

Academic Year/course: 2022/23

## 28917 - Ecology and management of agro-industrial byproducts

### Syllabus Information

**Academic Year:** 2022/23

**Subject:** 28917 - Ecology and management of agro-industrial byproducts

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

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

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

## 1. General information

## 2. Learning goals

## 3. Assessment (1st and 2nd call)

### 3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that he/she has achieved the expected learning outcomes through the following assessment activities.

The assessment will be carried out on the dates marked by the EPS.

#### ECOLOGY PART

In the ecology part, the continuous evaluation consists of 3 parts: partial exam, practical notes and questionnaires.

(1) Partial exam: When the ecology part is finished, there will be a partial exam that will include only the theory part. Students who have passed this exam (grade higher than 5 out of 10) may not take the theory part of the final exam. Students who fail or do not take the theory part of the final exam will have to take the theory part of the final exam.

(2) Practicum grade: the practicum grades will depend on the group work (70%) and on the grades of the reports/questionnaires of each practicum (30%). Students who fail, do not hand in the group work or have not attended the required face-to-face activities (80%) will have to take the practical part of the exam.

(3) Quizzes: During the course a series of readings and quizzes will be made available to the students (for a limited time).

The final grade for the ecology part (CF-Eco) will be determined by the following equation:

$$\text{CF-Eco} = 0.4 * \text{Practical grade} + 0.4 * \text{Theory grade} + 0.2 * \text{Questionnaires.}$$

In order to pass in the continuous evaluation format, students must have a grade higher than 5.0 in the partial exam and in the practicals.

In the case that the requirements of the previous section are not met (having reached 5.0 in each activity) or CF-Eco is lower than 5, the students will have to take the global exam of the failed part. In the case of not presenting the final grade will be:

If CF-Eco  $\geq$  4, the final grade will be: Failed (4.0)

If CF-Eco  $<$  4, the final grade will be: Fail (CF-Eco)

#### AGRO-INDUSTRIAL BY-PRODUCTS MANAGEMENT PART.

Continuous evaluation:

GSA Practices: will count 20% of the grade of the GSA part, and will be calculated according to the following weighted grades:

Laboratory practices (composting process): A report on the process will be handed in. The grade of this report will count 50% of the final grade of the GSA practices.

Computer practicals: A report will be handed in at the end of the practical. Practice 2 will count for 20% of the grade and practice 3 will count for 30% of the final grade of the GSA practices.

2. Group work: It will count 20% of the grade of the GSA part. The work on Agroindustrial Byproducts Management will be evaluated by means of a public presentation of about 10 minutes and subsequent defense. The degree of compliance with the proposed objectives, the procedure developed, the clarity of the exposition and the mastery of the subject demonstrated during the defense will be evaluated.

3. Agroindustrial Byproducts Management Exam: It will count 60% of the grade of the GSA part. The student will have to take a theory exam that will include standard questions and other theoretical-practical questions (questions and problems), representative of the global subject that has been covered throughout the course.

A minimum grade of 5 out of 10 in all parts (GSA practices, group work and exam) will be required to make the average with the rest of the tests taken.

ATTENTION: In case the student rejects the continuous evaluation option, in order to pass the Agroindustrial By-products Management part, the student will have to take a practical exam, a theory exam and an individual work equivalent to the group work. The teaching staff of the course recommends class attendance and the completion of classroom practices whenever possible.

In the case that the requirements of the continuous evaluation are not met (having reached 5.0 in each activity) or CF-GSA is lower than 5, the students will have to take the global exam of the failed part. In the case of not presenting the final grade will be:

If CF-GSA  $\geq$  4, the final grade will be: Failed (4.0)

If CF-GSA  $<$  4, the final grade will be: Fail (CF-GSA)

#### CRITERIA FOR PASSING THE ENTIRE COURSE:

? To pass the whole course, students must have a grade higher than 5.0 in both parts, Ecology and By-product Management.

? The final grade of the course (CA) will be determined by the following equation:  $CA = 0.5 \times \text{Ecology grade} + 0.5 \times \text{By-product Management grade}$ .

? In order to pass ( $CA \geq 5$ ) it is essential that:

o Ecology grade  $\geq 5,0$

o By-product Management Grade  $\geq 5,0$ .

? In the event that the requirements of the previous section are not met (having reached 5.0 in each part), the final grade will be obtained as follows:

o If  $CA \geq 4$ , the final grade will be: Fail (4.0)

o If  $CA < 4$ , the final grade will be: Fail (CA)

The evaluation activities will include some activities specifically related to SDGs 12, 13 and 1.

In relation to the SDGs, their evaluation is carried out in all the activities of the subject.

The success rate in the subject for the last three courses is 96.43% (course 18-19), 96.43% (course 19-20) and 83.33% (course 20-21).

## 4. Methodology, learning tasks, syllabus and resources

### 4.1. Methodological overview

The learning process designed for this subject consists of:

- Lectures. Teacher lectures in which participation of the students will be encouraged. Lectures from external experts could be included if available or relevant.
- Practical sessions in ecology will consist of: Practical onsite classroom sessions, a group meeting with the teacher and a field trip.
- Practical activities in ?Gestión de subproductos agroindustrial will consist of: group meetings with the teacher, problem-solving and study cases in the classroom and computer lab and visits to agricultural and cattle industry facilities

Throughout the entire course, in both theory and practical sessions, activities related to SDGs 12 (Responsible production and consumption), 13 (Climate change) and 15 (Forests, desertification and biological diversity) will be developed.

### 4.2. Learning tasks

#### The course includes the following learning tasks:

- Lectures in the classroom. Mainly master lectures with teacher's questioning. The rest corresponds to invited speakers and seminars.
- Special practices. Visits to facilities related to the program
- Classroom practices. Students will previously receive information in order to be prepared for the practice. Some of them will be in computer classrooms.
- Tutorials. For the teacher's survey of the theory and practice, activities individual and team, tutorials will be available

- Reports. Teachers will offer different Ecology, Environmental and Agroindustrial By-products subjects to the students. They will write a report on these subjects, following the teacher's advice.
- In relation to the SDGs, all the learning activities of the subject allow achieving the learning outcomes related to them.

### 4.3. Syllabus

The course will address the following learning tasks:

Theory program

- Ecology
- Organisms and their environment.
- Population ecology.
- Interactions among species.
- Biogeochemical cycles
- Compost process as an ecosystem example.
- Ecosystem services
- Management of Agroindustrial by-products
- Introduction to Environmental Management
- Agroindustries
- Waste and Agroindustry By-products legislation
- Management of Agroindustry wastes
- The technology of slaughter and slaughter by-products
- The technology of cereals and cereal by-products

Practical program

- Ecology
- Practices focused on the recognition of ecological processes and ecosystems
- Management of Agroindustry by-products
- Design and control of a compost process. Part 1
- Start of the team report
- The search for agroindustry facilities affected by regulations
- Design and control of a compost process. Part 2
- Report presentation
- The approximate overall distribution of the hours of work is at the next table. It can be the subject to changes regarding the availability of facilities for practices and the specific yearly academic calendar.

### 4.4. Course planning and calendar

Calendar of on-site lectures and report presentations

A 6 ECTS subject will need an average of 150 hours of work. The following table shows a breakdown of the different activities.

	Ecology	By-products
Activity	Students hours	Students hours
<i>On-site hours</i>	30	30
Lecture	15	15
Classroom practices	10	10
Special practices	5 (fieldwork)	5 (facilities)
<i>Off-site work</i>	45	45
Tutorials	10	15
Study	32,5	27,5

<i>Evaluation</i>	2,5	2,5
<b>Total</b>	<b>75</b>	<b>75</b>

The distribution of the different types of activities is shown in the following table. This distribution is indicative as it is subject to possible changes due to the availability of the facilities for practical classes, the availability of the facility to be visited and the holidays of the 2022/2023 academic calendar.

Tipo actividad / Semana	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Actividad Presencial</i>															
Teoría	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Problemas	2	2	2	2	2	2	0,5								
Prácticas laboratorio							0,5	2	2	2	2	2	2		
Trabajos en grupo															
Salidas de prácticas														5	
Tutorías ECTS															
Evaluación															3
<i>Actividad No presencial</i>															
Trabajo individual	4	4	2	4	4	2	4	3	2	2	2	2	2	1	1
Trabajo en grupo			2			2	1	1	2	2	2	2	2		2
<b>TOTAL</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>

#### 4.5. Bibliography and recommended resources

- BB** Begon, Michael. Ecology : from individuals to ecosystems / Michael Begon, Colin R. Townsend, John L. Harper. 4ª ed. Malden, MA : Blackwell Pub., cop. 2006 [Comentario del profesor: O cualquiera de sus ediciones]
- BB** García Morales, José Luis, coord. De residuo a recurso. El camino hacia la sostenibilidad. I. Recursos orgánicos. 3. Residuos agroalimentarios. Madrid: Mundi-Prensa, 2014 [Comentario del profesor: libro electrónico]
- BB** Smith, Thomas Michael. Elements of ecology / Thomas M. Smith, Robert Leo Smith. 9th. ed., global ed. Boston [etc.] : Pearson Education, cop. 2015
- BB** Tchobanoglous, George. Gestión integral de residuos solidos / George Tchobanoglous, Hilary Theisen, Samuel Vigil ; traducción y revisión técnica Juan Ignacio Tejero Monzón, José Luis Gil Diaz, Marcel Szanto Narea. [1a. ed. en español, reimpr.]. Madrid [etc.] : McGraw-Hill, D.L. 1996
- BC** Castells, J.E. Aprovechamiento de residuos agrícolas y forestales. Madrid: Díaz de Santos, 2012 [Comentario del profesor: libro electrónico]

- BC** Sánchez Báscones, Mercedes, coord. De residuo a recurso. El camino hacia la sostenibilidad. I. Recursos orgánicos. 2. Residuos ganaderos. Madrid: Mundi-Prensa, 2016 [Comentario del profesor: libro electrónico]
- BC** Vargas García, M<sup>a</sup> Carmen, coord. De residuo a recurso. El camino hacia la sostenibilidad. I. Recursos orgánicos. 1. Residuos agrícolas. Madrid: Mundi-Prensa, 2014 [Comentario del profesor: libro electrónico]

#### LISTADO DE URLs:

Guía técnica para la clasificación de residuos peligrosos (MITECO 2021)

[[https://www.miteco.gob.es/images/es/guiatecnicaclasificacionderesiduosnov\\_21\\_tcm30-509157.pdf](https://www.miteco.gob.es/images/es/guiatecnicaclasificacionderesiduosnov_21_tcm30-509157.pdf)]

Guías de Mejores Técnicas Disponibles por Sectores. Ministerio de Medio Ambiente y Medio Rural y Marino

[<http://www.prtr-es.es/documentos/documentos-mejores-tecnicas-disponibles>]

Ley 22/2011, de 28 de julio, de residuos y suelos contaminados

[<http://www.boe.es/boe/dias/2011/07/29/pdfs/BOE-A-2011-13046.pdf>]

Real Decreto 815/2013, de 18 de octubre, por el que se aprueba el Reglamento de emisiones industriales y de desarrollo de la Ley 16/2002, de 1 de julio, de prevención y control integrados de la contaminación

[<https://www.boe.es/eli/es/rd/2013/10/18/815>]

Real Decreto Legislativo 1/2016, de 16 de diciembre, por el que se aprueba el texto refundido de la Ley de prevención y control integrados de la contaminación

[<https://www.boe.es/eli/es/rdlg/2016/12/16/1>]

The updated recommended bibliography can be consulted in:

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28917>