# ORGANIC CHEMISTRY LABORATORY II

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| 1 | Course Title: | ORGANIC CHEMISTRY LABORATORY II | |
| 2 | Course Code: | KIM2014 | |
| 3 | Type of Course: | Compulsory | |
| 4 | Level of Course: | First Cycle | |
| 5 | Year of Study: | 2 | |
| 6 | Semester: | 4 | |
| 7 | ECTS Credits Allocated: | 4.00 | |
| 8 | Theoretical (hour/week): | 0.00 | |
| 9 | Practice (hour/week): | 0.00 | |
| 10 | Laboratory (hour/week): | 4 | |
| 11 | Prerequisites: | | |
| 12 | Language: | Turkish | |
| 13 | Mode of Delivery: | Face to face | |
| 14 | Course Coordinator: | Prof. Dr. MUSTAFA TAVASLI | |
| 15 | Course Lecturers: | Prof. Dr. Mustafa TAVASLI<br>Doç. Dr. Nevin ARIKAN ÖLMEZ | |
| 16 | Contact information of the Course Coordinator: | coskun@uludag.edu.tr<br>+90 224 29 41 725<br>Fen-Edebiyat Fakültesi, Kimya Bölümü,<br>16059 Görükle, Bursa<br>TÜRKİYE | |
| 17 | Website: | | |
| 18 | Objective of the Course: | Experimental realization of various reactions learned in Organic Chemistry I and Organic Chemistry II lessons, and synthetic applications of various classes of organic compound by the students | |
| 19 | Contribution of the Course to Professional Development: | To be able to synthesise commercial products, isolate them as pure products and characterise them in full. | |
| 20 | Learning Outcomes: | | |
| | | 1 | Recognition of equipment and glass material which is necessary for the synthesis experiment in organic chemistry lab. Acquiring the ability to establish the relevant reaction apparatus. |
| | | 2 | Be able to following the reaction, properly termination and isolation of the synthesized product with the appropriate purification method. |
| | | 3 | Recognize and know the literature of chemistry, survey various computerized literature databases of organic chemistry |
| | | 4 | Ability to determine the structure of an unknown organic compound given to him in the laboratory, with remembering the functional groups of organic compounds and their reactions with each other |
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| 21 | Course Content: | |
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| | **Course Content:** | |
| Week | Theoretical | Practice |
| **1** | | Introduction |
| **2** | | Fischer esterification reaction<br>Esters and their properties<br>Various methods of preparation of esters<br>preparation of acetate esters of acetic acid with various alcohols catalyzed by H2SO4. Quiz |
| **3** | | Grignard reaction<br>Organometallic compounds<br>Establishment of the apparatus designed for the Grignard reaction<br>synthesis and characterization of triphenyl methanol with the suitable reaction sequence. Quiz |
| **4** | | Survey the literature<br>Introduction to the literature of chemistry<br>Introduction of databases related to the organic chemistry<br>Selection of research topics and given to each student. |
| **5** | | Diels-Alder reaction<br>Introduction of the cycloaddition reactions<br>And the introduction of dienes and dienophiles<br>Mechanism and various examples of Diels-Alder reaction<br>stereochemistry of the reaction<br>Realization of Diels-Alder reaction between the sulpholene (1,3-butadiene source) and maleic anhydride. Quiz |
| **6** | | Tetrafenilsiklopentadienon synthesis (Week 1) |
| **7** | | Tetrafenilsiklopentadienon synthesis (Week 2)<br>Conversion of benzoine into benzil with HNO3 |
| **8** | | the dibenzyl ketone and benzil. Quiz<br>Synthesis of adipic acid from cyclohexanone |
| **9** | | Oxidation of cyclohexanone to adipic acid in the presence of KMnO4. Quiz<br>Chlorination of toluene |
| **10** | | Electrophilic aromatic substitution reactions<br>Nitration of toluene<br>Problem solving |
| **11** | | Synthesis of butyl bromide<br>Nucleophilic substitution reactions in organic chemistry<br>H2SO4<br>. Quiz |
| **12** | | Organic qualitative analysis (known sample analysis)<br>Fusion of known organic compund with Na and determination its elements, solubility tests, Functional group tests sulphanilic acid<br>Melting point determination, determining the structure of sulphanilic acid by using the Handbooks<br>. |
| **13** | | Organic qualitative analysis (unknown sample analysis)<br>Fusion of unknown organic compund with Na and determination its elements, solubility tests, Functional group tests sulphanilic acid<br>Melting point determination, determining the structure of unknown organic compound by using the Handbooks<br>. |

| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical | 14 | 2.00 | 28.00 |
| Practicals/Labs | 14 | 2.00 | 28.00 |
| Self study and preperation | 14 | 2.00 | 28.00 |
| Homeworks | 0 | 0.00 | 0.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 1 | 16.00 | 16.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 1 | 20.00 | 20.00 |
| Total Work Load | | | 120.00 |
| Total work load/ 30 hr | | | 4.00 |
| ECTS Credit of the Course | | | 4.00 |

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| **14** | | Organic Qualitative Analysis (unknown samples analysis) Completation of trials missing 11 th week to determine the structure of unknown organic compound<br>. |

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| **22** | Textbooks, References and/or Other Materials: | 1) G. Solomons ve C. Fryhle ;(Çev. Ed. G. Okay ve Y. Yıldırır), Organik Kimya; Literatür Yayınları, 2002.<br>2) Kenneth L. Williamson ; Macroscale and Microscale Organic Experiments,; D.C. Healt and Company, 1989.<br>3) Brian S. Furniss, Antony J. Hannaford, Peter W.G. Smith, Austin R. Tatchell; Vogel's Textbook of Practical Organic Chemistry,; Longman Scientific &Technical,; 1989.<br>4) Ender Erdik, Metin Obalı, Nadire Yüksekışık, Atilla Öktemer, Tarık Pekel, İhsanoğlu; Denel Organic Kimya; A.Ü.F.F Döner Sermaye İşletmesi yayınları, 2000. |
| **23** | Assesment | |

| **TERM LEARNING ACTIVITIES** | **NUMBER** | **WEIGHT** |
|---|---|---|
| Midterm Exam | 1 | 25.00 |
| Quiz | 1 | 25.00 |
| Home work-project | 0 | 0.00 |
| Final Exam | 1 | 50.00 |
| Total | 3 | 100.00 |
| Contribution of Term (Year) Learning Activities to Success Grade | | 50.00 |
| Contribution of Final Exam to Success Grade | | 50.00 |
| Total | | 100.00 |
| Measurement and Evaluation Techniques Used in the Course | | written exam, multiple choice questions, quiz, homework |

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| **24** | **ECTS / WORK LOAD TABLE** |

| **25** | **CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS** | | | | | | | | | | | | | | | |
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| | **PQ1** | **PQ2** | **PQ3** | **PQ4** | **PQ5** | **PQ6** | **PQ7** | **PQ8** | **PQ9** | **PQ10** | **PQ11** | **PQ12** | **PQ13** | **PQ14** | **PQ15** | **PQ16** |
| **ÖK1** | 5 | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 |
| **ÖK2** | 0 | 5 | 5 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK3** | 0 | 0 | 0 | 0 | 5 | 0 | 5 | 5 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| **ÖK4** | 5 | 5 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**LO: Learning Objectives PQ: Program Qualifications**

| **Contribution Level:** | **1 very low** | **2 low** | **3 Medium** | **4 High** | **5 Very High** |
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