University of Nicosia, Cyprus

Course Code	**Course Title**	**ECTS Credits**
CHEM-245	Organic Chemistry	6
Department	**Semester**	**Prerequisites**
Life and Health Sciences	Fall, Spring	CHEM-135 Physical Chemistry
Type of Course	**Field**	**Language of Instruction**
Required	Chemistry	English
Level of Course	**Year of Study**	**Lecturer**
1st Cycle	2nd	Dr. Photos Hajigeorgiou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of the course are to:

- Introduce students to the basic principles of organic chemistry,
- Cultivate in students an appreciation of the role of organic chemistry in everyday life and in biological systems
- Help students develop sound practical skills in the unique laboratory explorations of organic chemistry
- Enable students to become competent with the organic chemistry material included in the Medical College Admission Test (MCAT)

Learning Outcomes:

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

1. Draw the chemical structure of 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
5. Discuss the structure and chemical reactivity of phosphorus-containing organic compounds
6. Employ the chemical reactions of all above-named compounds to propose multistep syntheses of a wide variety of organic compounds
7. Interpret a variety of spectra, including IR, visible, UV and proton NMR spectra, in the determination of the chemical structures of organic compounds
8. Employ a wide variety of organic mechanisms to predict the products of

organic chemical reactions, including the regiochemistry and stereochemistry of the reaction intermediates and final products

9. Discuss the structures, functions, and key chemical reactions of the principal groups of biological compounds, including carbohydrates, lipids, amino acids, and proteins

Course Contents:

1. Functional Groups and Organic Nomenclature
2. Hydrocarbons
    i. alkanes
    ii. cycloalkanes
    iii. alkenes
    iv. aromatics
    v. alkynes
3. Oxygen Containing Molecules
    i. alcohols
    ii. aldehydes and ketones
    iii. carboxylic acids
    iv. carboxylic acid derivatives
4. Nitrogen Containing Compounds
5. Phosphorus Containing Compounds
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
9. Biological Molecules
    i. carbohydrates
    ii. amino acids, peptides and proteins
    iii. lipids

Laboratory Experiments:

1. Laboratory Safety Demonstrations
2. Dibenzalacetone by Aldol Condensation
3. Fractional Distillation
4. Extraction of Caffeine from Tea Leaves
5. Extraction of Limonene from Citrus Fruit
6. Cyclohexanone from Cyclohexanol
7. Adipic Acid from Cyclohexanone
8. Fischer Esterification: Synthesis of Methyl Benzoate
9. Nitration of Methyl Benzoate

Learning Activities and Teaching Methods:

Lectures, Laboratory Practical Sessions, and Assignments.

Assessment Methods:

Laboratory Practical Sessions, Tests, Final Examination

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
1. J. McMurry	Organic Chemistry	Brooks/Cole Publishing Company	2007 7th Edition	ISBN: 0-534-42005-2
2. K.L. Williamson	Organic Experiments	Houghton Mifflin Company	2004 9th Edition	ISBN: 0-618-30842-3

Recommended Textbooks/Reading:

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