SUBJECT TEACHING GUIDE

G450 - Chemistry

Degree in Marine Engineering

Academic year 2021-2022

1. IDENTIFYING DATA					
Degree	Degree in Marine Engineering			Type and Year	Core. Year 1
Faculty	School of Maritime Engineering				
Discipline	Subject Area: Chemistry Basic Training Module				
Course unit title and code	G450 - Chemistry				
Number of ECTS credits allocated	6	Term		Semester based (1)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. DE QUIMICA E INGENIERIA DE PROCESOS Y RECURSOS.
Name of lecturer	ALBERTO COZ FERNANDEZ
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Other lecturers	GEMA RUIZ GUTIERREZ CRISTINA RUEDA RUIZ

3.1 LEARNING OUTCOMES
- To know how to solve general chemistry problems, organic and inorganic chemistry problems and their applications in engineering
- Characteristics of fluid flow, liquefied gas, lubricants and refrigeration to operate the main and auxiliary machine and the control systems
- Fires and chemical characteristics for the prevention and control on board
- Chemical charactetristics of cargo for cargo operations in oil tankers, chemical and gas vessels
- Chemical characteristics for pollution prevention due to hydrocarbons, chemical products and/or liquefied gases
- Characteristics of chemical loads and risks

4. OBJECTIVES

Basic chemistry for Maritime Engineering, Marine Engineering and Nautical Engineering.
- Chemical behaviour, chemical reactions in water and calculus.
- Physico-chemical behaviour of gases, liquids and their properties. Physico-chemical operations.
- Inorganic formulation and general information about organic compounds.
- Fuels and lubricants. Chemistry in fire behaviour

6. COURSE ORGANIZATION

CONTENTS	
1	Part I: INTRODUCTION TO CHEMICAL ENGINEERING. Elements, compounds, symbols, formulation and stoichiometry. Introduction to organic chemistry and their compounds. Petroleum and hydrocarbons. Problems and practical case number 1 (computer room): general activities in a chemical laboratory, safety and simulation.
2	Part 2: PHYSICO-CHEMICAL PROPERTIES IN ENGINEERING States of aggregation. Gases, pressure, temperature, density, laws of gases, diffusion and mixing, inert gases, liquids, vapour pressure, properties, solids, state change, phases diagram, critical pressure and temperature, dew point, bubble point, Liquefied gas, solutions, heterogeneous mixing, specific substances, hydrates, polymers, solidification, high density, compatible and incompatible substances. Physico-chemical operations: distillation, extraction, crystallisation, polymerisation. Problems and practical case number 2 (laboratory): liquid-liquid extraction. First partial exam.
3	Part 3: WATER CHEMISTRY IN ENGINEERING Water: importance, classification, properties. Kinetic and chemical equilibrium. Acid-base equilibrium, precipitation, redox. Marine pollutant: general overview, effects of hydrocarbons and other chemical compounds in water. Problems and practical cases number 3 (computer room) and 4 (laboratory): temperature in equilibrium, water analysis. Homework
4	Part 4: FUELS AND LUBRICANTS Hazardous properties: toxic, harmful, corrosive, irritant, flammable, explosive, oxidiser, reactive. Heat in chemical reactions, exothermic reactions, combustion, fire, fuels and lubricants properties, electrostatic charge. Problems and practical case number 5 (computer room): fuels. Second partial exam Final exams

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Homework	Work	No	Yes	25,00
Laboratory work	Laboratory evaluation	No	Yes	15,00
Partial exams	Written exam	No	Yes	60,00
TOTAL				100,00

Observations

Observations for part-time students

Part-time students can go directly to final exams. In this case, the mark is given by 100% of the exam, including theory, problems and practical cases.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Baber, J. A.; Ibarz, J. Química general moderna. Ed. Marín, S.A.
Brown, T.; LeMay, Jr.; Bursten, B. Química La ciencia central. Editorial Prentice Hall Hispanoamericana SA.
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García, J. A.; González, M.A. Química. Ed. Tebar Flores.
Ibarz, J. Problemas de Química General" Ed. Marín S.A.
López, J.A. Problemas de química: cuestiones y ejercicios. Ed. Prentice Hall.
Morcillo, J. Temas básicos de química. Ed. Alhambra.
Orozco, C.; González, Mª N.; Pérez, A. Problemas resueltos de química aplicada. Ed. Paraninfo
Peterson, W. R. Nomenclatura de química inorgánica (IUPAC). Ed. Eunibar.
Petrucci, B.; Harwood, C.; Herring, R.H. Química General. Ed. Prentice Hall.
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Yen, T.F. Chemistry for engineers. Ed. Imperial College Press, cop.
Atkins, P.; Jones, L. Química. Moléculas. Materia. Cambio. Ed. Omega S.A.