



PERSONA CIÈNCIA EMPRESA
UNIVERSITAT RAMON LLULL

COURSE: INDUSTRIAL CHEMISTRY

SUBJECT MATTER: Process Technology

MODULE: Core Topics of Industrial Engineering

PROGRAM: Degree in Chemical Engineering

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GENERAL CHARACTERISTICS

Type: Basic Formation, Compulsory, Elective

Final Degree Project, Internship

Duration: Semestral

Semester / s: 7

Number of ECTS credits: 4

Language / s: Spanish, Catalan, English

DESCRIPTION

SHORT DESCRIPTION AND JUSTIFICATION

In this Chemical Engineering Degree course be acquired ability to know the processes developed by the chemical and biotechnological from a brief theoretical description, site visits and discussions with industry professionals.

The subject divided in two parts, firstly the development of non-renewable basic raw materials, oil, coal and natural gas for consumption and intermediate products grouped into families more or less general and on the other the extraction of raw materials from renewable resources and their transformation into equally intermediates and consumption.

Like this therefore, the student:

- Acquire basic knowledge about what the chemical and biotechnology in today's world and its economic implications.
- Will get an extension of their knowledge of chemistry through the study of real industrial processes. Although catalysis and materials science are not objective of this course, students will learn the catalysts involved and polymers obtained.
- Will integration between knowledge of chemistry and engineering, which will give the future a wide professional ability to analyze the situation of industry and technology.
- Take advantage the presentation of the key processes in the development of the chemical industry, to present basic concepts of good manufacturing practices, financial statement process or quality management, as well as the impact of energy, improving safety or reducing the environmental impact.

COMPETENCES

- To be able to understand and apply knowledge of Chemistry and Engineering for its application in the field of Chemical Engineering. (CB1, E2)
- Be able to analyze, integrate and interpret data and information from the field of Chemical Engineering. (CB3, E8).
- To be able to assess the risks in the use of chemical and biological substances and the processes in which they are involved. (E11).

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- Be able to assess the impact of their professional activity on the sustainable development of society. (T3)
- Basic knowledge of production and manufacturing systems. (CRI9)

PREREQUISITES

According to current academic teaching planning and regulations.

CONTENTS

- I. Principles of industrial chemistry
- II. Non-renewable resources .-
- III. Oil, natural gas and coal
- IV. Chemistry in C1
- V. Olefin
- VI. Aromatic
- VII. Renewable resources and bioprocesses

METHODOLOGY

LEARNING ACTIVITIES *

Learning activities	Hours	ECTS Credits	Competences
Lectures	32	1.2	CB1, E2, CRI9
Case and Problem-Solving Sessions	5	0.2	CB1, E2, CB3, E8, CRI9
Seminars	3	0.1	CB1, E2, CB3, E8, E11, T3, CRI9
Practical & Lab Work			
Presentations			
Personal study	65	2.4	CB1, E2, CB3, E8, E11, T3, CRI9
Assessment Tasks (Exams, Continuous Assessment...)	3	0.1	CB1, E2, CB3, E8, CRI9
TOTAL	108	4.0	

TEACHING METHODOLOGY

The subject teaching methodology is based on combining a dynamic exhibition, the professor presents the basic content, with a dynamic turn-based information search and presentation by the student. It encourages the active participation of the student and facilitates decision-making on their part.

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The teaching methodology of the course is based on the availability of laptops for the students. For personal study of the student is provided documents relating to the sessions and library resources.

ASSESSMENT

ASSESSMENT METHODS

Assessment Methods	Weight	Competences
Final Exam	35%	CB1, E2, CB3, E8, CRI9
Midterm Exam/s		
Follow-up Activities	30%	CB1, E2, CB3, E8, CRI9
Reports and Presentations	30%	E11, T3, CRI9
Lab or Field Work		
Projects		
Host Student Evaluation		
Participation	5%	E11, T3, CRI9

LEARNING OUTCOMES

Students must demonstrate knowledge of the fundamentals of chemical and biological processes and their application in practice of Chemical Engineering (→ CB1, E2, CRI9)

Students must demonstrate ability to analyze, integrate and interpret data and information in the field of Chemical Engineering (→ CB3, E8, CRI9)

Students must demonstrate ability to assess the risks of industrial facilities and the use of chemical and biological substances to manage their use and release into the environment (→ E11, CRI9)

Students must demonstrate ability to assess the impact of the Chemical Industry on the sustainable development of society (T3, CRI9)

QUALIFICATION

Evaluation the course will consider the qualifications of the monitoring activities (AS), and presentations of works (TP) of Participation (P) and the final exam (EF).

All the ratings are expressed on a scale of 0 to 10. The final grade is the weighted average of all activities: $EF + 0.35 \cdot 0.30 + 0.30 \cdot AS + 0.05 \cdot TP + P$.

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ASSESSMENT OF THE COMPETENCES

The skills assessment is:

- Evaluation Knowledge is carried on the final exam and follow-up activities and corresponds to 50% of the corresponding questionnaire.
- The assessment ability to analyze the information carried on the final exam and follow-up activities and corresponds to 50% of the corresponding questionnaire.
- Evaluation risks generated by the chemical and biotechnology (E11) as well as the impact on society it generated (T5) is done by evaluating the work and presentations of student participation and corresponds to 50 % of the grade for each item.

CB1/E2: Corresponds to the rating mean the section of knowledge obtained in the final examination and monitoring activities.

CB3/E8: Corresponds to the mean rating of paragraph analysis of information obtained in the final examination and monitoring activities.

E11: Corresponds to the mean rating of section work presentations and participation.

T3: Corresponds to the mean rating of section work presentations and participation.

CR19: Corresponds to the final grade of the course

BIBLIOGRAPHY

Encyclopedias Reference (The online version is updated annually):

- Ullmann'S. Industrial Chemistry & Chemical Engineering; 1999-2014 by John Wiley and Sons, Online ISBN: 9783527306732. Release 2010, 7th Edition accessed through the library website IQS.
- Kirk-Othmer. Industrial Chemistry & Chemical Engineering; 1999-2014 by John Wiley and Sons, Online ISBN: 9780471238966.

Books

- John A. Tyrell; Fundamentals of Industrial Chemistry: Pharmaceuticals, Polymers, and Business, Jun 30, 2014, Wiley, ISBN-13: 978-1118617564
- CA Heaton; An Introduction to Industrial Chemistry. Blackie Academic and Professional; Dec 31, 1995, 3rd ed. ISBN-13: 978-0751402728.
- Vian; Introduction to Industrial Chemistry, Reverte, Barcelona 1994



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- Debalina Sengupta, Ralph W. Pike; Chemicals from Biomass. Integrating into Bioprocesses Chemical Production Complex for Sustainable Development. Press RC - 2013 Series: Green Chemistry and Chemical Engineering.
- K. Weissermel and H.-J. Arpe; Industrial Organic Chemistry, John Wiley & Sons, 5th EDD. September 2010 ISBN: 978-3-527-32002-8
- HH Szmant; Organic Building Blocks of the Chemical Industry, John Wiley & Sons, 1989
- HH Szmant; Industrial Utilization of Renewable Resources, Technomic, 1986 Lancaster

DOCUMENT HISTORY

PREVIOUS REVISIONS

January 2, 2018, Dr. Rosa Nomen
September 13, 2016, Dr. Rosa Nomen
September 10, 2015, Dr. Rosa Nomen
September 1, 2014, Dr. Rosa Nomen
February 2, 2012, Dr. Rosa Nomen

CURRENT REVISION

7 September 2018, Dr. Rosa Nomen