COURSE GUIDE 2024/25

Faculty 215 - Faculty of Chemistry **Cycle** .

Degree GQUIMI20 - Bachelor's Degree in Chemistry **Year** Third year

COURSE

26114 - Organic Chemistry II **Credits, ECTS:** 9

COURSE DESCRIPTION

In this course, students will deepen their knowledge of organic chemistry through the study of modern methods of organic synthesis, general reactions and their specific versions, and their application to the synthesis of organic compounds.
The course includes an experimentation laboratory in Organic Chemistry, oriented to the planning and execution of the synthesis of simple organic molecules.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

The objectives of the course are as follows:

1) Know the structural characteristics and the symmetry and stereochemistry of organic compounds.

2) Become familiar with modern methods of organic synthesis, including specific reactions and versions.

3) Know the most important reaction mechanisms, considering aspects of chemo- and stereoselectivity.

4) Be able to propose short syntheses of simple compounds.

The aim is for the student to develop the basic and general competences defined in the RD1393/2007 for this level in the field of Chemistry as well as the following transversal competences (Fundamental Module M02):

-- M02MC08: Ability to select different instrumental techniques, simple or combined, for the characterisation of chemical substances.

-- M02MC09: To be able to present orally and in writing, in an understandable way, phenomena and processes related to Chemistry and related subjects.

-- M02MC10: Ability to search for and select information in the field of Chemistry and other scientific fields, making use of the bibliography.

-- M02CM11: Being able to relate Chemistry to other disciplines, as well as to understand its impact on today's society and the importance of the industrial chemical sector.

Successful completion of the course should also enable the student to acquire the following specific competences (Modules M01 and M02):

-- M01CM03: Safe use of the usual laboratory means and techniques.

-- M01CM05: Ability to observe, analyse and present results in the field of chemistry and other sciences.

-- M02CM02: Knowledge of the structure, properties, methods of preparation and the most important chemical reactions of the chemical elements and their compounds.

-- M02CM03: Ability to plan and carry out in the laboratory simple processes of synthesis and characterisation of chemical compounds, safely and using the most appropriate techniques, as well as to evaluate and interpret data derived from experimental observations.

The horizontal and vertical coordination of the subject in the Module and in the Degree will be ensured by the Commission ofCoordination of the Degree

Theoretical and Practical Contents

1. Structure, Symmetry and Stereochemistry of Organic Compounds.

Basic principles. Chirality. Stereogenic elements. Structural determination of the absolute and relative relative configuration. Conformational analysis Prochirality and topicity Stereoselective reactions.

2. Chemical transformations. Reactivity and Mechanisms.

- Formation of simple carbon-carbon bonds. Reactivity of enols and enolates. Alkylation reactions, conjugate additions and the aldol reaction with its variants. Asymmetric reactions.

- Formation of carbon-carbon multiple bonds and their reactivity. Elimination reactions (E1, E2 and E1cB). Syn pyrolytic eliminations, alkenes from hydrazones, diols and alkynes. Olefination reactions: Wittig and its variants, Julia'svariants, Julia and Peterson olefins. Olefin metathesis.

- Oxidations

- Reductions

TEACHING METHODS

Delivery of general content. Lectures supported by multimedia elements (Power Point presentations, videos, web pages) and other types of teaching material (molecular models).

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	40	10	15	25					
Horas de Actividad No Presencial del Alumno/a	60	22,5	15	37,5					

Legend:

M: Lecture-based	S: Seminar	GA: Applied classroom-based groups
GL: Applied laboratory-based groups	GO: Applied computer-based groups	GCL: Applied clinical-based groups
TA: Workshop	TI: Industrial workshop	GCA: Applied fieldwork groups

Evaluation methods

- Continuous evaluation
- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 70%
- Exercises, cases or problem sets 30%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

Evaluation methods and percentage in the final mark:

Mixed evaluation:

20% Partial written exams
50% Final written exam.
10% Seminars.
20% Laboratory practices.

1- To pass the course it is necessary to obtain a minimum mark of 4.0 in the final exam and to pass the laboratory practices.

2- The non-completion of the partial exam and seminars (or their presentation after the deadline) will imply a zero for said test). Failure to submit to the final written exam will suffice to be qualified NOT PRESENTED (no call is required), regardless of whether the partial exam or seminars have been taken.

3- The mark obtained in the partial exam and the seminars is only valid for the first call. In case of failing the first call, the second call will only be evaluated as a single exam with 80% of the grade.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

80% Final written exam.
20% Laboratory practices.

1- To pass the subject it is necessary to obtain a minimum grade of 5.0 in the final exam and to pass the laboratory practices.
2- Failure to submit to the final written exam will suffice to be qualified NOT PRESENTED (no call is required).

MANDATORY MATERIALS

As indicated by the teacher and at least one text from the basic bibliography. Personal laboratory equipment, especially lab coat, safety goggles, spatula and latex gloves.

BIBLIOGRAPHY

Basic bibliography

Structure, symmetry and stereochemistry:

1. E. Juaristi, Introduction to Stereochemistry and Conformational Analisis, John Wiley, New York.
2. A. Bassindale, The Third Dimension in Organic Chemistry, Ed. John Wiley & Sons, New York, 1991.
3. E. Eliel, S. H. Wilen, Stereochemistry of Organic Compounds, Ed. John Wiley & Sons, New York, 1994.
4. D. Nasipuru, Stereochemistry of Organic Compounds: Principles and Applications, John Wiley & Sons, New York, 1991.

Organic reactions. Reactivity and mechanisms:

5. F. A. Carey, Advanced Organic Chemistry, Kluver Academic, New York, 2001.
6. J. Clayden, N. Greeves, S. Warren, Organic Chemistry, Oxford University Press, 2012.
7. D. Klein, Química Orgánica, Ed. Panamericana, 2014

Detailed bibliography

1. ORGANIC SYNTHESIS: THE DISCONNECTION APPROACH. S. Warren, P. Hyatt, Wiley, 2008.
2. ORGANIC CHEMISTRY. J. Clayden, N. Greeves, S. Warren, P. Wothers, Oxford, 2005.
3. SÍNTESIS ORGÁNICA. RESOLUCIÓN DE PROBLEMAS POR EL MÉTODO DE DESCONEXIÓN. M. Carda, S. Rodríguez, F. González, J. Murga, E. Falomir, E. CASTILLO, Publicaciones de la Universitat Jaume I, Castellón, 1996.
4. SAFETY IN ACADEMIC CHEMISTRY LABORATORIES: VOLUME 1 y 2. ACCIDENT PREVENTION FOR FACULTY AND ADMINISTRATORS, 7ª Ed. American Chemical Society, Washington, DC, 2003

Journals

Organic Syntheses: http://www.orgsyn.org/
The Journal of Organic Chemistry: http://pubs.acs.org/journal/joceah
Organic Letters: http://pubs.acs.org/journal/orlef7
European Journal of Organic Chemistry: http://www3.interscience.wiley.com/journal/27380/home
Tetrahedron: http://www.sciencedirect.com/science/journal/00404020
Organic and Biomolecular Chemistry: http://www.rsc.org/Publishing/Journals/Ob/Index.asp
The Journal of Chemical Education: http://jchemed.chem.wisc.edu/

Web sites of interest

Organic Chemistry Portal: http://www.organic-chemistry.org/
Organic Resources Wordwide: http://www.organicworldwide.net/
Bases de datos de compuestos orgánicos: http://pubchem.ncbi.nlm.nih.gov/ , http://www.chemspider.com/

OBSERVATIONS