

Basic Chemistry I

Code: 105032
ECTS Credits: 8

| Degree | Type | Year | Semester |
|-------------------|------|------|----------|
| 2502444 Chemistry | FB | 1 | 1 |

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Roger Bofill Arasa
Email: Roger.Bofill@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Vicenç Branchadell Gallo
Xavier Solans Monfort
Miguel Guerrero Hernandez

Prerequisites

There are no official prerequisites. However, at the beginning of the course, students must know the fundamental concepts corresponding to the Chemistry courses (precipitation and redox). For those students who consider that their level of content is not adequate, a propaedeutic course is offered:
<http://www.uab.cat/web/docencia-de-grau/propedeutics-1248648002523>
This intensive course of 15-20 hours is taught during the first weeks of September, before the start of the official course, and provides the student with a review of the most important concepts to be able to follow this course properly.
The Academic Management of the Faculty of Sciences
(<http://www.uab.cat/web/la-facultat/gestio-academica-1192574735663.htm>)
(registration, dates, etc.) about this propaedeutic course.

Objectives and Contextualisation

The main objective of the subject is double. The first objective of this introductory course is to homogenize the level of knowledge acquired by students from different pre-university studies. Based on this knowledge, the second objective is to provide the student with the necessary

In particular and among other knowledge, the course must provide security to

the student in complex stoichiometric calculations and the formulation and nomenclature of the most important

chemical compounds; qualitative knowledge of the structure of the atom and the types of bonds present in molec

knowledge of the most important organic functional groups and the types of isomerism they show.

Competences

- Adapt to new situations.
- Apply knowledge of chemistry to problem solving of a quantitative or qualitative nature in familiar and professional fields.
- Be ethically committed.
- Communicate orally and in writing in ones own language.
- Have numerical calculation skills.
- Learn autonomously.
- Manage the organisation and planning of tasks.
- Manage, analyse and synthesise information.
- Obtain information, including by digital means.
- Propose creative ideas and solutions.
- Reason in a critical manner
- Resolve problems and make decisions.
- Show an understanding of the basic concepts, principles, theories and facts of the different areas of chemistry.
- Show initiative and an enterprising spirit.
- Show motivation for quality.

Learning Outcomes

1. Adapt to new situations.
2. Be ethically committed.
3. Communicate orally and in writing in ones own language.
4. Describe Valence bond and molecular orbital theories.
5. Describe the properties of the different aggregation states of matter, and relate these to chemical bonding and intermolecular forces.
6. Describe the structure of the atom.
7. Determine the electronic configurations of the elements and, from these, the properties of the elements.
8. Determine the hybridisation of atoms in molecules from Valence bond theory and apply molecular orbital theory to diatomic molecules.
9. Distinguish between the different types of chemical bonds and intermolecular interactions.
10. Draw Lewis structures of molecules and describe from these, their main properties.
11. Have numerical calculation skills.
12. Identify the processes of reduction and oxidation in a redox reaction and equalise the corresponding chemical equation.
13. Learn autonomously.
14. Manage the organisation and planning of tasks.
15. Manage, analyse and synthesise information.
16. Name and formulate the organic and inorganic chemical compounds.
17. Obtain information, including by digital means.
18. Propose creative ideas and solutions.

19. Reason in a critical manner
20. Resolve problems and make decisions.
21. Show initiative and an enterprising spirit.
22. Show motivation for quality.
23. Work properly with chemical equations and the main magnitudes of matter.

Content

PART I. Matter, compounds and chemical reactions

Chapter 1. Matter and chemical compounds

Chapter 2. Introduction to chemical reactions

Chapter 3. Gases

PART II. Atomic structure and bonding

Chapter 4. Atomic structure

Chapter 5. The periodic table

Chapter 6. Chemical bonding

Chapter 7. Bonding in solids and liquids

Unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents

Methodology

The course Fonaments de Química I consists of two types of supervised activities, the theoretical sessions and the problem sessions, which are distributed throughout the course in an alternating way. Theoretical sessions. Through the teacher's expositions the student must

of the subject and complement it with his/her personal study with the help of the materials that teachers have provided through the Campus

Virtual/Teams and the recommended bibliography. The

theoretical sessions will be open to the participation of the students, who

the questions and clarifications that they deem necessary.

Problem sessions. The objective of this supervised activity is to solve problems that have been previously raised to students through the Campus Virtual and were asked to be resolved

previously, in group or individually. We aim to stimulate the participation in problem sessions, taking advantage of it to consolidate the knowledge acquired during the course and during their personal study.

and during their personal study.

The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face or virtual teaching.

Activities

| Title | Hours | ECTS | Learning Outcomes |
|---------------------|-------|------|---|
| Type: Directed | | | |
| Exercise lessons | 20 | 0.8 | 16, 3, 21, 22, 6, 5, 4, 8, 7, 10, 9, 14, 12, 2, 18, 19, 20, 11, 23 |
| Study | 106 | 4.24 | 1, 16, 13, 3, 21, 22, 6, 5, 4, 8, 7, 10, 9, 14, 15, 12, 2, 17, 18, 19, 20, 11, 23 |
| Theoretical lessons | 48 | 1.92 | 16, 6, 5, 4, 8, 7, 10, 9, 12, 23 |

Assessment

The final grade of the subject is obtained from the exam marks and the continuous work of the student.

Weighted average of the exams of the subject = $0.50 \times \text{mark exam part I} + 0.50 \times \text{mark exam part II}$

Final mark of the course = $0.70 \times \text{weighted average mark of the exams} + 0.30 \times \text{continuous work mark}$
 To pass the course, the following two conditions must be fulfilled:

1) The final grade of the subject should be ≥ 5.0

2) The exam mark for each part of the course (I and II) must be ≥ 4.0

The marks of the students that have passed the course may be increase distribution between 'aprovats', 'notables', 'excel·lents' and 'MHs' that lecturers decide. Students who do not pass the course because the mark of the exam of one of the two parts is less than 4.0, but their overall mathematical average mark they will get a maximum final grade of 4.0.

Continuous work:

1) Evidences for each student will be collected during the two parts through individually or in groups, self-assessment on the Campus

Virtual, short tests in class, etc.)

2) The mark of the continuous work of the course will be the average of the course without considering the one with the lowest mark.

Exams:

1) An exam will be carried out at the end of each part during the course (exams).

2) At the end of the course, and throughout a single day, exams of the two exams).

To participate in those, students must have been previously evaluated in a set of activities whose weight equals

3) There is the possibility that students who do not need it take second-choice exams for improving the qualification of the course. For students who present them: of the exam corresponding to that part of the course will be:
a) equal to that of the second-choice exam, if the mark of the second-choice

b) equal to the average of the previous course exam and the second-choice exam, if the mark of the second-choice exam <

previous course exam mark

4) Use of unauthorized methods during any exam (copy or communication "suspens" in the global mark of the current course.

5) To attend an exam of any part of the course, it is essential to bring an identification document (ID or university card) with a recent and good quality photograph.

6) "No evaluable":

The course will be rated as "No evaluable" if the student has not participated in one of the parts (or both) into which the course is organized.

Student's assessment may experience some modifications depending on the restrictions to face-to-face activities

Assessment Activities

| Title | Weighting | Hours | ECTS | Learning Outcomes |
|-----------------|-----------|-------|------|---|
| Continuous work | 20 | 20 | 0.8 | 1, 16, 13, 3, 21, 22, 6, 5, 4, 8, 7, 10, 9, 14, 15, 12, 2, 17, 18, 19, 20, 11, 23 |
| Exams | 80 | 6 | 0.24 | 1, 16, 13, 3, 21, 22, 6, 5, 4, 8, 7, 10, 9, 14, 15, 12, 2, 17, 18, 19, 20, 11, 23 |

Bibliography

Textbook

QUÍMICA GENERAL: PRINCIPIOS Y APLICACIONES MODERNAS, R. H. Petrucci, F. G. Herring, J.D. Madura i C. Bissonnette , Pearson Educación SA, 10ª edició, Madrid 2011 (ISBN: 978-84-8322-680-3).

http://www.ingebook.com.are.uab.cat/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=1262

Other useful books

PRINCIPIOS DE QUÍMICA, P. Atkins i L. Jones, Médica Panamericana, 3ª edició, 2006.

QUÍMICA, R. Chang, McGraw-Hill, 9ª edició, 2010.

PRINCIPIOS DE FÍSICO-QUÍMICA, Ira N. Levine, McGraw-Hill 6ª edició, 2014

INTRODUCCIÓ A LA NOMECLATURA QUÍMICA INORGÀNICA I ORGÀNICA, J. Sales i J. Vilarrasa, Reverté, 5ª edició, 2003.

INTRODUCCIÓN A LA NOMENCLATURA DE LAS SUSTANCIAS QUÍMICAS, W. R. Peterson, Reverté, 2010.