

## **69964 - HVAC heating, ventilation and air conditioning in dual mention**

### **Syllabus Information**

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**Academic year:** 2024/25

**Subject:** 69964 - HVAC heating, ventilation and air conditioning in dual mention

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

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

**ECTS:** 3.0

**Year:** 1

**Semester:** First semester

**Subject type:** Optional

**Module:**

### **1. General information**

#### **Objectives of the subject**

The main objective of this subject is for the student to know the typology of air conditioning systems, their components and their advantages and disadvantages in order to be able to select the most appropriate solutions and the main calculations for sizing in each case.

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**

Basic knowledge of thermal engineering.

### **2. Learning results**

1. Properly interpret the typology of HVAC systems and their components
2. Evaluate the thermal energy transport factors in each system
3. Analyze advantages and disadvantages of each type of system
4. Evaluate for each case study which system is most suitable

### **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. Classification of HVAC systems.
2. All-air systems.
3. Water-to-air systems.
4. Energy transport in HVAC systems.
5. Selection factors.
6. Examples: case studies and outlines of principle.

#### **Laboratory practices**

1. Energy transport in HVAC systems.
2. Schemas of principle

### **4. Academic activities**

- Participatory master class. (14 hours)
- Troubleshooting and technical cases. (6 hours)
  - Taught to the whole group, the teacher explains the basic principles of the subject and

It solves problems representative of the application to realistic cases of professional practice. The participation of the students is sought.

- Laboratory and computer practices, in small groups. (6 hours)
- Special practices. Visits to companies, laboratories and research centres. (4 hours)
- Visits will be made to companies that manufacture terminal units and to buildings with different air conditioning systems at the University itself or outside.
- 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) The student becomes familiar with HVAC systems, with the collection and analysis of experimental data and computer tools. Apply the procedures of the matter. The practices will be evaluated by taking a test at the end of the session. Eventually, some practice can be carried out by taking advantage of the company's resources.
2. Practical work/projects (50%, minimum grade 4/10) There will be 1 delivery of tutored work that the student must later present and defend in an oral session during which they present the resolution and analysis of results as well as answer questions posed by the teacher about their resolution. 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.

In the event of not exceeding the minimum marks, there is the possibility of recovery on the same date established 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
- 11 - Sustainable Cities and Communities