Course guide
295552 - 295EQ013 - Chemical and Catalytic Reaction Engineering

Unit in charge: Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering.
Degree: MASTER'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2019). (Compulsory subject).
Academic year: 2022
ECTS Credits: 6.0
Languages: English

LECTURER
Coordinating lecturer: Soler Turu, Lluis
Others: Soler Turu, Lluis
Estrany Coda, Francisco
Calvet Tarragona, Aurelio
Bou Serra, Jorge

PRIOR SKILLS
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REQUIREMENTS
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DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES
Specific:
CEMUEQ-01. To apply knowledge of mathematics, physics, chemistry, biology and other natural sciences, obtained through study, experience and practice, with critical reasoning, to establish economically viable solutions to technical problems
CEMUEQ-02. To design products, processes, systems and services of the chemical industry, as well as the optimization of others already developed, taking as a technological base the various areas of chemical engineering, including processes and transport phenomena, separation operations and engineering of chemical, nuclear, electrochemical and biochemical reactions
CEMUEQ-05. To manage and supervise all types of facilities, processes, systems and services of the different industrial areas related to chemical engineering

Generical:
CGMUEQ-01. Ability to apply the scientific method and the principles of engineering and economics, to formulate and solve complex problems in processes, equipment, facilities and services, in which the matter undergoes changes in its composition, state or energy content, characteristic of the chemical industry and other related sectors among which are the pharmaceutical, biotechnological, materials, energy, food or environmental

Transversal:
06 URI. 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.
03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

TEACHING METHODOLOGY
Classroom. Self-study. Learning from projects and study cases
LEARNING OBJECTIVES OF THE SUBJECT

To develop the technical criteria to define a system of reactors of an industrial process based on chemical, biological, catalysis, mass and heat transfer data, material and energy flows
To obtain the training to analyze scientifically and technologically any kind of chemical or biological reactor and express the bases for its optimization and/or modification
Identify the problems and shortcomings of reactor-based chemical facilities and be able to provide engineering solutions
To reach scientific spirit to investigate new developments in the field of reactors

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours large group</td>
<td>42,0</td>
<td>28.00</td>
</tr>
<tr>
<td>Self study</td>
<td>96,0</td>
<td>64.00</td>
</tr>
<tr>
<td>Hours small group</td>
<td>12,0</td>
<td>8.00</td>
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</tbody>
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Total learning time: 150 h

CONTENTS

Catalysis

Description:

Specific objectives:
To obtain the scientific basis of catalysis and the catalytic systems used at industrial level. Acquire the ability to evaluate the efficiency of catalysts and be able to design and use them successfully in industrial processes

Related activities:
Design of heterogeneous catalysts

Full-or-part-time: 38h
Theory classes: 16h
Self study : 22h
Multiphase reactors

Description:

Specific objectives:
To acquire the theoretical and practical concepts of reactors that work in different phases, extrapolating the bases of mass transfer to these units. To acquire the theoretical and practical concepts of the reactors that work with solid catalysts and be able to perform a design and dimensioning of these equipment

Related activities:
Reactor analysis

Full-or-part-time: 38h
Theory classes: 16h
Self study : 22h

Enzymatic reactors and bioreactors

Description:

Specific objectives:
Acquire the theoretical and numerical concepts of enzymatic bioreactions and their applications. Acquire the theoretical and numerical concepts of fermentations and their applications

Related activities:
Analysis of enzymatic production systems and fermentation

Full-or-part-time: 38h
Theory classes: 16h
Self study : 22h

GRADING SYSTEM

Continuous assessment (3 exams, 25% each exam) and completion and presentation of a project (25%). Without reassessment.

EXAMINATION RULES.

Written exams are individual. The project is carried out in groups of two people
BIBLIOGRAPHY

Basic:

Complementary:

RESOURCES

Other resources:
Notes from class and other documents from the Digital Campus