

Course guide

330454 - QO - Organic Chemistry

Last modified: 21/05/2026

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.
Degree: BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2016). (Compulsory subject).
Academic year: 2026 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: López Martínez, Cristina

Others: López Martínez, Cristina

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. Understand and use the principles and their application in organic chemistry.
2. Develop the ability to analyze problem solving.
3. Develop critical reasoning.
4. Have the ability to train independently.

5. Operate efficiently individually and / or as a team.
6. Argue clearly to third parties the knowledge acquired.

Transversal:

7. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

The subject consists on 4 classroom hours, devoted to explain theoretical fundamental and to the solution of practical problems

LEARNING OBJECTIVES OF THE SUBJECT

The aim of the subject is to let know the organic chemistry of the laboratory and industrial, the description of different families of compounds as well as the formation of the intermediates required to obtain the final products.

STUDY LOAD

Type	Hours	Percentage
Hours small group	15,0	10.00
Hours large group	45,0	30.00
Self study	90,0	60.00

Total learning time: 150 h

CONTENTS

Title of the content 1: Biomolecules: Carbohydrates

Description:

Introduction. Monosacarides. Disacarides. Polysacarides. Heterosides. Functions

Full-or-part-time: 10h

Theory classes: 4h

Self study : 6h

Title of the content 2: Biomolecules: Lipids

Description:

Lipids: Introduction. Saponifiable lipids. Unsaponifiable lipids. Functions

Full-or-part-time: 10h

Theory classes: 4h

Self study : 6h

Title of the content 3: Biomolecules: Proteins

Description:

Introduction. Primary structure: Aminoacids. Secondary structure. Tertiary structure. Quaternary structure. Functions

Full-or-part-time: 5h

Theory classes: 2h

Self study : 3h

Title of the content 4: Biomolecules: Nucleotides and nucleic acids

Description:

Introduction: Nitrogenated bases, pentoses. Functions. Nucleic acids: RNA, DNA. Tipology. Functionality

Full-or-part-time: 7h

Theory classes: 2h

Laboratory classes: 2h

Self study : 3h

Title of the content 2: Introduction to Organic chemistry

Description:

Generalities. Nature. Organic chemical industry. Organic families (Nomenclature). Dipolar moment. Spectroscopical techniques. Isomerism of the Carbon. Type of reactions

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h



Title of the content 6: Study of the alkanes

Description:

Nature and industry examples. Nomenclature. Physical properties and characterization. Industrial synthesis. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 5h

Theory classes: 3h

Self study : 2h

Title of the content 7: Study of the alkenes and alkynes

Description:

Nature and industry examples. Nomenclature. Physical properties and characterization. Industrial synthesis: C2-C3, C4, C5-C18 and acetylene. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 15h

Theory classes: 6h

Self study : 9h

Title of the content 8: Study of the aromatic hydrocarbons

Description:

Nature and industry examples. Nomenclature. Physical properties and characterization. Industrial synthesis. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 10h

Theory classes: 6h

Self study : 4h

Title of the content 9: Study of the halogenated compounds

Description:

Nature and industry. Examples. Nomenclature. Physical properties and characterization. Industrial synthesis: C1, C2 and C3. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 10h

Theory classes: 6h

Self study : 4h

Title of the content 10: Study of the oxygenated compounds

Description:

Nature and industry examples. Nomenclature: alcohols, aldehydes and ketones, acids and derivatives. Physical properties and characterization. Industrial synthesis. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 20h

Theory classes: 8h

Self study : 12h



Title of the content 11: Study of the nitrogenated compounds

Description:

Nature and industry examples. Nomenclature. Physical properties and characterization. Industrial synthesis: C1, lactams. Main uses as final products. Reactivity in the laboratory

Full-or-part-time: 7h

Theory classes: 2h

Laboratory classes: 2h

Self study : 3h

ACTIVITIES

Written individual exam

Description:

Individual exams in the classroom to assess theoretical concepts and problem solving related with the content of the subject

A) 3 partial exams lasting 2 h will be done

Exam 1: Contents 1, 2, 3, 4, 5

Exam 2: Contents 6, 7, 8, 9, 10, 11

Specific objectives:

To understand the theoretical concepts of the related contents

Material:

Statements

Delivery:

Solving the exams and writing the results

Full-or-part-time: 10h

Theory classes: 4h

Self study: 6h

Practical assessment: laboratory sessions, final report and oral presentation

Description:

Participation in laboratory practicals and submission of the corresponding report.

Development of a final project and its oral presentation.

Specific objectives:

To deepen practical laboratory skills and oral scientific communication.

Delivery:

Submission of the laboratory report.

Oral presentation of the final project.

Full-or-part-time: 9h

Theory classes: 2h

Practical classes: 4h

Self study: 3h

Written final exam

Description:

Single assessment

If the continuous assessment grade is lower than 5, a final individual exam must be taken.

The final course grade will be the higher of the continuous assessment or the final exam.

Individual exam (assessable activity 1 to 11): 100%.

Full-or-part-time: 9h

Theory classes: 2h

Practical classes: 1h

Self study: 6h

GRADING SYSTEM

Any academic fraud, plagiarism or use or possession of unauthorised means in an assessment activity leads to a mark of zero (0) for the affected test or assignment. Furthermore, in accordance with the University's regulations, if disciplinary proceedings are initiated the subject is recorded as "Pending Assessment" until a decision is reached. These incidents are managed in accordance with the [Action Framework for Academic Integrity in Assessment at the UPC](#).

A) Continuous assessment

2 exams (evaluable exercise: 1, 2, 3, 4, 5): 37,5%

- This first midterm exam will take place during the midterm examination week, as indicated in the academic calendar for the course.

(evaluable exercise: 5, 6, 7, 8, 9, 10, 11): 37,5%

Laboratory practices/activities: 25%

If the continuous evaluation grade stays below 5, a final individual test will be held. The grade assignment will be the maximum between the continuous evaluation and the final test.

EXAMINATION RULES.

- Class attendance
- Carrying out individual exams
- Laboratory practices attendance
- Activities delivery

BIBLIOGRAPHY

Basic:

- Gorchs i Altarriba, Roser; Galán i Giró, Àngels. Química orgànica: estudi, reactivitat i aplicació dels principals compostos orgànics [on line]. Barcelona: Edicions UPC, 2003 [Consultation: 12/11/2020]. Available on: <http://hdl.handle.net/2099.3/36492>. ISBN 8483017393.

Complementary:

- Weissermel, K. Industrial Organic Chemistry [on line]. 2ª ed.. Weinheim: VCH, 1993 [Consultation: 07/10/2025]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=19035. ISBN 3527269959.

- Climent Olmedo, Mª José, i altres. Química orgànica: principales aplicaciones industriales. Valencia: Editorial UPV, 2008. ISBN 9788483633595.

- Centelles Serra, Josep Joan. Estructura de compostos orgànics i biomolècules. Barcelona: Universitat de Barcelona, 2009. ISBN 9788447534272.

- Vollhardt, K. Peter C; Schore, Neil Eric; Andreu Martínez, David. Química orgànica : estructura y función. 5a ed. Barcelona: Omega, cop. 2007. ISBN 9788428214315.

- Bruice, Paula Yurkanis. Química orgànica [on line]. 5ª ed. México: Pearson Prentice Hall, 2008 [Consultation: 01/07/2025]. Available



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