COURSE DATA

DATA SUBJECT

Code: 34183
Name: General Chemistry I
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1110 - Degree in Chemistry	Facultat de Química	1	First quarter
1929 - Double Degree Program in Physics and Chemistry	Facultat de Física	1	First quarter
1934 - Double Degree Program in Chemistry-Chemical Engineering	Facultat de Química	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1110 - Degree in Chemistry	Chemistry	BASIC
1929 - Double Degree Program in Physics and Chemistry	Primer Curso (Obligatorio)	COMPULSORY
1934 - Double Degree Program in Chemistry-Chemical Engineering	Primer curso	COMPULSORY

COORDINATION

FOLGADO MATEU JOSE VICENTE

SUMMARY

General Chemistry I is a core subject that is taught during the first semester of year 1 of the Degree in Chemistry. In the curriculum it is worth a total of 6 ECTS credits.

This subject, together with General Chemistry II (core subject taught in year 1, second semester), is mainly intended to provide students with in-depth knowledge of chemistry, based on the knowledge acquired during their secondary education, and with comprehensive information on certain aspects. This should serve to establish the foundations necessary for successfully addressing the further study of the different branches that make up the discipline.

Apart from basic elements such as nomenclature, formulation and stoichiometry, this subject will cover all the aspects related to the subject area, such as atomic structure and periodic properties, molecular structure and chemical bonding, states of aggregation and the different types of solids and of organic

functional groups.

Regarding the Sustainable Development Goals (SDGs), it is expected that students will be able to acquire a special sensitivity for a sustainable management of water (ODS 6), raw materials and energy sources (ODS 7) along with a sustainable development compatible with the environment (ODS 11 , 12, 13, 14 and 15).

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

COMPETENCES / LEARNING OUTCOMES

1108 -

Acquire a permanent sensitivity to quality, the environment, sustainable development and the prevention of occupational hazards.

Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional.

Demonstrate knowledge and understanding of essential facts, concepts, principles and theories related to the areas of chemistry.

Demonstrate knowledge of the characteristics and behaviour of the different states of matter and the theories used to describe them.

Demonstrate knowledge of the main aspects of chemical terminology, nomenclature, conventions and units.

Demonstrate knowledge of the main types of chemical reaction and their main characteristics.

Develop capacity for analysis, synthesis and critical thinking.

Evaluate, interpret and synthesise chemical data and information.

Express oneself correctly, both orally and in writing, in any of the official languages of the Valencian Community.

Have basic skills in the use of information and communication technology and properly manage the information obtained.

Interpret the variation of the characteristic properties of chemical elements according to the periodic table.

Recognise and evaluate chemical processes in daily life.

Relate the macroscopic properties and the properties of individual atoms and molecules, including macromolecules (natural and synthetic), polymers, colloids and other materials.

Show inductive and deductive reasoning ability.

Solve qualitative and quantitative problems following previously developed models.

Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.

Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.

Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.

Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

Understand the qualitative and quantitative aspects of chemical problems.

1110 - Degree in Chemistry

At the end of the course, the student will be able to assess risks in the use of chemical substances and laboratory procedures.

At the end of the course, the student will be able to describe the characteristics and behaviour of the different states of matter and the theories used to explain them.

At the end of the course, the student will be able to distinguish between qualitative and quantitative aspects of chemical problems.

At the end of the course, the student will be able to identify chemical processes in everyday life.

At the end of the course, the student will be able to identify the main types of chemical reactions and their key characteristics.

At the end of the course, the student will be able to state the principles of thermodynamics and kinetics and apply them in chemistry.

At the end of the course, the student will correctly use chemical terminology, nomenclature, conventions and units.

At the end of the course, the student will demonstrate inductive and deductive reasoning skills.

At the end of the course, the student will demonstrate the ability to analyse, synthesise and apply critical reasoning.

At the end of the course, the student will interpret the relationship between the variation of the characteristic properties of chemical elements and the periodic table.

At the end of the subject, the student will evaluate, interpret and synthesize the chemical data and information correctly.

Capacidad de análisis, síntesis y razonamiento crítico en la aplicación del método científico.

Collaborate effectively in teams, assuming responsibilities and leadership roles and contributing to collective improvement and development.

Communicate effectively, both orally and in writing, adapting to the characteristics of the situation and the audience.

Comprender la empresa como una realidad sistémica e inherentemente compleja, reconociendo e identificando las dimensiones consustanciales a los sistemas de gestión empresarial y los condicionantes, externos e internos, que inciden sobre su gestión.
Ser capaces de categorizar y jerarquizar las decisiones organizativas, e interpretar los procesos de adopción de decisiones en el ámbito de los modelos teóricos. Discriminar y manejar los principales métodos y técnicas disponibles para la elaboración del diagnóstico estratégico. Poder elaborar un diagnóstico estratégico básico.

Comprender las particularidades contables que presenta la regulación jurídico-mercantil de las empresas, relacionando la legislación mercantil aplicable a los distintos tipos operaciones societarias con la contabilidad de los hechos económicos que se regulan. Aprender a relacionar las leyes mercantiles que se ocupan de los concursos de acreedores con la contabilidad, adquiriendo práctica en el manejo de determinados textos legales vigentes.

Comprensión del mundo natural como producto de la evolución y de su vulnerabilidad frente a la influencia humana.

Contribute to the design, development and implementation of solutions that address social needs, taking the Sustainable Development Goals as a reference.

Demonstrate critical and self-critical reasoning within the field of study, considering aspects such as professional ethics, moral values and the social implications of the different activities undertaken.

Express oneself correctly, both orally and in writing, in any of the official languages of the Valencian Community.

Ser capaces de analizar la influencia que sobre el diseño del sistema de información de costes, ejercen, tanto la actividad concreta desarrollada por la entidad como la tecnología utilizada, la estructura organizativa y el estilo de dirección. Calcular costes preestablecidos y relacionarlos con la planificación y el control de la actividad interna. Seleccionar aquellos indicadores de gestión que faciliten el desempeño personal, estableciendo la frecuencia y el formato en función del usuario de destino.

Ser capaces de configurar y manejar un sistema integrado para la gestión contable de la empresa. Utilizar la hoja de cálculo como herramienta de análisis de la información económica de la empresa. Saber aplicar programas de apoyo a tareas específicas de gestión.

Understand and recognise, from within the discipline, inequalities based on sex and gender in society;

integrate different needs and preferences related to sex and gender into problem-solving and solution design.

DESCRIPTION OF CONTENTS

1. INTRODUCTION.

The chemical language. Periodic table, groups and blocks. Review of basic formulation and chemical nomenclature in inorganic, organic chemistry and coordination compounds. Problems of stoichiometry: mole concept. Limiting reagent. Gases. Solutions. Ways of expressing concentration.

2. ATOMIC STRUCTURE.

Review of Bohr atomic model. Introduction to quantum mechanics. Wave model for the hydrogen atom. Quantum numbers. Hydrogenic atomic orbitals.

3. POLYELECTRONIC ATOMS AND PERIODIC PROPERTIES

Effective nuclear charge. Electronic configurations. Ionisation energy. Electron affinity. Electronegativity. Atomic sizes.

4. CHEMICAL BOND I.

Basic concepts. Lewis structures. VSEPR model for the molecular structure. Located covalent bond model. Hybrid orbitals. Hybridisation of ethane, ethene and ethyne.

5. CHEMICAL BOND II.

Advanced concepts. MO model. Application to diatomic molecules of the first and second period. Isomerism.

6. STRUCTURE, BONDING AND BEHAVIOR OF MOLECULES

Brønsted-Lowry acids and bases. Acid behavior and molecular structure: factors that determine the acid character of oxoacids and organic compounds. Organic bases. Lewis acids and bases. Nucleophilicity and electrophilicity of molecular compounds.

7. MOLECULAR SOLIDS.

Intermolecular forces. Hydrogen bond. Influence on the physical properties of the compounds.

8. NON-MOLECULAR SOLIDS.

Structural classification and bond-type classification. Ionic solids energetics. Lattice energy. Transition towards covalency. Validity and application of the model.

9. NON-MOLECULAR SOLIDS II. METALLIC SOLIDS AND COVALENT NETWORKS

Solids with covalent network. Metallic solids: characteristics and packings. Models for the metallic bonding. Band theory. Electric conductors, semiconductors and insulators.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	9,00
Theory	51,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	0,00
Independent study and work	40,00
Preparation of lessons	30,00
Preparation for assessment activities	20,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

The subject is organised so the student is the protagonist of their own learning. The structure is as

follows:

Teaching material. - During the course students will have the educational material for the course.

Theory classes. - Will be lectures in which the teacher will give an overview of the topic with particular

emphasis on those new or particularly complex issues. These classes are complemented by personal

study time.

Tutorials.- Students attend these sessions in small groups. Lecturers propose activities such as

the resolution of issues or problems, questions, resolution of doubts, or other new activities conducting to obtain a continuous assessment of the students.

EVALUATION

FIRST CALL

Modality A

The knowledge acquired will be assessed through a final exam on the date established by the faculty, which will account for 85 % of the final note. The exam will consist of objective questions about the knowledge considered basic (see the list of learning outcomes), and numerical and relationship problems that require the students to consider aspects of the subject appearing on various topics. The student's participation in any of the activities proposed during the academic period that are related to the subject will be valued with 15 % of the final grade, among which it is worth highlighting:

- Delivery of solved problems and exercises.
- Attendance and reasoned and clear participation in discussions.
- Troubleshooting and raising doubts.
- Carrying out tasks and/or oral presentations.
- Carrying out written tests.
- Class attendance.
- Any other complementary training activity determined by the professor.

The final mark will be that of the final test plus the one obtained in all the activities that are proposed, with the percentage indicated for each one of them. To pass the subject, the student must obtain a minimum grade of 5 in the final test and the weighted average must be equal to or greater than 5.

Modality B

Those students who for justified reasons cannot attend class regularly can request, at most within one month from the beginning of the course, to be evaluated by means of a written exam on the date set by the Faculty which will account for 90 % of the final note, plus a percentage of 10% for carrying out activities such as:

• Delivery of solved problems and exercises.

• Carrying out tasks.

• Any other complementary training activity determined by the professor.

To pass the subject, the student must obtain a minimum grade of 5 in the final test and the weighted average must be equal to or greater than 5.

SECOND CALL

In the second call, modalities A and B will be maintained, with the same conditions and percentages described for the first call will be maintained. Students will maintain the grade obtained in the activities proposed during the course for this second call. The second call written exam will be held on the date set by the Faculty. To pass the subject, the student must obtain a minimum grade of 5 in the final test and the weighted average must be equal to or greater than 5.

Final warning

Copying or plagiarism of any assignment that is part of the evaluation will make it impossible to pass the course, and the student will be subject to the appropriate disciplinary procedures.

Please note that, according to Article 13 d) of the University Student Statute (RD 1791/2010, December 30), "*it is the duty of a student to refrain from using or cooperating in fraudulent procedures in evaluation tests, in the work performed or in official University documents*".

REFERENCES

- BROWN, T.L. et al. Química. La Ciencia Central. 12ª Edición. México: Pearson Educación. 2014. ISBN: 9786073222372. https://trobes.uv.es/permalink/34CVA_UV/um6gse/alma991002521629706258

- PETRUCCI, R.H.; HERRING, F.G.; MADURA, J.D.; BISSONNETTE, C. Química General. 11ª Edición. Madrid: Pearson Educacion, 2017. ISBN: 9788490355336. https://trobes.uv.es/permalink/34CVA_UV/um6gse/alma991002509739706258

- ATKINS, P. y JONES, L. Principios de Química. Los Caminos del Descubrimiento. 5ª Edición. Buenos Aires: Ed. Médica Panamericana, 2012. ISBN: 9789500602822.

- MAHAN, B.H. y MYERS, R.J. Química: Curso Universitario. 4ª Edición. Argentina: Addison-Wesley Iberoamericana, 1990. ISBN: 9780201644197

- WHITTEN, K.W.; DAVIS, R.E.; PECK, M.L.; STANLEY G.G. Química. 10ª Edición. México: Cengage Learning, 2015. ISBN: 9788448113865.

- AMERICAN CHEMICAL SOCIETY, Química. Un proyecto de la ACS. Barcelona: Ed. Reverté, 2005. ISBN: 9788429170016

- CHANG, R. Química. 12ª edición. México: Ed. Mc Graw Hill, 2017. ISBN: 9786071513939 https://trobes.uv.es/permalink/34CVA_UV/um6gse/alma991002556139706258

- LÓPEZ CANCIO, J.A. Problemas de Química. Madrid: Prentice Hall, 2000. 978-842-05-2995-0

- PETERSON, W.R. Nomenclatura de las sustancias químicas. 5ª Ed. Barcelona: Reverte, 2020. ISBN 978-84-291-7609-4