

27235 - Organic Chemistry Insights

Syllabus Information

Academic Year: 2020/21

Subject: 27235 - Organic Chemistry Insights

Faculty / School: 100 - Facultad de Ciencias

Degree: 452 - Degree in Chemistry

ECTS: 5.0

Year: 4

Semester: Second semester

Subject Type: Optional

Module: ---

1. General information

1.1. Aims of the course

The subject and their expected results respond to the following statements and objectives:

- Explore the interrelation between structure, properties and reactivity of organic compounds.
- Educate the student in synthetic strategies of interest for the design and preparation of compounds and materials organic.
- Have an integrated view of the reaction mechanisms in organic chemistry.
- Manage primary and secondary sources of utility in organic chemistry.

1.2. Context and importance of this course in the degree

The course delves into the more advanced concepts of organic chemistry. Its contents complete those acquired in the organic chemistry I and organic chemistry II exams in order to give a complete and specialized education in organic chemistry education.

It is complementary with other optional exams such as Chemistry Organometallic (27234), Homogeneous Catalysis (27232) and Industrial organic chemistry (27237)

1.3. Recommendations to take this course

It is recommended to have passed the following subjects of Organic Chemistry I and Organic Chemistry II.

2. Learning goals

2.1. Competences

To overcome the course, the student will be more competent to...

- Acquire precise knowledge of the concepts and fundamentals of organic chemistry.
- Learn about and handle concepts such as: synthetic equivalent, protecting groups, investment of polarity and in general the problem of selectivity in a reaction in organic chemistry.
- Propose reasonable synthetic procedures for the preparation of organic compounds
- Solve problems and questions proposed, as well as defend the results critically
- Generate possible ideas and options for action before the organic chemistry-related problems.
- Properly handle all kinds of current bibliography
- Express themselves orally and in writing in a clear and precise way. Use with precision and property-specific vocabulary and terminology
- Connect the organic chemistry with other areas and disciplines.

2.2. Learning goals

The student, to overcome this subject, shall demonstrate the following results...

- Handle all general concepts, previously studied, on stereochemistry and reactivity of organic functions, using specific vocabulary and terminology accurately and properly.
- Determine relationships of isomerism between organic molecules, establishing relationships of topologicality between atoms and functional groups.
- Differentiate different types of organic reactions in view of reagents and products.
- Meet new reactions of synthetic interest.
- Propose reaction mechanism based on the proposed intermediate.
- Design moderately complex organic synthesis using a retrosynthetic analysis.
- Set the most suitable protective groups for the most important functional groups
- Understand and establish methods to predict the selectivity in stereoselective reactions
- Understand the principle of catalysis and its application to metal catalysis and organocatalysis.

2.3.Importance of learning goals

The course learning outcomes are fundamental to acquire adequate specialization in organic chemistry that allows address complex problems directly related to the design of synthetic routes of products of a certain complexity and to the elucidation of reaction mechanisms. Also, they will provide the knowledge necessary for efficient catalytic systems in organic reactions and will offer the possibility of complementing the knowledge acquired in other disciplines related to organic chemistry.

3.Assessment (1st and 2nd call)

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

The student must demonstrate that it has achieved learning outcomes expected by the following evaluation activities:

According to the rules of evaluation of the University of Zaragoza, the student may submit to continuous assessment or the unique global test. The student will receive the highest score obtained in the case of presenting to both exams (CA and GT).

CONTINUOUS EVALUATION

The evaluation of knowledge will be continuously assessing each of the parties that comprise the course.

- Monitoring and active participation in classes, resolution of practical questions and submission of abstracts of talks which could be programmed (10%)
- Realization of works and researches literature (20%)
- Test written (70%)

To be accepted for the written test the student will have had to carry out all the proposed activities and have been delivered, when so requested, before the designated date. The score this test is modulated with the activities carried out throughout the course according to the indicated percentage.

At the end of this test, which will be made at latest 3 days before the global test, will be the final grades of the subject, in accordance with the continuous assessment.

GLOBAL SINGLE TEST

Regardless of the continuous assessment, there will be a single global test for the subject in which you can get a rating from 0 to 10 points.

For this global test note only the same results shall be taken into account, and previous results from the continuous assessment shall not be considered.

The number of official calls for review to which the registration gives right (2 per registration) as well as the consumption of such calls is set to permanence regulations for undergraduate studies and regulation of standards of assessment of learning. This latter Regulation, also the general criteria of the test design will be adjusted and rating, and according to the same system will be made public hours, date and place that the review will be held at publish ratings. Such regulations can be found at: <http://wzar.unizar.es/servicios/coord/norma/evalu/evalu.html>

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as:

1. Lectures (3 ECTS)
2. Exercises (1 ECTS)
3. Bibliographic work & seminar (1 ECTS)
4. Attendance at lectures at the Faculty of Sciences (follow-up study) all activities should be indicated through

4.2.Learning tasks

The course includes the following learning tasks:

- Lectures
- Troubleshooting: all the lectures will be followed by the corresponding classes of exercises.
- Practice sessions

4.3.Syllabus

The course will address the following learning tasks:

- Topic 1. Organic synthesis. Synthesis and functional groups interconversion. Regioselectivity. Chemoselectivity and protective groups. Introduction to disconnection approach (retrosynthetic analysis)
- Topic 2. Ring closures and openings. Concerted and pericyclic reactions.
- Topic 3. Organic reactions mediated by transition metals. Hydroformylation. Alilacion Nucleophilic.Cross-coupling.
- Topic 4. Synthesis of enantiomeric pure compounds. Enantiomeric resolutions by crystallization. Chromatographic resolutions. Normal kinetic resolutions (KR) and parallel (PKR). Dynamic kinetic resolution (DKR). Dynamic kinetic asymmetric transformation (DYKAT).
- Topic 5. Stereoselective and stereospecific synthesis. Asymmetric synthesis. Concepts and applications. Asymmetric reactions of unsaturated systems C = X. Addition mechanism models.
- Topic 6. Catalysis in Organic Chemistry. Asymmetric Organocatalysis.

All lectures will be followed by the corresponding classes of problems.

4.4.Course planning and calendar

Calendar of sessions and presentations

The face-to-face sessions (lectures and problems) will take place in the classroom and at the time indicated by the Secretariat of the Faculty of Science and it will be available at the beginning of the course on the web:

<http://ciencias.unizar.es>.

At the first weeks of the course, the works will be assigned to the students to be sended and exposed at the end of the course.The delivery will be done by email in any of the PDF, PPT (X) or DOC (X) formats and it will be not necessary to present them in printed form. The date of delivery and presentation shall be before the final test corresponding to the continuous assessment. Itwill be announced in advance on the notice board of the Department of Organic Chemistry and on the Teaching digital platform (ADD).

The subject (global) final test will be held at the place, date and time indicated by the Faculty of Sciences and will be available at the beginning of the course on the web: <http://ciencias.unizar.es>

Classes will begin on the date corresponding to the start of the second semester classes. Class schedules, classroom and the calendar of exams will be published on the website of the Faculty of Sciences.

Everything related to the continuous assessment (choice and delivery of works)-related activities will be published through the digital platform ADD. The evidence regarding the continuous evaluation will be also published on the notice board of the Department of Organic Chemistry.

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=27235&year=2019