1. BASIC INFORMATION

Course	Chemistry for engineering
Degree Program	Degree in Aerospace Engineering in Aircraft
School	Architecture, Engineering and Design
Year	First year
ECTS	6
Credit type	Mandatory
Languages/s	English and Spanish
Mode	On-Campus
Semester	First semester
Academic year	2025-2026
Coordinating professor	Janaina Cejudo Sanches
Professors	Janaina Cejudo Sanches and Eva Espinosa Cano

2. PRESENTATION

Chemistry is a 6 ECTS course taught in the first year of several engineering degrees. Its aim is to introduce the basic concepts of chemistry that an engineer will need in his or her professional career. Concepts developed in this course will be applied in other subjects in the following courses. The course is divided into two sections. The first one studies the structure and properties of matter. The second explains chemical transformations and their relation to various industrial processes involved in the engineering world.

Engineers must acquire sufficient chemical knowledge to understand the basic characteristics of the materials used in their profession. They should be able to recognize the requirements and characteristics of different compounds and process in different environments.

3. LEARNING OUTCOMES

Knowledge:

KN03 (CON03) FB04. Ability to understand and apply the basic principles of general chemistry, organic and inorganic chemistry, and their applications in engineering.

Specific knowledge of the subject:

- Identify and describe the chemical structure of matter: the periodic system, chemical bonding, and intermolecular forces.
- Identify and describe the fundamentals of organic chemistry.

Skills:

SK04. Use computer tools to search for bibliographic or information resources (Information Search).

Specific skills of the subject:

- Solve problems in applied chemistry.
- Create structured and rigorous engineering reports (based on laboratory practices)
- Work safely in a chemistry laboratory.
- Analyze chemical reactions: thermochemistry and chemical kinetics; acid-base, precipitation, and redox equilibria.

Competences:

CP12. Generate new ideas and concepts from known ideas and concepts, reaching conclusions or solving problems, challenges, and situations in an original way in the academic and professional environment.

CP13. Convey messages (ideas, concepts, feelings, arguments), both orally and in writing, strategically aligning the interests of the various parties involved in communication in the academic and professional environment in the field of aerospace engineering.

CP14. Employ information and communication technologies for data search and analysis, research, communication, and learning in the field of aerospace engineering.

CP15. Influence others to guide and lead them towards specific objectives and goals, taking into consideration their viewpoints, especially in professional situations arising from the volatile, uncertain, complex, and ambiguous (VUCA) environments of the current world.

CP16. Collaborate with others in achieving a shared academic or professional objective, actively participating, demonstrating empathy, and practicing active listening and respect for all team members.

CP17. Integrate analysis with critical thinking in an evaluation process of different ideas or professional possibilities and their potential for error, relying on evidence and objective data that lead to effective and valid decision-making.

CP18. Adapt to adverse, unexpected situations that cause stress, whether personal or professional, overcoming them and even turning them into opportunities for positive change.

CP19. Demonstrate ethical behavior and social commitment in the performance of professional activities, as well as sensitivity to inequality and diversity.

4. CONTENT

Chemical structure of matter

- The Periodic System.
- Chemical bond
- Intermolecular forces.

Chemical transformations of matter

- Chemical reactions.
- Thermochemistry and chemical kinetics.
- Acid-base, precipitation and redox balances
- Organic Chemistry

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Survey of objectives and interests
- Master class
- Laboratory practices
- Group research or group problem solving
- Designs
- Simulation
- Case study

6. LEARNING ACTIVITIES

The following table shows, for each learning activity: ***i***) the total time the student will spend, ***ii***) the time distribution between in-class and off-class time, and ***iii***) the course policy about the use of artificial intelligence (AI) in that activity.

Campus-based mode:

Learning activity	Total time	In-class Time	Use of AI
Lectures / masterclasses	30 hours	30 hours (100%)	Allowed
Laboratory / problem-solving workshops	12 hours	12 hours (100%)	Not Allowed
Group research and integrative group work	50 hours	18 hours (47%)	Assessed
Self-study	70 hours	0 hours (0%)	Promoted
TOTAL	**150 hours**	**60 hours (40%)**	

Further details about the AI-use policy will be published through the virtual campus platform once the course has started.

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Assessment system	Weight
SE01 – Exams and objective tests	30-35%
SE02 – Articles, essays and reports	15-30%
SE03 – Peer-evaluation, working sessions and alternative assessment procedures	15-30%
SE04 – Off-class events, conferences and seminars (*)	10%
SE05 – Core/cross-curricular competences (performance)	10-15%

(*) If these activities could not be carried out, the corresponding weight would split evenly between systems SE02 and SE03.

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain:

- A score of 5,0 out of 10 or greater in the final test.
- An average final score (according to the previous table) equal or greater than 5,0 out of 10.
- 50% attendance.

When the minimum required to carry out the weighted average of the evaluable activities is not met (the minimum is not reached in the 2 first previous points), the final grade will be:

- the weighted average if its value is less than or equal to 4,0
- 4,0 if the value of the weighted mean is greater than 4,0
- If the attendance requirement is not met, the student can only pass in the extraordinary period

The grade in the first exam period will be considered as **NP** (Not Presented) when the student has not delivered any evaluable activity of those that are part of the weighted average.

7.2. Second exam period

To pass the course in the second exam period, you must obtain:

- A score of 5,0 out of 10 or greater in the final test.
- An average final score (according to the previous table) equal or greater than 5,0 out of 10

When the minimum required to carry out the weighted average of the evaluable activities is not met (the minimum is not reached in any of the previous points), the final grade will be:

- the weighted mean if its value is less than or equal to 4,0
- 4,0 if the value of the weighted mean is greater than 4,0

The grade in the second exam period will be considered as **NP** (Not Presented) when the student has not delivered any new evaluable activity in relation to the previous ordinary period.

Students must compensate all the evaluable assignments they did not successfully passed in the ordinary session or all the necessary ones to achieve a weighted average over 5,0 out of 10.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Homework assignment / working session Group project presentation	week 2-3
Homework assignment / working session. Lab practice.	week 4-5
Homework assignment / working session. Lab practice.	week 6-7
Midterm exam / 2nd group project assignment. Lab practice	week 8
Homework assignment / working session. Lab practice	week 10-12
Homework assignment / working session. Lab practice	week 12-13
Final group project assignment	week 14
Final Exam	week 15

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

- "Chemistry", K.A. Goldsby R. Chang, 12ª ed., Madrid, McGraw-Hill, 2016.
- "Chemistry & Chemical Reactivity". 8th ed. John c. Kotz.
- "General Chemistry " Ralph H. Petrucci, William S. Harwood; Prentice Hall, D.L. 1998.
- "Organic chemistry" / K. Peter C. Vollhardt, Neil E. Schore. 5th ed New York: W.H. Freeman and Company, 2007.

10. DIVERSITY MANAGEMENT UNIT

Students with specific learning support needs:

Curricular adaptations and adjustments for students with specific learning support needs, in order to guarantee equal opportunities, will be overseen by the Diversity Management Unit (UAD: Unidad de Atención a la Diversidad).

It is compulsory for this Unit to issue a curricular adaptation/adjustment report, and therefore students with specific learning support needs should contact the Unit at unidad.diversidad@universidadeuropea.es at the beginning of each semester.

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the "surveys" section in virtual campus or via e-mail.
Your assessment is necessary for us to improve.
Thank you very much for your participation.