

## 69965 - Air handling unit design in dual mention

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 69965 - Air handling unit design in dual mention

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura

**Degree:** 657 - Master in Mechanical Engineering

**ECTS:** 3.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Optional

**Module:**

### 1. General information

#### Objectives of the subject

The subject will provide students with the necessary resources to be able to design Air Handling Units (AHUs), essential equipment in building air conditioning installations.

With the concepts taught, the student will be able to assess and use the specific regulations on AHUs. The notions of air quality will be enhanced, as well as the psychometric processes necessary to achieve it: ventilation, filtering, heat recovery, freecooling, heating and cooling of the air.

The different applications and uses of the AHUs will be analysed and the criteria for selecting air conditioners, their integration into the building, their installation and maintenance will be taught.

The Dual Mention takes advantage of the knowledge and human and material resources available to the company to strengthen the integration of the learning of technologies with their practical application in a company.

#### Recommendations for taking the subject

In order to achieve the objectives planned in the subject, it is highly recommended that the student has previously passed the subject of the Sectorial Optional Itinerary of Air Conditioning: Air conditioning systems

### 2. Learning results

1. Recognise and assess specific calculation and simulation techniques and methodologies for the design of Air Handling Units (AHUs).
2. Project, calculate, design and control components for AHUs.
3. Successfully apply calculation, simulation and optimisation techniques in ventilation and air conditioning installations.
4. Collect, analyse and interpret information on the state of the art and applicable legislation to design, develop and improve AHU facilities.
5. Teamwork: Actively collaborate with a group of people to design AHUs.

### 3. Syllabus

In each Individual Training Plan, the specific objectives and milestones of the subject in the company are specified. There is a tutor in the company, who ensures the learning of technologies and work methodologies and their application to the company's production processes and products.

#### Syllabus

1. Psychrometry and its processes.
2. Air quality in buildings. Fundamentals of ventilation. Filtering systems.
3. Construction characteristics of AHUs. Mechanical resistance of the housing. Transmittance thermal of the envelope. Watertightness. Acoustic insulation.
4. Components of the AHUs:
  - a. Ventilators.
  - b. Heat recovery systems.
  - c. Regulation and freecooling gates.
  - d. Filtration.
  - e. Heat and cold batteries.
  - f. Humidity control.

g. Control.

4. Analysis of the different applications and uses of AHUs, selection criteria and design programs.
5. Installation and maintenance of the AHUs.

## Practices and visits

1. Design of Air Handling Units for building ventilation.
2. Design of Air Handling Units for building air conditioning

## 4. Academic activities

- Participatory master class. (10 hours)
- Laboratory and computer practices, in small groups. (16 hours)
- Special practices. Visits to unique companies and buildings. (4 hours)
- Visits will be made to companies that manufacture UTAs and to unique buildings that have them incorporated
- Personalized teacher-student tutoring. The teacher will publish a schedule of tutorials.
- Study and personal and team work. (42 hours)
  - Study of theory, exercises, questions and problems in addition to those solved in class. This encourages autonomous work, studying the subject and applying it to the resolution of the cases raised. This directed activity, but of autonomous execution, is fundamental in the student's learning process and for the passing of the evaluation activities.
  - Preparation of work and practice reports, individually or through teamwork, as indicated in each activity.
- Evaluation tests. (3 hours)

The alternating contract includes the schedule that the student must remain at the university centre to attend training activities. During the working day in the company, a programme of activities is also agreed to achieve the objectives and milestones specified in the Individual Training Plan.

## 5. Assessment system

The subject is preferably proposed with a **continuous assessment** that consists of three blocks:

1. Evaluation of practices. (50%, minimum grade 4/10) Eventually, some practice can be carried out by taking advantage of the company's resources.
2. Evaluation of the practical work/projects and their presentation (oral) (50%, minimum grade 4/10) The subject work is developed on technical cases of the company. The adjustment of its scope and the assessment criteria are established between the professor responsible for the subject and the company tutor.

If the minimum marks are not exceeded, there is the possibility of recovery in the same date set for the global exam.

The student also has the possibility of passing the subject through the **global evaluation** in the official calls. The evaluation will be carried out by means of a theoretical-practical test on the dates established by the center.

## 6. Sustainable Development Goals

- 7 - Affordable and Clean Energy
- 9 - Industry, Innovation and Infrastructure
- 12 - Responsible Production and Consumption