1. OVERVIEW

Subject area	Chemistry
Degree	Bachelor's Degree in Physics
School/Faculty	School of Architecture, Engineering and Design
Year	First
ECTS	6 ECTS
Type	Core
Language(s)	Spanish
Delivery mode	On campus
Semester	First semester

2. INTRODUCTION

Chemistry is a fundamental science that is essential to understand the structure of matter and its transformations.

Chemistry is a core subject area that allows students to understand the atomic structure of matter, the molecular structure of substances and their transformation into other substances or aggregate states of the same substances. Students will be able to understand the theoretical laws that govern these transformations.

In addition, by studying this subject area, students will gain enough knowledge of the chemical processes that can affect the composition and structure of materials to ensure that, when in similar situations, physics graduates will be able to make the best decisions. The knowledge gained in this subject area lays the foundations for studying other subject areas in later years of the degree, such as Thermodynamics, Solid-State Physics and Nuclear and Particle Physics, among others. In addition, this is a core subject area for the Materials Speciality, with a big impact on career opportunities for physics graduates in the field of research or the design and development of new materials.

3. SKILLS AND LEARNING OUTCOMES

Key skills (CB, by the acronym in Spanish):

- CG3 - To understand and express oneself in a language of science other than Spanish in a professional setting.
- CB1 - Students have shown their knowledge and understanding of a study area originating from general secondary school education, and are usually at the level where, with the support of more advanced textbooks, they may also demonstrate awareness of the latest developments in their field of study.

Transversal skills (CT, by the acronym in Spanish):

- CT4 - Written communication/Oral communication: Ability to communicate and gather information, ideas, opinions and viewpoints in order to understand and be able to act upon them, whether they are through spoken word and gestures, or through written word and/or visual aids.

- CT5 - Problem solving: Be able to critically evaluate information, separate complex situations into their constituent parts, recognise patterns, and consider alternatives, different approaches and perspectives in order to find optimal solutions and negotiate efficiently.

Specific skills (CE, by the acronym in Spanish):

- CE08 - To understand and apply the basic principles of general chemistry and to describe its applications in relation to physics.

Learning outcomes (RA, by the acronym in Spanish):

- RA1: To calculate the amounts of different substances involved in chemical equilibrium and the point at which this equilibrium is reached, and to predict how the position of equilibrium moves when its conditions change.
- RA2: To predict the properties of a certain substance based on its constituent elements, and to determine if a certain reaction will occur.
- RA3: To gain the necessary skills used in chemistry labs, understanding and conducting lab experiments and writing the corresponding scientific reports.

The following table shows how the skills developed in the subject area match up with the intended learning outcomes:

Skills	Learning outcomes
CB1, CT5, CE08	RA1 – To calculate the amounts of different substances involved in chemical equilibrium and the point at which this equilibrium is reached, and to predict how the position of equilibrium moves when its conditions change.
CB1, CT5, CE08	RA2 – To predict the properties of a certain substance based on its constituent elements, and to determine if a certain reaction will occur.
CG3, CB1, CT4, CT5, CE08	RA3 - To gain the necessary skills used in chemistry labs, understanding and conducting lab experiments and writing the corresponding scientific reports.

4. CONTENTS

The subject is organised into four learning units (UA, by the acronym in Spanish) that, in turn, are divided into topics. The content is as follows:

1. The periodic system.
2. Chemical bonds. Intermolecular forces.
3. Chemical reactions.
4. Thermochemistry and kinetic chemistry.
5. Balancing acid–base, precipitation and redox reactions.
6. Introduction to organic chemistry.

5. TEACHING/LEARNING METHODS

The types of teaching/learning methods are as follows:

Collaborative learning: Students learn to collaborate with other people (classmates and professors) in order to find creative, comprehensive and constructive solutions to questions and problems that arise from the given case studies, using all relevant knowledge and material resources available.
Problem-based learning: Students are given problems and asked to solve them, working individually or in groups.
Lectures: Presentations by the professor with the necessary technological tools to maximise comprehension of the learning content.
Workshop-based learning: Students acquire knowledge through learning to use the tools and equipment needed in their profession. In other words, "learning by doing".
Guided academic activities: Individual and group work that is more independent, including information searches, written summaries, debates and the public defence of projects.

6. LEARNING ACTIVITIES

The types of learning activities, plus the amount of time spent on each activity, are as follows:

On campus:

Learning activity	Number of hours
AF1: Lectures	36
AF2: Oral presentations of projects and debates	6
AF3: Report writing	24
AF4: Assessment	6
AF5: Practical activities (problems, written work, projects, workshops and/or lab work)	24
AF6: Tutorials	16
AF7: Independent working	38
TOTAL	150

7. ASSESSMENT

The assessment systems, plus their weighting in the final grade for the subject area, are as follows:

On campus:

ASSESSMENT SYSTEMS	Min%	Max. %
Individual on-campus knowledge tests (theory and/or practice)	50	50

Oral defence	5	15
Submission of group and/or individual reports, written work, projects or exercises	20	40
Performance observation	5	20

On the Virtual Campus, when you open the subject area, you'll find details of your assessable tasks, including the submission dates and assessment procedures for each task.

8. BIBLIOGRAPHY

The recommended bibliography is indicated below:

Química, K.A. Goldsby R. Chang, 12ª ed., Madrid, McGraw-Hill, 2016.

“Chemistry & Chemical Reactivity”. 8th ed. John c. Kotz.

"Química y reactividad química". 5ª Edición. John C. Kotz; Paul M. Treichel. Ed. Thomson, 2003.

Química general: principios y aplicaciones modernas Ralph H. Petrucci, William S. Harwood; Prentice Hall, D.L. 1998.

Química general Ralph H. PETRUCCI, (11ª ed.): principios y aplicaciones modernas Pearson. 2017

Formulación y nomenclatura: química inorgánica: [según la normativa IUPAC] / W.R. Peterson, William Roger Barcelona: EDUNSA, 1993.

Química orgánica / K. Peter C. Vollhardt, Neil E. Schore. Barcelona: Omega, D.L. 1995. 2ª ed.