240271 - Simulation and Optimisation of Chemical Processes

Coordinating unit: 240 - ETSEIB - Barcelona School of Industrial Engineering
Teaching unit: 713 - EO - Department of Chemical Engineering
Academic year: 2018
Degree: BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan

Teaching staff
Coordinator: Elsa Pastor Ferrer
Others: Oriol Gibert Agulló

Opening hours
Time table: See the notice board at the Chemical Engineering Department

Prior skills
Numerical Methods in Chemical Engineering
Basic Operations
Kinetics and reactors

Requirements
To have passed the above mentioned subjects

Degree competences to which the subject contributes
Specific:
1. Capacity to analyse, design, simulating and optimising processes and products.

Transversal:
2. 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.
3. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.

Teaching methodology
Lectures, problems seminars and practical exercises at the computer labs

Learning objectives of the subject
The general aim of the subject is that the students become qualified to solve analysis, synthesis and optimization problems of chemical processes using computer methods and techniques. In particular, students have to be able:
240271 - Simulation and Optimisation of Chemical Processes

1. To model and analyse chemical systems in steady and transient state.
2. To pose and solve simulation and optimization problems using several computer tools.
3. To identify the most suitable tools to solve simulation and optimization problems.
4. To use skillfully several software packages for chemical processes engineering.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Total learning time: 127h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group:</td>
<td>0h</td>
</tr>
<tr>
<td>Hours medium group:</td>
<td>30h</td>
</tr>
<tr>
<td>Hours small group:</td>
<td>30h</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>0h</td>
</tr>
<tr>
<td>Self study:</td>
<td>67h 30m</td>
</tr>
</tbody>
</table>
# 240271 - Simulation and Optimisation of Chemical Processes

## Content

<table>
<thead>
<tr>
<th>Chapter 1  INTRODUCTION</th>
<th>Learning time: 20h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td>Practical classes: 4h</td>
</tr>
<tr>
<td>Lectures</td>
<td>Self study : 12h</td>
</tr>
<tr>
<td>Problems seminars</td>
<td></td>
</tr>
<tr>
<td>Self-learning</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 2  ENERGY AND MASS BALANCES</th>
<th>Learning time: 10h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td><strong>Related activities:</strong></td>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td>Lectures</td>
<td>Self study : 6h</td>
</tr>
<tr>
<td>Problems seminars</td>
<td></td>
</tr>
<tr>
<td>Self-learning</td>
<td></td>
</tr>
</tbody>
</table>
### Chapter 3  MODELLING AND SIMULATION OF PROCESS UNITS

**Learning time:** 30h  
- Theory classes: 6h  
- Practical classes: 3h  
- Laboratory classes: 3h  
- Self study: 18h

**Description:**  

**Related activities:**  
- Lectures  
- Problems seminars  
- Practical exercises seminars  
- Self-learning

### Chapter 4  COMPUTER SIMULATION OF CHEMICAL PROCESSES

**Learning time:** 40h  
- Theory classes: 8h  
- Practical classes: 4h  
- Laboratory classes: 4h  
- Self study: 24h

**Description:**  

**Related activities:**  
- Lectures  
- Problems seminars  
- Practical exercises seminars  
- Self-learning
Chapter 5  OPTIMIZATION OF CHEMICAL PROCESSES

Learning time: 50h
Theory classes: 10h
Practical classes: 5h
Laboratory classes: 5h
Self study: 30h

Description:

Related activities:
- Lectures
- Problems seminars
- Practical exercises seminars
- Self-learning

Planning of activities

(ENG) PRÀCTIQUES

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>12h</td>
</tr>
<tr>
<td>Theory classes: 12h</td>
</tr>
</tbody>
</table>

(ENG) EXAMEN PARCIAL

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1h 30m</td>
</tr>
<tr>
<td>Theory classes: 1h 30m</td>
</tr>
</tbody>
</table>

(ENG) EXAMEN FINAL

<table>
<thead>
<tr>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>3h</td>
</tr>
<tr>
<td>Theory classes: 3h</td>
</tr>
</tbody>
</table>

Qualification system

FINAL MARK: $NF = 0.2 \times NP + 0.3 \times NEP + 0.5 \times NEF$;

NP: Mean mark of practical exercises
NEP: Mid term exam mark
NEF: Final exam mark

Reevaluation: Reevaluation exam includes all the contents. In case of reevaluation, the final mark will be the mark of the reevaluation exam.
Regulations for carrying out activities

All tests (i.e. practical exercises, mid term exam and final exam) can be done using all sorts of available bibliographic material: lecture notes, books, solved problems, etc. All tests are compulsory.

Bibliography

Basic:


Complementary:


Others resources: