Chemical process analysis and design

Academic Year: (2019 / 2020) **Review date: 28/01/2020 16:30:33**

Department assigned to the subject: Materials Science and Engineering and Chemical Engineering Department

Coordinating teacher: AZNAR JIMENEZ, ANTONIO

Type: Compulsory ECTS Credits : 6.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Recommended that the student has basic knowledge of chemistry and its applications in engineering.

OBJECTIVES

Covers core competencies from the title.

* Own and understand knowledge that can provide a base or opportunity to be original in the development and/or application of ideas, often in a context of research (nb6).

* Let students know to apply the acquired knowledge and ability to problem-solving in new environments or little known in wide (or multidisciplinary) contexts related to their field of study (CB7).

* That students have learning skills which allow them to continue studying in a way that will be largely self-directed or autonomous (CB10).

General competences of the title covers.

* Capacity for the drafting, signing and developing projects in the field of mechanical engineering which have as their object, in accordance with the knowledge acquired as set out in paragraph 5 of the order, construction, reform, repair, conservation, demolition, manufacturing, installation, Assembly or exploitation: structures, mechanical equipment, energy facilities, electrical and electronic equipment, installations and industrial plants and processes of manufacturing and automation

Competencies common to the branch of industrial engineering title covers.

* Having adequate knowledge of the scientific and technological aspects of: mathematical, analytical and numerical methods in engineering, electrical engineering, energy engineering, chemical engineering, mechanical engineering, mechanics of continuous media, industrial electronics, automatic, manufacturing, materials, quantitative methods of management, computer engineering, town planning, infrastructure, etc. (CG1).

* Project, calculating and designing products, processes, facilities and plants (CG2).

* Carry out research, development and innovation in products, processes and methods (CG4).

* Carry out strategic planning and apply to both building systems as production, quality and environmental management (CG5).

* Apply the acquired knowledge and solving problems in new environments or little known within contexts broader and multidisciplinary (CG8).

* Knowledge, understanding and ability to apply the necessary legislation on the exercise of the

profession of Industrial Engineer (CG11).

Specific powers of the title of industrial engineering covers.

* Capacity for analysis and design of chemical processes (CE4).

Competences at the level of subject covered.

* Knowledge and capabilities to analyze, design, and design of chemical processes.

* Knowledge and skills to perform the verification and control of installations and systems whose purpose is the realization of chemical processes.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to processes and unit operations and transport phenomena.
2. Balance of matter. A single phase systems. Systems of several phases. Balance in processes of non-reactive systems. Balances in reactive processes.
3 Unit operations. Common operations and equipment. Gas-solid operations and equipment. Liquid-liquid operations and equipment. Liquid-solid operations and equipment. Solid-solid operations and equipment. Distillation. Absorption of gases and common systems design. Liquid-liquid extraction. Adsorption and ion exchange.
4. Kinetics of reactions. Catalysis and catalysts. Heterogeneous kinetics and its application to the design of catalytic reactors.
5. Reaction engineering. Single phase reactors. Reactors with solid catalyst. Catalytic reactors with two changing phases. Reaction gas / liquid. Reactions with solids.

LEARNING ACTIVITIES AND METHODOLOGY

Training activities will include:
* master classes, where will be the knowledge that students need to acquire. To facilitate its development students will receive the notes from class and will have basic texts of reference enabling them to follow classes and develop further work.
* Problem solving by the student which will serve as a self-assessment and to acquire the necessary capabilities.
* Kinds of problems, to develop and discuss the problems that are being proposed to the students.
* Laboratory practice, where the student check experimentally the concepts and theoretical results seen in class.
* "On-line" self-assessment exercises.
* Mentoring individualized for the resolution of questions and personalized counseling.
* Collective tutorials.

ASSESSMENT SYSTEM

% end-of-term-examination/test:	60
% of continuous assessment (assigments, laboratory, practicals…):	40

Continuous evaluation will represent 40% of the total, distributed of the following way Note:
* 20%: rating obtained in laboratory practice.
* 20%: both by test "on line" as written tests in lesson time of the subject.
* 60%: final exam. You will need to obtain a minimum of 4 about 10 in such examination to be able to average the rest of the continuous assessment.
Both continuous assessment tests dates as of preparation of the practical laboratory sessions published on the tab of the subject, are tentative and may undergo some change that will communicate with a minimum of two weeks advance notice in "Global Classroom".
For students who have not made the continuous assessment, the regular final exam will have a maximum of 6 points out of 10 rating. Both the extraordinary and ordinary exam is tailored to dates and official schedules published by the direction of the EPS.