



Information about the subject

Degree: Bachelor of Degree in Marine Sciences

Faculty: Faculty of Veterinary Medicine and Experimental Sciences

Code: 271109 **Name:** Chemistry

Credits: 6,00 **ECTS Year:** 1 **Semester:** 1

Module: Fundamental Science

Subject Matter: Chemistry **Type:** Basic Formation

Field of knowledge: Sciences

Department: -

Type of learning: Classroom-based learning

Languages in which it is taught: Spanish

Lecturer/-s:

271A

Ana Maria Hernandez Martinez (**Responsible Lecturer**)

am.hernandez@ucv.es



Module organization

Fundamental Science

| Subject Matter | ECTS | Subject | ECTS | Year/semester |
|----------------|-------|--------------------------------|------|---------------|
| Physics | 12,00 | Fluid Mechanics | 6,00 | 1/2 |
| | | Physics | 6,00 | 1/1 |
| Mathematics | 6,00 | Mathematics | 6,00 | 1/1 |
| Chemistry | 12,00 | Chemistry | 6,00 | 1/1 |
| | | Chemistry of Aqueous Solutions | 6,00 | 1/2 |
| Biology | 12,00 | Biochemistry | 6,00 | 1/2 |
| | | Biology | 6,00 | 1/1 |
| Geology | 6,00 | Geology | 6,00 | 1/2 |

Recommended knowledge

Chemistry (High School level).



Learning outcomes

At the end of the course, the student must be able to prove that he/she has acquired the following learning outcomes:

- R1 The student is able to understand and assimilate the concepts included in the syllabus of the subject.
- R2 The student is able to solve problems related to the contents of the subject by using different resources.
- R3 The student is able to work in a chemistry laboratory performing basic operations correctly and observing the relevant safety regulations.
- R4 The student is able to understand correctly the planning of a practical laboratory experience, as well as its development, purpose and interpretation of the results.
- R5 The student uses language appropriately, both in general writing and in the presentation of data.
- R6 The student collaborates with his/her teacher and classmates during the learning process.



Competencies

Depending on the learning outcomes, the competencies to which the subject contributes are (please score from 1 to 4, being 4 the highest score):

| BASIC | | Weighting | | | |
|-------|---|-----------|---|---|---|
| | | 1 | 2 | 3 | 4 |
| CB1 | Students acquire and understand knowledge in their field of study based on general secondary education but usually reaching a level that, although supported on advanced text books, also includes aspects involving state-of-the-art knowledge specific to their area. | | | | X |
| CB2 | Students are able to apply knowledge to their work in a professional way and have the competences enabling them to state and defend views and opinions as well as perform problem-solving tasks in their field of study. | | X | | |
| CB5 | Students develop the necessary learning skills to undertake further studies with a high level of autonomy. | | | | X |

| GENERAL | | Weighting | | | |
|---------|--|-----------|---|---|---|
| | | 1 | 2 | 3 | 4 |
| CG1 | Capacity to analyze and synthesize | | | X | |
| CG2 | Capacity to organize and plan | | | X | |
| CG3 | Mastering Spanish oral and written communication | | X | | |
| CG5 | Knowing and applying Basic ITC skills related to marine science | | | X | |
| CG6 | Capacity to manage information (capacity to look for and analyze information coming from different types of sources) | | | X | |
| CG7 | Decision making | | | | X |
| CG8 | Capacity to work in interdisciplinary and multidisciplinary team | | | X | |
| CG9 | Interpersonal skills | | X | | |



| | | | | |
|------|--|---|---|---|
| CG10 | Critical and self-critical capacity | x | | |
| CG11 | Capacity to learn | | | x |
| CG12 | Capacity to adapt to new situations | | x | |
| CG13 | Capacity to produce new ideas (creativity) | x | | |
| CG16 | Capacity to apply theoretical knowledge | | | x |

| SPECIFIC | Weighting | | | |
|----------|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| CE8 | Identifying and analyzing new problems and proposing solution strategies | | | x |
| CE9 | Knowing how to carry out experiments and measurements both in the laboratory and during sample collection | | | x |
| CE11 | Knowing how to do fieldwork and laboratory experiments in a safe and responsible way, promoting teamwork | | | x |



Assessment system for the acquisition of competencies and grading system

| Assessed learning outcomes | Granted percentage | Assessment method |
|----------------------------|--------------------|---|
| R1, R2, R6 | 65,00% | Written test with theoretical and practical questions |
| R1, R2, R5, R6 | 15,00% | Delivery of guided assignments, whose objectives and contents will be proposed by the teacher |
| R1, R2, R3, R4, R5 | 10,00% | Laboratory test |
| R1, R2, R5, R6 | 10,00% | Oral presentation |

Observations

A minimum mark of 5 out of 10 is required in the written test and the practical laboratory test, in order to be able to average with the rest of the marks and pass the subject. The written test is broken down into (a minimum mark of 5 out of 10 is required in each of the parts in order to be able to average):

- Theoretical questions 30%
- Practical questions (problems) 35%.

The "laboratory test" consists of a laboratory practical. Attendance at the laboratory practical is compulsory. Only 1 absence from the laboratory is allowed, provided that it is justified. The teacher will keep track of attendance. Unjustified absence from a practical will result in a 10% penalty in the practical exam mark. Unjustified absence from all practical sessions will result in a penalty of 50% of the practical exam mark. Absence from more than one practice, without attending all of them, will be studied individually to choose the penalty at the discretion of the teacher.

MENTION OF DISTINCTION:

According to Article 22 of the Regulations governing the Evaluation and Qualification of UCV Courses, the mention of "Distinction of Honor" may be awarded by the professor responsible for the course to students who have obtained, at least, the qualification of 9 over 10 ("Sobresaliente"). The number of "Distinction of Honor" mentions that may be awarded may not exceed five percent of the number of students included in the same official record, unless this number is lower than 20, in which case only one "Distinction of Honor" may be awarded.



Learning activities

The following methodologies will be used so that the students can achieve the learning outcomes of the subject:

- M1 Teacher presentation of contents, analysis of competences, explanation and in-class display of skills, abilities and knowledge.
- M2 Group work sessions supervised by the professor. Case studies, diagnostic tests, problems, field work, computer room, visits, data search, libraries, on-line, Internet, etc. Meaningful construction of knowledge through interaction and student activity.
- M3 Activities carried out in spaces with specialized equipment.
- M6 Personalized and small group attention. Period of instruction and/or guidance carried out by a tutor to review and discuss materials and topics presented in classes, seminars, readings, papers, etc.
- M8 Set of oral and/or written tests used in initial, formative or additive assessment of the student.
- M9 Group preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical , practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es)
- M10 Student's study: Individual preparation of readings, essays, problem-solving, seminars, papers, reports, etc. to be presented or submitted in theoretical, practical and/or small-group tutoring sessions. Work done on the university e-learning platform (www.plataforma.ucv.es).



IN-CLASS LEARNING ACTIVITIES

| | LEARNING OUTCOMES | HOURS | ECTS |
|-------------------------|------------------------|--------------|-------------|
| ON-CAMPUS CLASS M1 | R1, R2, R5, R6 | 40,00 | 1,60 |
| PRACTICAL CLASSES M2 | R1, R2, R4, R5, R6 | 5,00 | 0,20 |
| LABORATORY M3 | R3, R4, R5, R6 | 10,00 | 0,40 |
| TUTORIAL M6 | R1, R2, R5, R6 | 3,00 | 0,12 |
| ASSESSMENT M8 | R1, R2, R3, R4, R5, R6 | 2,00 | 0,08 |
| TOTAL | | 60,00 | 2,40 |

LEARNING ACTIVITIES OF AUTONOMOUS WORK

| | LEARNING OUTCOMES | HOURS | ECTS |
|-------------------------|-------------------|--------------|-------------|
| GROUP WORK M9 | R4, R5, R6 | 20,00 | 0,80 |
| INDEPENDENT WORK M10 | R1, R2, R3, R6 | 70,00 | 2,80 |
| TOTAL | | 90,00 | 3,60 |



Description of the contents

Description of the necessary contents to acquire the learning outcomes.

Theoretical contents:

| Content block | Contents |
|---|--|
| Practical Contents | Laboratory and Boat hours. |
| Unit 2- Structure of the atom | <p>Introduction to General Chemistry.</p> <ol style="list-style-type: none">2. Models of atom structure: Thomson Model, Rutherford.3. Bohr model.4. Sommerfeld model.5. Principles of Quantum Mechanics6. Schrödinger's equation.7. Atomic orbital and electronic configuration |
| Unit 3: Chemical Periodicity and the Periodic Table | <ol style="list-style-type: none">1. Triads of Döbereiner's Triads. Newlands' Octaves, Mendeleev and Meyer, Moseley.2. Periodic Properties: electrical conductivity, atomic and ionic radii, ionization potential, electronic affinity, electronegativity. |
| Unit 4: The Chemical Link | <ol style="list-style-type: none">1. Lewis' structures.2. The Ionic bond. Properties of ionic compounds.3. The Covalent bond. Properties of covalent compounds.4. The Molecular Orbital Theory. Molecular Orbital Diagrams (MOM)5. The metallic bond. |



Unit 5: The Chemical Balance

1. Balance constant. Le Chatelier's Principle.
2. Spontaneity of a process.
3. Speed of reaction.
4. Acid-base equilibrium, pH, buffer solution.
5. Redox equilibrium. Batteries. Corrosion.
6. Solubility equilibrium. Factors affecting solubility
7. Complexes. Structure and link. Factors affecting stability. Formation balances.

Organization of the practical activities:

| | Content | Place | Hours |
|------|---|----------------|-------|
| PR1. | Concept of salinity, pH and dissolved oxygen. Sampling instruments: Niskin bottle and water analysis: salinometer, pH Meter and oximeter. | Boat | 2,00 |
| PR2. | Preparation of solutions, obtaining and separation of precipitates | Laboratory | 2,00 |
| PR3. | Acid-base balances. pH measurement. | Laboratory | 2,00 |
| PR4. | Determination of suspended solids. | Marine station | 2,00 |
| PR5. | Colorimetry. Lamber Beer's Law. | Laboratory | 2,00 |



Temporary organization of learning:

| Block of content | Number of sessions | Hours |
|---|--------------------|-------|
| Practical Contents | 5,00 | 10,00 |
| Unit 2- Structure of the atom | 5,00 | 10,00 |
| Unit 3: Chemical Periodicity and the Periodic Table | 5,00 | 10,00 |
| Unit 4: The Chemical Link | 5,00 | 10,00 |
| Unit 5: The Chemical Balance | 10,00 | 20,00 |

References

- "Química Inorgánica", D.F. SHIVER, P.W. ATKINS Y C.H. LANGFORD. Ed. Reverté (1998)
- "Química" (6ª edición), R.CHANG. Ed. Mc Graw-Hill (1999)
- Los Elementos y Moleculas de la vida" Introducción a la Química Biológica y Biología Molecular. 2ª Parte.LOSADA M., VARGAS M.A. Ed. Rueda.
- "Química". Curso Universitario. MAHAN B.H. Ed. Fondo Educativo Interamericano.
- "Química General". Equilibrio i canvi. OLBA A. Ed. PUV
- "Química" Un proyecto de la ACS. FREEMANN W. H. Ed.Reverté
- "Química Inorgánica", E. GUTIÉRREZ RIOS. Ed. Reverté, (1978).
- "Química Inorgánica", A.G. SHARPE, Ed. Reverté, (1998).
- "Química Inorgánica avanzada", F.A. COTTON, G.WILKINSON, Ed. Wiley, (1986).
- "Seawater: Its composition, properties and behaviour", J.BROWN, A. COLLIG, D. PARK, J.
- "Curso práctico de química orgánica", R.Q. BREWSTER, C.A. VAN DER WERF Y W.E. MC EWEN. Ed. Alhambra.
- "Química Orgánica", K.P.C. VOLHARDT, Ed. Omega (1990)
- "Química Orgánica"(9ª edición), H.HART, D.J. HART Y L.E. CRAINE, Ed. Mc Graw-Hill (1995).
- "Métodos de laboratorio para química orgánica", R. KEESE, R.K. HÜLLER Y T.P. TOUBE. Ed. Limusa.



Addendum to the Course Guide of the Subject

Due to the exceptional situation caused by the health crisis of the COVID-19 and taking into account the security measures related to the development of the educational activity in the Higher Education Institution teaching area, the following changes have been made in the guide of the subject to ensure that Students achieve their learning outcomes of the Subject.

Situation 1: Teaching without limited capacity (when the number of enrolled students is lower than the allowed capacity in classroom, according to the security measures taken).

In this case, no changes are made in the guide of the subject.

Situation 2: Teaching with limited capacity (when the number of enrolled students is higher than the allowed capacity in classroom, according to the security measures taken).

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject will be made through a simultaneous teaching method combining onsite teaching in the classroom and synchronous online teaching. Students will be able to attend classes onsite or to attend them online through the telematic tools provided by the university (videoconferences). In any case, students who attend classes onsite and who attend them by videoconference will rotate periodically.

In the particular case of this subject, these videoconferences will be made through:

☒ Microsoft Teams

☐ Kaltura



Situation 3: Confinement due to a new State of Alarm.

In this case, the following changes are made:

1. Educational Activities of Onsite Work:

All the foreseen activities to be developed in the classroom as indicated in this field of the guide of the subject, as well as the group and personalized tutoring, will be done with the telematic tools provided by the University, through:

☒ Microsoft Teams

☒ Kaltura

Explanation about the practical sessions:

Las sesiones prácticas de laboratorio se realizarán de forma no presencial, utilizando las herramientas de Teams y UCVNet, a través de seminarios sobre el fundamento teórico, vídeos, y el tratamiento de datos.



2. System for Assessing the Acquisition of the competences and Assessment System

ONSITE WORK

Regarding the Assessment Tools:

☒ The Assessment Tools will not be modified. If onsite assessment is not possible, it will be done online through the UCVnet Campus.

☐ The following changes will be made to adapt the subject's assessment to the online teaching.

| Course guide | | Adaptation | |
|-----------------|----------------------|--------------------------------------|---------------------|
| Assessment tool | Allocated percentage | Description of the suggested changes | Platform to be used |

The other Assessment Tools will not be modified with regards to what is indicated in the Course Guide.

Comments to the Assessment System: