Universitat Autònoma de Barcelona

2021/2022

Chemistry

Code: 101023
ECTS Credits: 6

Degree	Type	Year	Semester
2500502 Microbiology	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

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Use of Languages

Principal working language: spanish (spa)
Some groups entirely in English: No
Some groups entirely in Catalan: No
Some groups entirely in Spanish: No

Other comments on languages

The sheets of problems and the assessment exercises will be delivered in Catalan or English.

Prerequisites

The students must have clear the contents of the subject of Chemistry that is taught in first and second of Baccalaureate. As reinforcement they can do the "Química" propedéutic course of the Faculty of Ciences.

Objectives and Contextualisation

It is a subject of a basic nature, since many of the vital processes that will be studied in different subjects of this Degree are explained using chemical formulations. Chemistry is, therefore, a basic tool to understand and develop other subjects of the degree.

The objectives of the subject are:

1. Properly manipulate chemical equations, equalize them and perform stoichiometric calculations.

2. Identify the processes of oxidation and reduction of a redox process and equalize the global reaction.

3. Draw Lewis structures of chemical compounds and qualitatively predict their molecular properties from them (molecular geometry and polarity).

4. Identify the organic functional groups present in biomolecules and name and formulate the corresponding organic compounds.

5. Describe the conformational isomerism in alkanes and cycloalkanes and their application in biological systems.

6. Determine and represent the configuration of the stereogenic (chiral) centers in chemical compounds and

describe the properties and relevance of these compounds at a biological level.

7. Describe the basics of organic reactions and their application in biological systems.

8. Solve basic chemical problems.

Competences

- Apply knowledge of theory to practice
- Display sensibility towards environmental, health and social matters.
- Identify and solve problems.
- Know and interpret the fundamental principles of chemistry in order to understand the molecular bases of life processes.

Learning Outcomes

1. Apply knowledge of theory to practice
2. Display sensibility towards environmental, health and social matters.
3. Identify and solve problems.
4. Know and interpret the fundamental principles of chemistry in order to understand the molecular bases of life processes.

Content

CHAPTER 1: Basic Concepts in Chemistry: structure and properties.

CHAPTER 2: Chemical equilibrium. Thermodynamics and equilibrium. Equilibrium constant. Reaction kinetics. Weak acids and bases. Acid-Base Reactions. Buffer solutions. Oxidation and reduction. Oxidation degree and oxidation number.

CHAPTER 3: Lewis structures. Resonance. Basic bond concepts. Geometry of molecules. Dipolar moment of bonds and molecules.

CHAPTER 4: Organic functional groups: Alkanes, alkenes, alkynes, alcohols, halides, amines, carbonyl compounds, carboxylic acids. Aromaticity. Acidity in organic compounds. Nomenclature. Stereochemistry.

CHAPTER 5: Organic reactions in biological systems. Examples of: substitution and elimination reactions, oxidation of alcohols, synthesis and hydrolysis of esters, transamination.

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

Methodology

The development of the course is based on the following activities

Master Classes:

The teacher will give the basic contents related to the program and solve the questions of the students.

Problems:

Students will have to prepare the programmed problems at home and will discuss them in class with the teacher

Practices:

There will be two practices in the laboratory, which are mandatory, in which some of the knowledge acquired in the master classes will be applied.

Tutorials:

A tutoring class will be devoted to the nomenclature and others to solve doubts and to prepare the practices.

**The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities.*

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.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Supervised	8	0.32	1, 4, 3, 2
Supervised	15	0.6	3
Supervised	32	1.28	1, 4, 2
Type: Supervised			
Supervised	1	0.04	1, 4, 3, 2
Type: Autonomous			
Autonomous	9	0.36	1, 4, 3, 2
Autonomous	25	1	4, 3, 2
Autonomous	56	2.24	1, 4, 3, 2

Assessment

The competences will be evaluated by means of continuous evaluation which will include works and written tests. The system is organized in 3 modules, each of which will have a specific weight assigned to the final grade:

- Written work module. This module will have a global weight of 10%.

- Laboratory module: a report of the laboratory practices with a weight of 10% will be evaluated.

- Module of partial written tests: will consist of two partial tests with a weight of 40% each of them.

- In order to pass the subject, you must draw at least 4 points out of 10 in each of the modules and you must have done the written work and the laboratory practices. The subject will be considered to be exceeded when the average of the modules is equal to or greater than 5 points out of 10.

- Students who do not pass the partial test module assessments can retrieve them at the scheduled date at the end of the semester. In order to do the recovery, the student is obligated to submit to both partial examinations.

- Those that pass the subject can improve the note doing the examination of recovery. This improvement will be considered as long as the note of the recovery is higher than that obtained in the average of the modules. If the recovery note is equal to or bellow the average grade in 1 point, theaverage grade will remain. In case the recovery note is more than 1 points bellow than the average grade, the final grade will be considered as the average of the two notes.

- The students who finally do not obtain the minimum qualification required to be able to pass each one of the tests of the partial written test module or the minimum qualification to be able to pass the module of written work or the module of Laboratory, will not approve the subject. In this case, the final maximum grade will be 4.

- From the second enrolment of the subject it will not be necessary that the student realize the module of laboratory or the module of written work if it obtained the competences of these parts of the subject in the previous course. A student will obtain the non-appraising (No Avaluable) qualification when the number of assessment activities carried out is less than 66% of those programmed for the subject (work, three exams and two practical sessions).

**Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities*.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
a) Individual written work	10%	0	0	1
b) Laboratory module: a report of the laboratory practices will be evaluated.	10%	0	0	1
c) First written test	40%	2	0.08	1, 4, 3, 2
d) Second writen test	40%	2	0.08	1, 4, 3, 2

Bibliography

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ii) Bruice, P.Y. Essential Organic Chemistry, 3rd Ed. Ed. Pearson Education, 2016 (ISBN 9781292089034).

2.- Timberlake, K.C. Química: Una Introducción a la Química General, Orgánica y Biológica, 10ª Ed. Ed. Pearson Educación, S.A. 2011 (ISBN 9788483227435).

3.- i) Holum, J.R. Fundamentos de Química General, Orgánica y Bioquímica para Ciencias de la Salud, 1a Ed. Editorial Limusa, México, 1999 (ISBN:968-18-4637-0).

ii) Holum, J.R. Fundamentals of General, Organic and Biological Chemistry, 6th Ed. John Wiley& Sons Publishing, 1997 (ISBN-10 0471175749, ISBN-13 978-0471175742).

iii) Holum, J.R. Elements of General, Organic and Biological Chemistry, 9th Ed. John Wiley & Sons Publishing, 1995 (ISBN 0471059064, ISBN 047111605X).

4.- SolomonsT.W.G. Química Orgánica, 3ª Ed. Ed. Limusa S.A. 2014 (Vol. 1: ISBN 10 9786070506963, Vol 2: 9786070506970).

5.- Carey F.A., Giuliano R.M. Química Orgánica, 9ª Ed. Ed. McGraw-Hill, 2014 (ISBN 9786071512109).

6.- Química, (un proyecto para la A.C.S.), Editorial Reverte, 2007 (978-84-291-7001-6).

7- IUPAC Nomenclature of Organic Chemistry: http://www.acdlabs.com/iupac/nomenclature/

8.- ACD/ChemSketch for Academic and Personal Use. A Free Comprehensive Chemical Drawing Package: http://www.freechemsketch.com

9.- Pulido F. Nomenclatura de Química Orgánica: http://es.slideshare.net/manoa21/nomenclatura-quimicaorganica-29646851?next_slideshow=1

10.- Rosso V. Química Orgánica Nomenclatura: http://es.slideshare.net/verorosso/qumica-orgnica-nomenclatura?qid=09239331-ba5c-4096-9104-dd4cb26fe630&

11.- Hernández Santadaría J.A. Formulació i Nomenclatura de Química Orgànica.: http://es.slideshare.net/joseangelb7/formulacio-i-nomenclatura-organica?related=2

Software

ACD/ChemSketch for Academic and Personal Use. A Free Comprehensive Chemical Drawing Package: http://www.freechemsketch.com