

## 28628 - Sustainable Construction and Energy Efficiency in Buildings

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 28628 - Sustainable Construction and Energy Efficiency in Buildings

**Faculty / School:** 175 - Escuela Universitaria Politécnica de La Almunia

**Degree:** 422 - Bachelor's Degree in Building Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Compulsory

**Module:**

### 1. General information

**As a primary goal, the student should conclude the four-month period with an understanding of what is, how it is designed and how it is executed.**

Energy efficiency has become, in recent years, a primary objective both for administrations and for homeowners. Energy efficiency follows three basic principles:

- Reduction of energy demand: passive strategy, linked to the thermal envelope. Demand reduction is also achieved with proper management of indoor ventilation.
- Use of installations with maximum efficiency: active strategy, it considers the use of installations with the highest possible energy efficiency, taking into account that energy consumption is the result of the relationship between the demand of the building and the performance of its installations.
- Use of renewable energies, the satisfaction of demand through the use of renewable and clean energy sources

The following goals aligned with the following Sustainable Development Goals (SDGs) will be addressed primarily of the United Nations 2030 Agenda

Goal 3.9: Health and Wellness.

Goal 4.3-4.7.-4.c: Quality Education.

Goal 5.1-5.5-5.c: Gender Equality.

Goal 6.1-6.b: Clean Water and Sanitation.

Goal 7.1-7.b: Affordable and Clean Energy

Goal 8.2-8.8: Decent Work and Economic Growth

Goal 9.1-9.4-9.5-9.5-9.b: Industry, Innovation and Infrastructure.

Goal 11.1-11.c: Sustainable Cities and Communities

Goal 12.1-12.c: Responsible Production and Consumption

Goal 13.1-13.2-13.9: Climate Action

### 2. Learning results

Once the student has passed the subject, he/she must:

1.-KNOW the materials and traditional or prefabricated construction systems used in building, their varieties and the physical and mechanical characteristics that define them. BAMBOO, CORK, WOOD. ADOBE. MUD, MUD, THATCH, VEGETAL COVERINGS

2.-IDENTIFY the construction elements and systems, define their function and compatibility and their implementation in the construction process . Plan and solve construction details.

3.- KNOW the specific control procedures of the material execution of the building work.

4: HAVE the ability to apply technical regulations to the building process, and generate technical specification documents for building construction procedures and methods.

5: HAVE Aptitude to apply the specific regulations on installations to the building process.

6: INTERVENE in the ENERGY REHABILITATION of buildings and in the restoration and conservation of the built heritage . KNOWING the professional work of "Building Energy Manager"

- 7: CERTIFY energy certification of buildings.
- 8: DESIGNING ENERGY PASSIVE and Sustainable buildings.
- 9: KNOW the professional work of "Building Energy Manager"

### 3. Syllabus

Presentation of practical work.

Practical Work 1. Integral rehabilitation of a building from the point of view of energy efficiency.

Unit I Introduction and regulatory context: 2 school days

Unit II Fundamentals of solar radiation: 3 school days

Unit III Bioclimatic Architecture 2 teaching days

Unit IV PASSIVHAUS: 3 school days

Unit V ENVIRONMENTAL CERTIFICATIONS: 2 school days

Exam of the first midterm exam of the subject. Unit I, II, III, IV, V

Unit VI Energy Certification. 2 school days.

Unit VII Energy rehabilitation of buildings. 2 school days

Unit VIII Renewable Energies in Building 2 teaching days

Unit IX Efficient installations: 3 school days

Unit X Infiltrations and Thermography: 2 school days

Unit XI Bioconstruction: 2 school days

Unit XII Sustainable Urban Planning: 1 school day.

Examination of the second midterm exam of the subject. Units VI, VII, VIII, IX, X, XI

Delivery of practical work

Final test of the subject.

This planning proposal may be varied at the teacher's discretion according to pedagogical needs.

### 4. Academic activities

#### - Master class as theoretical content

The contents of the subject are presented in class.

#### - Practical class

Visits are made to different building energy rehabilitation works

#### - Practical seminars

Time is dedicated within each theory class to solve problems that arise during practical work

#### - Exhibition of work by the student.

The student presents the results of his work in class

#### -Assessment tests

The weekly timetable of the subject can be found at [www.eupla.unizar.es](http://www.eupla.unizar.es)

Final exam dates will be as officially published at: [www.eupla.unizar.es/index.php/secretaria-2/informacion-academica/distribucion-de-examenes](http://www.eupla.unizar.es/index.php/secretaria-2/informacion-academica/distribucion-de-examenes)

### 5. Assessment system

Students may choose between a continuous assessment process or a global assessment.

#### Continuous assessment system

The continuous assessment system will include the following group of gradable activities:

The attendance to the classes, indicated by UNIZAR, will be taken into account (80%) the active participation of the student, answering to the questions punctually posed by the teacher in the daily course of the class, their fluency and oral expression when expressing in public the works and the qualification of the proposed theoretical-practical exercises.

**Contribution to the final grade of the subject 10%**

Work to be done by the student: Throughout the term, the student will have to carry out several tasks to be solved individually or in groups.

**Contribution to the final grade of the subject 30%**

**Written evaluative tests:**

These tests will include theoretical and/or practical questions, of the different subjects to be assessed, their total number will be of two distributed throughout the semester

Each of these tests will contribute 30% to the final grade of the subject.

**Contribution to the final grade of the subject 60%**

**Global final assessment test (not continuous):**

For those students who do not adopt the continuous assessment process, the following tests will be given:

**Presentation and exhibition of an individual work:**

The paper must be submitted in writing on the day of the tests and then presented orally.

It will be scored from 0 to 10 and will contribute 30% to the final grade. The assessment criteria are the same as for the face-to-face students.

**Contribution to the final grade of the subject 30%**

**Final written test:**

They will include the resolution of theoretical questions posed, considering not only the correct resolution of the questions posed, but also the order and structure of the answers, as well as the clarity of the exposition.

In the final test, a theoretical and a practical part may be taken, at the discretion of the teacher in charge of the subject.

**Contribution to the final grade of the subject 70%**

In the final test, the previous presentation of the work may be omitted, at the discretion of the teacher of the subject.