Course guide
205123 - 205123 - Polymers from Renewable Resources for Industrial Applications

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 702 - CEM - Department of Materials Science and Engineering.

Degree:
MASTER’S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER’S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER’S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).

Academic year: 2023   ECTS Credits: 3.0   Languages: English

LECTURER

Coordinating lecturer: Fakhoui, Farayde Matta
Others: Velasco Perero, Jose Ignacio, Zoppe, Justin Orazio

PRIOR SKILLS

none

TEACHING METHODOLOGY

Expositional and participatory classes
Work of analysis of practical cases and recent scientific publications including oral presentation.

LEARNING OBJECTIVES OF THE SUBJECT

Know the possible renewable sources from raw materials capable of substituting polymers from non-renewable sources for industrial applications. Know the processing techniques and characterization of these materials, thus contributing to greater sustainability and circular economy.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self study</td>
<td>48,0</td>
<td>64.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>16,5</td>
<td>22.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>10,5</td>
<td>14.00</td>
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</tbody>
</table>

Total learning time: 75 h
CONTENTS

Introduction to polymers from renewable sources

**Description:**
Definition and classification of basic concepts such as: bioplastics, biopolymers, biodegradability, compostable, sustainable. Polymers from renewable sources. Sources, chemical structure, properties, modifications.

**Full-or-part-time:** 15h
Theory classes: 3h 18m
Laboratory classes: 2h 06m
Self study : 9h 36m

Processing and characterization

**Description:**
Processing techniques and characterization of polymers from renewable sources.

**Full-or-part-time:** 15h
Theory classes: 3h 18m
Laboratory classes: 2h 06m
Self study : 9h 36m

Compounding

**Description:**
Incorporation of additives, plasticizers, bioactive compounds, cellulose nanocrystals, natural fibers. Techniques for obtaining and incorporating bioactive compounds into materials.

**Full-or-part-time:** 15h
Theory classes: 3h 18m
Laboratory classes: 2h 06m
Self study : 9h 36m

Biodegradability and tests

**Description:**

**Full-or-part-time:** 15h
Theory classes: 3h 18m
Laboratory classes: 2h 06m
Self study : 9h 36m

Aplicacions i innovacions

**Description:**
Industrial applications, case studies. Smart materials.

**Full-or-part-time:** 15h
Theory classes: 3h 18m
Laboratory classes: 2h 06m
Self study : 9h 36m
GRADING SYSTEM

The final grade for the course will depend on the following evaluation activities:
1) Four sets of case studies: 40%
2) A written report/oral presentation in groups of a minimum of 2 students and a maximum of 4 students: 35%
3) A final exam: 25%

BIBLIOGRAPHY

Basic: