Course guide
240EI034 - 240EI034 - Chemical Technology

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering.
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Compulsory subject).
Academic year: 2023 ECTS Credits: 4.5 Languages: Catalan, Spanish

LECTURER

Coordinating lecturer: Darbra Roman, Rosa Mari
Others: Bou Serra, Jordi Perseguer, Carme Tarragó, Diana Casal Valls, Oriol Martinez Rodriguez, Maria Almajano Pablos, Maria Pilar

REQUIREMENTS

No prerequisites

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEMEI04. Ability for the analysis and design of chemical processes.

TEACHING METHODOLOGY

EXPOSITORY AND PARTICIPATIVE LECTURES

Description: Explain the contents of this subject.
Support material: Slides, exercises, videos and papers. All the material is available on-line (atenea).
Description of the assignments due and their relation to the assessment: Continuous test. Mid-term exam. Final exam.
Specific objectives: To comply with those set in this subject.

LEARNING OBJECTIVES OF THE SUBJECT

The specific objectives of this subject are:
1. Make the student aware of the diversity of products and industries related with the industrial chemistry.
2. Identify the raw materials and intermediate products used in the chemical production at large scale.
3. Understand the different physicochemical processes that allow the transformation of these raw materials to a final product.
4. Describe relevant processes for the chemical industry.
5. Identify environmental, social and safety aspects related to these processes.
6. Value the importance of maintenance and other related services for the proper functioning of the chemical plants.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>27,0</td>
<td>24.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>13,5</td>
<td>12.00</td>
</tr>
<tr>
<td>Self study</td>
<td>72,0</td>
<td>64.00</td>
</tr>
</tbody>
</table>

Total learning time: 112.5 h

CONTENTS

Chapter 1. Introduction

Description:
Chemical industry importance at Spanish level and at a global scale. Concept of Unit Operation. Definition of chemical process and the important factors for its success: continuous and discontinuous processes, flow diagram, PID. Storage and transport. Main natural sources of raw materials for the chemical industry: lithosphere, hydrosphere, atmosphere and biosphere.

Specific objectives:
Objectives: 1, 2 i 5.

Related activities:
Lectures (3h)
1 paper to read at home and online exercises

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 6h
Theory classes: 3h
Self study : 3h

Chapter 2. Maintenance and auxiliary services

Description:
Maintenance importance for the chemical industry. Maintenance types and function. Introduction to other practical aspects of the industry (subcontracting, communication, management, etc.). Auxiliary services: steam, vacuum, compressed air, nitrogen, etc.

Specific objectives:
Objective: 6.

Related activities:
Lectures (4h)

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 12h
Theory classes: 4h
Self study : 8h
Chapter 3. Distillation

Description:

Specific objectives:
Objective: 3.

Related activities:
Lectures (7h)
Practical exercises

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 19h
Theory classes: 7h
Self study : 12h

Chapter 4. Petroleum and Petrochemical Industry

Description:

Specific objectives:
Objectives: 2, 3 and 4.

Related activities:
Lectures (5h)
Practical exercises
2 papers to read at home

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 14h
Theory classes: 5h
Self study : 9h
### Chapter 5. Kinetics and reactors

**Description:**

**Specific objectives:**
Objective: 2, 3 i 4

**Related activities:**
Lectures (7h)
Practical exercises

**Related competencies:**
CEMEI04. Ability for the analysis and design of chemical processes.

**Full-or-part-time:**
23h
Theory classes: 7h
Self study: 16h

### Chapter 6. Chlor-Alkali industry

**Description:**

**Specific objectives:**
Objectives: 2, 3 and 4

**Related activities:**
Lectures (2h)
1 paper to read at home

**Related competencies:**
CEMEI04. Ability for the analysis and design of chemical processes.

**Full-or-part-time:**
6h
Theory classes: 2h
Self study: 4h
Chapter 7. Membrane technology

Description:

Specific objectives:
Objective: 3, 5

Related activities:
Lectures (6h)
Practical exercises

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 16h
Theory classes: 6h
Self study : 10h

Chapter 8. Other industries

Description:
Short description of production process of diverse chemical industries such as: Fertilizers industry, Detergents industry, Polimers industry, Paper industry, Cement industry, etc.

Specific objectives:
Objectives: 2, 3 and 4

Related activities:
Lectures (2,5h)
Practical exercises
Visits to a chemical plants (4h)

Related competencies:
CEMEI04. Ability for the analysis and design of chemical processes.

Full-or-part-time: 16h 30m
Theory classes: 6h 30m
Self study : 10h

GRADING SYSTEM

Continuous evaluation tests (PAC): 15% of the final qualification
Mid-term exam (EP): 35% of the final qualification
Final exam (EF): 50% of the final qualification

Final qualification (NF): NF = 0.15*PAC + 0.35*EP + 0.50*EF

Reevaluation exam (ER): 85% of the total reevaluation qualification
Reevaluation qualification (NR): NR=0.15*PAC + 0.85*ER
EXAMINATION RULES.

The mid-term exam eliminates content, which is not recovered with the final exam. The reevaluation exam will substitute the qualification obtained in the partial and final exams. The continuous tests are not reevaluated. You will not be able to take notes with you at the exam, only the subject form for the problems part. Programmable calculator will only be used in the tests when you are explicitly informed.

BIBLIOGRAPHY

**Basic:**

**Complementary:**