

Course guide 330454 - QO - Organic Chemistry

Unit in charge: Teaching unit:	Manresa School of Engir 750 - EMIT - Departmer	Last modified: 05/06/2024 neering nt of Mining, Industrial and ICT Engineering.
Degree:	BACHELOR'S DEGREE IN	CHEMICAL ENGINEERING (Syllabus 2016). (Compulsory subject).
Academic year: 2024	ECTS Credits: 6.0	Languages: Catalan

LECTURER

Coordinating lecturer:	Heras Cisa, Francesc Xavier De Las
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

Туре	Hours	Percentage
Hours large group	45,0	30.00
Hours medium group	15,0	10.00
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 laboratoriy

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

Title of the activity 1: 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 Exam 2: Contents 5, 6, 7 & 8 Exam 3: Contents 9, 10 & 11

B) Unique Exam lasting 3 h will be done: Contents from 1 to 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: 15h Theory classes: 6h Self study: 9h

GRADING SYSTEM

A) Continuous assessment 3 individuals (evaluable exercise: 1, 2, 3 & 4): 25% (evaluable exercise: 5, 6, 7 & 8): 25% (evaluable exercise: 9, 10 & 11): 25% 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



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: <u>http://hdl.handle.net/2099.3/36492</u>. ISBN 8483017393.

- Weissermel, K. Industrial Organic Chemistry. 2^a ed.. Weinheim: VCH, 1993. ISBN 3527269959.

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

Complementary:

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