Course guide
280607 - 280607 - Chemistry

Last modified: 25/10/2023

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 713 - EQ - Department of Chemical Engineering.

Degree: BACHELOR'S DEGREE IN MARINE TECHNOLOGIES (Syllabus 2010). (Compulsory subject).
BACHELOR'S DEGREE IN NAUTICAL SCIENCE AND MARITIME TRANSPORT (Syllabus 2010). (Compulsory subject).
BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 6.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: LUIS JAVIER DEL VALLE MENDOZA

Others: Primer quadrimestre:
LUIS JAVIER DEL VALLE MENDOZA - GESTN, GNTM, GTM

Segon quadrimestre:
AURELIO CALVET TARRAGONA - GESTN, GNTM, GTM
LUIS JAVIER DEL VALLE MENDOZA - GESTN, GNTM, GTM
OSCAR GONZALEZ FERNANDEZ - GESTN, GNTM, GTM
NEKANE LOZANO HERNÁNDEZ - GESTN, GNTM, GTM
JUAN TORRAS COSTA - GESTN, GNTM, GTM

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
GTM.CE2. Basic knowledge of general chemistry, organic and inorganic chemistry and its applications in engineering.
GESTN.CE3. Basic knowledge of general chemistry, organic and inorganic chemistry and its applications in the field of naval engineering technology.

TEACHING METHODOLOGY

* Receive, understand and synthesize knowledge.
* Set up and solve problems.
* Develop critical thinking and reasoning and defend it orally or in writing.
* Submit the report of the labs individually and / or group.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course the student will have:
1. Basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering.
2. Basic knowledge of general chemistry, organic and inorganic chemistry and its applications in the field of naval engineering technique.

STUDY LOAD

Type	Hours	Percentage
Self study	90,0	60.00
Hours medium group	24,0	16.00
Hours small group	6,0	4.00
Hours large group	30,0	20.00

Total learning time: 150 h

CONTENTS

1. Chemical elements and chemical bonding

Description:
Atomic theory and structure of the atom. Periodic table and periodic properties. Link types: covalent and ionic metal. Theory Lewis covalent bond. Hybridizations atomic and molecular geometry. Theories on the metallic bond.

Full-or-part-time: 13h
Theory classes: 9h
Practical classes: 1h
Laboratory classes: 1h
Guided activities: 1h
Self study : 1h

2. Dissolutions

Description:
Water as a solvent, water properties: electrolytic substances. Measures of concentration. Colligative properties. Equilibria in aqueous phase: the equilibrium constant and the principle of Le Chatelier. Acid-Base Equilibria. Precipitation-solubility equilibria. Introduction to redox equilibria and their implications in the field of sailing.

Full-or-part-time: 9h
Theory classes: 9h

3. Inorganic and organic compounds

Description:
Introduction to the inorganic nomenclature. Introduction to organic nomenclature. Main inorganic nautical interest. Petroleum refining. Combustion reactions.

Full-or-part-time: 5h
Theory classes: 5h

4. Elemental analysis, analysis of water and organic compounds

Description:
Water analysis: nautical main parameters of interest. Analysis of fuel: nautical main parameters of interest.

Full-or-part-time: 4h
Theory classes: 4h

5. States of matter

Description:
Types of intermolecular interactions. Theory of ideal gases. Introduction to metallic and ionic packaging. Introduction to phase equilibrium.

Full-or-part-time: 3h
Theory classes: 3h

ACTIVITIES

Laboratory practices

Description:
1. Physical-chemical water analysis.
2. Acid-base titrations.

Specific objectives:
* Consolidate the theoretical knowledge on the subject of chemistry.
* Develop skills and abilities to work in a chemistry laboratory.
* Promote respect for the environment through the management of chemical waste (greening the subject).

Material:
Own chemistry laboratory.

Delivery:
Individual report and / or group of laboratory practices.

Related competencies :
CE3.GESTN. Basic knowledge of general chemistry, organic and inorganic chemistry and its applications in the field of naval engineering technology.
CE2. Basic knowledge of general chemistry, organic and inorganic chemistry and its applications in engineering.

Full-or-part-time: 4h
Laboratory classes: 2h
Guided activities: 1h
Self study: 1h

GRADING SYSTEM

For instance:
The final score is the sum of the following partial scores:
Final score= 0.5 SF + 0.35 SP+ 0.15 SL

SF:Final test
SP: Partial test
SL: laboratory teaching qualification (lab, computer room).
The final test consists of part types with test questions and issues associated with the learning objectives of the course concepts in knowledge and / or understanding, and a set of exercises and application problems. It has about 3 hours to do it.
Continuous assessment and partial test is to do different activities, both individual and group, summative and formative, carried out during the course.
The rating of the laboratory teaching is the average of the laboratory activities.
REEVALUATION
Reassessment scheduled for the subject of Chemistry, is an optional situation chosen by the student that it deems appropriate. The reassessment requirement is to have completed the labs. The event will consist of a single test that considers the entire contents of the subject. The test methodology consists reassessment of part types with test questions and issues associated with the learning objectives of the course concepts in knowledge and / or understanding, and a set of exercises and application problems

EXAMINATION RULES.

* If it is not any laboratory activities, continuous assessment or final test performed, shall be deemed not scored.
* It is deemed not-presented to students who have not made any test, either the final or continuous assessment or has performed more than a practice.
* In any case you can have any kind of form controls learning or testing.

BIBLIOGRAPHY

Basic:
- Brown, T. L [et al.]. Química: la ciencia central [on line]. 11a ed. Mexico: Pearson Educación, 2014 [Consultation: 01/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=4690. ISBN 9786073222358.
- Chang, Raymond; Overby, Jason. Química [on line]. 13a ed. Ciudad de México: McGraw Hill Interamericana Editores, 2020 [Consultation: 01/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=10619. ISBN 9781456279943.
- Petrucci, Ralph H. [et al.]. Química general : principios y aplicaciones modernas [on line]. 11a ed. Madrid: Pearson Prentice Hall, 2017 [Consultation: 01/09/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6750. ISBN 9788490355336.

Complementary:
- Wade, L. G. Química orgánica, Vol. 2 [on line]. 9a ed. México: Pearson education, 2017 [Consultation: 07/10/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6677. ISBN 9786073238502.
- Aguilar, Manuel [et al.]. Fonaments de química: problemes. Barcelona: Edicions UPC, 1993. ISBN 8476533179.
- Sales i Cabre, Joaquim; Vilarasa, Jaume. Introducció a la nomenclatura química (inorgànica i orgànica). Barcelona: Reveté, 2003. ISBN 8429175512.
- Wade, L. G. Química orgánica, Vol. 1 [on line]. 9a ed. México: Pearson education, 2017 [Consultation: 07/10/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=6676. ISBN 9786073238489.