Course guides
390432 - TBR - Biological Treatment of Waste

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: 2021  ECTS Credits: 6.0  Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Lopez Martinez, Margarita
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 products resulting from the biological treatment of organic waste and contrast them with other organic materials.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>40,0</td>
<td>26.67</td>
</tr>
<tr>
<td>Hours small group</td>
<td>20,0</td>
<td>13.33</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h
## CONTENTS

### Introduction and organic waste

**Description:**
content english

**Full-or-part-time:** 29h  
Theory classes: 7h  
Laboratory classes: 2h  
Self study : 20h

### Biological Treatments

**Description:**
content english

**Full-or-part-time:** 112h  
Theory classes: 29h  
Laboratory classes: 18h  
Self study : 65h

### Elements for the Choice of the Treatment System

**Description:**
content english

**Full-or-part-time:** 9h  
Theory classes: 4h  
Self study : 5h

## ACTIVITIES

### ACTIVITY 1: THEORY LECTURES

**Description:**
38 h classroom sessions. Items for this activity are described in the contents section.

**Specific objectives:**
Indicated in the contents of every topic.

**Full-or-part-time:** 86h  
Theory classes: 38h  
Self study: 48h
ACTIVITY 2: EXAMS

Description:
Individual written test at mid-course.
Individual written test at the end of the course.

Specific objectives:
Assess the maturity of the knowledge and skills acquired in the sessions of lectures and in the resolution of problems and applied cases.

Material:
Exam statement, calculator.

Delivery:
Solved exam.

Full-or-part-time: 2h
Theory classes: 2h

ACTIVITY 3: CASE STUDY AND LABORATORY

Description:
b) Study of the processes of anaerobic digestion and composting. Process and technology design.
c) In the laboratory, recognition, basic analysis and identification of organic materials from various activities with special attention to those that can be biologically treated.

Material:
Exercises, problems and cases proposed. Computer and calculator. Different documents.

Full-or-part-time: 50h
Laboratory classes: 12h
Self study: 38h

ACTIVITY 4: VISIT TO FACILITIES

Description:
T2 technical visits of 4 hours (8 hours). Visit to industrial facilities for biological treatment of organic waste and other types of treatment / destination. One will be carried out at some anaerobic digestion and composting system with a high capacity capacity. Another one will be made to a simpler installation.

Material:
Questionnaire of the visit. Appropriate clothing and shoes.

Delivery:
Filled questionnaire, where the degree of understanding of the installation, the environmental and management problem that is solved, the social aspects of this and the conditions for the correct operation and operation of the global project are reflected.

Full-or-part-time: 12h
Laboratory classes: 8h
Self study: 4h
GRADING SYSTEM

The evaluable sections of the subject are the following:

N1: mid-term exam.
N2: final term exam.
N3: average of the marks of each one of the practices.
N4: visits to waste treatment facilities.
N5: class exercises.

Final grade = 0.15N1 + 0.30N2 + 0.40N3 + 0.10N4 + 0.05N5

BIBLIOGRAPHY

Basic:

Complementary: