teaching unit: 753 - TA - Department of Architectural Technology
Academic year: 2018
Degree: MASTER'S DEGREE IN ADVANCED BUILDING CONSTRUCTION (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 5
Teaching languages: Spanish

Teaching staff
Coordinator: Haurie Ibarra, Laia
Others: Monton Lecumberri, Joaquin
Rosell Amigo, Juan Ramon
Navarro Ezquerra, Maria Antonia

Opening hours
Timetable: It will be specified at the beginning of the course

Degree competences to which the subject contributes

Basic:
2. Possess and understand knowledge which provide a basis or opportunity to be original in the development and/or application of ideas, usually in a context of research.
3. The students must be able to apply the acquired knowledges and their ability of resolution of problems in new or little known environments inside more wide environments (or multidisciplinary) related with their study field.
4. The students must be able to integrate knowledges and front to the complexity to formulate opinions from an information which, being incomplete or limited, includes reflections about the social and ethical responsibilities linked to the application of their knowledges and opinions.
5. The students must be able to communicate their conclusions and the knowledges and ultimate reasons which support to specialised and non-specialised audiences in a clear mode and without ambiguities.
1. The students must possess the learning abilities which allow them to continue studying in a way which should be to a large extent self-directed and autonomous.

Specific:
6. Capacity of innovation: identify the reasons and the mechanisms of the technologic and technical changes.
7. Elaborate and manage installation projects.

General:
8. Prepare to communicate with efficiency, orally but also in written.
9. Provide to the student the capacity to apply the knowledge acquired in the resolution of complex problems in any sector of the building construction.
10. Analyse, evaluate and synthesise critically, new and difficult ideas of promotion, in academic and professional contexts, scientific advances, technologics, socials or cultural in the society of knowledge.

Transversal:
11. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.
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Teaching methodology

Theoretical and laboratory classes
Technical visits
Supervision of the individual and team activities

Learning objectives of the subject

This course aims to introduce the students to the main techniques used in the diagnosis of the state of a building and to the characterization techniques used to identify and/or evaluate the properties of the materials of the building.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Hours large group:</th>
<th>15h</th>
<th>12.00%</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>5h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>5h</td>
<td>4.00%</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>10h</td>
<td>8.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>90h</td>
<td>72.00%</td>
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Content

<table>
<thead>
<tr>
<th>General concepts</th>
<th>Learning time: 4h</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
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**Description:**
In this lesson the scientific method and the criteria to select analytical techniques will be discussed. The differences among qualitative, semi-quantitative and quantitative analysis will be explained, as well as the differences between destructive, semi-destructive and non-destructive tests. Aspects such as sampling, reproducibility, accuracy, precision and measurement error will be explained.

**Related activities:**
Exercises to practise the aspects covered in this lesson

<table>
<thead>
<tr>
<th>Diagnosis methods</th>
<th>Learning time: 14h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 12h</td>
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<tr>
<td></td>
<td>Guided activities: 2h</td>
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</table>

**Description:**
Description of the existing tools used to perform the diagnose of a building. The techniques will be grouped according with the nature of the inspected constructive element:

1) Concrete structures
2) Masonry structures
3) Wood structures
4) Slabs
5) Floor and wall covering

**Related activities:**
- Laboratory experience
- Site visit to put into practice some of the tools explained in class

<table>
<thead>
<tr>
<th>Materials characterization</th>
<th>Learning time: 10h</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
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</tbody>
</table>

**Description:**
Study of different materials characterization techniques that can be used in the determination of pathological processes and building materials degradation.

**Related activities:**
- Visit to a centre where we can see some of the techniques explained in class

Qualification system

The evaluation will be done taking into account the mark obtained in the final exam (30%) and the mark of the activities done along the course (70%)
Bibliography

Basic:


Complementary:


