Course guides
310726 - 310726 - Envelopes and Finishes Construction

Unit in charge: Barcelona School of Building Construction
Teaching unit: 753 - TA - Department of Architectural Technology.

Degree: BACHELOR’S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2019). (Compulsory subject).

Academic year: 2021  ECTS Credits: 4.5  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Paris Viviana, Oriol

Others: Capellà Llovera, Joaquin
        Paris Viviana, Oriol

PRIOR SKILLS

Graphic expression.
Written expression.
Oral expression.

REQUIREMENTS

It is very recommendable to have passed the subjects of Construcció I-II-III.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONtributes

Specific:
1. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
2. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.

Transversal:
3. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
4. 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.
5. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
6. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
7. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
TEACHING METHODOLOGY

Methodology based on a learning focused on the student (the active involvement of the student in all the process implicates a development of the self-learning and self-evaluation abilities of reasoning):
The learning of modules of objectives. The purpose of this method is to make easier to the student the global comprehension of the different knowledges which are in some way related between them and which form the course list of topics.
The learning based in problems (ABP), in this case the student sets out a problem which for its resolution it is necessary to acquire all the required competences and knowledge.

The directed learning hours consist on the one hand in teaching theoretical classes (big group) where the professor does a brief exposition to introduce the general learning objectives related with the basic concepts of the subject. Subsequently and by means of practical exercises, the professor motivates and involves the students so that they can participate actively in their own learning. It is used support material in detailed teaching plan by ATENEA: learning objectives by contents, concepts, examples, evaluation activities and directed learning schedules and bibliography.

On the other hand, the directed learning hours also consist on teaching practical classes (medium group) where the students generally work in work groups of 3 members, by the resolution of exercises related with the specific learning objectives of each one of the contents of the subject.
Most of these practical sessions incorporate generic competences. Therefore cooperative learning techniques are developed at class.

Generally, after each theory session out of class tasks are proposed, which must be worked individually or in groups.

This teaching methodology is planned for a maximum of 50-55 students.

LEARNING OBJECTIVES OF THE SUBJECT

It is intended that the student acquire their own intellectual tools so as to be able to diagnose the type of envelope and finish and the most appropriate construction technologies according to functionality, architecture and place.
The course aims, mainly, to establish the bases of the exchange of energy, matter and information through the envelope and the different interior spaces of the building, as well as to provide the criteria and analysis to determine the appropriate envelope and the interior space of the building in function of its benefits and its environmental responsibility. The correlation of expiring to non-expiring insights is 40/60.

At the end of the course, the student must be able to:

Determine an appropriate technology and prioritize the selection criteria
Explain the meaning of a technologically correct surround system according to use and location, as well as the separation systems of the different interior spaces. Relate and assess the suitability of the façade and the interior space according to the CTE
· Define an enclosure based on the climatic and use preexistence and the interior space according to the different uses attached to it.
· Identify the different envelope systems and their problems. Identify the different interior uses and specify their impermeability or opacity with the different annexed spaces.
· Use the hygrothermal, technological and scientific concepts to specify an enveloping system, as well as the requirements of the different interior spaces

Identify, classify and choose the suitability of the different construction elements that make up the distribution and communication systems inside a building as well as the coatings that provide the finish.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>27,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>18,0</td>
<td>16.00</td>
</tr>
<tr>
<td>Self study</td>
<td>67,5</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 112,5 h
## CONTENTS

### MODULE 1: THE ENVELOPE. CLIMATE AND ENERGY REGULATOR

**Description:**
In this content we work:
Hygrothermal Concepts and Parameters
The envelope and the interior space as a regulator:
1. Acoustic
2. Thermal
3. Light
4. Climate
The indoor climate
Roof and Facade a solution of continuity.

**Specific objectives:**
Knowledge of the fundamentals and principles applied to building, hygrothermia, acoustics, and light.

**Related activities:**
There will be done the activity 1.

**Related competencies:**
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

**Full-or-part-time:** 22h 30m
- Theory classes: 6h
- Practical classes: 3h
- Self study: 13h 30m
MODULE 2: THE ENCLOSURE. TYPOLOGIES, SYSTEMS AND deconstruction

Description:
In this content we work:
- Criteria and classification Facades and Roofs
- Functional Systems.
- Construction systems.
- Structural Systems.
- Entremats Systems and Panel Systems
- Construction typologies
- Mounting typologies
- Descosintució

Specific objectives:
Knowledge of the specific procedures for the control of the material execution of the building work.

Related activities:
There will be done the activity 2.

Related competencies:
- FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
- FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
- 02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
- 05 TEQ N2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.

Full-or-part-time: 30h
- Theory classes: 8h
- Practical classes: 4h
- Self study: 18h
**MODULE 3: THE SUSTAINABLE ENVELOPE and performance**

**Description:**
In this content we work:
Optimization of climate systems according to use.
1. Acoustic.
2. Thermal.
3. Light.
4. Climate.

Environmental responsibility from the point of view of:
1 Material.
2 Element.
3 System.

Performance and environmental impact analysis of different types.
3d print. Industrialization.

**Related activities:**
There will be done the activity 3.

**Related competencies :**
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
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04 COE N2. 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.

**Full-or-part-time:** 17h 30m
Theory classes: 4h
Practical classes: 3h
Self study : 10h 30m
MODULE 4: THE INTERIOR SPACE

Description:
The volumes served and their position with respect to the relationship with attached interior spaces must meet a previously defined program of needs, with the aim not only of separating areas but also of protection against thermal and acoustic actions and concepts of habitability that serve to determine constructive solutions to adopt.
The server volumes that must solve communication problems save different slopes in a fast and comfortable way, they determine constructive solutions that consider evacuation and sectorization problems.

Specific objectives:
1. Interpret and apply the performance requirements of the practicable vertical elements.
2. Interpret and apply the performance requirements of non-practicable vertical elements.
3. Interpret and apply the performance requirements of stairs.
4. Interpret and apply the performance requirements of the ramps.
5. Justify and apply the functional and constructive typologies in practicable vertical elements.
7. Choose the suitability of the different functional and construction typologies, both in scales and ramps.
8. Choose the suitability among the different functional and constructive typologies, both in the practicable vertical elements and in the non-practicable vertical elements.

Related activities:
There will be done the activity 4.

Related competencies:
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
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Full-or-part-time: 22h 30m
Theory classes: 6h
Practical classes: 3h
Self study : 13h 30m
MODULE 5 COATINGS

Description:
The classification of the finishing systems into three large groups: horizontal, vertical and ceiling surfaces. All three receive the attacks typical of the use to which they are intended. The three groups have to provide a light, acoustic and thermal and functional environment that requires a formal, textural and pictorial aspect of its own that will end up determining the constructive solutions to be adopted.

Specific objectives:
1. Interpret and apply the performance requirements of floor coverings.
2. Interpret and apply the performance requirements of wall coverings.
3. Interpret and apply the performance requirements of roof coatings.
4. Justify and apply the functional and constructive typologies of the cladding, walls and ceilings.
5. Choose the suitability of the different functional and constructive types of floors, walls and ceilings.

Related activities:
There will be done the activity 5.

Related competencies:
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

Full-or-part-time: 20h
Theory classes: 5h
Practical classes: 3h
Self study: 12h

ACTIVITIES

ACTIVITY 1. PERMEABILITY AND OPACITY

Description:
Resolution of the exercise by the student, which the teacher will return the following week corrected so that he can compare with the official resolution. Represents a part of the continuous evaluation of 10%

Specific objectives:
At the end of the activity, the student should be able to:
1. Define an envelope based on the preexistence of weather and use
2. Diagnose a technologically correct envelope according to use and location.
3. Assess the suitability of the façade

Related competencies:
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.
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Full-or-part-time: 3h
Practical classes: 3h
ACTIVITY 2. SYSTEMS. FACADES AND ROOFS

Description:
In groups of 3 members and in the classroom, an exercise is done at the end of the ENVELOPE topic. TYPOLOGIES, SYSTEMS AND DESCOSNTRUCCIÓ with a statement related to a topic of environmental interest and in which it is necessary to apply most of the specific learning objectives of the topic.

Specific objectives:
At the end of the activity, the student should be able to:
1.- Know the current construction systems
2.- Control the hermeneutics of current systems according to new criteria.
3.-Analyze the pros and cons of a typology and system according to a construction procedure
4.- Requirements and Regulations

Delivery:
Exercise of each one of the members of the group with the corresponding peer evaluation and the common group report. Return, with the corresponding feedback from the teachers, to the next session and general reflection in the classroom on the most notable common errors and the associated learning objectives that should be reinforced. Represents a part of the continuous evaluation 12%.

Related competencies:
05 URI N2. EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
04 COE N2. 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.
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Full-or-part-time: 4h
Practical classes: 4h
ACTIVITY 3. ENVIRONMENTAL IMPACT AND BENEFITS

Description:
Carrying out in the classroom an exercise on the subject SUSTAINABLE ENVELOPE and performance that covers all the specific learning objectives of the subject, with a statement related to a subject of environmental interest or everyday life. Correction by the teaching staff.

Specific objectives:
At the end of the activity, the student should be able to:
1. Technologically assess the different construction systems.
2. First level quantify the environmental cost.
3. Diagnose a technology that enables the facade change.

Delivery:
Resolution of the exercise by the student, which the teacher will return corrected so that he can compare with the official resolution. Represents a part of continuous evaluation (9%)

Related competencies :
04 COE N2. 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.
05 TEQ N2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
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07 AAT N2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

Full-or-part-time: 3h
Practical classes: 3h

ACTIVITY 4. demands VOLUMES SERVERS AND SERVED

Description:
Application and compliance with the different requirements and regulations of the server and served volumes

Delivery:
Exercise of each one of the members of the group with the corresponding peer evaluation and the common group report. Return, with the corresponding feedback from the teachers, to the next session and general reflection in the classroom on the most notable common errors and the associated learning objectives that should be reinforced. Represents a part of the continuous evaluation 10%.

Related competencies :
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
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05 TEQ N2. TEAMWORK - Level 2. Contributing to the consolidation of a team by planning targets and working efficiently to favor communication, task assignment and cohesion.
02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

Full-or-part-time: 3h
Practical classes: 3h
ACTIVITY 5. COATINGS OF THE INTERIOR SPACE

Description:
In groups of 3 members and in the classroom, an exercise is done at the end of the COATINGS topic with a statement related to a topic of environmental interest and in which it is necessary to apply most of the specific learning objectives of the topic. Subsequently, a co-evaluation between groups is made.

Delivery:
Exercise of each one of the members of the group with the corresponding peer evaluation and the common group report. Return, with the corresponding feedback from the teachers, to the next session and general reflection in the classroom on the most notable common errors and the associated learning objectives that should be reinforced. Represents a part of the continuous evaluation 9%.

Related competencies:
FE-04. FE-4 Knowledge of the materials and traditional or prefabricated construction systems used in construction, their varieties and physical and mechanical features which define them.
FE-07. FE-7 Ability to identify the constructive elements and systems, define its function and compatibility, and its implementation to construction in the construction process. Plan and solve constructive details.
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02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

Full-or-part-time: 3h
Practical classes: 3h

GRADING SYSTEM
Continuous assessment consists of carrying out different activities of a summative and formative nature, carried out during the course (inside and outside of class).

Activity 1. 5%
Activity 2. 10%
Activity 3. 5%
Activity 4. 30%

There will also be a midterm and final exam with the following percentage
Partial 25%
Final 25%

EXAMINATION RULES.
All tests will be done with all the reference material used throughout the course.
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Other resources:
Normative:
Technical Code in Construction
SU Safety of use
DB HS Salubrity
DB HE Energy save
DB SI Security in case of fire
DB HR Noise protection

Decree 259/2003 of 21 October, about the minimum habitability requirements in housing buildings and the habitability certificate (DOGC no. 3999, 30 October of 2003)
Decree 135/1995 Accessibility code of Catalonia