Sorganic Chemistry of Functional Groups-II

1. GENERAL

SCHOOL	NATURAL SCIENCES			
ACADEMIC UNIT	CHEMISTRY			
LEVEL OF STUDIES	UNDERGRADUATE			
COURSE CODE	XO 303	SEMESTER 3 rd		
COURSE TITLE	ORGANIC CHEMISTRY OF FUNCTIONAL GROUPS-II			
INDEPENDEN if credits are awarded for separate components of exercises, etc. If the credits are awarded for the	INDEPENDENT TEACHING ACTIVITIES edits are awarded for separate components of the course, e.g. lectures, laboratory ercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits		WEEKLY TEACHINO HOURS	G CREDITS
		Lectures 3 5		
	Seminars 1			
	Laboratory work -			
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).				
COURSE TYPE	Field of Science (Organic Chemistry)			
general background, special background, specialised general knowledge, skills development				
PREREQUISITE COURSES:	Typically, there are not prerequisite course.			
	Essentially, the students should possess the knowledge provided through the previously taught theoretical courses: "Structure, Reactivity and Mechanisms in Organic Chemistry" (1 st semester) and "Organic Chemistry of Functional Groups I" (2 nd semester).			
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. Teaching may be however performed in English in case foreign students attend the course.			
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES			
COURSE WEBSITE (URL)	https://eclass.upatras.gr/courses/			

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

By the end of this course the student will be able to:

Be familiar with the general chemistry of the following classes of organic compounds: Aldehydes, ketones, Carboxylic acids and their derivatives, Amines and other nitrogen containing compounds (e.g. nitro). Specifically:

Aldehydes –ketones, Carboxylic acids and derivatives:

- 1. Present the most important reactions-methods for the preparation of carbonyl compounds and reactions involving inter-conversion of carbonyl groups. Present the most important reactions with the participation of carbonyl group.
- 2. Evaluate chemical methods and propose-apply methods for the synthesis and inter-conversion of carbonyl compounds and their conversion to other organic compounds.
- 3. Present the applications and use of carbonyl compounds.

Amines and other nitrogen containing compounds

Distinguish between the behaviour of amines as nucleophiles and bases, and between nitrogen in sp3, sp2 and sp hybridization. Explain the basicity of amines, and the reduced basicity of amides. Understand the usefulness of diazonium compounds and apply them in the synthesis of substituted aromatic derivatives.

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

By the end of this course the student will, furthermore, have developed the following skills (general abilities):

- 1. Ability to exhibit knowledge and understanding of the essential facts, concepts, theories and applications which are related to Organic Chemistry.
- 2. Ability to apply this knowledge and understanding to the solution of problems related to Organic Chemistry of non-familiar nature.
- 3. Ability to adopt and apply methodology to the solution of non-familiar problems of Organic Chemistry.
- 4. Study skills needed for continuing professional development.
- 5. Ability to interact with others in chemical or of interdisciplinary nature problems.

Generally, by the end of this course the student will, furthermore, have develop the following general abilities: *Searching, analysis and synthesis of facts and information, as well as using the necessary technologies*

Adaptation to new situations

Decision making

Autonomous (Independent) work

Group work

Exercise of criticism and self-criticism

Promotion of free, creative and inductive thinking

Respect to natural environment

Work design and management

3. SYLLABUS

Aldehydes -ketones, Carboxylic acids and derivatives:

- 1. A preview of Carbonyl Compounds
- 2. Aldehydes and Ketones: Nucleophilic Addition Reactions
- 3. Carboxylic Acids and Nitriles
- 4. Carboxylic Acid Derivatives: Nucleophilic Acyl Substitution Reactions
- 5. Carbonyl Alpha-Substitution Reactions
- 6. Carbonyl Condensation Reactions

Amines and other nitrogen functions

Primary, secondary and tertiary amines, amine basicity, synthesis of amines by substitution and reduction reactions, reactions of amines - alkylation, Hofmann exhaustive methylation, acylation, preparation of diazonium compounds - and their use in synthesis; nitro compounds.

4. TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Face to face.			
USE OF INFORMATION AND	Use of PowerPoint presentation in teaching.			
COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Use of eclass platform (eclass.upatras.gr)			
TEACHING METHODS The manner and methods of teaching are described in	Activity	Semester workload		
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.	Lectures (3 contact hours per week x 13 weeks)	52		
	Tutorials (1 contact hour per week x 13 weeks – Analysis of problem solving strategy and solution of representative problems)			
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	Two (2) progress examinations, one at the middle (mid-term) and one the end of semester (2 contact hours for each exam)	4		
	Final examination (3 contact hours)	3		
	Hours for private study of the student	66		
	Course total	125		
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure	1. Optionally, two (2) progress examinations, one at the middle and one the end of semester (mid-term). Minimum passing grade for each: 5.			
Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically, defined evaluation evitoria are sized. and if	 Written examination after the end of the se passing grade: 5. 	mester. Minimum		
Specifically-defined evaluation criteria are given, and if and where they are accessible to students.				

5. ATTACHED BIBLIOGRAPHY

- 1. L. G. Wade JR, "Organic Chemistry", Translation to Greek: D. Komiotis et al, A. Tziolas and Sons Publications, 2010.
- 2. J. McMurry, "Organic Chemistry", Translation to Greek: A. Varvoglis, M. Orfanopoulos, I. Smonou et al, University of Crete Publications, 2012.
- 3. Devid Klein, "Organic Chemistry", Translation to Greek: G. Kokotoset al, Utopia Publications, 2015.
- 4. T. Mavromoustakos, T Tselios, K. Papakonstantinou, "Basic Pronciples of Organic Chemistry", in Greek language, Symemtria Publications, 2014.
- 5. Clayden, N. Greeves, S. Warren, P. Wothers, "Organic Chemistry", Oxford University Press, Oxford, 2001.