

Organic Chemistry

Code: 101893
ECTS Credits: 3

Degree	Type	Year	Semester
2501230 Biomedical Sciences	OB	1	1

Contact

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Teaching groups languages

You can check it through this [link](#). To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

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.

Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
- Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
- Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
- Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.

- Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
- Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
- Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
- Work as part of a group with members of other professions, understanding their viewpoint and establishing a constructive collaboration.

Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Make changes to methods and processes in the area of knowledge in order to provide innovative responses to society's needs and demands.
3. Students must be capable of applying their knowledge to their work or vocation in a professional way and they should have building arguments and problem resolution skills within their area of study.
4. Students must be capable of collecting and interpreting relevant data (usually within their area of study) in order to make statements that reflect social, scientific or ethical relevant issues.
5. Students must be capable of communicating information, ideas, problems and solutions to both specialised and non-specialised audiences.
6. Students must develop the necessary learning skills to undertake further training with a high degree of autonomy.
7. Students must have and understand knowledge of an area of study built on the basis of general secondary education, and while it relies on some advanced textbooks it also includes some aspects coming from the forefront of its field of study.
8. Take account of social, economic and environmental impacts when operating within one's own area of knowledge.
9. 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 isomerism. 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.

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			
Laboratory classes	8	0.32	9
Problems	4	0.16	9
Theory classes	20	0.8	9
Type: Supervised			
Tutorials	1	0.04	
Type: Autonomous			
Solving problems	8	0.32	9
Study	30	1.2	9

Assessment

"Continued avaluation"

The continuous evaluation of skills is organized in 3 modules, each of which will be assigned a specific weight in the final qualification:

- Written Work module: the learning and use of a free nomenclature and molecular drawing program will be assessed with an individual work. This module will have an overall weight of 10%.
- Laboratory module: a report on mandatory laboratory practices will be evaluated with a weight of 10%.
- Written partial tests module: it will consist of two partial tests with a weight of 30% the first, and 50% the second.

In order to pass the subject, you must get at least 4 points out of 10 in each of the two written partial tests, the nomenclature work and the laboratory practices. The subject will be considered passed when the average of the modules is equal to or higher than 5 points out of 10.

Students who do not pass the evaluations of the partial tests module will be able to recover them on the scheduled date at the end of the semester. In order to make up for it, the student is required to take both partial exams.

Those who pass the subject will be able to improve their grade by taking the make-up exam. This improvement will be considered as long as the recovery grade is higher than the one obtained in the middle of the modules. If the recovery grade is equal to or lower by less than 1 point, the grade of the average will be maintained. If the recovery grade is lower by 1 point or more than the average grade, the final grade will be considered as the average of the two grades.

Students who do not finally obtain the minimum grade required to pass each of the tests in the written partial tests module or the minimum grade to pass the written assignments module or the Laboratory module, will not pass the subject. In this case, the maximum final grade will be 4.

From the second registration of the subject, the student will not need to complete the laboratory practices or the written work if he/she achieved the skills of these parts of the subject in the previous year.

A student will obtain the grade of Non-Evaluable when the number of assessment activities carried out is less than 50% of those scheduled for the subject (the assignment, the two exams and the two practice sessions).

"Unique Assessment"

Students who have accepted the single assessment modality will have to take a final test and a "written work". In addition, they will have to present the mandatory laboratory reports at the end of each session together with the continuous assessment students. The final test will consist of a theory exam and problems where they will have to solve a series of exercises similar to those worked on in the Classroom Practice sessions. When they have completed it, they will hand in the report of the "Written assignment" that will have been submitted online at some point during the course. The grade for Laboratory Practices will be that of the average of the reports.

In order to pass the subject, they must get at least 4 points out of 10 in each of the three previous activities: final test, written work and laboratory practices.

The student's grade will be the weighted average of the three activities, where the theory and problems exam will account for 80% of the grade, the Laboratory Practices 10% and the report from the Written Assignment the 10%

If the final grade does not reach 5 points, the student has another opportunity to pass the subject through the recovery exam that will be held on the date set by the coordination of the Degree whose content will be the same as that of the final test.

From the second registration of the subject, the students will not need to complete the laboratory practices or the written work if they achieved the skills of these parts of the subject in the previous year.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Laboratory	10%	0.5	0.02	7, 3
Test of theory and problems (first test)	40%	1.5	0.06	1, 8, 2, 7, 6, 5, 3, 4, 9
Test of theory and problems (second test)	40%	1.5	0.06	1, 8, 2, 7, 6, 5, 3, 4, 9
Written work	10%	0.5	0.02	7, 3

Bibliography

- i) Bruice, P.Y. *Organic Chemistry*, 8th Ed. Ed. Pearson Education, 2017 (ISBN 9781292160344, ISBN1292160349).
 - 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*, 10^a 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.- Solomons T.W.G. *Química Orgánica*, 3^a Ed. Ed. Limusa S.A. 2014 (Vol. 1: ISBN 10 9786070506963, Vol 2: [9786070506970](#)).
 - 5.- Carey F.A., Giuliano R.M. *Química Orgánica*, 9^a 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:
 - i) <https://iupac.qmul.ac.uk/BlueBook/>
 - ii) <https://publicacions.iec.cat/repository/pdf/00000195/00000013.pdf>
 - iii) https://www.upo.es/depa/webdex/quimfis/docencia/quimbiotec/Nomenclatura_organica.pdf
 - 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/quimica-orgnica-nomenclatura?qid=09239331-ba5c-4096-9104-dd4cb26fe6308>

Software

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