

Course guide

310075 - 310075 - Building Construction and Environment

Last modified: 15/05/2023

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 2015).
(Optional subject).

Academic year: 2023 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: MONTSERRAT BOSCH GONZALEZ

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. FB-4 Knowledge of the chemical features of the materials used in construction, its fabrication processes, the methodology of the trials for determining its features, its geologic origin, the environmental impact, the recycling and the residues management.
2. FB-5 Knowledge of the theoretical basis and the basic principles applied to the construction, of the fluid mechanics, the hydraulics, the electricity and electromagnetism, the calorimetry and thermal comfort, and the acoustics.
3. FE-12 Knowledge of the evaluation of the environmental impact of the construction and demolition, the sustainability in the construction, and the procedures and techniques to evaluate the energetic efficiency of the buildings.
4. FE-13 Ability to apply the technical regulation to the construction process, and generate documents of technical specification in the constructive procedures and methods of buildings.
5. FE-14 Aptitude to apply the specific regulations about facilities in the construction process.
6. FE-22 Knowledges of the organisation of the professional work and studies, offices and professional societies, the regulations and rules related with the functions which the Building Engineer develops and the responsibility framework associated to the activity.
7. FE-29 Aptitude to write documents which are part of execution projects made in a multidisciplinary form

Transversal:

8. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.
9. EFFICIENT ORAL AND WRITTEN COMMUNICATION. Communicating verbally and in writing about learning outcomes, thought-building and decision-making. Taking part in debates about issues related to the own field of specialization.
10. SUSTAINABILITY AND SOCIAL COMMITMENT. Being aware of and understanding the complexity of social and economic phenomena that characterize the welfare society. Having the ability to relate welfare to globalization and sustainability. Being able to make a balanced use of techniques, technology, the economy and sustainability.
11. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.
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.

TEACHING METHODOLOGY

Within the new learning framework, it is pretended that the students acquire the sufficient criteria to front the professional exercise from an environmental perspective. The theoretical classes are used for introducing the different concepts and the scientific and technological knowledge which will allow to evaluate the construction activity under sustainability and ethical parameters.

The students must develop their autonomous task by complementing the information and practising their abilities, they must solve problems, considering the main questions of the course, analyzing their future professional activity and searching new solutions or answers to the environmental challenges.



LEARNING OBJECTIVES OF THE SUBJECT

At the end of the subject, the students should be able to:

- . Determine the elements and indicators of the environment.
- . Explain the meaning of sustainability, environment, ecology and environmental impact.
- . Relate the activities suitable of the degree with the social requests of the environmental responsibility.
- . Identify the elements and the activities which the building engineering must contribute to the sustainability.
- . Know the constructive alternatives: From the low-tech to the industrialization and the prefabrication as strategies.
- . The materials from the environmental analysis: ACV, ecolabels, DAPc systems, recycled materials, etc.

STUDY LOAD

Type	Hours	Percentage
Self study	45,0	60.00
Hours large group	12,0	16.00
Hours medium group	9,0	12.00
Hours small group	9,0	12.00

Total learning time: 75 h

CONTENTS

(ENG) C1 : SOCIETAT I MEDIAMBIENT

Description:

In this content the students work:

The precedents and the current environmental sensitivity. The situation reading, the critical analysis and the strategies of future. The indicators of the environmental impact on the construction.

Related activities:

There will be done the activities 1, 2 and 3 which correspond to a practice, a directed work and an autonomous learning work, with a value of the 20% of the final mark.

Full-or-part-time: 25h

Theory classes: 10h

Guided activities: 5h

Self study : 10h

(ENG) C2 MATERIALS I IMPACTE AMBIENTAL. ESTRATÈGIES I OPORTUNITATS

Description:

In this content the students work:

The role of the materials regarding to the environmental impact on the construction. Environmental requirements of the construction materials. Ecolabels, Analysis of the Cycle of Life, DAPc tools. The opportunities of the materials from the recycling: demands and outputs. Innovation and research in materials of low environmental impact.

Related activities:

There will be done the activities 4 and 5 corresponding to directed activities, with a value of 30% of the final mark.

Full-or-part-time: 25h

Theory classes: 10h

Guided activities: 5h

Self study : 10h



(ENG) C3 EXIGÈNCIES MEDIAMBIENTALS EN ELS PROJECTES TÈCNICS

Description:

In this content the students work:

Demands of use of the buildings and alternatives to the traditional systems: functionality, compatibility, dismantling, inspectionability, dimensional coordination, tolerances, environmental evaluation, durability.

Passiv House versus energy buildings.

Cooperation for the development, Technological Sovereignty, possibilities and limitations of the Low Tech.

Related activities:

There will be done the activities 6 and 7, which correspond to a practice and a continuous evaluation directed activity, with a value of 50% of the final mark.

Full-or-part-time: 46h

Theory classes: 10h

Practical classes: 5h

Guided activities: 10h

Self study : 21h



ACTIVITIES

(ENG) A1 MAPA CONCEPTUAL

Description:

Before starting the course it is interesting to know the perception of each one of us about sustainability, environment, ecology and even technology. From a conceptual or mental map we can classify in a flexible way the concepts which we think that are part of the new paradigm. This is an exercise of presentation, self-analysis and self-reflection which must be kept till the end of the course to check if after 4 months working about technology and environment, we have been able to reorder our ideas and incorporate new concepts.

Specific objectives:

- List and define the key concepts related with the sustainability and the environment.
- Organise the information available, understand it, summarize it and classify it.
- Compare and contrast the different standpoints about the sustainability and the environment.
- Examine what it is happening in the world from the environmental perspective.
- Link environmental impact events supposedly random.
- Use the information processed during the course to apply it in the construction field.
- Contrast environmental policies and the different social sensitivities.

Material:

Format: At class the students must do a first version of the conceptual map with all the concepts they think that are related with environment and technology. It will be necessary to do a new clean version which must be sent via campus in a period of 2/3 days to reuse it at the end of the course. This new format should be presented in word format, or if it is possible, using the web resources available to the making of conceptual maps (for example students can check and download the IHMC map Tools) software.

Delivery:

Starting date and deadline: The first version of the map is done at class and delivered the next two days via campus, through the application available. At the end of the course the students will make a similar mental map but now with all the knowledge acquired. The delivery of these two maps is not compulsory nor evaluable but provides a useful information to the students about their achievement degree of the course contents.

Rúbrica. As the activity is not marked there won't be rúbrica but it is considered that, at least, a simple mental map must contain 15/20 concepts related among them. The final map of the course must contain at least 30 concepts.

Full-or-part-time: 1h 15m

Theory classes: 0h 15m

Practical classes: 0h 07m

Guided activities: 0h 08m

Self study: 0h 45m



(ENG) A2 LECTURA D'UN LLIBRE

Description:

Description. The scientific knowledge is acquired largely from well selected readings. In the case of the sustainability, the technology and the environment there is a wide bibliography, nevertheless it is not well planned or documented or has not enough quality because presently the topic generates a pseud-science or scientific spreading which must be filtered to distinguish it from the scientific articles and serious books. There will be given to the students a list of recommended books and each student will choose depending on their worries and interests. The reading of the book will be done during the four-month term and at the end of the course a brief text analysis will be presented.

Specific objectives:

- List and define the key concepts related with the sustainability and the environment.
- Organise the information available, understand it, summarize it and classify it.
- Compare and contrast the different standpoints about the sustainability and the environment.
- Examine what it is happening in the world from the environmental perspective.
- Link environmental impact events supposedly random.
- Use the information processed during the course to apply it in the construction field.
- Contrast environmental policies and the different social sensitivities.

Material:

Format: It is not easy to do an appropriate review or reflective reading of a book for the first time. In the campus the students will find examples about how to do this opinion article so that they have some standards and understand what is expected from their work. The format will be a word document (not in Pdf to facilitate the correction of the document) with no more than 2000 words but perfectly regulated and written.

Delivery:

Starting date and deadline: It is highly recommended that the student starts the reading of the book as soon as possible so that the own dynamic of the four-month term does not cause the accumulation of the works at the end of the course. The delivery date of the text commentary is free, but the deadline will be during the penultimate week of the course so that the professor will have time for doing the correction, make the relevant comments and explain to the rest of the group the conclusions and considerations extracted from all the readings.

Rúbrica: There will be accepted texts in catalan and/or spanish equally, but without grammatical errors.

- . If the text has more than 10 orthographic errors it won't be evaluated.
- . The title, author, publishing house and basic datum of the chosen book must be perfectly identified.
- . The extension of the document won't exceed 2000 words.
- . The text must have the appropriate level of University Degree studies: organized, well composed and presented.
- . The document will include, at least, these sections: brief summary, identification of basic ideas, conclusions and personal valuation.

Full-or-part-time: 12h

Theory classes: 12h



(ENG) A3 EXERCICIS D'AUTOAVALUACIÓ: TESTS I PROBLEMES SENZILLS, VIA CAMPUS

Description:

Description. In the virtual campus the students can find some questionnaires which evaluate the acquired learning of the students during the course. The questionnaires will have different formats and answers but the students will know in every moment if they have achieved the required knowledge so that they can act consequently looking over the contents of each module if necessary.

Specific objectives:

- List and define the key concepts related with the sustainability and the environment.
- Organise the information available, understand it, summarize it and classify it.
- Compare and contrast the different standpoints about the sustainability and the environment.
- Examine what it is happening in the world from the environmental perspective.
- Link environmental impact events supposedly random.
- Use the information processed during the course to apply it in the construction field.
- Contrast environmental policies and the different social sensitivities.

Material:

Format: The format is severe with the standards of the Campus.

Delivery:

Starting date and deadline: The starting date and deadline of the questionnaire will be published by the campus as the course advances. The activity will have a limited time to be solved and a deadline.

Full-or-part-time: 6h

Practical classes: 6h

(ENG) A4 VISITA AL CENTRE MATER FAD

Description:

Description. The Materials Centre MATER, linked to the Foment de les Arts Decoratives (FAD), has an exposition space where there are catalogued more than 4000 materials with samples at disposal of researchers and university students. The activity consists in attend to the guided visit to the Centre and make a reasoned commentary about the materials observed, from an environmental perspective.

Specific objectives:

- List and define the key concepts related with the sustainability and the environment.
- Organise the information available, understand it, summarize it and classify it.
- Compare materials depending on environmental criteria.
- Identify the different environmental impact evaluation tools of the materials. Regulations, labels, etc.
- Choose sustainability strategies in the definition of the construction projects.
- Analyze, classify, list and distinguish materials from various criteria: physical, mechanical, durability and environmental impact features, etc.
- Link architecture/construction/social trends/environmental commitment and materials.
- Use the information processed during the course to apply it in new materials field.
- Evaluate the materials relating outputs and environmental impact.

Material:

Format: Document in word/pdf format, with a maximum extension of one page approximately.

Delivery:

Starting date and deadline: According to the calendar, the dates will be published in the virtual Campus and the delivery of the document will be done in the period of one week since the visit to the MATER Centre.

Rúbrica: There will be accepted texts in Catalan and/or Spanish equally, but without orthographic errors.

. If the text has more than 10 orthographic errors it won't be evaluated.

. The text must have the appropriate level of University Degree studies: organized, well written and presented.

Full-or-part-time: 3h

Practical classes: 3h



(ENG) A5 RECERCA EN MATERIALS

Description:

Description: The construction generates a high environmental impact. The choice of the materials is a decision where the building engineers can act from various perspectives: the materials design, the environmental impact evaluation of each material, the energy cost of the fabrication, the identification of sustainable materials, the choice, selection and proposal of materials, the research of materials, etc.

The students, in groups of three, will write a basic project of the development of a material with the theoretical objective of getting the consideration of Eco-label, DAPc or another environmental evaluation tool.

Specific objectives:

- List and define the key concepts related with the sustainability and the environment.
- Organise the information available, understand it, summarize it and classify it.
- Compare materials depending on environmental criteria.
- Identify the different environmental impact evaluation tools of the materials. Regulations, labels, etc.
- Choose sustainability strategies in the definition of the construction projects.
- Analyze, classify, list and distinguish materials from various criteria: physical, mechanical, durability and environmental impact features, etc.
- Link architecture/construction/social trends/environmental commitment and materials.
- Use the information processed during the course to apply it in new materials field.
- Evaluate the materials relating outputs and environmental impact.

Material:

Format: The document to present will have three parts:

- . Proposal of development of the product and market research.
- . Recommendations of use and application field, pros and cons of the materials.
- . Legal framework, applied regulations, compulsory and recommended trials, etc.

The extension of the work will be, approximately, of 10 pages.

Delivery:

Starting date and deadline: The work must be delivered by campus in the period scheduled in the virtual campus.

Rúbrica: There will be accepted texts in Catalan and/or Spanish equally, but without orthographic errors.

- . If the text has more than 10 orthographic errors it won't be evaluated.
- . The text must have the appropriate level of University Degree studies: organized, well written and presented.

Full-or-part-time: 8h

Practical classes: 8h



(ENG) A6 INDUSTRIALITZACIÓ I PREFABRICACIÓ COM A ALTERNATIVA SOSTENIBLE

Description:

Description: It is programmed a conference of a company manager of the prefabrication and industrialization of construction systems sector which will be done at class. Before the conference the students must have prepared, in groups of three, three questions to the lecturer.

Based on the conference and an arranged visit to a factory, showroom or similar, the students must participate in the forum that will be opened in the Campus.

Specific objectives:

- List and define the key concepts related with the environment, the sustainability and the impacts of the construction from the project conception.
- Organise the information available, understand it, summarize it and classify it.
- Compare and contrast the demands, necessities, options, possibilities, alternatives, incidents and environmental and economic costs of the decisions made during the project phase.
- Examine which are the environmental demands that, from the different administrations, are planned in the construction projects.
- Link architecture/construction/social trends/energy saving from the project perspective.
- Use the information processed during the Module to apply it in the construction field.
- Contrast environmental policies in various geographic scenes.
- Define and justify the construction projects in different contexts.

Material:

Format: Conference + questionnaire + visit + forum involvement.

Delivery:

Starting date and deadline: The works will be defined from the conference and the arranged visit. The forum will remain opened during 9 days since the weekend following the visit till the next weekend.

Rúbrica: The evaluation of this activity will be done with this table:

- . Attendance to the conference will worth the 20% of the mark.
- . Questionnaire for the lecturer will worth the 20% of the mark.
- . Attendance to the factory, showroom or building visit will worth a 40% of the mark.
- . Participation in the forum will worth the 20% of the mark.

Full-or-part-time: 13h

Theory classes: 2h

Self study: 11h



(ENG) A7 LOW TECH

Description:

Description. The Cooperation to the sustainable development needs specific constructive tools which relate the availability of construction materials and techniques with the own resources of the countries which cooperate. The technological sovereignty is a previous demand which must be considered. The Low-Impact Environmental Technologies, also known as LOW-TECH, are usually the most suitable to use in countries on process of development, but these technologies also can be considered as a construction alternative in our adjacent environment.

Specific objectives:

- List and define the key concepts related with the environment, the sustainability and the impacts of the construction from the project conception.
- Organise the information available, understand it, summarize it and classify it.
- Compare and contrast the demands, necessities, options, possibilities, alternatives, incidents and environmental and economic costs of the decisions made during the project phase.
- Examine which are the environmental demands that, from the different administrations, are planned in the construction projects.
- Link architecture/construction/social trends/energy saving from the project perspective.
- Use the information processed during the Module to apply it in the construction field.
- Contrast environmental policies in various geographic scenes.
- Define and justify the construction projects in different contexts.

Material:

Format: The format of this activity changes depending on the four-month term. The Autumn four-month term coincides with the Week of the Science and Technique, and there will be scheduled the LOW-TECH Conferences, which will have the duration of two mornings. The students will write a summary document of the knowledge acquired.

Delivery:

Starting date and deadline: The summary document must be delivered by campus during the period scheduled on the virtual campus depending on the date of the Conferences.

Rúbrica: The attendance to the Conferences is compulsory and will be evaluated:

- . Attendance to one conference: 40% of the mark.
- . Attendance to two conferences: 80% of the mark.
- . Writing of the summary document: 20% of the mark.

Full-or-part-time: 10h

Practical classes: 10h

(ENG) A8 TREBALL FINAL

Description:

There will be written a final project which will contain all the contents of the DAC according to the specifications of each four-month term.

Specific objectives:

Ability to make a complete Technical Project.

Delivery:

End of the four-month term.

Full-or-part-time: 1h

Theory classes: 1h

GRADING SYSTEM

The qualification system is based on the continuous evaluation from the different activities proposed during the course, and the final mark is the addition of these partial marks:

For Module 1 Activity 1: 0%; Activity 2: 30%; TOTAL 30%

For Module 2 Activity 3: 15%; Activity 4: 15%; TOTAL 30%

For Module 3 Activity 5: 20%; Activity 6: 20%; TOTAL 40%

There will be a final evaluation exercise for those who have not chosen the continuous evaluation or have not acquired the educational objectives during the course.

EXAMINATION RULES.

It is compulsory to do at least the 80% of the activities proposed. The modules are evaluated individually and it is necessary to pass, at least two of the three modules. The rules of realisation and the value of the activities are detailed in the educational guide.

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Basic:

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Complementary:

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