BRIEF DESCRIPTION AND JUSTIFICATION (of the meaning of the course in relation to the studies. Between 100 and 200 words)

General Chemistry examines and deepens the concepts studied during the bachelor and introduces new concepts that are considered basic to adapt the level of students’ knowledge to the needs of the subjects included in subsequent courses. Specifically:

- The chemical language that allows designing and formulating the inorganic and organic chemical elements and compounds, in accordance with the IUPAC standard rules.
- The concepts related to the stoichiometry of substances, the concentration of dissolutions and the stoichiometry of reactions, and their application to the quantitative analysis of mixtures of substances.
- Basic knowledge of chemistry and quantum mechanics related to the structure of matter: structure of atoms, periodic properties of the elements, linkage and structure of the molecules, how they interact to give rise to the different aggregation states and the own states of the matter.
- Knowledge that allows describing the ideal physico-chemical systems in equilibrium (gaseous systems, aqueous solution systems) and predicting the physical and chemical transformations that these systems experience by submitting them to different actions.

COMPETENCES (of the course placed in relation to the pre-assigned competences in the subject matter)

- That students demonstrate knowledge in the area of study, which is mostly constructed on the grounds of the general secondary education (high school). Even though this knowledge is usually at the level of advanced textbooks, it also includes some of the corresponding state-of-the-art. (CB1)
- That students have the ability to gather and interpret relevant data (normally within their area of study) to think over and make judgments on relevant social, scientific or ethical issues. (CB3)
• Be able to understand and apply basic knowledge of Mathematics, Chemistry, Physics and Biology to the field of Biotechnology. (E1)

PREREQUISITES * (modules, subject matters, courses or knowledge necessary for the follow-up of the subject. State previous courses required to be completed)

Competences of previous educational stages.

CONTENTS (List the content of the course, with up to two level detail)
1. Atomic structure.
2. The periodic table of the elements and their periodic properties.
3. Chemical bond (theories and bonding types) and intermolecular forces.
4. Basic nomenclature and formulation in inorganic chemistry.
5. Basic nomenclature and formulation in organic chemistry.
7. Aggregation states of matter.
8. Physical balance between different phases: study of systems with a component and dissolutions.
9. Chemical equilibrium in homogeneous gas systems.
10. Ionic balances in aqueous solutions of acids, bases and low soluble salts.
11. Electrochemistry (electrolysis and batteries).

METHODOLOGY

LEARNING ACTIVITIES (Complete the table relating activities, workload in ECTS credits, and competences)

<table>
<thead>
<tr>
<th>Learning Activities</th>
<th>ECTS Credits</th>
<th>Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>4,4</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Case and Problem-Solving Sessions</td>
<td>0,8</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Seminars</td>
<td>0,2</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Practical and Lab Work</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Presentations</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Personal Study</td>
<td>6,4</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Assessment Tasks (Exams, Continuous Assessment...)</td>
<td>0,2</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12,0</strong></td>
<td><strong>CB1, CB3, E1</strong></td>
</tr>
</tbody>
</table>

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TEACHING METHODOLOGY (justify the teaching methodology in relation to the competences and course contents. Between 100 and 200 words)

- **Lectures** - The concepts included in the program are presented, using the classic techniques: chalkboard and projections. In some classes, teaching experiences are interspersed which facilitate the understanding of some concepts and favour the participation of the students. Dynamic classes are encouraged in which the question-answer game can benefit not only the student who asked the question, but also his or her classmates.

- **Case and Problem-Solving Sessions** - There are collections of exercises and problems, which are given to students throughout the course. With the exercises, we try to help the student to understand, deepen and relate the concepts studied in the sessions of exposition of concepts. With the problems, the students learn to use the theoretical concepts with agility and reinforce their comprehension. Exercises and problems, corresponding respectively to the parts of theory and of problems of the exams, are thickening these collections, with what is tried to avoid that the students feel surprised in their first university exams. Problems/exercises-type and problems/exercises that present greater difficulties for the students are solved in class.

- **Seminars** - They are taught on a specific subject, or part of the subject, in order to reinforce it or, simply, to attend to the doubts that have arisen to the students when studying without the limitation that the time factor imposes to the other types of class.

- **Personal study activities** - It is necessary to acquire the competences of each subject and to assimilate the knowledge exposed in the sessions of exposition of concepts and sessions of resolution of exercises, problems and cases, using, when it is necessary, the recommended material of consultation. They also include the preparation of tasks related to the other activities, and the preparation of exams.

- **Assessment tasks** - written tests carried out during or after the course (follow-up checks, partial examinations, final examinations).

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ASSESSMENT

ASSESSMENT METHODS * (Complete the table relating assessment methods, competences, and weight percentage in the course qualification)

<table>
<thead>
<tr>
<th>Assessment methods</th>
<th>Weight</th>
<th>Competences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>50%</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Partial Exam/s</td>
<td>30%</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Continuous Assessment Activities</td>
<td>20%</td>
<td>CB1, CB3, E1</td>
</tr>
<tr>
<td>Reports and Presentations</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lab or Field Work</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Projects</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Host Student Evaluation</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Participation</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES * (Explanation of the student's achievements that allow the assessment of competences, relating them to the competences and the assessment methods)

- Students must demonstrate they have understood the basic concepts of the subject. They must be able to correctly explain these concepts and demonstrate sufficiency in differentiating, relating and using these concepts. (CB1, CB3, E1)

- Students must prove sufficiency to interpret the statement of exercises and problems. They must demonstrate sufficient to question the validity of a model through a new experimental event that drives the advance of science. They must demonstrate sufficiency to raise the chemical equations related to the exercises and problems proposed. They must demonstrate sufficient to consider and solve the calculation algorithms which are necessary to solve the problems safely. (CB1, CB3, E1)

QUALIFICATION (Explanation of the qualification system)

The assessment of the subject takes into account the qualifications obtained by the student in following assessment activities:

- 1 inorganic nomenclature test and 1 organic nomenclature test
- 4 controls CO (follow-up activities of approximately 1.5 hours that are carried out throughout the year)
- 2 partial exams EP (exams programmed in the middle and the end of the academic year, with an approximate duration of 4 hours per exam)
- 1 final exam (first call) EF (final exam in which the whole subject is evaluated and with an approximate duration of 5 hours).

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To evaluate the subject according to what is established in the following sections, the score of the two nomenclature tests may not be less than 80%. Otherwise, the final grade of the subject will be a maximum of 3.5.

**Qualification in the first call**
The final qualification (NF) is the best score chosen from the following three values:

a) \( NF = 0.20 \times \text{average CO} + 0.30 \times \text{average EP} + 0.50 \times \text{EF} \)

b) \( NF = 0.20 \times \text{average CO} + 0.80 \times \text{EF} \)

c) \( NF = 0.20 \times \text{average CO} + 0.80 \times \text{average EP} \)

- The student always has the right to carry out the final exam, but **if by means of the evaluation carried out with CO and EP the student obtains a qualification equal or superior to six, he/she can resign to the final examination.**

Equation b) is only applicable if the student has completed the two partial exams (EP) with an average mark of not less than 2.5.

**Qualification in the second call.**
If the student does not pass the subject on the first call, he may take the make-up exam, in which he will obtain a new mark (ER). In this call, the best score of the following two values will be chosen as the final grade (NF):

a) \( NF = 0.20 \times \text{average CO} + 0.80 \times \text{ER} \)

b) \( NF = \text{ER} \)

- The make-up exam mark (ER) must be at least 4.0.
- Equation b) is only applicable if the student has taken the exam of the first call.

**Additional aspects.**
The controls and exams (CO, EP, EF, ER) are scored on a **scale of 0 to 100 points.** The final grades (NF) are calculated on this same scale and are transformed to the **0 to 10 point scale (NFE)** using the following equations:

\[
\begin{align*}
\text{NF} < 60 & \quad \text{NFE} = 0.0 + (\text{NF}-0) * 5.0/60.0 \quad \text{Fail} \\
60 \leq \text{NF} < 70 & \quad \text{NFE} = 6.0 + (\text{NF}-60) * 1.0/10.0 \quad \text{Satisfactory} \\
70 \leq \text{NF} < 85 & \quad \text{NFE} = 7.0 + (\text{NF}-70) * 2.0/15.0 \quad \text{Good} \\
85 \leq \text{NF} & \quad \text{NFE} = 9.0 + (\text{NF}-85) * 1.0/15.0 \quad \text{Excellent}
\end{align*}
\]

It should be noted that the pass score corresponds to a 5 on the scale from 0 to 10 points and to a 60 on the scale from 0 to 100 points. The student's record will appear on the scale from 0 to 10 points.

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ASSESSMENT OF THE COMPETENCES  (Describe the grading system for each competence in relation with the assessment tasks)

For the assessment of the competences CB1, CB3 and E1 the final score of the subject will be used as an indicator.

BIBLIOGRAPHY  (Recommended and accessible to the student.)


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