Course guides

310410 - 310410 - Control and Evolution of Building Fires

Unit in charge: Barcelona School of Building Construction
Teaching unit: 748 - FIS - Department of Physics.
737 - RMEE - Department of Strength of Materials and Structural Engineering.
732 - OE - Department of Management.

Degree: MASTER'S DEGREE IN ADVANCED BUILDING CONSTRUCTION (Syllabus 2014). (Optional subject).

Academic year: 2020  ECTS Credits: 5.0  Languages: Spanish

LECTURER

Coordinating lecturer: Lacasta Palacio, Ana Maria
Others: Marimon Carvajal, Frederic
Guixa Mora, Jaime

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
6. Recognise the materials and construction techniques of each historical period and value its influence in the architecture design.
10. Use the physic principles in the thermic, luminic and acoustic scope.

General:
7. Provide to the student the capacity to apply the knowledge acquired in the resolution of complex problems in any sector of the building construction.
8. Analyse, evaluate and synthesise critically, new and difficult ideas of promotion, in academic and professional contexts, scientific advances, technologics, socials or culturals in the society of knowledge.

Transversal:
9. ENTREPRENEURSHIP AND INNOVATION: Knowing about and understanding how businesses are run and the sciences that govern their activity. Having the ability to understand labor laws and how planning, industrial and marketing strategies, quality and profits relate to each other.
11. 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.
12. 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.

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.
TEACHING METHODOLOGY

Blackboard classes: theory and problems.
Experimental and computational works.
Promotion of working in group

LEARNING OBJECTIVES OF THE SUBJECT

- Acquisition of knowledge about the basics of generation and spread of fire.
- Acquisition of knowledge about the mechanisms of fire propagation in buildings.
- Learning about the behavior of materials when subjected to high temperatures.
- Acquisition of knowledge on the existing protection systems and to establish the most appropriate in each case.
- Knowing the fire simulation programs and understand the principles of operation.
- Acquisition of knowledge on the behavior of structures in fire

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group</td>
<td>5,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Guided activities</td>
<td>10,0</td>
<td>8.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>5,0</td>
<td>4.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>72.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>15,0</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Total learning time: 125 h

CONTENTS

Fires. Introduction

Description:

Full-or-part-time: 4h
Theory classes: 2h
Self study: 2h

Physicochemical Fundamentals of Fire

Description:

Full-or-part-time: 15h
Theory classes: 1h
Practical classes: 2h
Self study: 12h
### Behavior of materials against fire

**Description:**

**Related activities:**
Experimental study about the behaviour against the fire of the materials. This work will be done in the fire lab of the EPSEB.

**Full-or-part-time:** 22h
- Theory classes: 3h
- Practical classes: 2h
- Guided activities: 1h
- Self study: 16h

### Fire evolution in buildings

**Description:**

**Related activities:**
Utilization of the FDS software for the simulation of the fire spreading on buildings. This work will be done in the fire lab of the EPSEB.

**Full-or-part-time:** 30h
- Theory classes: 4h
- Practical classes: 2h
- Laboratory classes: 2h
- Guided activities: 2h
- Self study: 20h

### Human behavior under fire conditions

**Description:**

**Full-or-part-time:** 16h
- Theory classes: 2h
- Laboratory classes: 2h
- Self study: 12h

### Structural security

**Description:**
High-temperature behavior of steel and concrete structures.

**Full-or-part-time:** 22h
- Theory classes: 4h
- Guided activities: 2h
- Self study: 16h
Security of buildings in case of fire

Description:

Full-or-part-time: 16h
Theory classes: 2h
Practical classes: 2h
Self study: 12h

GRADING SYSTEM
The final mark will be calculated from the qualification of four works.

BIBLIOGRAPHY

Basic: