

Academic Year/course: 2021/22

29604 - Chemistry

Syllabus Information

Academic Year: 2021/22

Subject: 29604 - Química

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 430 - Bachelor's Degree in Electrical Engineering

ECTS: 6.0

Year: 1

Semester: 330-First semester o Second semester

107-First semester

430-First semester o Second semester

Subject Type: Basic Education

Module:

1. General information

1.1. Aims of the course

The subject and its expected results meet the following proposals and goals:

The aim is that the students would acquire a general view of the chemistry and its importance in our society and would be able to apply the theoretical and practical knowledge of chemistry in the development of his/her profession as industrial engineer.

These proposals and goals are aligned with some of the Sustainable Development Goals, SDGs, of the 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>) and several specific targets, so that the acquisition of the learning outcomes on the subject provides the student with training and competence for contributing to some extent to their achievement:

- Goal 3: Ensure healthy lives and promote well-being for all at all ages. Target 3.9.
- Goal 6: Ensure availability and sustainable management of water and sanitation for all. Target 6.3.
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. Targets 7.2. and 7.3.
- Goal 12: Ensure sustainable consumption and production patterns. Targets 12.2. and 12.5.

1.2. Context and importance of this course in the degree

This subject is programmed in the first semester of the first academic year of the degree in Electrical Engineering and belongs to the module of basic learning of the degrees in the branch of Industrial Engineering. The basic concepts learnt in this subject will serve as a basis for other subjects of subsequent academic years, such as, Technical thermodynamics, Foundations of transmission of heat, Materials engineering and Environmental engineering.

1.3. Recommendations to take this course

To have acquired the competences own to the previous educational stages

2. Learning goals

2.1. Competences

When passing the subject the student will be more competent to?

Solve problems and take decisions with initiative, creativity and critical reasoning (C4)

Learn in a continued way and develop strategies for an autonomous learning (C11)

Understand the principles of basic knowledge of general chemistry, organic chemistry and inorganic chemistry and apply them to engineering (C15)

2.2. Learning goals

To pass this subject the student must demonstrate the following results?

He/she handles the basic principles of general chemistry, organic chemistry and inorganic chemistry.

He/she handles the basic laws that regulate the reactions: thermodynamics, kinetics and equilibrium

He/she solves exercises in a complete and reasoned way

He/she suitably applies the theoretical concepts in the laboratory by means of a correct and sure use of the basic material and equipments

He/she uses a rigorous language in chemistry

He/she suitably presents and discusses data and results

2.3. Importance of learning goals

They provide tools for subsequent learnings and for the professional activity of electrical engineers

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student should show that he/she has reached the expected learning results by means of the following activities of evaluation:

Written exam of nomenclature of Inorganic Chemistry and Organic Chemistry. The mark will range between 0 and 10 points and will suppose the **10 %** of the final mark in the subject.

Written exam comprising definitions, multiple-choice questions, and theoretical short answer questions. The mark will range between 0 and 10 points and will suppose the **40 %** of the final mark in the subject.

Written exam to assess the student skills in the problem-solving questions. The mark will range between 0 and 10 points and will suppose the **40 %** of the final mark in the subject.

Realisation of laboratory sessions, delivery of a report for each practice according to the guidelines indicated at the beginning of each session, and realisation of a written exam. The mark in this part will range between 0 and 10 points and will suppose the **10 %** of the final mark in the subject.

Procedure of assessment of the subject

For the assessment of the subject, a procedure of **GLOBAL evaluation assessment** will be followed.

This will take place in each one of the two announcements of the subject, in the period fixed and programmed by the centre for the realisation of examinations and will consist of several written exams (exam of Nomenclature (10%), exam of Theory (40%) and exam of Problems (40%)).

The mark of laboratory practices (10%) will be obtained during the realisation of the laboratory sessions of practices of laboratory, according to the calendar fixed by the centre for them. The mark of practices will be calculated according to the following equation:

Practices mark = $0,3 \times \text{exam mark} + 0,7 \times \text{laboratory mark}$

A minimum mark of 3.0 points in the written exam of practices is required to apply the previous equation. If this mark is not reached, it will be considered that the student has failed in the part of practices. If the student has not made the laboratory sessions, in addition to the written exams previously indicated, he/she should do a practical exam in the laboratory, in which it will carry out one experience related with those programmed in the laboratory sessions of laboratory. This exam will suppose the 10% of the final mark.

To pass the subject it will be necessary to have a minimum note of 4.0 points in each one of the exams as well as in the practices, and a minimum average mark of 5.0 points.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process designed for this course is based on:

The subject is planned to improve the active learning of the students so that the lectures are conceived as general introductions to each chapter, introductions that will be completed afterward by the rest of proposed activities, including the resolution of questions and problems, the assistance to tutoring sessions tutorials and the realization of laboratory sessions

4.2. Learning tasks

The course includes the following learning tasks:

On-site theory and practice sessions (5,0 credits)

Lectures with the support of TIC's will be mainly used. In the practice sessions the participation of the student will be encouraged.

Laboratory sessions (1,0 credits)

The laboratory sessions will be oriented towards the acquisition by the student of skills in handling the material of the laboratory as well as to develop his/her deduction, communication, team working and analysis abilities, communicative. Besides, special attention will be paid to the importance of security guidelines in the laboratory and to the correct handling of wastes.

The subject in the platform Moodle 2.0.

Academic tutorials sessions

Possibility for students of 1st course of the Degree of following the subject "Gestión de la Información para el Grado en Ingeniería Eléctrica" (basic level) managed by the Biblioteca Hypatia.

4.3. Syllabus

The program of theory sessions consists of 10 chapters:

- Chapter 1. Periodic table and properties
- Chapter 2. Chemical nomenclature
- Chapter 3. Chemical bonds
- Chapter 4. States of aggregation of the matter
- Chapter 5. Chemical reactions and solutions
- Chapter 6. Thermochemistry
- Chapter 7. Chemical thermodynamics

- Chapter 8. Chemical equilibrium
- Chapter 9. Chemical kinetics
- Chapter 10. Electrochemistry

The program of laboratory sessions consists of three sessions:

- Session 1. Security in the laboratory. Study of solids in the function of the type of bond
- Session 2. Chemical equilibrium
- Session 3. Electrolysis. Energy interconversion

4.4. Course planning and calendar

Schedule of classroom teaching and work presentation

The lectures, practice sessions, and laboratory sessions will be given according to the schedule established by the Centre which is published prior to the date of the beginning of the course.

Each professor will inform of his/her schedule of tutoring sessions, schedule that also will be available on the web of the center.

The detailed schedule of the activities to be developed will be established once the University and the Center have approved the academic calendar (which could be consulted in the web of the center)

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=29604&Identificador=12448>