240507 - Further Chemistry

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering
Academic year: 2019
Degree: BACHELOR’S DEGREE IN MATERIALS ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR’S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
ECTS credits: 3  Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: Garcia Alvarez, Montserrat
Others: Garcia Alvarez, Montserrat

Degree competences to which the subject contributes

Specific:
1. Spatial vision capacity and knowledge on graphic representation techniques, both with traditional methods of metrical geometry and descriptive geometry, and by means of computer aided design applications.
2. Capacity to understand and apply basic knowledge principles of general chemistry, organic and inorganic chemistry and their engineering applications.

Transversal:
3. SELF-DIRECTED LEARNING. Detecting gaps in one's knowledge and overcoming them through critical self-appraisal. Choosing the best path for broadening one's knowledge.

Teaching methodology
The course, with a high experimental content is done through lectures and laboratory sessions and problems.

Learning objectives of the subject

General goal
Familiarize students with the chemical behavior of organic compounds of industrial and environmental interest.

Specific goals
- Understand the classical methods of chemical analysis systems in industrial and environmental interest.
- Know how to interpret the results of the characterization techniques of chemical compounds
# Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group: 0h 0.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group: 30h 40.00%</td>
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<td></td>
<td>Hours small group: 0h 0.00%</td>
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<td></td>
<td>Guided activities: 0h 0.00%</td>
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<tr>
<td></td>
<td>Self study: 45h 60.00%</td>
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## Content

<table>
<thead>
<tr>
<th>1. STRUCTURAL DETERMINATION OF ORGANIC COMPOUNDS</th>
<th>Learning time: 5h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 2h</td>
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<thead>
<tr>
<th>2. INFRARED SPECTROSCOPY (IR)</th>
<th>Learning time: 7h</th>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 1h</td>
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<tr>
<td>Self study : 4h</td>
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<tr>
<th>3. NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY (NMR)</th>
<th>Learning time: 18h</th>
</tr>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 2h</td>
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<tr>
<td>Self study : 11h</td>
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<tr>
<th>4. ULTRAVIOLET SPECTROSCOPY (UV) AND MASS SPECTROMETRY</th>
<th>Learning time: 8h</th>
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<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td>Theoretical foundations. Features UV bands. Structural fragmentation in mass spectrometry. Applications.</td>
<td>Practical classes: 1h</td>
</tr>
<tr>
<td>Self study : 5h</td>
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## 5. INTRODUCTION TO EXPERIMENTAL METHODS: EXPERIMENTAL SEPARATION OF MIXTURES

**Description:**

**Learning time:** 13h
- Theory classes: 3h
- Practical classes: 2h
- Self study: 8h

## 6. OBTAINING THE ESSENCE OF CINNAMON

**Description:**
Separation of an essential oil such as cinemaldehid by drag steam. Liquid-liquid extraction with decanting funnel. Characterization by IR spectroscopy.

**Learning time:** 7h
- Theory classes: 2h
- Practical classes: 1h
- Self study: 4h

## 7. PREPARATION OF THE FOOD ADDITIVE ISOAMYL ACETATE

**Description:**
Esterification reaction of an alcohol. Isolation by extraction. Structural study by IR spectroscopy.

**Learning time:** 10h
- Theory classes: 2h
- Practical classes: 2h
- Self study: 6h

## 8. EXPERIMENT WITH NATURAL PRODUCTS: VINEGAR AND SUCROSE

**Description:**

**Learning time:** 7h
- Theory classes: 2h
- Practical classes: 1h
- Self study: 4h
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**Qualification system**

NF = 0.35·NL + 0.15·AL + 0.25·NAC + 0.25·NEF

NF = Final Note
NL = Note lab sessions (laboratory work + practical reports)
AL = Attendance at laboratory sessions
NAC = Note continuous assessment (attendance + delivery exercises)
NEF = Note final exam

**Bibliography**

**Complementary:**


**Others resources:**

- Class notes.