

Course Unit: 93506 – Applied organic chemistry

Year 1 Semester 1 ISCED Code: 531 ECTS: 3

Type of Course Unit: Compulsory **Delivery Mode:** Face-to-face **Language of Instruction:** Portuguese

COURSE COORDINATOR: Humberto Manuel Índio Tomás Chaves

HOURS OF WORK

TOTAL HOURS	Contact Hours								Hours in autonomous work
	Theory	Theory and practice	Practical and laboratory work	Field work	Seminar	Internship	Tutorial guidance	Other	
75		45							30

Prerequisites (if applicable): Not applicable.

LEARNING OUTCOMES (knowledge, skills and competence)

It is intended that students develop the following skills:

Assesses and minimizes know the main health and safety risks associated with work in the laboratory.

- Knows and identifies different classes of organic compounds.
- Through the structure and functional groups, provides various physical and chemical properties.
- Provides chemical and physical behavior of different compounds in different situations.

CONTENTS

- I - Chemical safety in laboratories
- II - Structure of organic compounds
- III - Chemical bonds and properties of organic compounds
- IV - Stereochemistry
- V - Naming and properties of:
 - V.1 - Hydrocarbons: alkanes and cycloalkanes
 - V.2 - Hydrocarbons: alkenes and alkynes
 - V.3 - Halogenated hydrocarbons
 - V.4 - Aromatic hydrocarbons
 - V.5 - Alcohols and ethers
 - V.6 - Aldehyde and ketones
 - V.7 - Amines
 - V.8 - Carboxylic acids and salts derived
 - V.9 - Derivatives of carboxylic acid: acyl chlorides, anhydrides, amides and esters.

DEMONSTRATION OF THE CONTENTS COHERENCE WITH THE COURSE UNIT'S LEARNING OUTCOMES

In the theoretical part of the classes the concepts and fundamentals are exposed and discussed to understand and apply to the study of various organic molecules. In practical part of the classes, students begin to apply theoretical fundamentals concepts (structure, chemical bonding and properties of organic compounds) to the chemical and physical characterization of organic molecules, taking into account the functional groups that constitute those molecules. It is intended thereby to provide to student, the knowledge that make it able to identify functional groups in a molecule, and can also make a prediction of some of their physical and chemical properties. Being a laboratory, a dangerous place and that students will use several times in the course or in their professional life this course aims to give a small introduction to working with safety and health in a laboratory. It will be very useful these students are aware of this problem.

TEACHING METHODOLOGIES

The program of this course consists of two blocks of matter - a theoretical part and the other with practical resolution of exercises on the subjects taught in the theoretical part. These two parts are interconnected, since the theoretical lesson concepts and are exposed grounds for understanding and implementing the study of organic molecules. The teaching methodology includes a set of theoretical lectures, fundamental to acquire basic knowledge about the different concepts of chemical bonding, structure and properties of compounds, with a focus on expositive and interactive classes, with audio-visual equipment. In continuation of the theoretical part will be performed exercises, which are applied in the teachings of their syllabus, under the supervision of the teacher. The weekly schedule is 3 hours of theoretical and practical lessons. The final results of the evaluation exam in which students have access after a successful participation at 75% of lessons and the workgroup.

DEMONSTRATION OF THE COHERENCE BETWEEN THE TEACHING METHODOLOGIES AND THE LEARNING OUTCOMES

This course aims to sensitize students to the importance of organic chemistry in our days and specifically in the food area. The aim is also to make a small approach to work safely in a laboratory, because it is expected that the student use with some frequency in this course and in your professional life. This first part will be taught a theoretical exposition with concrete examples, followed by discussion. Then, as a practical example, there will be a visit to a laboratory to verify the conditions of hygiene and safety.

In the remaining parts of the subject, students will acquire capacity for estimating properties of some organic compounds, and thus can predict behaviours or influence that they will have in certain situations in the areas of food technology. The student will be able to interpret and analyse the contributions of some organic compounds that can be used for storage, packaging and food additives. To achieve these objectives there will be a more theoretical exposition and discussion of organic molecules and functional groups. Throughout this exposure will be given concrete examples of applications of organic molecules in general, but also in the food area. Then, to consolidate knowledge, students perform exercises on the subjects taught in a group and individually, with accompanying teacher.

Thus demonstrates that there is consistency of teaching methodologies with the learning objectives of the course.

EVALUATION METHODS

The students prepare, with the support of the teacher, a workgroup: Organic Chemistry in Food. Can also address another issue related to the matter under study. The evaluation results from the balance of the examination (80%) with the group work (20%)

MAIN BIBLIOGRAPHY

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- Francis Carey, "Organic Chemistry", Mc Graw Hill, 7th ed., 2007.
- R. T. Morrison, R.N. Boyd "Química Orgânica", Fundação Calouste Gulbenkian, 9th ed.
- Stanley H. Pine, James B. Hendrickson, Donald J. Cram, George S. Hammond, "Organic Chemistry", International Student Edition. 1987.
- Maria João Marcelo Curto Segurança em laboratórios químicos, Universidade Nova de Lisboa, 1979.
- H. G. O. Becker et al. "Organikum - Química Orgânica Experimental", Fundação Calouste Gulbenkian, 2nd ed., Lisboa, 1997.
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