UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
CHEM-245	Organic Chemistry	6
Prerequisites	**Department**	**Semester**
CHEM-135	Life & Health Sciences	Spring
Type of Course	**Field**	**Language of Instruction**
Required Course	Chemistry	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr. Marios Stylianou	2nd
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-face	LAB practical session included	None

Course Objectives:

The main objectives of the course are to:

- to give students an introduction to the basic principles of organic chemistry,
- to cultivate an appreciation of the role of organic chemistry in everyday life and in biological systems
- to help develop sound practical skills in the unique laboratory explorations of organic chemistry

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Draw the chemical structure and name a wide variety of classes of organic compounds.
2. Discuss the physical and chemical properties of saturated, unsaturated and aromatic hydrocarbons.
3. Discuss the physical and chemical properties and main reactions of oxygen-containing organic compounds, including unsaturated carbonyl group compounds.
4. Discuss the structure and reactivity of nitrogen-containing organic compounds (such as amines, amino acids and protein structure molecules).
5. Employ the chemical reactions of all above-named compounds to propose multistep

syntheses of a wide variety of organic compounds.

6. Interpret a variety of spectra, including IR, visible, UV and proton NMR spectra, in the determination of the chemical structures of organic compounds.
7. Employ a wide variety of organic mechanisms to predict the products of organic chemical reactions, including the region-chemistry and stereochemistry of the reaction intermediates and final products.
8. Discuss the structures, functions, and key chemical reactions of the principal groups of biological compounds, including carbohydrates, lipids, amino acids, and proteins.

Course Content:

1. Functional Groups and Organic Nomenclature

2. Hydrocarbons
   - i. Alkanes (Chain Radical Reactions)
   - ii. Cycloalkanes
   - iii. Alkenes
   - iv. Alkynes
   - v. Aromatics

3. Oxygen Containing Molecules
   - i. alcohols
   - ii. aldehydes and ketones
   - iii. carboxylic acids
   - iv. carboxylic acid derivatives

4. Nitrogen Containing Compounds (Amines and Amino acids, Proteins)

5. Carbohydrates

6. Molecular Spectroscopy and Structure Determination
   - i. absorption spectroscopy (IR and UV)
   - ii. mass spectrometry
   - iii. proton NMR spectroscopy

7. Organic Stereochemistry

8. Organic Synthesis and Mechanisms

Laboratory Experiments:

1. Laboratory Safety Demonstrations
2. Solubility – Polarity of Organic Compounds
3. Detection of Functional Groups in Organic Compounds
4. Detection of S, N and Cl in Organic Compounds
5. Infra-Red (IR) Spectroscopy
6. Separation of an Acetone-Water Mixture by Simple Distillation
7. Isolation of Limonene from Orange Peel Using Hydro-distillation
8. Saponification: Preparation of Bar Soap
9. Extraction – Isolation of Caffeine from Tea
10. Synthesis of Dibenzalacetone
11. Recrystallization – Determination of the Melting Point of Organic Compounds

Learning Activities and Teaching Methods:

Lectures, Laboratory Practical Sessions, Interactive Workshops and Assignments.

Assessment Methods:

1. Midterm Examination
2. QUIZZ-TEST
3. LAB Assessment
4. Final Examination

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Organic Chemistry	John E. McMurry	OpenStax	2023	ISBN 13: 9781951693985
Organic Experiments	K.L. Williamson	Houghton Mifflin Company	2004	ISBN: 0-618-30842-3

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Study Guide and Student Solutions Manual for John McMurry's Organic Chemistry	S. McMurry	Thompson Brooks/Cole	2004 6th Edition	ISBN: 0-534-40934-2
Organic Chemistry	T.W.G. Solomons and C.B. Fryhle	Wiley	2004 8th Edition	ISBN: 978-0-471-41799-6