

COURSE OUTLINE

(1) GENERAL

FACULTY	SCIENCES		
SCHOOL	CHEMISTRY		
LEVEL OF STUDY	UNDERGRADUATE		
MODULE CODE	YN304	SEMESTER	3rd
TITLE	Organic Chemistry Laboratory I		
INDEPENDENT TEACHING ACTIVITIES In case the credits are awarded in distinct parts of the course e.g. Lectures, Laboratory Exercises etc. If the credits are awarded uniformly for the entire course, indicate the weekly teaching hours and the total number of credits		WEEKLY TEACHING HOURS	CREDITS
LABORATORY and TUTORIAL (1 hour weekly tutorial and 3 hours of laboratory exercises)		4	7
<i>Add rows if necessary. The teaching organization and teaching methods used are described in detail in (d)</i>			
MODULE TYPE general background, specialist background, specialization, general knowledge, skills development	GENERAL BACKGROUND		
PREREQUISITE MODULES:	NO		
LANGUAGE OF LECTURING-TUTORING and EXAMS:	GREEK		
THE MODULE IS OFFERED TO ERASMUS STUDENTS	NO		
WEBPAGE OF MODULE (URL)			

(2) LEARNING OUTCOMES

Learning Outcomes

The learning outcomes of the module are described as the specific knowledge, skills and abilities of an appropriate level that students will acquire after successful completion of the course.

Consult Appendix A

- *Description of the Level of Learning Outcomes for each cycle of study according to the Qualifications Framework of the European Higher Education Area*
- *Descriptive Indicators of Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Summary Guide for Writing Learning Outcomes*

The objective of the Organic Chemistry Laboratory is:

- a) to familiarize students with the laboratory space and the use of instruments, utensils and reagents,
- b) to learn laboratory techniques and acquire experimental skills and
- c) to consolidate knowledge of Organic Chemistry by connecting theory and experiment.

Upon completion of the laboratory, the student will have acquired the knowledge and skills to be able to:

- ✓ Collect all the necessary information (properties, hazard of substances, synthesis bibliography,

etc.) ✓ Know the theory of all separation and purification techniques of organic compounds ✓ Set up various devices required for the separation and purification of organic compounds and successfully carry out the experimental part. ✓ To organize and perform simple syntheses of organic molecules ✓ To process and present the results of the experimental exercises carried out The students' practice in the Organic Chemistry Laboratory will cultivate the critical spirit and scientific way of thinking, will enhance self-motivation and active learning, while at the same time developing team spirit and cooperation through group practice in the laboratory. In addition, students realize the necessity of waste management and environmental protection and practice observing the rules of hygiene and safety in the laboratory areas.	
General Skills <i>Taking into account the general competencies that the graduate must have acquired (as listed in the Diploma Supplement and listed below), which of these does the module aim to achieve?</i>	
<i>Searching, analyzing and synthesizing data and information, using the necessary technologies</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Autonomous work</i> <i>Teamwork</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Generating new research ideas</i>	<i>Project planning and management</i> <i>Respect for diversity and multiculturalism</i> <i>Respect for the natural environment</i> <i>Demonstration of social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Exercise of criticism and self-criticism</i> <i>Promotion of free, creative and inductive thinking</i> <i>Other...</i>
(3) MODULE CONTENT 1. Safety rules. Ground glassware and their use. Introduction to Organic Compounds. Solubility, Polarity, Boiling Point – Melting Point 2. Browsing the Chemical Bibliography and Information Sources. Programs for drawing and visualizing organic molecules. 3. Purification of solid organic compounds. Recrystallization. Selection of the appropriate solvent. Solubility tests. Recrystallization from a mixture of solvents. Recrystallization process. 4. Determination of melting point. Identification and assessment of the purity of a solid by determining the melting point. Mixed melting point. Purity control of the recrystallization product. 5. Distillation. Simple distillation. Fractional distillation. Distillation under reduced pressure. Rotary evaporator. Separation and identification of a mixture of unknown liquids by fractional distillation. Steam distillation. 6. Extraction. Problems during extraction-Emulsion formation. Separation of a mixture of acidic, basic and neutral components. Drying. Identification of compounds by melting point and refractive index respectively. 7. Thin Layer Chromatography (TLC). Effects of solvent and polarity on Thin Layer Chromatography. Separation and identification of the active ingredient of analgesic preparations by TLC. 8. Column chromatography. Separation of the main components from spinach leaves and control of purity by TLC chromatography. 9. Synthesis of acetylsalicylic acid (Aspirin). Calculation of reaction yield. Control of product purity 10. Isolation of natural products. Isolation of limonene from orange peel by steam distillation. Isolation of cinnamic aldehyde from cinnamon. Isolation of the natural product eugenol from cloves. 11. Characteristic reactions of functional groups of organic compounds and identification by infrared spectroscopy. Qualitative analysis of organic compounds	

(4) TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHODOLOGY <i>Face to face, Distance learning, etc.</i>	Face-to-face tutorials and lab exercises
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<p>USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT)</p> <p><i>Use of ICT in Teaching, Laboratory Education, and Communication with Students</i></p>	<p>Use of ICT (powerpoint and video) in teaching. Support of the learning process through the electronic platform e-class. Specifically, the slides of the tutorials, the theory and the experimental instructions are posted, while for each lab exercise the pre-lab test and the post-lab test are conducted and the laboratory reports are submitted. Communication with the students via e-mail, resolution of doubts.</p>	
<p>TEACHING ORGANIZATION</p> <p><i>The teaching methods and methods are described in detail.</i></p> <p><i>Lectures, Seminars, Laboratory Exercise, Field Exercise, Literature Study & Analysis, Tutorial, Internship (Placement), Clinical Exercise, Artistic Laboratory, Interactive Teaching, Educational Visits, Study Preparation (Project), Writing of Paper/Thesis, Artistic Creation, etc.</i></p> <p><i>The student's study hours for each learning activity are listed as well as the hours of unguided study according to the principles of ECTS</i></p>	<p>Activity</p>	<p>Semester Workload</p>
	<p>Lab exercises (3 hours per week X 13 weeks)</p>	<p>39</p>
	<p>Tutorial (1 hour per week X 13 weeks) with a presentation of the theory and experimental procedure of the laboratory exercises</p>	<p>13</p>
	<p>Pre lab quiz</p>	<p>13</p>
	<p>Post lab quiz</p>	<p>13</p>
	<p>Laboratory report. Literature study and analysis</p>	<p>52</p>
	<p>Student study hours and preparation for the final exam</p>	<p>42</p>
	<p>Final Exam (3 hours)</p>	<p>3</p>
	<p>Total</p>	<p>175 hours (total workload)</p>
<p>STUDENT EVALUATION</p> <p><i>Description of the assessment process</i></p> <p><i>Language of Assessment, Assessment Methods, Formative or Inferential, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Clinical Examination of a Patient, Artistic Interpretation, Other / Others</i></p> <p><i>Expressly specified assessment criteria are stated and whether and where they are accessible to students.</i></p>	<p>The grade of the laboratory is determined by the following:</p> <ol style="list-style-type: none"> From the tests (prelab quiz) before the start of the experimental process, grade A1, at a rate of 15% From the diligent and successful execution of the experiments, Laboratory participation, method of recording, presenting and evaluating the experimental results (reactions, reaction mechanisms, yields, observations) as a reference sheet - laboratory notebook, as well as questions to consolidate the material, grade A2, at a rate of 20% From the tests (postlab quiz) after the end of the experimental process, grade A3, at a rate of 15% From the final written exam on the material of the laboratory exercises, Grade B, at a rate of 50% <p>The calculation of the final overall grade of the course "Organic Chemistry Laboratory I" is calculated as follows: Final grade = {A1}x0.15 + {A2}x0.20 + {A3}x0.15 + {B}x0.5</p> <p>* In order for a student to be considered to have successfully attended the laboratory, he or she must have been evaluated with a grade higher than or equal to 5 in each individual part, i.e. $A = (A1+A2+A3) \geq 5$ and $B \geq 5$.</p> <ul style="list-style-type: none"> At the end of each semester, a week of making up for laboratory exercises is held. Students who have had one (1) absence during the current semester are entitled to practice in this week. In case the student has more than one absence, he/she must repeat the unperformed laboratory experiments in the next academic year. A student who has been absent from more than four laboratory exercises (≥ 4) 	

	<p>must re-register for the course in a future semester and repeat all the experiments.</p> <ul style="list-style-type: none"> • Successful completion of all laboratory experiments of the Laboratory is a prerequisite for students to attend the final written examination. If a student has a grade A ($=A1+A2+A3$)<5, he/she cannot take part in the written examination of the laboratory. He/she must re-register for the course in a future semester and repeat all the experiments. • • In case the trainee has completed the laboratory part of the exercises, but has a laboratory grade less than 5, then he/she is given the opportunity to participate in a partial laboratory examination in September.
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(5) RECOMMENDED BIBLIOGRAPHY

1. Laboratory Techniques and Experiments in Organic Chemistry, Authors: Pavia L. Donald, Lampman M. Gary, Kriz S. George, 2020. ISBN 9789963274789, Publisher: BROKEN HILL PUBLISHERS LTD, Evdoxos book code: 94643616
2. INTRODUCTION TO SPECTROSCOPY, Authors: Pavia L. Donald, Lampman M. Gary, Kriz S. George, Vyvyan A. James, 2020. ISBN: 9789925575640, Publishers: BROKEN HILL PUBLISHERS LTD
Evdoxos book code: 86055668

Relevant Scientific Journals:
Journal of Chemical Education