Teaching guide

IDENTIFICATION DETAILS

Degree:	Pharmacy
Scope	Pharmacy
Faculty/School:	Experimental Sciences
Course:	ORGANIC CHEMISTRY
Type:	Basic Training
ECTS credits:	9
Year:	1
Code:	2519
Teaching period:	Second semester
Subject:	Chemistry
Module:	Chemistry
Teaching type:	Classroom-based
Language:	Spanish
Total number of student study hours:	225

SUBJECT DESCRIPTION

Chemistry is the scientific discipline that studies the nature of matter and its transformations. One of the branches of this discipline is Organic Chemistry whose object of study is carbon chemistry, fundamental for the development of life.

The teaching of this subject will provide the student with the necessary basis to understand the structure, properties and reactivity of a large number of molecules that are very important from a pharmacological point of view.

Organic Chemistry is a Basic Training course in Chemical Matter belonging to the Chemistry Module. This course is taught in the second semester and is assigned a teaching load of 9 ECTS credits equivalent to 225 hours of

student work. The teaching of the subject Organic Chemistry will allow the student to be able to identify and name the different functional groups present in an organic compound, as well as to visualize and propose its three-dimensional structure. With the development of this subject, the student will know, understand and deepen the basic principles of reactivity of the most important functional groups in organic chemistry and the mechanisms by which these reactions take place.
Therefore, after studying the subject, the student will be able to describe and be able to apply these basic principles of reactivity to organic molecules of great importance from a pharmacological point of view, such as drugs or antibodies. But in addition to all these objectives, which could be framed in the training of the 'pharmaceutical professional', teaching the subject of Organic Chemistry also seeks to train the 'personal pharmacist', that is, to train 'people with capacity for service, strong will, sense of duty, social and personal responsibility, commitment and moral integrity' as well reflected in the Ideology of our university.

GOAL

Applying all the concepts learned in the development of the subject, the student must be able to devise plausible synthetic routes for obtaining simple organic molecules. To do this, the student must acquire sufficient knowledge to:

Understand the atomic structure of carbon, the different types of bonds that this atom can present and the spatial distribution of these bonds.
Identify the main functional groups, as well as to know their characteristics and their reactivity
Predict the reactivity of organic compounds and propose the mechanisms by which these reactions take place.

PRIOR KNOWLEDGE

Those students who, prior to the start of the Academic Year, have the level of knowledge of the 2nd year of Baccalaureate (Scientific) in the subjects Chemistry and Physics will achieve maximum use of the Organic Chemistry course. The subject of General Chemistry (first semester of the first year of the degree in Pharmacy) provides useful but not essential knowledge of chemistry to pass Organic Chemistry.

COURSE SYLLABUS

THEORETICAL SYLLABUS OF THE SUBJECT: The subject is divided into three main blocks:
BLOCK I. Introduction and Basic Concepts of Organic Chemistry. This block reviews the concepts already studied by students both in the Baccalaureate and in the subject of General Chemistry (Topic 1). The most basic and transversal concepts necessary for the perfect assimilation of the subject are studied, such as: formal charges, stability, resonant structures, radicals or nucleophilia and electrophilia.
BLOCK II. The carbon skeleton. The detailed study of the different organic compounds originated mainly by the combination of carbon and hydrogen begins. It addresses the study of basic concepts such as chemical reactivity, types and mechanisms of reaction. In addition, the reactivity of the simplest functional groups is reviewed: halogenated derivatives, alkanes, alkenes, alkynes, aromatic compounds and heterocycles through some of the most common reactions in organic chemistry such as: substitutions, deletions, additions or SEEr
BLOCK III. Functional groups and their reactivity. This block describes in detail the main functional groups with heteroatoms most common in Organic Chemistry: alcohols, phenols, ethers, epoxides, thiols and sulfides,

aldehydes, ketones, carboxylic acids and derivatives, amines and derivatives, together with the reactivity that the presence of these groups confers on the organic molecule that contains them. Some of the most important reactions of these functional groups will be reviewed: oxidation and reduction reactions, nucleophilic addition reaction, acylation reaction and hydrolysis.
PRACTICAL SYLLABUS OF THE SUBJECT: The most important aspects that students must master to work in an organic synthesis laboratory will be addressed: Management and identification of the most suitable instruments for carrying out routine processes in the laboratory, identification of functional groups, drug synthesis, isolation and purification of compounds.

EDUCATION ACTIVITIES

FACE-TO-FACE WORK ACTIVITIES:
- [AFP1] THEORETICAL CLASSES: The teacher will develop the theoretical concepts that are part of the subject, the presentations used by the teacher will be available to the students.
- [AFP2] LABORATORY PRACTICES: students under the supervision of the teacher will carry out practical activities within a chemistry laboratory.
- [AFP3] EXERCISE CLASSES: In class, the teacher will develop as many of the problems proposed in the syllabus as part of learning.
- [AFP4] CONSOLIDATION SEMINARS: Practical seminars will be held in small groups, the teacher will help to answer the necessary questions so that students can solve the proposed practical exercises. The seminars will allow the student to practice and consolidate the most important concepts of the subject.

SELF-EMPLOYMENT ACTIVITIES
- [AFNP1] INDIVIDUAL WORK: A5.1. Preparation, study and consolidation by the student of the theoretical contents and practical cases proposed in the exhibition sessions and consolidation seminars. A5.2. Study prior to carrying out laboratory practices. A5.3. Prior preparation for practical sessions.

OPTIONAL REINFORCEMENT ACTIVITY:
- [AFNP4 + AFP5] Individual or group tutoring with the teacher. The tutoring schedule can be consulted in the degree coordinator and will be informed by the teacher at the beginning of the course

DISTRIBUTION OF WORK TIME

TEACHER-LED TRAINING ACTIVITIES	INDIVIDUAL WORK
95 Horas	130 Horas

Cross Skills

To nurture an attitude of intellectual curiosity and a quest for truth in all areas of life.

To be able to approach a subject by means of rigorous, profound and comprehensive thought.

To be able to assess knowledge acquired.

To be able to apply the theoretical knowledge learnt in the of solving problems and practical cases linked to the various subjects.

LEARNING RESULTS

Identify, design, obtain, analyze and produce active ingredients, drugs and other products and materials of health interest.

Estimate the risks associated with the use of chemicals and laboratory processes.

Know and understand the characteristics of reactions in solution, the different states of matter and the principles of thermodynamics and their application to pharmaceutical sciences.

Know and understand the nature and behavior of functional groups in organic molecules.

Carry out standard laboratory processes including the use of scientific synthesis and analysis equipment, including appropriate instrumentation.

SPECIFIC LEARNING RESULTS

Apply the theoretical content included in the thematic blocks

Develop the basic operations of an organic chemistry laboratory, such as those involved in the synthesis and isolation of simple organic substances and their structural determination.

Apply the scientific method, and skills for the synthesis, isolation and characterization of organic compounds

Propose different types of chemical reactions depending on the functional groups present in a substrate.

Propose a plausible synthetic route for obtaining simple organic molecules.

Select the appropriate technique to carry out the synthesis and purification of a drug

LEARNING APPRAISAL SYSTEM

ORDINARY EVALUATION SYSTEM:
To qualify the subject of Organic Chemistry, through continuous evaluation, the different aspects developed during the course will be evaluated under sections (A1-A4). Sections A1, A3 and A4 correspond to the theoretical part of the subject. Section A2 corresponds to the practical part of the subject
* A1 - SE1: Written or oral, developmental, short answer or test-type tests (60%).
* A2 - SE8. Attendance and participation in face-to-face activities in the laboratory (18%).
* A3 - SE2+SE3. Individual and group work (20%).
* A4 - SE4. Attendance and participation in face-to-face classroom activities. (2%)
The subject will be approved when the final grade obtained, after applying the statistical weights of each of these parts, is equal to or greater than 5 (out of 10). In order to obtain the average grade, the student must obtain a grade higher than 5.0 in sections A1 and A2

ALTERNATIVE EVALUATION SYSTEM:
This system is intended for repeat students who do not take advantage of the ordinary evaluation system because they cannot attend classes on a regular basis, students who want to take advantage of this alternative evaluation system must contact the teacher to request to take advantage of this system.
* A1 - SE1. (60%). The same written test will be taken as for the students on call.
* A3 - SE3 + A4 SE4. (22%) Deliveries, written tests and/or tutoring will be proposed to be carried out by the student.
* A2 - SE8 (18%). students will do the internships under the same conditions and with the same evaluation system as non-repeating students.
NOTES:
* Attendance at all practical sessions is mandatory. The unjustified absence of any of these sessions leads to the loss of the right to an internship evaluation in the ordinary call and a suspension of the course. In the same way, arriving late or leaving the practice session early without the teacher's permission will be sufficient cause to lose the right to evaluate this part of the subject. Students in this situation should immediately contact the teacher.
* Students who do not obtain a grade equal to or greater than (5.0) in section A1 will not be able to pass the subject
* Students who do not obtain a grade equal to or higher than (5.0) in the A2 section will not be able to pass the subject, and it will also be necessary to obtain a score higher than (5.0) in the theoretical practical exam to be able to average in section A2
* For section A3 to be part of the evaluation, students must submit their submissions before the deadline set by the teacher.
* For the A4 section to be part of the final evaluation, the student must attend more than 50% of the classes. Since the student may miss 50% of the total activities carried out in the classroom, proof of non-attendance will not be accepted.
* If the student in the ordinary call does not have the subject approved but has a grade equal to or greater than (5.0) in sections A1 or A2, he can keep the grade from that section for the extraordinary call. To pass the subject, sections A1 and A2 with a score lower than (5.0) in the ordinary call must be evaluated in the extraordinary call.
* Students who enroll for the second or more times in a subject, in the first few days of the course, should contact the teacher to find out about the evaluation criteria specific to their case.
* Plagiarism, the use of illegitimate means in evaluation tests, and inappropriate behavior within the laboratory will be sanctioned in accordance with those established in the Evaluation Regulations and the University's Coexistence Regulations.

ETHICAL AND RESPONSIBLE USE OF ARTIFICIAL INTELLIGENCE

1.- The use of any Artificial Intelligence (AI) system or service shall be determined by the lecturer, and may only be used in the manner and under the conditions indicated by them. In all cases, its use must comply with the following

principles:
a) The use of AI systems or services must be accompanied by critical reflection on the part of the student regarding their impact and/or limitations in the development of the assigned task or project.
b) The selection of AI systems or services must be justified, explaining their advantages over other tools or methods of obtaining information. The chosen model and the version of AI used must be described in as much detail as possible.
c) The student must appropriately cite the use of AI systems or services, specifying the parts of the work where they were used and describing the creative process followed. The use of citation formats and usage examples may be consulted on the Library website(https://www.ufv.es/gestion-de-la-informacion_biblioteca/).
d) The results obtained through AI systems or services must always be verified. As the author, the student is responsible for their work and for the legitimacy of the sources used.
2.- In all cases, the use of AI systems or services must always respect the principles of responsible and ethical use upheld by the university, as outlined in the Guide for the Responsible Use of Artificial Intelligence in Studies at UFV. Additionally, the lecturer may request other types of individual commitments from the student when deemed necessary.
3.- Without prejudice to the above, in cases of doubt regarding the ethical and responsible use of any AI system or service, the lecturer may require an oral presentation of any assignment or partial submission. This oral evaluation shall take precedence over any other form of assessment outlined in the Teaching Guide. In this oral defense, the student must demonstrate knowledge of the subject, justify their decisions, and explain the development of their work.

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Klein D. Organic Chemistry 2013 Pan-American

Clayden J, Organic Chemistry 2012 Oxford
(Clayden J, Organic Chemistry 2012 Oxford , ||Morrison RT, Organic Chemistry 2011 Pearson)

Additional

Carey A.F. Organic Chemistry McGraw-Hill 1999