Chemistry I

Code: 103264
ECTS Credits: 6

2025/2026

Degree	Type	Year
Food Science and Technology	FB	1

Contact

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Although there are no official pre-requisites, it is very convenient for the student to review:

- The concepts of stoichiometry.

- The Lewis model for the representation of chemical structures.

- The basic knowledge of nomenclature of organic chemistry.

Objectives and Contextualisation

It is a first-year subject, of basic training in the foundations of organic chemistry, both from the structural point of view and chemical reactivity. The acquired knowledge should allow students who pass the subject to understand the concepts of isomerism related to organic compounds, as well as to understand the chemical transformations of basic biochemical processes that will later be seen in other subjects of the degree.

More specifically, the objectives of the subject are:

1) Achieve knowledge and understanding of the basic concepts of the various chemical bond theories applicable to organic compounds.

2) Be able to describe and understand the different types of isomerism of organic compounds.

3) Identify and describe the reactivity and reaction mechanisms of the main organic reactions, as well as the various factors that influence them.

Competences

- Analyse, summarise, resolve problems and make professional decisions.
- Apply knowledge of the basic sciences to food science and technology.
- Apply the scientific method to resolving problems.
- Display knowledge of the physical, chemical, biochemical and biological properties of raw materials and foods.

Learning Outcomes

1. Analyse, summarise, resolve problems and make professional decisions.
2. Apply the scientific method to resolving problems.
3. Describe the different types of isomerism in organic compounds.
4. Describe the mechanisms of the principal organic reactions and the various factors that affect them.
5. Describe the structure of the atom.
6. Describe the technofunctionality of organic compounds in accordance with the characteristics of the environment.
7. Distinguish between the different types of chemical bonds and intermolecular interactions.
8. Identify the basic reactivity associated with the various functional organic groups.
9. Identify the functional groups of the principal natural organic products and their most important reactions.
10. Name and formulate the organic and inorganic chemical compounds.

Content

The contents of this subject are as follows:

- Unit 1. Electronic structure of the atom. Introduction to the different types of chemical bonds. Lewis structures. Simple and multiple carbon bonds. Intermolecular forces.

- Unit 2. Introduction to organic compounds. Structures and formulas of organic molecules. Degree of oxidation of an organic compound. Classification of organic compounds according to their degree of oxidation and their functional groups. Acidity and basicity of organic compounds. Concept of nucleophile and electrophile.

- Unit 3. Conformational and stereochemical analysis. Conformational isomerism of linear alkanes. Newman projections. Conformational isomerism of cycloalkanes. Chirality. Stereogenic centers. Configurational isomerism: enantiomers and diastereomers. The *R / S* nomenclature to describe stereogenic centers. cis-trans or *Z-E* isomerism. Optical activity. Fisher projections.

- Unit 4. Hydrocarbons. alkanes, alkenes and aromatic compounds. Aromaticity criteria.

- Unit 5. Organic compounds with oxidation degree 1. Alkyl halides, alcohols, ethers, thiols and amines. Nucleophilic substitution reactions: S_N1 and S_N2. Elimination reactions: E1 and E2. Alcohol reactivity: dehydration and oxidation reactions.

- Unit 6. Organic compounds with oxidation degree 2. Aldehydes and ketones. General structure and reactivity. Acetals and hemiacetals. Cyclic forms of carbohydrates. Aldolic condensation.

- Unit 7. Organic compounds with oxidation degrees 3 and 4. Carboxylic acids and derivatives. Amino acids and peptides. Claisen condensation reaction. Reduction reactions.

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Master classes	33	1.32	1, 10, 2, 3, 4, 6, 5, 7, 9, 8

Seminars	16	0.64	1, 10, 2, 3, 4, 6, 5, 7, 9, 8
Type: Autonomous			
Study and solve problems	95	3.8	10, 2, 3, 4, 6, 5, 7, 9, 8

The development of the course, in terms of teaching methodology and training activities, is based on the following activities:

- Lectures/flipped classroom, where students acquire the theoretical knowledge of the subject.

- Seminars, which are sessions with a small number of students that should serve both to answer questions and to study more deeply certain key concepts and their application in practical cases. They are mostly dedicated to solve exercises.

- Evidences, which are exercises solved individually in or outside the master classes.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Evidences	15%	2	0.08	1, 2, 3, 4, 6, 5, 7, 9, 8
First exam	40%	2	0.08	1, 10, 2, 3, 4, 6, 5, 7, 9, 8
Second exam	45%	2	0.08	1, 10, 3, 4, 6, 5, 7, 9, 8

The evaluation of the scientific-technical knowledge of the subject achieved by the student, is done individually, continuously and through written tests consisting of:

- 2 partial exams with an incidence in the final mark of 40% the first and of 45% the second. The minimum grade required to pass the course is 4.0 out of 10.0 in each exam.

- Resolution of exercises (evidences) with an overall incidence of 15%. These exercises are compulsory and thus, those students who fail to do so will automatically be graded with a zero.

- For students who have not passed one of the partial exams there will be a retake of one or both partial exams.

- The student who has passed the exams may decide to take the retake to improve the mark, with the understanding that the student will give up the grade achieved in the first place.

- To pass the subject, a minimum of 5.0 points out of 10.0 calculated according to the percentages given above.

- A student is graded as "*non-assessable*" if she/he has participated in assessment activities that represent ≤ 15% of the final grade.

Single assessment will consist of a single test in which the contents of the entire subject program will be assessed with different types of exercices (multiple-choice test, problem solving, development of concepts, etc.) The grade obtained in this test will account for 100% of the final grade and the minimum grad to pass the subject is a 5.0 out of 10.0 for the single test. The single assessment test will take place on the same day, time and place as the last continuous assessment test of the subject. The single assessment can be recovered on the day set for the recovery of the subject. A student is graded as "*non-assessable*" applying the same ncriterion as for continuous assessment. Thereview of the finalgrade follows the same procedure as for continuous assessment.

Bibliography

- T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder, Organic Chemistry, 11th Edition, John Wiley and Sons, New York, 2013.

- Y. Bruice. Organic Chemistry (3ª Ed) Prentice-Hall International, 2001.

- K. Peter. C. Vollhardt; Neil E. Schore, Organic Chemistry (7th Ed), Ed. Freeman, WH & Co., 2015

- H. Schmid. Química Biológica. Las bases químicas de la vida. Ed. Interamericana. 1986.

- W. R. Peterson. Formulación y nomenclatura en Química Orgánica, EUNIBAR, 1987.

- https://www.organic-chemistry.org/

In general, any book of introduction to organic chemistry.

The use of molecular models to facilitate 3D vision is highly recommended.

Software

Not applicable.

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	1	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	2	Catalan	first semester	morning-mixed
(TE) Theory	1	Catalan	first semester	morning-mixed