

Course guides

330454 - QO - Organic Chemistry

Last modified: 23/06/2020

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: 2020 **ECTS Credits:** 6.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Heras Cisa, Francesc Xavier De Las

Others:

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

1. (ENG) Comprendre i utilitzar els principis i la seva aplicació en química orgànica.
2. (ENG) Desenvolupar la capacitat d'anàlisi en la resolució de problemes.
3. (ENG) Desenvolupar el raonament crític.
4. (ENG) Tenir capacitat de formar-se de forma autònoma.
5. (ENG) Funcionar de forma eficient a nivell individual i/o en equip.
6. (ENG) Argumentar de forma clara a tercers els coneixements adquirits.

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 medium group	15,0	10.00
Self study	90,0	60.00
Hours large group	45,0	30.00

Total learning time: 150 h



CONTENTS

Title of the content 1: Biomolecules: Glucides

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 alkanes 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. 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

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): 33 %

(evaluable exercise: 5, 6, 7 & 8): 33 %

(evaluable exercise: 9, 10 & 11): 33 %

B) Unique assessment

Individual exam (activity assessed from 1 al 11): 100 %

The final score will be the maximum value obtained according to the system A) or B).

EXAMINATION RULES.

- Class attendance
- Carrying out individual exams



BIBLIOGRAPHY

Basic:

- Centelles Serra, Josep Joan. Estructura de compostos orgànics i biomolècules. Barcelona: Universitat de Barcelona, 2009. ISBN 9788447534272.
- Weissermel, K. Industrial Organic Chemistry. 2^a ed. . Weinheim: VCH, 1993. ISBN 3527269959 .
- 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: 29/01/2018]. Available on: <http://hdl.handle.net/2099.3/36492>. ISBN 8483017393.

Complementary:

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