27215 - Organic Chemistry II

Información del Plan Docente

Academic Year	2017/18
Faculty / School	100 - Facultad de Ciencias
Degree	452 - Degree in Chemistry
ECTS	12.0
Year	3
Semester	Annual
Subject Type	Compulsory
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It favors the understanding of the different chemical processes that occur in the environment. A wide range of teaching and learning tasks are implemented, such as theory sessions, laboratory sessions, assignments, and tutorials.

Students are expected to participate actively in the class throughout the semester.

27215 - Organic Chemistry II

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

Further information regarding the course will be provided on the first day of class.

5.2.Learning tasks

The course includes 12 ECTS organized according to:

- Theory sessions (6 ECTS): 60 hours.

- Laboratory sessions (3 ECTS): 30 hours.

- Problem-solving sessions (3 ECTS): 30 hours.

Theory sessions: lecture notes and a series of problems (and its solutions) will be available for the students. At the end of each topic, some of the problems will be solved in class by the professor and the rest will be done individually.

Laboratory sessions: these 4-hour sessions take place approximately 2 times every week. Students are provided with the practical exercises' instructions to be done as well as a theoretical introduction to the session's contents.

5.3.Syllabus

The course will address the following topics:

Theory sessions

Enols and enolates : Ceto-enol tautomerism. Formation of enolates. Reactivity of enols and enolates. Nitrogen analogous of enols and enolates.

Alkylation of enolates : Enolates of compounds with active methylenes. Enolates derived from other carbonyl compounds: regio- and stereoselectivity. Enamines and aza-enolates.

Reaction of enolates with aldehydes and ketones : The aldol reaction. The Mannich reaction. The Knoevenagel reaction. The enolates of esters.

Acylation of enolates : Reactions of Claisen and Dieckmann. Acylation of enolates of ketones. Other acylations.

Conjugate additon of enolates : The Michael reaction. The Robinson anulation. Other reactions of addition conjugate to a,b unsaturated carbonyls

27215 - Organic Chemistry II

Compounds of phosphorus : Utility in transformation of functional groups. Ylides and carbanions stabilized by phosphorus: reactions of Wittig, Wadswoth-Emmons and Horner.

Compounds of sulfur : Carbanions and ylides of sulfur in the creation of C-C bonds. Elimination giving to C=C bonds.

Compounds of silicon : Compounds with a Si-O bond. Carbanions estabilised by silicon: Peterson reaction. Compounds of organosilicon: b-effect and synthetic utility.

Reductions : Catalytic hydrogenation. Hydrides of B and Al. Reduction by dissolving metals. Reductive coupling of carbonyls.

Oxydations : Oxidation of alcohols. Epoxidation and dihydroxylation of alkenes. Oxidative cleavage of 1,2-diols and alkenes. Baeyer-Villiger oxidation.

Heterocyclic compounds : Aromatic heterocycles. p-deficient systems: pyridine. p-excedents systems : pyrrole, furan and thiophene

Carbohydrates : Structure and reactivity of monosaccharides. Glycosides and anomeric effect. Disaccharides and polisaccharides.

Amino acids, peptides and proteins : Structure and synthesis of amino acids. Peptides and proteins. Synthesis of peptides.

Polymers : Polymers of addition. Radical , anion and cation polymerization. Polymers of condensation. Properties of polymers

Laboratory sessions

Session 1. Aldol reaction

Session 2. Claisen condensation

Session 3. NaBH4 reduction

Session 4. Wittig reaction

Session 5. Synthesis of a heterocycle

Session 6. Penta-O-acetyl-D-glucose

Session 7. Preparation of nylon 6,10

5.4.Course planning and calendar

27215 - Organic Chemistry II

For further details concerning the timetable, classroom and further information regarding this course please refer to the "Facultad de Ciencias" website (http://ciencias.unizar.es/web/horarios.do).

5.5.Bibliography and recommended resources

https://psfunizar7.unizar.es/br13/egSolotexto.php?codigo=27215

BB	Clayden, Jonathan. Organic chemistry / Jonathan Clayden, Nick Greeves, Stuart Warren . 2nd ed. Oxford : Oxford University Press, cop. 2012
BB	McMurry, John. Química orgánica / John McMurry ; traducción, María Aurora Lanto Arriola, Jorge Hernández Lanto ; revisión técnica, Alfredo Vázquez Martínez...[et al.] . - 7ªed. México D.F. : Cengage Learning, cop.2008
BB	Solomons, T. W. Graham. Organic chemistry : international student version / T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder . 11th ed. Singapore : John Wiley & Sons, cop. 2014
BB	Vollhardt, K. Peter C.. Química orgánica : estructura y función / K. Peter C. Vollhardt, Neil E. Schore ; traducción y coordinación, David Andreu Martínez . - 5ª ed. Barcelona : Omega, D.L. 2007
BB	Wade, Leroy Grover, jr. Química orgánica (2 vol.) / L. G. Wade, Jr. ; traducción Ma. Aurora Lanto Arriola, Laura Fernández Enríquez . 7ª ed. México : Pearson, cop. 2012
BB	Wade, Leroy Grover, Jr.. Química orgánica / L. G. Wade, Jr. ; traducción y revisión del texto por Ángel Manuel Montaña Pedrero, Consuelo Batalla García . - 5ª ed. Madrid [etc.]: Pearson/Prentice Hall, D.L. 2004
BC	Carey, Francis A.. Advanced organic chemistry. Part A, Structure and mechanisms / Francis A. Carey and Richard J. Sundberg . - 5th ed. New York

27215 - Organic Chemistry II

[etc.] : Springer, cop. 2007

BC Carey, Francis A.. Advanced organic chemistry. Part B, Reactions and synthesis / Francis A. Carey and Richard J. Sundberg . - 5th ed. New York [etc.] : Springer, cop. 2007

BC Carruthers, W.. Modern methods of organic synthesis / W. Carruthers, Iain Coldham . - 4th ed., repr. Cambridge [etc.] : Cambridge University Press, 2005

BC Davies, David T.. Aromatic heterocyclic chemistry / David T. Davies . - Repr. with corr. Oxford [etc.] : University Press, 2004

BC Davis, Benjamin G.. Carbohydrate chemistry / Benjamin G. Davis, Antony J. Fairbanks . 1st ed. repr. Oxford [etc.] : Oxford University Press, 2011, cop. 200

BC Jones, John. Amino acid and peptide synthesis / John Jones . 2nd ed. repr. Oxford [etc.] : Oxford University Press, 2011, cop. 200

BC Sainsbury, M.. Heterocyclic Chemistry. Royal Society of Chemistry, 2001

BC Smith, Michael B.. Organic Synthesis. 3rd. ed. Wavefunction, 2011

URLs:

[http://www.organic-chemistry.org/reactions.htm]

[http://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/intro1.htm]