Course guide
820522 - ERQQ - Chemical Reaction Engineering

Unit in charge: Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering.

Degree: BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).
Academic year: 2023  ECTS Credits: 6.0  Languages: Catalan

LECTURER

Coordinating lecturer: AURELIO CALVET TARRAGONA
Others:
Primer quadrimestre:
AURELIO CALVET TARRAGONA - Grup: T1
FRANCISCO ESTRANY CODA - Grup: T1

Segon quadrimestre:
FRANCISCO ESTRANY CODA - Grup: M10
VICENÇ MARTI GREGORIO - Grup: M10

PRIOR SKILLS

Those ones established in accordance with the knowledge acquired about chemistry, physics, mathematics, thermodynamics, material transfer and heat transmission

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEQUI-19. Understand mass and energy balances, biotechnology, mass transfer, separation operations, chemical reaction engineering, the design of reactors, and the recovery and processing of raw materials and energy resources.
CEQUI-20. Analyse, design, simulate and optimise processes and products.

Transversal:
07 AAT N3. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

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LEARNING OBJECTIVES OF THE SUBJECT

Provide the fundamental knowledge of stoichiometry, kinetics and equilibrium of complex systems with chemical reactions multiple
Apply the knowledge acquired to design chemical reactors' installations with the most appropriate configuration for a specific reaction
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>60,0</td>
<td>40.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

**Total learning time:** 150 h

CONTENTS

- **Theme 1: Introduction to Chemical Reactors**

**Description:**

**Specific objectives:**
To acquire knowledge for calculation of stoichiometric models of chemical reactions with multiple chemical equations, known initial and final composition of the reactant system.

**Related activities:**
- Initial test
- Exercises
- Test of monitoring
- Problems
- Final Test
- Study of the theory
- First report of non-attendance work.

**Full-or-part-time:** 35h
- Theory classes: 14h
- Self study: 21h

- **Theme 2: Homogeneous kinetics**

**Description:**

**Specific objectives:**
To acquire knowledge for calculation of kinetic equations of homogeneous chemical reactions from the experimental results by fitting kinetic models proposed.

**Related activities:**
- Initial test
- Exercises
- Test of monitoring
- Problems
- Final Test
- Study of the theory

**Full-or-part-time:** 40h
- Theory classes: 16h
- Self study: 24h
- **Theme 3: Heterogeneous kinetics and applications**

**Description:**

**Specific objectives:**
To acquire knowledge for calculation about heterogeneous kinetics equations of chemical reactions from the models used to address the study of reaction mechanisms.

**Related activities:**
Study of the theory

**Full-or-part-time:** 22h 30m
Theory classes: 9h  
Self study : 13h 30m

- **Theme 4: Ideal reactors**

**Description:**

**Specific objectives:**
To acquire knowledge for calculation and design of chemical reactors based on kinetic and stoichiometric models of the proposed chemical reaction, using the models of ideal chemical reactors.

**Related activities:**
Exercises  
Problems  
Study of the theory

**Full-or-part-time:** 30h  
Theory classes: 12h  
Self study : 18h
-Theme 5: Design of installations of industrial reactors

Description:

Specific objectives:
To acquire knowledge of optimization of design parameters of chemical reactor according to criteria of economic profitability, safety and the minimizing environmental impact.

Related activities:
Exercises
Problems
Study of the theory
Second report of non-attendance work

Full-or-part-time: 22h 30m
Theory classes: 9h
Self study: 13h 30m

GRADING SYSTEM

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EXAMINATION RULES.

The realization of the activities is subject to the academic regulations established by the Technical University of Catalonia

BIBLIOGRAPHY

Basic:

Complementary: