

Course guide

310755 - 310755 - Sensorisation and Digitalisation of Use

Last modified: 18/10/2023

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 2019).
(Optional subject).

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

LECTURER

Coordinating lecturer: Caballero Mestres, Antoni

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Paris Viviana, Oriol

TEACHING METHODOLOGY

Students must acquire behaviors of technological autonomy with environmental and economic criteria.

In this matter, it is particularly important to bear in mind that students are immersed in a highly technological and practical environment. For this reason, it is intended that the key methodology is problem-based learning, so that learning is oriented towards solving situations and problems in daily life that are close to the student. Thus, the design of these activities must achieve the learning of the objectives and the achievement of key competences through problem solving, decision-making and the acquisition of communication skills. These key competences must allow students to achieve the set of knowledge, skills and abilities necessary for their personal fulfillment and their active integration in society. To this end, it is essential that the methodology established in the matter contributes to the achievement of the key competences detailed in the "Objectives" section.

On the other hand, the proposed activities must always bear in mind the diversity of the students in the classroom. It is essential that the design of these activities take into account the different learning rhythms, in order to promote the ability to learn by themselves. In the teaching of the subject, therefore, an active work in which the students participate constantly in the acquisition of their knowledge should be encouraged. This is achieved by working cooperatively in small groups, in which everyone is equally responsible and must actively collaborate with the rest of the group. Flexible and heterogeneous groupings can be made depending on the task and the individual characteristics of the students. To carry out this methodology it is necessary, first of all, to make the objectives that are expected to be achieved in each activity clear, which must always be raised through questions that allow establishing a dialogue and a first contact with the knowledge of the students.

It is necessary that the teacher provide all the necessary resources to carry out or solve the activities, and establish the guidelines for the presentation (either in writing or by carrying out a project) and the organization of the time available. Tasks that allow the meaningful use of reading and writing and the use of ICT, either through oral presentations or debates, should be favored. All of this should be aimed at developing critical and creative thinking skills. Thus, the teacher must become a mediator and facilitator of the learning process, and provide the necessary feedback to maintain the enthusiasm and motivation of the students.

LEARNING OBJECTIVES OF THE SUBJECT

Technological development shapes the current world we know. This context makes it necessary to train technicians in decision-making related to technological processes, with a critical sense, with the ability to solve problems related to it; in short, to use and learn about materials, processes and technological objects that facilitate the ability to act in a technified environment that improves our quality of life.

The innovation and the search for alternative solutions have facilitated progress, and the need for change has always been linked to the human being. For this reason, the Construction sector in which we live needs a broad technological education that facilitates the knowledge of the various technologies, as well as the techniques and scientific knowledge that support them.

It is, therefore, necessary to create a subject where the Technological part and specifically the Internet of Things and Big Data are part of the future challenges to respond to the challenges that new technicians will face. Provide coherence and complete the learning associated with the use of technologies by making an integrated treatment to achieve competent use in each context and associating specific and common tasks.

STUDY LOAD

Type	Hours	Percentage
Self study	45,0	60.00
Hours large group	30,0	40.00

Total learning time: 75 h

CONTENTS

Sensors

Description:

It develops the contents related to the various information and communication technologies, wired and wireless. It is intended to acquire skills in the use of basic tools and applications to search, download, exchange and publish information.

It is necessary to know how the existence of sensorization allows determining an adequate behavior of the building, with respect to the use of its spaces, and its facilities.

In this content we work:

1. Understand the Technological change that the new construction 4.0 entails
2. Know the types of sensors and their characteristics for the application in built buildings
2. Analysis and characteristics of communication languages
3. Present and future technologies in building sensorization.

Specific objectives:

1. Know and use patterns for software design.
2. Know the fundamentals of database management systems, as well as their correct logical and physical design.

Related activities:

Understand the Technological change that the new construction 4.0 entails

Know the types of sensors and their characteristics for the application in built buildings

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

Sensor networks

Description:

It deals with the development of knowledge about the components that make up the different sensorizations of a building. Recognize the different components of a building's facilities and understand their use and operation. Energy saving should be promoted.

Sensorization cannot be treated from a single point of view, it has to be understood as an information network that allows the maximum information available to be extracted.

In this content we work:

1. building typology
2. Complexity of network customization
3. Current and future technologies
4. Knowledge of available tools.
5. Analysis Systems

Specific objectives:

1. Know and use patterns for software design.
2. Know the fundamentals of database management systems, as well as their correct logical and physical design.
3. Ability to analyze components and their specifications for guided and unguided sensor systems.

Related activities:

Analysis and characteristics of communication languages
Present and future technologies in building sensorization.

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

Digitization of use

Description:

It deals with the industrial and domestic use of different electronic components. It allows students to know the basic electronic components, as well as to carry out simulations to analyze the behavior and the languages of use.

You have to know the tools that currently exist on the market to determine how they take advantage of these new data capture systems.

In this content we work:

1. Criteria and modeling hypotheses.
2. Computer programs.
3. Necessary tools to be able to face technological change.

Specific objectives:

1. Know and use patterns for software design.
2. Know the fundamentals of database management systems, as well as their correct logical and physical design.
3. Ability to analyze components and their specifications for guided and unguided sensor systems.
4. Ability to select specialized electronic circuits and devices for transmission, routing or routing and terminals, both in fixed and mobile environments.

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

Analysis of data

Description:

It refers to the study of systems with the ability to regulate their own behavior based on prior programming. It allows to bring several technologies closer to each other.

It is intended that the student knows the importance of data management in the information management structure that sensorization needs, a training based on the structuring of several databases will be determined to extract useful information.

In this content we work:

1. Analysis of data obtained by the sensorisation process in typical buildings

Specific objectives:

1. Know and use patterns for software design.
2. Know the fundamentals of database management systems, as well as their correct logical and physical design.
3. Ability to analyze components and their specifications for guided and unguided sensor systems.
4. Ability to select specialized electronic circuits and devices for transmission, routing or routing and terminals, both in fixed and mobile environments.
5. Ability to design interface devices, data capture and storage, and terminals for sensorization services and systems.

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

Determination of AI (artificial intelligence)

Description:

It tries to understand the social aspects of the technological phenomenon, both regarding its socioeconomic conditions and everything that affects its ethical, labor and environmental consequences. Students reflect on the different advances throughout history and the economic and environmental repercussions they have.

The next step to the correct structuring of the data is the exploitation of the same, in this sense artificial intelligence must play a key role in the process, and must be programmed by technical specialists in the construction sector that allows the extraction of adequate information to the use that you want to give.

In this content we work:

1. Use of artificial intelligence criteria to carry out advanced analyzes that allow knowing the behavior of the building and making the pertinent decisions by the technician.

Specific objectives:

1. Know and use patterns for software design.
2. Know the fundamentals of database management systems, as well as their correct logical and physical design.
3. Ability to analyze components and their specifications for guided and unguided sensor systems.
4. Ability to select specialized electronic circuits and devices for transmission, routing or routing and terminals, both in fixed and mobile environments.
5. Ability to design interface devices, data capture and storage, and terminals for sensorization services and systems.

Related activities:

DETERMINATION OF AI (Artificial Intelligence)

1. Use of Artificial Intelligence criteria to carry out advanced analysis that will allow to understand the behavior of the building and making the pertinent decisions by the technician.

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

GRADING SYSTEM

Continuous

BIBLIOGRAPHY

Basic:

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RESOURCES

Computer material:

- Nom recurs. Resource