



Faculty of Experimental Sciences

TEACHING GUIDES

ACADEMIC YEAR 2023-24

BACHELOR'S DEGREE IN CHEMISTRY

Subject Data

Name:

QUÍMICA ORGÁNICA

English name:

ORGANIC CHEMISTRY

Code:

757509206

Type:

COMPULSORY

Hours:

	Total	In class	Out class
Time distribution	150	60	90

ECTS:

Standard group	Small groups			
	Classroom	Lab	Practices	Computer classroom
	4	2	0	0

Departments:

QUÍMICA PROFESOR JOSÉ CARLOS VÍLCHEZ MARTÍN

Knowledge areas:

ORGANIC CHEMISTRY

Year:

2nd COURSE

Semester

2nd SEMESTER

TEACHING STAFF

Name:	E-mail:	Telephone
PATRICIA MARÍA REMÓN RUIZ	patriciamaria.remon@diq.uhu.es	959219876

Others Data (Tutoring, schedule...)

First semester: Mon 10-12 h, Tue 10-12 h, Wed 16-18 h
Second semester: Tue 12-14 h, Wed 16-18 h, Thu 16-18 h

SPECIFIC INFORMATION OF THE COURSE

I. Contents description:

I.1 In English:

In this course we will study the structure, physical properties and reactivity of main organic functional groups.

I.2 In Spanish:

En esta asignatura se llevará a cabo el estudio de la estructura, propiedades físicas y reactividad de las principales funciones orgánicas.

2. Background:

2.1 Situation within the Degree:

Professional activity of a Graduate in Chemistry involves actions that affect the progress of technology, industry, the quality of society life, and even the environment and living beings that inhabit it. Therefore, it is essential for a correct and efficient professional action of these graduates to know how their actions could affect the environment and organisms' life and how they should react to these possible alterations. This subject training is of special relevance, for example, in the pharmaceutical industry, agrochemical, food and scientific and technical advice on topics such as the discovery of new drugs, new materials, as well as to begin in scientific research and teaching.

2.2 Recommendations

It is recommended that the student has the subject "Basic Concepts in Organic Chemistry" completed

3. Objectives (as result of teaching):

The subject "Organic Chemistry" is studied from the point of view of the different functional groups in which the organic compounds which are part of organic matter, natural products and living beings are grouped. Following this system, the student acquires advanced theoretical-practical knowledge of the composition of organic matter along with its physical properties and chemical reactivity illustrated by reaction mechanisms.

4. Skills to be acquired

4.1 Specific Skills:

C2 – To know the main types of reaction 4 and the main characteristics associated with each of them.

C4 – To know the main structural research techniques, including spectroscopy.

C11 – To know the properties of aliphatic, aromatic, heterocyclic and organometallic compounds.

C12 – To know the nature and behavior of functional groups in organic molecules.

C13 – To know the main synthetic routes in organic chemistry, including the interconversion of functional groups and the formation of carbon-carbon and carbon-heteroatom bonds.

Q3 - Competence to evaluate, interpret and synthesize chemical data and information.

Q4 - Ability to recognize and carry out good practices in scientific and professional work.

Q5 - Competence to present, both in written and oral form, scientific material and argumentation to an audience specialized.

P1 - Ability to safely handle chemical materials, taking into account their physical and chemical properties, including any specific hazards associated with its use.

P2 - Ability to carry out standard laboratory procedures involved in analytical and synthetic work, in relationship with organic and inorganic systems.

P4 - Ability to handle standard chemical instrumentation, such as that used for structural studies and separations.

P6 - Ability to carry out risk assessments related to the use of chemical substances and laboratory procedures.

4.2 General, Basic or Transversal Skills:

CB1 – Students have demonstrated to possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, while supported by advanced textbooks,

It also includes some aspects that involve knowledge from the forefront of your field of study.

CB2 - Students know how to apply their knowledge to their work or vocation in a professional way and have the

competencies typically demonstrated through making and defending arguments and solving problems

within your study area.

CB3 - Students have the ability to collect and interpret relevant data (normally within their area of

study) to make judgments that include a reflection on relevant issues of a social, scientific or ethical nature.

CB4 - Students can transmit information, ideas, problems and solutions to a public both specialized as unspecialized.

CB5 - Students have developed those learning skills necessary to undertake studies with a high degree of autonomy.

B1 - Capacity for analysis and synthesis.

B2 - Capacity for organization and planning.

B6 - Troubleshooting.

B8 - Teamwork.

CG1 - Students have developed and demonstrated learning skills and knowledge from of their field of study, being able to apply them in their work, interpreting relevant data to make judgments of topics of various kinds, being able to transmit them to both a specialized and non-specialized audience.

5. Training Activities and Teaching Methods

5.1 Training Activities:

- Theory sessions on the contents of the program
- Problem solving sessions
- Practical sessions in specialized laboratories or computer rooms

- Participatory master class
- Development of practices in specialized laboratories or computer rooms in small groups
- Development of field practices in small groups
- Troubleshooting and practical exercises
- Individual or collective tutorials. Direct teacher-student interaction
- Assessments and Exams

5.2 Teaching Methods::

Theoretical classes:

In-person classes covering theoretical content and practical exercises (problems) of the subject, using didactic resources such as slides, computerized presentations, and videos. Utilization of the computer lab to reinforce previously acquired theoretical and practical knowledge.

Addressing any doubts or questions.

Laboratory Practices:

Laboratory practices in small groups, involving hands-on experience with experimental techniques, discussion of results and drawing conclusions. At the end of the practices students must pass an exam about the laboratory experiments

Addressing any doubts or questions.

5.3 Development and Justification:

- In-person classes of theory and problems: These sessions will be held with the entire group. Its objective is to structure the concepts and problems of the subject. The teacher's presentation will be supported with the necessary audiovisual resources.
- Seminars and conferences: Knowledge on specific theoretical topics will be expanded with different seminars and/or conferences organized within the subject.
- Laboratory practices: The objective of these sessions is that students can convey the theoretical aspects and/or practical knowledge in the laboratory, acquired in the corresponding in-person classes.
- Tutored seminars and resolution of theoretical-practical questions: Seminars will be held to resolve doubts and questions, both theoretical and practical.

6. Detailed Contents

Block I. Study of oxygenated functions

Unit 1. Structure and synthesis of alcohols. (3 hours)

Unit 2. Alcohol reactions. (4 hours)

Unit 3. Ethers, epoxides and sulfides. (3 hours)

Block II. Study of aromatic compounds

Unit 4. Aromatic compounds. (4 hours)

Unit 5. Reactions of aromatic compounds. (4 hours)

Block III. Study of compounds with carbonyl group and amines

Unit 6. Ketones and aldehydes. (3 hours)

Unit 7. Amines (3 hours)

Unit 8. Carboxylic acids. (3 hours)

Unit 9. Derivatives of carboxylic acids. (3 hours)

Laboratory practices:

Practice 1. Synthesis of p-nitroaniline from aniline

Practice 2. Reduction of benzophenone with NaBH₄

Practice 3. Synthesis of aspirin

7. Bibliography

7.1 Basic Bibliography:

- Wade, L.G. Organic Chemistry, Pearson
- Vollhardt, K.; Schore, N. Organic Chemistry: Structure and Function. WH Freeman

7.2 Additional Bibliography:

- Francisco García Calvo-Flores, José A. Dobado Jiménez. "Problemas resueltos de química orgánica " Madrid: Thomson, 2008
- Emilio Quiñóá Cabana, Ricardo Reguera Vega "Cuestiones y ejercicios de química orgánica" MC Graw Hill

8. Systems and Assessment Criteria

8.1 System for Assessment:

Exam with exercises and theoretical questions
Laboratory practices report
Resolution of questionnaires

8.2 Assessment Criteria and Marks:

8.2.1 Examinations Call I

Continuous Assessment will be as follows:

- Resolution of questionnaires that will be a 20% of the global mark of the subject.
- Exam about the laboratory experiments, nomenclature and formulation of organic compounds. This exam will account for 10% of the overall grade for the subject, and a minimum score of 5.0 points is required to pass the laboratory practices. The attendance to these laboratory practices is mandatory to pass the subject.
- Realization of a final exam that will correspond to a 70% of the global mark of the subject.

To pass the subject it is mandatory to obtain 5.0 as score in the laboratory, nomenclature and formulation exam, and 5.0 in the final exam (EX) as a minimum mark and to obtain a minimum sum (global mark) of 5.0.

For the global mark of the subject will be taken into account the breach by the student of the basic behaviour rules that must respect the university community of the Faculty of Experimental Sciences and that has been approved in the Centre Board.

8.2.2 Examinations Call II

This evaluation will consist of two exams, one exam about the laboratory experiments that will correspond to the 15% of the final mark and a second exam about theoretical questions and exercises from the theoretical part of the subject that will correspond to the 85% of the final mark of the subject. It is mandatory to have a minimum mark of 5.0 to pass the subject.

In the final qualification the student's fulfilment of the basic norms of behaviour and functioning, which should be respected by the university community of the Faculty of Experimental Sciences, will be considered. These norms were approved in the Faculty Council

8.2.3 Examinations Call III

This evaluation will consist of two exams, one exam about the laboratory experiments that will correspond to the 15% of the final mark and a second exam about theoretical questions and exercises from the theoretical part of the subject that will correspond to the 85% of the final mark of the subject. It is mandatory to have a minimum mark of 5.0 to pass the subject.

In the final qualification the student's fulfilment of the basic norms of behaviour and functioning, which should be respected by the university community of the Faculty of Experimental Sciences, will be considered. These norms were approved in the Faculty Council

8.2.4 Extraordinary Call

This evaluation will consist of two exams, one exam about the laboratory experiments that will correspond to the 15% of the final mark and a second exam about theoretical questions and exercises from the theoretical part of the subject that will correspond to the 85% of the final mark of the subject. It is mandatory to have a minimum mark of 5.0 to pass the subject.

In the final qualification the student's fulfilment of the basic norms of behaviour and functioning, which should be respected by the university community of the Faculty of Experimental Sciences, will be considered. These norms were approved in the Faculty Council

8.3 Single Final Evaluation:

If the student chooses to have a final single evaluation, this will be carried out through the realization of two exams that will represent 100% of the mark. On the one hand, an exam related to laboratory practices that will mean 15% of the qualification and on the other one an exam which will contain the contents developed in the theoretical and problem classes, which will represent an 85% of the global mark.

To have this type of evaluation, single final evaluation, in the first two weeks of the subject or in the two weeks following to the enrolment (if this has occurred after the beginning of the subject), the student will have to communicate this decision to the professor of the subject by email. According to the evaluation regulation approved by the Governing Council of March 13, 2019, this will imply the express resign of the continuous evaluation, without the possibility of changing the system.

In the final qualification the student's fulfilment of the basic norms of behaviour and functioning, which should be respected by the university community of the Faculty of Experimental Sciences, will be considered. These norms were approved in the Faculty Council.