Course guide

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: 2022 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

Theory and problem classes will be taught.
A practical work will be carried out in the fire laboratory.
A computational simulation work will be carried out.
Group work will be encouraged.

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>Guided activities</td>
<td>10,0</td>
<td>8.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>72.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>5,0</td>
<td>4.00</td>
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<tr>
<td>Hours small group</td>
<td>5,0</td>
<td>4.00</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

## Security of buildings in case of fire

**Description:**

**Related activities:**
Clase práctica sobre gestión de incendios en edificios en construcción

**Full-or-part-time:** 16h
- Theory classes: 2h
- Practical 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

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**GRADING SYSTEM**

The final mark will be obtained from the grades obtained in four works carried out throughout the course.

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**BIBLIOGRAPHY**

**Basic:**