

**Quality Systems and Environmental Management  
Tools**

Code: 103244  
ECTS Credits: 6

Degree	Type	Year	Semester
2501925 Food Science and Technology	OB	4	1

**Contact**

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**Use of Languages**

Principal working language: spanish (spa)  
Some groups entirely in English: No  
Some groups entirely in Catalan: No  
Some groups entirely in Spanish: No

**Other comments on languages**

The environmental management tools and quality standards will be taught in Catalan (70%). Certifiable food safety standards and quality seminars will be taught in Spanish (30%).

**Teachers**

Montserrat Mor-Mur Francesch  
Raquel Barrena Gomez

**Prerequisites**

Have previously studied subjects of hygiene, food technology and human nutrition.

**Objectives and Contextualisation**

1. Describe the fundamental concepts, the historical foundations and the bibliographic bases.
2. Demonstrate that you know the fundamental bases of industrial ecology and waste management.
3. Identify the different wastewater treatment systems and their characterization.
4. Interpret the different types of atmospheric pollutants and their treatments.
5. Demonstrate that you know the different quality assurance and security programs and your organization.
5. Interpret the corresponding certificates and documentation.
6. Discriminate the relevant information and the audit procedure.
7. Analyze the safety certification, its bases and its application.

## Competences

- Adopt an ethical stance and attach importance to quality in work.
- Apply the processes of evaluation, management and communication of food risk to all agrofood sectors.
- Apply the scientific method to resolving problems.
- Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
- Design, institute and audit quality systems applicable to food companies.
- Develop individual learning strategies and planning and organisation skills.
- Plan by-product and waste treatment and recycling systems from criteria of sustainability and respect for the environment.
- Provide auditing and legal, scientific and technical advisory services to the agri-food industry.
- Search for, manage and interpret information from different sources.
- Select the appropriate analytical procedures (chemical, physical, biological and sensory) in accordance with the objectives of the study, the characteristics of the analytes and the fundamental principles of the technique.
- Show sensitivity to environmental, sanitary and social issues.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Work individually or in unidisciplinary and multidisciplinary teams and in international contexts.

## Learning Outcomes

1. Adopt an ethical stance and attach importance to quality in work.
2. Apply the scientific method to resolving problems.
3. Communicate effectively with both professional and non-professional audiences, orally and in writing, in the first language and/or in English.
4. Compare the various quality systems applicable to process and product.
5. Describe the environment-related problems of the food industry.
6. Develop individual learning strategies and planning and organisation skills.
7. Enumerate all the stages of the food supply chain that lead to the attainment of overall food quality, including those of workers' safety.
8. Explain the toxic and environmental hazards deriving from food-processing by-products.
9. Identify conformities, non-conformities and irregularities during an audit process.
10. Identify the underlying principles, the characteristics and the uses of the different systems for treating waste in the form of liquids, solids and gases.
11. Interpret and justify the scope of quality reports.
12. Interpret findings from trials used in studies on quality.
13. Propose traceability and documentation methodologies for processes and products.
14. Search for, manage and interpret information from different sources.
15. Show sensitivity to environmental, sanitary and social issues.
16. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
17. Validate standardised work procedures .
18. Work individually or in unidisciplinary and multidisciplinary teams and in international contexts.

## Content

1. Introduction. Basics Bibliography.
2. Tools for minimization. Industrial Ecology, Cleaner Production, Life Cycle Analysis.
3. Waste management. Type of waste, waste management and coding, main waste treatments: composting, anaerobic digestion, thermal treatments.

4. Waste water management and treatment. Characterization of wastewater, main physical, chemical and biological parameters. Main basic operations of wastewater treatment: primary treatments, biological processes, chemical processes.
5. Emissions to the atmosphere. Main atmospheric pollutants: particles, gases and odors. Main basic operations of atmospheric emission treatment.
6. Global quality assurance. Quality assurance programs. Staff and organization.
7. Audits and accreditation. Certificates and documents. Specific cases of certification. Foods with healthy properties, GMOs and others.
8. Food quality and safety. The quality standards applied to food safety.
9. From HACCP to security certification. BRC, IFS, ISO 22000 standards and others.
10. Supplier relationship - client. The audit of the system.

## Methodology

### Seminars

9 hours of seminars and discussion of problems:

- 6 hours seminars to solve problems related to environmental management tools.
- 4 hours of seminars related to the auditable standards of quality and food safety. The dynamics of the works and the rules of accomplishment will be defined.

Autonomous activities: preparation of the subject based on material that will be given by the professor or bibliography to be able to work later on Cases of Study in class.

### Practical works

- Preparation of the subject based on material that will be given by the professor or bibliography to be able to work later, with cases of study in class.
- Work based on the discussion between suppliers and clients in different situations of conflict, related to quality audits and food security. This work will be carried out in a group. Finally, these works will be presented in class for 10 minutes.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Seminars	11	0.44	1, 4, 3, 15, 7, 8, 9, 11, 12, 13, 18, 17
Theoretical teaching in environmental management tools	18	0.72	2, 1, 14, 15, 5, 6, 10, 12, 18
Theoretical teaching in quality and food safety	18	0.72	2, 1, 14, 4, 15, 6, 7, 8, 9, 11, 12, 13, 18, 17
Type: Autonomous			

Cases of the subject	71	2.84	2, 1, 14, 4, 3, 15, 6, 7, 8, 9, 11, 12, 13, 18, 17
Problems worked in class	30	1.2	2, 1, 14, 3, 15, 5, 6, 10, 18

## Assessment

The evaluation of the student will be based on the following distribution:

1.- Theoretical tests (theoretical examination) .....	50%
1.1.- Examining environmental management tools .....	25%
1.2.- Quality test .....	25%
2.- Practical tests .....	40%
2.1.- Cases .....	15%
2.1.1- Oral presentation .....	5%
2.1.1- Written works .....	20%
3.- Assistance to mandatory activities .....	10%

NOTE: It is necessary to pass the theoretical exam to be able to pass the subject.

To carry out the assessment, a theoretical exam will be carried out with short questions or test questions.

The practical tests will be derived from:

The continuous evaluation of the assistance to the practices.

Completion of practical work will be presented throughout the semester.

Oral presentations

Each group will present their works orally on the day and time they are communicated, in accordance with the calendar. However, if the number of students is very high, they will only show the best work, according to the availability of hours and the criteria of the teaching staff.

Once the first part of the subject (environmental management tools), a partial exam will be carried out, which will represent 25% of the subject's grade. Finally, when the theoretical content is completed, there will be a second partial exam (quality and safety), which will represent the other 25% of the qualification.

Students who do not pass the subject, average of the two parts of the subject, should carry out a new theoretical examination of recovery or return to present the practical work. Once the subject is evaluated, each student will be indicated which is the part of the subject that is passed or which must be recovered, if necessary.

Students not present in any of the evaluations, will have to carry out a new theoretical examination of recovery or will return to present the cases not presented. This new evaluation will be at the same time as recovery assessments.

It will be considered that a student is not evaluable if he has participated in assessment activities that represent  $\leq 15\%$  of the final grade.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance to mandatory activities	10% of the	0	0	1, 4, 15, 5, 7, 8, 10,

	final grade			9, 11, 13, 18, 17
Practical work on The vision of the supplier and the client of food products in relation to quality and food safety	25% of the final grade	0	0	16, 2, 1, 14, 4, 3, 15, 6, 7, 8, 9, 11, 12, 13, 18, 17
Resolution of problems related to cases Environmental management tools	15% of the final grade	0	0	2, 1, 14, 3, 15, 5, 6, 10, 18
Theoretical evaluation of environmental management tools	25% of the final grade	1	0.04	1, 15, 5, 10
Theoretical evaluation on quality and safety	25% of the final grade	1	0.04	4, 15, 7, 8, 9, 11, 13, 17

## Bibliography

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Martínez-Costa M., Martínez-Lorente A.R., Choi T.Y. 2008. Simultaneous consideration of TQM and ISO 9000 on performance and motivation: An empirical study of Spanish companies. Int. J. Production Economics 113:23-39.

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Wark, K., Warner, C.F. Contaminación del aire. Origen y control. Ed. Limisa. 1998.

## Software

We will not use any specific software for this subject.