

## 28953 - Agri-food industry installations

### Syllabus Information

**Academic year:** 2024/25

**Subject:** 28953 - Agri-food industry installations

**Faculty / School:** 201 - Escuela Politécnica Superior

**Degree:** 583 - Degree in Rural and Agri-Food Engineering

**ECTS:** 6.0

**Year:** 4

**Semester:** First semester

**Subject type:** Optional

**Module:**

### 1. General information

The aim is to study the auxiliary water and energy supply systems for processes in the agri-food industry. On the one hand, the hydraulic installations for pressurized air, ventilation and supplies of fuel gases are studied. On the other hand, heat and cold production facilities are analyzed. Another objective is the application of current regulations to the design of this type of installations.

These objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>), specifically, the learning activities planned in this subject will contribute to the achievement of target 7.2, target 9.4, and target 13.3.

### 2. Learning results

1. Recall the basic concepts that constitute the essence of the various auxiliary water and energy supply systems used in the food industry.
2. Resolve issues related to the hydraulic design of fuel gas pipelines.
3. Design ventilation systems for different types of premises.
4. Interpret and handle tables, diagrams and software (EES) with databases of physical and thermodynamic properties of substances and fluids.
5. To analyze different thermodynamic circuits, identifying the different devices and auxiliary elements, as well as the appropriate selection criteria suitable for each case.
6. Differentiate the properties, risks and field of application of fuels and refrigerants frequently used in the food industry.
7. Calculate the heat balance of heating and cooling installations in the food industry.
8. Select through online catalogs the necessary equipment for the water and energy supply of the agri-food industry.
9. Apply the standards and regulations in force in the field of the installations studied.
10. Prepare assignments and reports of computer and laboratory practices making appropriate use of ICTs(word processing, spreadsheet, bibliographic searches on the Internet) of the cases presented and the practices carried out.

### 3. Syllabus

**Unit 1:** Hydraulic installations in the agri-food industry

**Unit 2:** Energy installations in the agri-food industry

**Unit 3:** Heat production

**Unit 4:** Fuels

**Unit 5:** Cold production

**Unit 6:** Refrigerants

**Unit 7:** Heat balance of a refrigeration plant

**Unit 8:** Refrigeration compressors

**Unit 9:** Capacitors

**Unit 10:** Evaporators

**Unit 11:** Rules and Regulations

### 4. Academic activities

**Theory and Problems (50 h):** Attendance to theory classes and problem solving.

**Laboratory and computerized practices (10 h):** 5 practical sessions will be held.

**Study and independent work (84 h).** During this non-attendance mode, students will dedicate themselves to personal study.

**Assessment (6 h).**

**Tutoring.** They may be face-to-face or virtual.

## 5. Assessment system

The assessment system will be global, considering:

### 1. Theory exam and problems

*1st and 2nd Call*

It will consist of two parts: theory and problems. Only grades greater than or equal to 4 will be compensated. The grade of the test will be weighted between the two parts: theory (40%) and problems (60%), and cannot be lower than 4 in order to be compensated by the rest of the activities that are evaluated. This grade will account for **70% of the final grade**.

### 2. Laboratory and computer-based practical exams

*1st and 2nd Call*

If the student has completed all the practices, the evaluation will be carried out by submitting the practice reports, which will be delivered on the established date. The grade obtained, which cannot be lower than 3 in order to be compensated by the rest of the activities that are evaluated, will represent **30% of the final grade**.

Students who have not previously taken the laboratory practicals, who have not submitted the reports on the established date, and/or who want to improve their grade, will be summoned, the same day and at a different time than the theory and problems exam, to take the practical exam and will have to perform some parts of the practicals contemplated in the program and answer a questionnaire. For this, the student will only be able to consult the scripts of the practices. This test will account for 30 % of the grade, being necessary a minimum grade of 3 to be able to be compensated by the rest of the activities that are evaluated.

The success rates for the subject in the last three years are: 2020/21: 100%; 2021/22: 100%; 2022/23: 100%.

## 6. Sustainable Development Goals

7 - Affordable and Clean Energy

9 - Industry, Innovation and Infrastructure

13 - Climate Action