

## SUBJECT TEACHING GUIDE

G602 - Petrochemical Refining

Degree in Energy Resources Engineering

Academic year 2022-2023

1. IDENTIFYING DATA					
Degree	Degree in Energy Resources Engineering			Type and Year	Compulsory. Year 4
Faculty					
Discipline	Subject Area: Technology of Mineral and Energy Resources Module: Training in Energy Resources, Fuels and Explosives				
Course unit title and code	G602 - Petrochemical Refining				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR				
Name of lecturer	AURORA GAREA VAZQUEZ				
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Office	E.P. de Ingeniería de Minas y Energía. Planta: + 1. DESPACHO DE AURORA GAREA VAZQUEZ (147)				
Other lecturers	JAVIER PINEDO ALONSO				

### 3.1 LEARNING OUTCOMES

- Understanding the refinery engineering topics from basic concepts and unit operations, covering some separation technologies (distillation of crudes to refinery fractions), and conversion processes (catalytic reforming and isomerization, alkylation, hydroconversion, fluid catalytic cracking).

#### 4. OBJECTIVES

The objectives of the subject are:

- (2) learning the inlet and outlet streams in a refinery scheme, the characterization of the crude oils, and the main refined products;
- (1) learning the processes operated in the petroleum refining: separation technologies (distillation of crudes to refinery fractions), and conversion processes (catalytic reforming and isomerization, alkylation, hydroconversion, fluid catalytic cracking);
- (3) environment aspects to be considered in the petroleum refining.

#### 6. COURSE ORGANIZATION

##### CONTENTS

1	Part I. Chemical processes and unit operations. Some applications of unit operations. Distillation. Mass and enthalpy balances. Equilibrium L-V. Efficiency in separation processes. Diffusion.
2	Part II. Petroleum refining and petrochemical plants. Introduction. Initial processing in petroleum refining. Petroleum refinery: operation units and catalytic processes. Chemical reactors. Petrochemical plants. Environmental and safety aspects.
3	Part III. Carbochemistry. Introduction. Processes of coal conversion. Chemical reactors. Environmental and safety aspects.

#### 7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written reports of individual and group activities Mínimum mark: 5,00 (scale 0-10). Date: during the semester after each activity is completed, attendance required for the evaluation. Contribution to the overall grading mark: 40%.	Work	No	Yes	40,00
Written exams of the subject Mínimum mark: 5,00 (scale 0-10) Date: Halfway through the semester and in dates fixed by the School for the ordinary and extraordinary evaluation calls. Contribution to overall grading mark: 60 %.	Written exam	Yes	Yes	60,00

TOTAL 100,00

##### Observations

The recovery will take place in the special period dedicated to the effect (extraordinary call) and in the same form of the tests of the ordinary evaluation. Those students who have not passed the part of Work activities, will be able to return the corrected reports before the date of the examination calls in order to be evaluated again.

##### Observations for part-time students

The evaluation of the subject can be adapted to the partial time students upon request.

## 8. BIBLIOGRAPHY AND TEACHING MATERIALS

### BASIC

J. -P. Wauquier, El refino del petróleo, volumen 1. Díaz de Santos, 2004.

J. -P. Wauquier, Petroleum refining, vols. 1-4. Technip, 1994.

J. H. Gary, G.E. Handwerk, Refino de petróleo: tecnología y economía. Reverté, 1980. Reimpresión 2003.

R.A. Dubois, Introducción a la refinación de petróleo, Eudeba, 2006.

J. G. Speight, The chemistry and technology of petroleum. CRC Press, Taylor & Francis Group, 2007.

J. G. Speight, The chemistry and technology of coal. CRC Press, Taylor & Francis Group, 2013.

J. G. Speight, The refinery of the future, Elsevier, 2011.

M. A. Fahim, T. A. Alsahhaf, A. Elkilani, Fundamentals of petroleum refining. Recurso electrónico. Elsevier, 2010.

A. K. Coker, Petroleum refining. Design and Applications Handbook, John Wiley & Sons, 2018.