

28938 - Fundamentals of food technology

Syllabus Information

Academic year: 2024/25

Subject: 28938 - Fundamentals of food technology

Faculty / School: 201 - Escuela Politécnica Superior

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

ECTS: 6.0

Year:

Semester: Second semester

Subject type: Optional

Module:

1. General information

This subject provides the necessary knowledge on the composition, quality parameters, methods of analysis, alteration agents and the fundamentals of the food preparation, preservation and transformation processes. The aim is to enable the student to select the most appropriate technology for the processing and preservation of a food product, taking into account the advantages, limitations, disadvantages and suitability for the use of their choice.

These approaches and objectives are aligned with some of the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (<https://www.un.org/sustainabledevelopment/es/>), specifically, the learning activities planned in this subject will contribute to the achievement of target 9.4 of Goal 9, and target 12.3 of Goal 12.

2. Learning results

1. Describe the main components of foods and their physicochemical, microbiological and sensory properties.
2. Recognize the main mechanisms of food spoilage and strategies to minimize them.
3. Know and apply the fundamentals of bromatological, microbiological and sensory analysis of foods.
4. Know the main preservation strategies, their mechanisms of action, the parameters that determine their efficacy and their effects on food properties.
5. Know and apply the techniques and equipment normally used for food preservation and processing.
6. Acquire, develop and exercise skills necessary for the chemical, physical and microbiological analysis of food.
7. Elaborate results obtained from the observation and measurement of physical and chemical properties and changes during food processing.
8. Apply the basic knowledge acquired in the calculation of food preservation treatments.

Learning results 1, 2, 3, 4, 7 and 8 align with the SDGs, in particular with target 12.3 and outcomes 5, 6 with target 9.4.

3. Syllabus

DIDACTIC UNIT 1. INTRODUCTION, QUALITY PARAMETERS AND FOOD COMPONENTS

Topic 1. Introduction

Topic 2. Food components

Topic 3. Food quality parameters

Topic 4. Physical and chemical analysis of food

DIDACTIC UNIT 2. FOOD SPOILAGE AGENTS

Topic 5. Physical and chemical agents of food spoilage

Topic 6. Biological agents of alteration

DIDACTIC UNIT 3. FOOD PREPARATION, PROCESSING AND PACKAGING OPERATIONS

Topic 7. Food preparation and processing operations

Topic 8. Food packaging

DIDACTIC UNIT 4. FOOD PRESERVATION PROCESSES

Topic 9. Fundamentals of food processing by heat

Topic 10. Fundamentals of food preservation by lowering the temperature: refrigeration and freezing
Topic 11. Fundamentals of conservation by lowering water activity

Topic 12. Fundamentals of conservation by modification of the atmosphere

Topic 13. Chemical preservation, acidification preservation and fermentations

Topic 14. Other food preservation or decontamination technologies

4. Academic activities

Lectures: 30 hours

Theoretical sessions where the contents of the subject will be explained

Laboratory practices: 15 hours

Practical sessions in the laboratory and Pilot Plant (food analysis methods, quality parameters and equipment used for food preservation and processing).

Problem solving and case studies: 15 hours

Calculation, adjustment and optimization of heat treatments

Methods used for the preservation of a given food, formulation and legal requirements.

Study: 87 hours

Assessment 3 hours

All activities are aligned with SDGs 12 and 9, in particular target 12.3 and target 9.4.

5. Assessment system

The subject will be evaluated in the **continuous assessment** mode by means of the following activities:

- **Intermediate tests** (65% of the grade, minimum 5 out of 10).

They will consist of two individual theoretical-practical written tests throughout the semester. The tests will consist of 5 short questions and 10 simple answer test questions and 1 theoretical-practical case. The multiple-choice questions will be of simple answer. In the short answer questions, the correctness and synthesis capacity in the answer will be valued.

In the qualification of the theoretical-practical assumptions will be valued the correctness of the approach, the results obtained as well as the order, presentation and interpretation of the same.

- **Laboratory practicals** (15% of the grade, minimum 5 out of 10).

There will be several laboratory practices distributed throughout the semester. The following aspects will be evaluated:

- Handling of laboratory material and techniques and solutions provided to the problems encountered.

- Report made at the end of each practice.

- Student autonomy and participation.

- **Project** (20 % of the grade, minimum 5 out of 10)

During the problem solving sessions and case studies, team work will be proposed to be developed throughout the subject in classroom and laboratory sessions. The following aspects will be evaluated: formal aspects of presentation (order, clarity, correct use of bibliographic sources), adequate presentation of the results (graphs, tables, statistical analysis), preparation of the material and handling of the analytical techniques, order and clarity in the oral presentation.

If the student has not passed any of these activities during the semester, they will have the opportunity to pass the course by means of a global test in two the subject by means of a **global test** in the two official calls.

The global test will consist of a written exam including 20 multiple-choice questions, 10 short questions and 2 theoretical and practical assumptions on the contents covered in the theoretical and practical sessions of the subject and its weight on the overall grade will be of 80% (65% theoretical questions and 15% practical questions) and a second activity which will be the delivery and defense of the work (20% of the overall grade).

The detailed assessment system will be explained in the presentation of the subject.

All planned activities contribute to the evaluation of the two SDGs that define the subject, target 9.4 and 12.4. Both goals are totally or partially evaluated in all the programmed assessment activities and contribute to the overall grade of 32.5% for the theoretical tests, 7.5% for the practical assessment and 10% for the tutored work. At the weight of the overall test is 50%.

The success rates for the subject in the last three years are: 2020/21: 100%; 2021/22: 100%; 2022-2023: 100%.

6. Sustainable Development Goals

9 - Industry, Innovation and Infrastructure

12 - Responsible Production and Consumption