Universida_{de}Vigo

Subject Guide 2023 / 2024

IDENTIFYIN Basic opera	IG DATA
Subject	
Subject	and processes of
	refining,
	petrochemicals and
	carbo-chemicals
Code	V09G311V01402
Study	Grado en
programme	Ingenieria de los
	Recuisos Mineros y Energéticos
Descriptors	ECTS Credits Choose Year Quadmester
Descriptors	9 Optional 4th 1st
Teaching	#EnglishFriendly
language	Spanish
Department	
Coordinator	Domínguez Santiago, María de los Ángeles
Lecturers	Domínguez Santiago, María de los Ángeles
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General	In this subject, the basic concepts of mass and energy balances, chemical reactors and separation operations
description	based on the mass transfer most used in the industry are introduced.
	exposed as well as the obtaining of organic derivatives widely used in daily life
	English Friendly subject: International students may request from the teachers: a)
	resources and bibliographic references in English, b) tutoring sessions in English, c) exams
	and assessments in English.
Training an	nd Learning Results
Code	•
B1 Scientif	fic and technical training and qualification as a Mining Engineer and knowledge of the functions of consultancy,
analysi	s, design, calculus, project, construction, maintenance, preservation and exploitation.
B2 To be fa	amiliar with the multiple technical and legal factors involved in the process of development, within the field of
mining	engineering, with the knowledge acquired in accordance with section 5 of order CIN/306/2009, pertaining to
geologi	cal and mining prospecting and investigation, the explorations of all sorts of geological resources, including
ground	water, underground construction, underground storage, treatment and benefit plants, energy plants, mineral ring and stool and iron plants, building materials plants, carbon chemistry, potrochemistry and gas plants, wasto
treatme	ent and tributary plants, explosives factories, and ability to use well-tested methods and accredited
technol	logies, with the aim of achieving the highest efficiency and ensuring the protection of the Environment and the
safety a	and health of workers and users.
B3 Ability t	to design, write and plan partial or specific projects within the units specified in the previous section, such as
mechar	nical and electric plants and their maintenance, networks of energy transportation, facilities for transportation
and sto	rage of solid, liquid and gaseous materials, waste sites, tailing dams, foundation and support, demolition,
restora	tion, controlled explosions and explosives logistics.
B4 Ability t	to design, plan, run, inspect, sign and manage projects, plants or facilities, within their field.
$\frac{C47}{C48}$ To know	<i>N</i> , understand and use the principles of basic process operations.
	w, understand and use the principles of processes of reinning, petrochemicals and carbon chemicals.
	to under links between the unifient elements of all the knowledge they acquired, understanding them as
	rest and develop practical solutions, using the relevant theoretical knowledge, to phenomena and problems.
situatio	ins of ordinary reality that are specific to engineering, developing appropriate strategies.
D5 To be fa	amiliar with the relevant sources of information. including constant updating, in order to practice onens
profess	ion competently, accessing all the present and future tools of information search, constantly adapting to
technol	logical and social changes.
D8 Unders	tanding engineering within a framework of sustainable development with environmental awareness.

D10 To become aware of the need for continuous training and the constant improvement of quality, developing the values that are characteristic of scientific thinking, showing flexible, open and ethical attitudes in the face of different situations and opinions, particularly as regards non-discrimination on the grounds of gender, race or religion, respect for fundamental rights, accessibility, etc.

Expected results from this subject				
Expected results from this subject	Training and Learning Results			
Know and understand the basic aspects of separation operations and chemical reactors.	B1 B2 B3	C47	D3 D5	
Know the processes used to obtain fuels and petrochemical raw materials	B3 B1 B2 B3 B4	C48	D10 D5 D8 D10	
Know the techniques for measuring the properties of fuels	В3	C48	D1 D8 D10	

Contents	
Торіс	
1. Introduction	Introduction. General concepts
2. Material and energy balances	Material balances in systems with and without chemical reaction.
	Energy balances in systems with and without chemical reaction.
3. Separation operations	Destillation. Rectification
	Liquid-liquid extraction
	Absorption
4. Introduction to chemical reactors	Design of ideal chemical reactors
5. Natural gas and petroleum refining.	Natural gas: constitution and conditioning.
	Petroleum characterization. Fractionation, cracking, reforming, alkylation
	and coking. Products mixture.
Petrochemical processes	Main compounds derived from methane, ethene, propene and benzene.
7. Coal processes	Technological use of coal: pyrolysis, gasification, etc.

Planning				
	Class hours	Hours outside the classroom	Total hours	
Lecturing	40.3	80	120.3	
Problem solving	20	7.2	27.2	
Laboratory practical	8	0	8	
Practices through ICT	8	6	14	
Essay questions exam	1	23	24	
Problem and/or exercise solving	1.5	30	31.5	
*The information in the planning table is fo	r guidance only and does no	ot take into account the het	erogeneity of the students.	

 Methodologies

 Description

 Lecturing
 Presentation, by the teaching staff, of the main knowledge corresponding to the subjects of the subject.

 Problem solving
 The teacher will propose to the students a series of problems so that they can solve them in the classroom or outside the classroom.

Laboratory practical	The students will carry out practices related to separation operations.
Practices through ICT	A process simulator will be used to simulate the basic operations studied: rectification, liquid-liquid extraction, absorption, etc.

Personalized assistance			
Methodologies	Description		
Problem solving	The students canconsult, during tutorial hours, any doubt about theoretical or practical aspects of the subject.		

Assessment

Description

Qualification Training and Learning Results

Lecturing	They will make activities in Moovi and exercises in class or of autonomous form related with each one of the subjects.	15	B1 B3		D5
	Expected results: Know and understand the basic aspects of separation operations and chemical reactors.				
	Know the processes used to obtain fuels and petrochemical raw materials.				
Laboratory practical	The work and the report made by the students will be valued.	10	— В2 В4	C47	D1
	Expected results: Know and understand the basic aspects of separation operations and chemical reactors				
Practices through IC	The work and the report made by the students will be valued.	10	B2 B3	C47	D1 D3 D8
	Expected results: Know and understand the basic aspects of separation operations and chemical reactors				
Essay questions exam	An examination will be carried out, in the last week of the term, on the topics of natural and refined gas, petrochemical and coal processes.	25	B1 B2	C48	D1 D5 D8
	Expected results:				D10
	Know the processes used to obtain fuels and petrochemical raw materials. Know the techniques for measuring the properties of fuels				
Problem and/or exercise solving	An examination of basic operations problems will be carried out on the date established in the official calendar of the center.	40	B1 B2 B4	C47	D3 D8 D10
	Expected results: Know and understand the basic aspects of separation operations and chemical reactors.				

Other comments on the Evaluation

Continuousevaluation - First assessment :

To pass the subject, a minimum of 3.5/10 is required in each of the evaluable sections. In the event that the result of the addition of all the grades is equal to or greater than 5, but the minimum score is not reached in any of the evaluable sections, the final grade will be 4.

Global evaluation considerations:

Students will have a maximum period of two months from the start of the course to give up the continuous assessment option.

This global test can include questions from laboratory practices and ITC supported practices, therefore, the student will be able to achieve 100% of the qualification.

Continuous evaluation - Second assessment:

In the second opportunity, the grades for the laboratory practices and ITC supported practices will be kept for those students who have passed these methodologies. For those students who have not passed them or have renounced the continuous assessment option, the second assessment exam may include questions from these methodologies.

Exam Timetable: Exam dates and roomsmust be verified in the official webpage of the school: http://minaseenerxia.uvigo.es/es/docencia/examenes

Sources of information

Basic Bibliography

Himmelblau, D.M., **Basic principles and calculations in Chemical Engineering**, 6, Prentice-Hall, 1996 McCabe W.L., Smith, J.C., Harriot, P., **Operaciones unitarias en Ingeniería Química**, 7, McGraw-Hill, 2007 Gary, J.H., Handwerk, G.E., Kaiser, M.J., **Petroleum refining technology and economics**, 5, CRC Press, 2007 **Complementary Bibliography**

Izquierdo, J.F., Costa, J., Martinez, E., Izquierdo, M., Introducción a la Ingeniería Química, 1, Reverté, 2011

Recommendations