

**Organic Chemistry**

Code: 101893  
ECTS Credits: 3

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OB	1	1

**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.

**Objectives and Contextualisation**

Organic Chemistry studies the reactivity of carbon. Since living beings are formed by molecules based on the carbon atom, Organic Chemistry is a fundamental matter to understand the vital processes of these beings.

Basic ideas about energy relations, chemical equilibrium, conformational and stereochemical analysis of organic compounds are given. The different functional groups are studied and the structure of the compounds with the reactivity is related.

**Skills**

- Contribute to public discussions on cultural matters.
- Develop independent learning habits and motivation to continue training at postgraduate level.
- Develop independent learning strategies.
- Develop scientific knowledge, critical reasoning and creativity.
- Identify and understand the advances and challenges of research.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

**Learning outcomes**

1. Contribute to public discussions on cultural matters.
2. Develop independent learning habits and motivation to continue training at postgraduate level.
3. Develop independent learning strategies.

4. Develop scientific knowledge, critical reasoning and creativity.
5. Identify and understand the advances and challenges of research.
6. Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

## Content

### Chapter 1. Introduction to Organic Chemistry

Lewis structures, resonance, molecular geometry. Kinetic and thermodynamic stability of the carbon chains. Structures and formulas of organic molecules.

### Chapter 2. Organic Compounds

Classification of organic compounds: functional groups; degree of oxidation; nomenclature, physical properties and molecular structure.

### Chapter 3. Conformational and stereochemical analysis

Constitutional isomeria Conformational isomers. Isomerism Z-E of the alquens. Stereoisomers: enantiomers and diastereomers. Chirality and its conditions. Optical activity. Configuration: representation and nomenclature. Racemic mixtures. Compounds with more than one stereogenic center: meso forms. Chiral compounds and their importance in living beings.

### Chapter 4. Organic reactions in biological systems

Introduction to organic reactions. Reaction intermediates. Classification of organic reactions: reactions of addition, substitution and elimination. Oxidation and reduction reactions.

## Methodology

The student acquires the own knowledge of the subject attending the classes of theory that will complement with the individualized study.

### Problems classes

The student consolidates the knowledge acquired in theory classes by solving problems. A dossier of exercises will be given that the students will have to solve during the course. A selected part of these exercises will be solved by problem teachers so that students learn the appropriate methodology to find the solutions. During this process, students' participation will be important. Teachers will help to develop the critical sense and logical reasoning in order to increase the ability of students to solve problems.

### Classes of Practices

The laboratory classes focus on the learning of the basic techniques and to familiarize the student with the conditions of security that manipulation of chemical products requires. To be able to attend the sessions of laboratory practices, the student must justify having passed the security tests that will be found in the Virtual Campus and be knowledgeable and accept the rules of operation of the laboratories of the Faculty of Biosciences.

## Activities

Title	Hours	ECTS	Learning outcomes
<b>Type: Directed</b>			
Laboratory classes	8	0.32	4, 3, 2, 5, 6

Problems	4	0.16	1, 4, 3, 2, 6
Theory classes	20	0.8	1, 4, 3, 2, 5, 6
<b>Type: Supervised</b>			
Tutorials	1	0.04	4, 3, 2, 5
<b>Type: Autonomous</b>			
Solving problems	8	0.32	4, 3, 2, 5, 6
Study	30	1.2	4, 3, 2, 5, 6

## Evaluation

A continuous evaluation of the competences will be carried out that will include a work 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: the learning and use of a free molecular naming and drawing program with individual work will be evaluated. This module will have a weight of 10%.
- Laboratory module: a report of the laboratory practices with a weight of 10% will be evaluated.
- Module of partial written tests: it will consist of two partial tests with a weight of 40% the first, and of 40% the second. In order to pass the subject, the student must draw at least 4 points out of 10 in each of the two written partial tests and the work of nomenclature and laboratory practices must be done and approved. 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 first partial exam may take a recovery exam.

Students who do not finally obtain the minimum qualification required to be able to pass each of the tests of the partial written test module or the minimum qualification to be able to pass the written work module or the Laboratory module, will not pass 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 realizes the module of laboratory or the module of written works if it obtained the competences of these parts of the subject in the previous course.

A student will obtain the **Non-Evaluable** qualification when the number of assessment activities carried out is less than 50% of those programmed for the subject (work, both partial tests and the two practical sessions).

## Evaluation activities

Title	Weighting	Hours	ECTS	Learning outcomes
Test of theory and problems	100%	4	0.16	1, 4, 3, 2, 5, 6

## Bibliography

1.- Timberlake, K.C. QUIMICA: Una Introducción a la Química General, Orgánica y Biológica, 10<sup>a</sup> Ed. Ed. Cedro, Pearson Educación, S.A. **2011** (ISBN 978-84-8322-809-8).

2.- Holm, J.R. *Elements of General, Organic and Biological Chemistry*, 9th Ed., **1995**, John Wiley & Sons Publishing. *Fundamentals of General, Organic and Biological Chemistry*, 5th Ed., **1994**.

- 3.- Bruice, P.Y. Essential Organic Chemistry, 3<sup>rd</sup> Ed. Ed. Prentice Hall, 2014 (ISBN-10: 0321937716, ISBN-13: 9780321937711).
- 4.- Solomons T.W.G. *Química Orgánica*, 3<sup>a</sup> Ed. Ed. Limusa S.A., **2011** (Vol. 1: ISBN 10: [6070506960](https://www.isbn-international.org/product/9780705069603) / ISBN 13: [9786070506963](https://www.isbn-international.org/product/9786070506963); Vol 2: ISBN 10: [6070506979](https://www.isbn-international.org/product/6070506979) ISBN 13: [9786070506970](https://www.isbn-international.org/product/9786070506970))
- 5.- Carey F.A., Giuliano R.M. *Química Orgánica*, 9<sup>a</sup> Ed. Ed. McGraw-Hill, **2014** (ISBN: 00001367MX).
- 6.- Química, (*un proyecto para la A.C.S.*). Editorial Reverte. **2007**.
- 7.- IUPAC Nomenclature of Organic Chemistry: <http://www.acdlabs.com/iupac/nomenclature/>
- 8.- <http://www.freechemsketch.com>
- 9.- Pulido F. Nomenclatura de Química Orgánica:  
[http://es.slideshare.net/manoa21/nomenclatura-quimicaorganica-29646851?next\\_slideshow=1](http://es.slideshare.net/manoa21/nomenclatura-quimicaorganica-29646851?next_slideshow=1)
- 10.- Rosso V. Química Orgánica Nomenclatura:  
<http://es.slideshare.net/verorosso/quimica-orgnica-nomenclatura?qid=09239331-ba5c-4096-9104-dd4cb26fe630f>
- 11.- Hernández Santadaría J.A. Formulació i Nomenclatura de Química Orgànica.:  
<http://es.slideshare.net/joseangelb7/formulacio-i-nomenclatura-organica?related=2>