



Course guide

390432 - TBR - Biological Treatment of Waste

Last modified: 15/01/2024

Unit in charge: Barcelona School of Agri-Food and Biosystems Engineering
Teaching unit: 745 - DEAB - Department of Agri-Food Engineering and Biotechnology.

Degree: BACHELOR'S DEGREE IN BIOSYSTEMS ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: Lopez Martinez, Marga

Others: Lopez Martinez, Marga
Huerta Pujol, Oscar

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. Biological processes for treating of organic waste.

Transversal:

2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 3. Taking social, economic and environmental factors into account in the application of solutions. Undertaking projects that tie in with human development and sustainability.

TEACHING METHODOLOGY

- Theory classes To explain the concepts and promote the participation of students
- Classroom / cabinet practices: To solve problems and study case related to the subject.
- Laboratory practice: A 2h laboratory session for the recognition and identification of organic materials, especially those that can be evaluated by means of biological treatments or products resulting from the treatments.
- Technical visits: To know the operation of industrial facilities for biological treatment of organic waste.

LEARNING OBJECTIVES OF THE SUBJECT

The student, upon successful completion of the subject, will be able to:

- Know the social, economic, regulatory and environmental framework for the management of organic waste
- Know the main characteristics of organic waste and interpret the analytical parameters useful for the evaluation of organic waste.
- Understand the scientific and technical foundations of the biological processes used for the treatment of organic waste.
- Evaluate the characteristics of the main products resulting from the biological treatment of organic waste and contrast them with other organic materials.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours small group	20,0	13.33
Hours large group	40,0	26.67

Total learning time: 150 h

CONTENTS

Introduction. Organic waste and legal framework

Description:

- General frame of waste management of organic waste. Definitions
- Policy framework
- The role of biological treatment. The case of Catalonia
- Characterization, origin and quantification of organic waste suitable for biological treatment

Specific objectives:

- To achieve the knowledge to identify the most suitable biological treatment to be applied to an organic waste considering the characteristics and the legal framework

Related activities:

- Activity 1: Classroom lessons
- Activity 2: Assessment
- Activity 3: Resolution of problems

Full-or-part-time: 29h

- Theory classes: 7h
- Laboratory classes: 2h
- Self study : 20h

Biological Treatments

Description:

- Anaerobic digestion
- Composting
- Biodrying and biostabilisation
- Vermicomposting
- Bocashi
- Transformation by use of insect larvae
- In-situ solution for waste management (agrocomposting, home and community composting)
- End treatments
- Characterisation of products and agricultural use
- Sizing of facilities

Specific objectives:

- To identify the biological and environmental aspects of the biological treatments
- To identify the main characteristics of the products of the biological treatments
- To size facilities for the treatment of organic waste
- To understand the main features of the use of organic waste and products

Related activities:

- Activity 1: Classroom lessons
- Activity 2: Assessment
- Activity 3: Laboratory
- Activity 4: Resolution of problems and cases
- Activity 5: Technical visits

Full-or-part-time: 112h

- Theory classes: 29h
- Laboratory classes: 18h
- Self study : 65h



Elements for the Choice of the Treatment System

Description:

As final section, other aspect different than technical will be presented and considered to decide the better waste treatment in a particular situation

Specific objectives:

- To be able to decide the best biological treatment considering social, environmental, legal, economic and technical aspects.

Related activities:

Activity 1: Classroom lessons

Activity 2: Assessment

Activity 3: Resolution of problems

Full-or-part-time: 9h

Theory classes: 4h

Self study : 5h

GRADING SYSTEM

The evaluable sections of the subject are the following:

N1: final term exam.

N2: course work.

N3: visits to waste treatment facilities.

Final grade = $0.45N1+0.45N2+0.10N3$

EXAMINATION RULES.

Exams are individual tests. Calculator and pen are needed.

Cellphones are not allowed and any material can be shared.

It is not allowed to get out the classroom while the exam is ongoing.

BIBLIOGRAPHY

Basic:

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- Soliva-Torrentó, M.. Compostatge i gestió de residus orgànics. Barcelona: Diputació de Barcelona, 2001. ISBN 8477948038.

Complementary:

- Bernal Calderón, M. Pilar. Uso agrícola de materiales digeridos : situación actual y perspectivas de futuro. Madrid: Mundi-Prensa, 2014. ISBN 9788484766919.
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