COURSE OUTLINE 1.

GENERAL

SCHOOL	Environment & Agricultural Engineering		
ACADEMIC UNIT	Natural Resources Management & Agricultural Engineering		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**1390**	**SEMESTER**	**B**
COURSE TITLE	ORGANIC CHEMISTRY		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures and Laboratory Exercises	5	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General Background
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES
COURSE WEBSITE (URL)	
TEACHING STAFF (Lectures & Laboratory exercises)	Lectures: Couladouros Elias, Tarantilis Petros, Pappas Christos, Kokotou Maroula Laboratory Exercises: Couladouros Elias, Tarantilis Petros, Pappas Christos, Kokotou Maroula, Daferera Dimitra, Mihou Anastasia, Mpouzas Emmanoyil, Kanakis Charalampos

2. LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B • Guidelines for writing Learning Outcomes*

ORGANIC CHEMISTRY is the basic background course for understanding the structure and reactions of organic compounds.
The course material aims to introduce students to the basic modes of operation of the characteristic groups of organic molecules with their environment, which is a prerequisite for understanding their physical and chemical behaviour in food and human nutrition. Understanding the mechanism of a general reaction as well as its stereochemical route leads to the understanding and interpretation of the products obtained.

It also refers to concepts and methodologies related to the classification of chemical reactions, the importance of stereochemistry and optical activity of organic compounds and the need to know the basic spectroscopic techniques for structure identification.

The aim of the course is for the students to understand the structure, physical properties, and characteristic chemical reactions of molecules of the most basic homologous series and stereochemistry – activity relation.

Upon successful completion of the course students will be able to:

- Describe the molecular structure of basic organic molecules, and correlate structural differences with their chemical activity and biochemical behaviour
- Indicate the products of basic organic reactions found in the metabolic pathways of food ingredients
- Identify the factors that affect the stability of organic molecules and predict their conversions depending on the chemical environment.
- Know the basic spectroscopic techniques applied for the analysis and characterization of organic compounds

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Project planning and management with Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
…… Production of new research ideas
Others…
…….

• Search, analyze and synthesize data • Decision making • Working independently • Respect for the natural environment • Exercise criticism and self-criticism • Production of free, creative and inductive thinking

3. SYLLABUS

Lectures

1. Basic homologous series of organic compounds, classification of organic reactions, basic mechanisms of organic reactions, basic definitions
2. Basic spectroscopic methods for determining the structure of organic molecules.
3. Carbon chain formulations and stereochemistry
4. Alkanes, alkenes, alkynes-conjugated polyenes, electrophilic addition reactions.
5. Alkyl halides, nucleophilic substitution reactions, cleavage reactions
6. Carbonyl compounds, nucleophilic addition reactions
7. Amines, acids, acid derivatives
8. Aromatic compounds, electrophilic substitution reactions
9. Sugars (mono-, oligo-, polysaccharides)
10. Amino acids - proteins
11. Lipids, steroids - hormones
12. Terpenes - carotenoids
13. Vitamins - Nucleic acids

Laboratory Excercises

1. Separating components of a mixture by extraction.
2. Ultra Violet- Visible Spectroscopy (UV-Vis)
   Quantitative Analysis of chlorophyll α- and b- by UV-Vis spectroscopy
3. Thin Layer Chromatography (TLC) Terpenoid separation by TLC method
4. Esterification-Fisher esterification reaction-Small scale synthesis of volatile esters
5. Saponification
6. Transesterification
   Synthesis of Biodiesel from vegetable oils
7. Qualitative tests of Carbohydrates - Reducing Sugars
8. Synthesis of Aspirin
9. Synthesis of oxime of cyclohexanone

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY

Face-to-face, Distance learning, etc.

Face-to-face or/and distance learning

Lectures take place in Amphitheater and Laboratories are used for excercises

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

Use of ICT in teaching, laboratory education, communication with students

Using Powerpoint presentations and video display.
Communication with students via e-mail, e-class and e-student.
Learning process support through e-class access, online databases, etc.

TEACHING METHODS

The manner and methods of teaching are described in detail.
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS

Activity	*Semester workload*
Lectures	50
Laboratory practice	75
Total	**125**

STUDENT PERFORMANCE EVALUATION

Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, openended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.

Written final exam in course theory that includes:
- Short answer questions
- Problem solving
- Evaluation of theory principles

Student performance evaluation in Laboratory practice includes:

a) Oral examination during the exercises (15%)
b) Evaluation of laboratory reports (15%)
c) The average grade of two (2) written exams during the semester (70%)

Students who achieve a grade ≥5 pass the lab otherwise they take part to the final written exam which includes:

- Short answer questions
- Multiple choice test

5. ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Related academic journals:

- ORGANIC CHEMISTRY, J. Clayden, N. Greeves, S. Warren Utopia Publishing, 2016. - ORGANIC CHEMISTRY FOR LIFE SCIENCES, David Klein, 1st Greek edition, Utopia Publishing, 2015.
- ORGANIC CHEMISTRY, F. A. Carey, R. M. Giuliano, N. T. Allison, S.L. Bane, Kritiki Publishing, 2020
- PRACTICAL AND THEORETICAL ISSUES OF ORGANIC CHEMISTRY, E. Couladouros - V. Konstantinou, Laboratory Notes.