COURSE LAYOUT

1. GENERAL

SCHOOL	**School of Animal Biosciences**		
DEPARTMENT	**Department of Animal Science**		
STUDY LEVEL	**Undergraduate**		
COURSE CODE	**3640**	**SEMESTER**	**2nd**
COURSE TITLE	**PRINCIPLES OF ORGANIC CHEMISTRY**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**ECTS**
Course: Theory and Laboratory Practice (4+2)	6	6

COURSE TYPE (Foundation course, General knowledge, Scientific area, Developing skills)	Foundation course
PREREQUISITES	No
LANGUAGE	Greek
IS THE COURSE OFFERED for ERASMUS STUDENTS?	No
COURSE WEB PAGE	https://mediasrv.aua.gr/eclass/courses/EZPY145/

2. LEARNING OUTCOMES

Learning Outcomes

Introductory course to basic concepts and principles of Organic Chemistry with particular emphasis on the structure and functionality of organic compounds found in living organisms (biomolecules, drugs and pollutants).

Upon successful completion of the course, students are expected to know-understand the:

- basic principles of Organic Chemistry (inductive and mesomeric effects, resonance, carbon hybridization).
- nomenclature, structures and characteristic properties of the major classes of organic compounds along with their characteristic reactions.
- structure and functionality of organic molecules found in living organisms, and
- basic spectroscopic techniques utilized for the identification of the structure of the organic molecules.

Students also be will be able to:

- recognize and understand the molecular structures and main reactions of the major classes of organic compounds.
- understand the basic principles and main rules of stereochemistry.
- comprehend the basic principles of spectroscopy techniques (UV-Ultraviolet, IR-Infrared, NMR-Nuclear Magnetic Resonance and MS-Mass Spectrometry) as well as their applications for the determination of the structure of organic molecules.
- distinguish the main classes of organic compounds & biomolecules, understand their properties and biological functions as well as their mechanisms of action.
- use basic laboratory equipment and develop skills for solving problems and data processing

General Competences

Data analysis-synthesis, information mining. Application of relevant technologies
Adapting new situations
Work as individual

Teamwork (in the lab)
Working in a multidisciplinary environment
Respect the natural environment
Exercise criticism and self-criticism
Promotion of creative and inductive thinking

3. COURSE CONTENT

THEORY

- Electronic Theories (atomic structure, orbitals, bonds, carbon hybridization, inductive and mesomeric effects, resonance).
- Stereochemistry (general concepts, asymmetric carbons and molecules, three-dimensional molecular structure, enantiomeric and diastereomeric structures, racemic mixtures, meso-compounds, *cis-trans* and *E-Z* stereoisomers).
- Nomenclature of Organic molecules
- Classification of reactions and reagents. Reaction mechanisms (addition, substitution). Acidity - basicity of molecules.
- Spectroscopy - Structure determination (basic principles and applications in structure determination)
  - o Ultraviolet
  - o Infrared
  - o Nuclear Magnetic Resonance
  - o Mass spectrometry
- Chemistry of Functional Groups (structure, reactivity, major reactions)
  - o Alkanes
  - o Alkenes
  - o Alkynes
  - o Alkyl halides,
  - o Alcohols, ethers
  - o Carbonyl compounds
  - o Acids and their derivatives
  - o Amines
  - o Aromatic compounds
- Biomolecules (applications and utility)
  - o Carbohydrates (aldoses, ketoses, monosaccharides or disaccharides, D or L sugars, Fischer and Haworth projections, chair conformation and basic properties-reactions of monosaccharides)
  - o Amino acids-Peptides-Proteins (acid base properties, structure, synthesis and sequence of peptides, protein structures)
  - o Lipids (fatty acids-fats-oils-triglycerides)
  - o Isoprene compounds (terpenoids-carotenoids-steroids)
  - o Vitamins-Hormones
  - o Nucleic Acids (purines, pyrimidines, nucleosides and nucleotides, DNA and RNA)

LABORATORY

- Extraction-Filtration (Separation of benzoic acid from organic and inorganic impurities)
- Spectrophotometry I (Qualitative assessment of α- and β-chlorophylls in animal feed)
- Spectrophotometry II (Quantitative determination of β-carotene)
- Thin layer chromatography (TLC)
- Acidic-basic properties of the amino acids
- Column chromatography
- Isolation of essential oils
- Literature review

4. TEACHING and LEARNING METHODS - Evaluation

<table>
<tr><td>TEACHING METHOD</td><td>Face to face (theory-laboratory) and remote support via E-mail</td></tr>
<tr><td>USE OF INFORMATICS and COMMUNICATION TECHNOLOGIES</td><td>Power point presentations and video projections in lectures
Use of e-class platform
Students' support via e-mail</td></tr>
<tr><td>TEACHING ORGANISATION (Lectures, individual or group assignments, field trips, individual study et.c.)</td><td>
<table>
<tr><th>Activities</th><th>Workload per semester</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Laboratory practices</td><td>26</td></tr>
<tr><td>Individual work</td><td>50</td></tr>
<tr><td>Team work</td><td>22</td></tr>
<tr><td>Total contact hours and training</td><td>150</td></tr>
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<tr><td>STUDENTS EVALUATION</td><td><u>Theory</u>
Written exams (100%) (either as final exam or as the sum of two progress exams during the semester)
<u>Laboratory</u>
Short answers to questions before every practice, 20%
Written exam (Multiple choice questions, simple questions and problems) 60%
Individual work assignment 20%</td></tr>
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5. LITERATURE

- All lectures are available at *e-class* as *power-point* presentations

Books:

- «ORGANIC CHEMISTRY» (*translated from English*), John McMurry, Edit. University of Crete
- «ORGANIC CHEMISTRY» (*translated from English*), L.G. WADE Jr., TZIOLAS eds