

Degree	Type	Year
2504602 Nanoscience and Nanotechnology	OB	2

Contact

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

There are no prerequisites, but it is recommended to have passed the subjects 'Chemical link and structure of matter' and 'Chemical reactivity' of 1st year.

Objectives and Contextualisation

The subject Chemistry of the elements is taught in the second semester of the 2nd year of the Degree in Nanoscience and Nanotechnology and is a compulsory subject.

The training objectives are included in the following sections:

- Predict the properties of the elements and their compounds by applying the different binding theories and models of Inorganic Chemistry.
- Establish the reactivity and general tendencies of the elements according to their position in the periodic table.
- Identify the main most representative inorganic compounds, their properties, synthesis and applications.
- Introduction to the complexes of transition metals: classification of the type of ligands and isomerism.

Learning Outcomes

- CM13 (Competence) Apply chemical knowledge to solve quantitative and qualitative problems, using bibliographic sources when necessary.
- CM14 (Competence) Work collaboratively to plan and organise the basic tasks carried out in a physicochemical analysis laboratory.
- CM15 (Competence) Handle chemical products and wastes while taking their impact on safety and the environment into account.
- KM20 (Knowledge) Describe the electronic structure of atoms and their ions in the periodic table.

5. SM21 (Skill) Apply the main techniques used in to identify and characterise the structure and composition of the material.
6. SM21 (Skill) Apply the main techniques used in to identify and characterise the structure and composition of the material.
7. SM21 (Skill) Apply the main techniques used in to identify and characterise the structure and composition of the material.
8. SM22 (Skill) Explain the variation in properties of the chemical elements and their compounds, based on the periodic table groups and crystal structure.
9. SM23 (Skill) Identify the properties and applications of the main organic and inorganic compounds.

Content

THEORY

General Perspective of the Periodic Table redox reactivity

Hydrogen

Alkaline and alkaline earth metals Group

Elements of group 13

Elements of group 14

Elements of group 15

Elements of group 16

Elements of group 17

Elements Noble gases

Elements of transition

The metals of the block f

PROBLEMS

The content of this section, which will be delivered in the form of a dossier, consists of a certain number of statements of problems related to the topics developed in theory.

LABORATORY PRACTICES

There will be threr laboratory sessions of four hours each.

Practice 1 (2 sessions): Synthesis of Pb (II) nitrate and Pb (II) chloride. Practice 2 (1 session): Synthesis of sodium thiosulfate.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			

The training activities are divided into three sections: theory classes, problem classes and laboratory practices, each with its specific methodology. These activities will be complemented by 2h of tutoring.

Theory classes

The teacher will explain the content of the syllabus. These expository sessions will be the most important part of the theory section.

In the hands of the teacher and through communication through the Virtual Campus, the knowledge of some selected parts of the syllabus should be sought and studied through autonomous learning by the students. To facilitate this task, information on locations in textbooks, web pages, etc. will be provided.

Also to reinforce learning, cooperative activities to be carried out in a group within the classroom will be proposed. These will be directed by the teacher, as in some kind of theory as in some of problems, and will consist in the discussion and sharing of the knowledge acquired by each member of the group.

Classes of problems

The theory group will be divided into two subgroups of problems. Students will attend the sessions scheduled by their subgroup of problems.

At the beginning of the semester will be delivered through the Virtual Campus a dossier of statements of problems of the subject that will be resolved throughout the sessions. In these sessions distributed throughout the semester, the problem teacher will expose the experimental and calculation principles necessary to work on the problems, explaining the guidelines for the resolution and reinforcing at the same time the knowledge of different parts of the Mata of the classes of theory.

Laboratory practices

The group will be subdivided into two subgroups. It is necessary to appear to the practices with laboratory coat, the protocol of practices(available in the Virtual Campus) printed, and previously read. There will also be a notebook to record the observations made and the data obtained.

On the days established in the calendar, the students will be summoned in the Chemistry of the Elements laboratory to carry out basic experiences. The practices will be carried out in pairs and will be evaluated individually. At the end of the internship, the internship booklet must be submitted in order to evaluate the comprehension of the practices and to have the experimental results of each one of the practices. Attendance at practices is mandatory.

Material available in the Virtual Campus of the subject Teaching guide

Presentations used by teachers to theory classes Dossier of problem classes

Protocols of practical classes

Links to educational web addresses

Calendar of teaching activities (classroom classes, laboratory classes, evaluations). 15 minutes of a class will be allocated to answer the UAB institutional surveys.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

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Assessment

Continuous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Laboratory resultats	15%	2	0.08	CM14, CM15, SM23
Theory&problems sessions	85%	8	0.32	CM13, KM20, SM21, SM22

Exams

For evaluation purposes, the subject can be considered divided into two parts.

Throughout the semester two partial exams will be carried out, one of each part (ExP1 and ExP2), an exam of practices and a global examination of recovery (ExG), all of them with a grade between 0 and 10.

Follow-up work

Throughout the semester a certain number of tests of student follow-up will be collected (problems solved individually or in groups, short classroom tests, etc.). Each student will obtain, therefore, two follow-up notes (S1 and S2), which will be the averages of the grades obtained in the follow-up tests of each part of the subject.

Laboratory practices

The student will complete two compulsory laboratory practices throughout the course. These practices will be evaluated with an internship exam (EP) and laboratory follow-up (notebook, performance, attitude) (SL).

ratings:

Each part of the subject will have a grade (Not1, Not2, Not3) that will be:

$$\text{Not1} = 0.85 \times \text{ExP1} + 0.15 \times \text{S1} \quad \text{Not2} = 0.85 \times \text{ExP2} + 0.15 \times \text{S2} \quad \text{Not3} = 0.60 \times \text{EP} + 0.40 \times \text{SL}$$

The final grade (NF) will be obtained in the following way:

$$\text{NF} = 0.85 \times (\text{Not1} + \text{Not2}) / 2 + 0.15 \times \text{Not3}$$

To overcome the subject by partial, the following two conditions must be met:

- 1) The final grade for the subject (NF) must be ≥ 5.0
- 2) To be able to do media, ExP1, ExP2 and Not3 must be ≥ 4.5 and the practice test (EP) ≥ 4.0

In case the above requirement is not met, the student must take the global recovery exam, where he / she can recover one or both partial exams and/or the practical exam, since the subjects of each part will be separated and identified as such (ExR1, ExR2 and ExRP). The NF will be calculated by replacing the ExP1 and / or ExP2 and / or EP values with those obtained in the ExR1 and / or ExR2 and / or ExRP recovery exam.

In order to be able to take the globalrecovery exam, it is mandatory that the students have previously presented the exams of the 1st and 2nd partial.

To pass the subject in the global exam the following conditions must be met:

Precondition: Only students who have obtained a minimum grade in the average of the subject of a 3.5 will be able to submit to the final test.

Prerequisite: To participate in the recovery of students must have been previously evaluated in a set of activities the weight of which equals a minimum of two thirds of the total grade of the subject

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

2) To be able to do media, ExP1 and ExP2 and EP (ExR1 and ExR2 and ExRP in case of recovery) must be ≥ 4.5

Students who pass the course by partial but want to improve their qualification, may be submitted to the global exam but must do it fulfilled; that is, the two subtests corresponding to each partial. The note of the exam of recovery will replace the note that could have of the sets of both partial ones and, therefore, will have a weight of 85% (the note of the works of follow-up will not be able to be recovered). Students who apply to improve grades will not be eligible for enrollment.

Single Assessment

Students who have opted for the single assessment mode must take a final exam consisting of an examination of the entire subject syllabus to be taken on the day on which the students of the continuous assessment take the exam of the second partial. This grade will average with the grade of the laboratory practices.

The grade will be = Exam mark (85%) + Laboratory mark (15%).

If the final grade does not reach 5, the student has another opportunity to pass the subject by means of the recovery exam to be held on the date set by the coordination of the degree. This student's exam mark will replace the old one to obtain the grade.

Bibliography

Book of text

* Química Inorgánica Descriptiva - Geoff Rayner-Canham (2ª ed.) Ed. Pearson Prentice Hall (2000)

* Descriptive Inorganic Chemistry - Geoff Rayner-Canham, Ed. Freeman (1996)

Other Books :

* Química Inorgánica - Shriver & Atkins (4ª ed.) Ed. McGraw-Hill (2006)

* Química Inorgánica - C.E. Housecroft, A.G. Sharpe (2ª ed.) Ed. Pearson Prentice Hall (2006)

Software

In case the lectures are online: Teams

Language list

Name	Group	Language	Semester	Turn
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(PAUL) Classroom practices	1	Spanish	second semester	afternoon
(PAUL) Classroom practices	2	Catalan	second semester	afternoon
(PLAB) Practical laboratories	1	Catalan/Spanish	second semester	morning-mixed
(PLAB) Practical laboratories	2	Catalan/Spanish	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	afternoon