# ASYMMETRIC SYNTHESIS IN ORGANIC CHEMISTRY

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| 1 | Course Title: | ASYMMETRIC SYNTHESIS IN ORGANIC CHEMISTRY |
| 2 | Course Code: | KIM6012 |
| 3 | Type of Course: | Optional |
| 4 | Level of Course: | Third Cycle |
| 5 | Year of Study: | 1 |
| 6 | Semester: | 2 |
| 7 | ECTS Credits Allocated: | 5.00 |
| 8 | Theoretical (hour/week): | 3.00 |
| 9 | Practice (hour/week): | 0.00 |
| 10 | Laboratory (hour/week): | 0 |
| 11 | Prerequisites: | CHEM 6018 Principles Organic Synthesis I |
| 12 | Language: | Turkish |
| 13 | Mode of Delivery: | Face to face |
| 14 | Course Coordinator: | Prof. Dr. NECDET COŞKUN |
| 15 | Course Lecturers: | - |
| 16 | Contact information of the Course Coordinator: | coskun@uludag.edu.tr<br>+90 224 29 41 725<br>Uludağ Üniversitesi, Fen-Edebiyat Fakültesi, Kimya Bölümü, 16059 Görükle / BURSA, TÜRKİYE |
| 17 | Website: | |
| 18 | Objective of the Course: | Learn the theory of the methodologies applied to the synthesis of enantiomericaly pure organic compounds, and use in the future synthetic targets. |
| 19 | Contribution of the Course to Professional Development: | |
| 20 | Learning Outcomes: | |
| | **1** | What is asymmetric synthesis, understanding and recognition of the reagents and reactions widely used in the synthesis of the compounds in enantiomeric purity |
| | **2** | Designing an asymmetric synthesis reaction |
| | **3** | |
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| 21 | Course Content: | |

**Course Content:**

| Week | Theoretical | Practice |
|---|---|---|
| 1 | The importance of chirality and the stereoisomeric differences, the asymmetry | |
| 2 | Determination of the Composition of enantiomers, Determination of absolute configuration | |

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| **3** | Asymmetric Synthesis Approaches, Some Common Definitions in Asymmetric Synthesis and Stereochemistry | |
| **4** | Chirality Transfer, Establishment of Quaternary Carbon Centers | |
| **5** | Preparation of Alfa-Amino Acids, Chiral Acetals Nucleophilic displacement | |
| **6** | Alkylation of aldehydes induced by chiral catalyst: Asymmetric Nucleophilic Addition, Catalytic Asymmetric Participation of Dialkylzinc to ketones compounds: Enantioselective preparation of the tertiary alcohols | |
| **7** | Asymmetric cyanohydration, Asymmetric hydroxyphosphonylation | |
| **8** | Substrate-Controlled Aldol Reaction, Reagent-controlled Aldol Reactions | |
| **9** | Chiral catalyst-controlled aldol reaction, Double Asymmetric Aldol Reactions MIDTERM PRESENTATIONS | |
| **10** | Asymmetric Allylation Reactions, asymmetric alkylation and allylation of imines | |
| **11** | Some other addition reactions: Henry Reaction | |
| **12** | Asymmetric Diels-Alder and other cycloaddition reactions | |
| **13** | Applications of asymmetric reactions in the synthesis of natural compounds | |
| **14** | Applications of asymmetric reactions in the synthesis of natural compounds | |

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| **22** | Textbooks, References and/or Other Materials: | [1] Guo-Qiang Lin, Yue-Ming Li, Albert S. C. Chan, Principles and applications of asymmetric synthesis,Wiley-Interscience, 2001<br>[2] A.Koskinen, Asymmetric synthesis of natural products, Wiley, 1993 |
| **23** | Assesment | |

| **TERM LEARNING ACTIVITIES** | **NUMBER** | **WEIGHT** |
|---|---|---|
| Midterm Exam | 0 | 0.00 |
| Quiz | 0 | 0.00 |
| Home work-project | 1 | 50.00 |
| Final Exam | 1 | 50.00 |
| Total | 2 | 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 | | |

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

| Activites | Number | Duration (hour) | Total Work Load (hour) |
|---|---|---|---|
| Theoretical | 14 | 3.00 | 42.00 |
| Practicals/Labs | 0 | 0.00 | 0.00 |
| Self study and preperation | 14 | 2.00 | 28.00 |
| Homeworks | 1 | 36.00 | 36.00 |
| Projects | 0 | 0.00 | 0.00 |
| Field Studies | 0 | 0.00 | 0.00 |
| Midterm exams | 0 | 0.00 | 0.00 |
| Others | 0 | 0.00 | 0.00 |
| Final Exams | 1 | 72.00 | 72.00 |
| Total Work Load | | | 178.00 |
| Total work load/ 30 hr | | | 5.93 |
| ECTS Credit of the Course | | | 5.00 |

| **25** | **CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS** | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **PQ1** | **PQ2** | **PQ3** | **PQ4** | **PQ5** | **PQ6** | **PQ7** | **PQ8** | **PQ9** | **PQ10** | **PQ11** | **PQ12** | **PQ13** | **PQ14** | **PQ15** | **PQ16** |
| **ÖK1** | 0 | 5 | 5 | 5 | 5 | 0 | 5 | 0 | 4 | 5 | 0 | 4 | 0 | 0 | 0 | 0 |
| **ÖK2** | 0 | 5 | 5 | 5 | 5 | 0 | 5 | 0 | 4 | 5 | 0 | 4 | 0 | 0 | 0 | 0 |
| **LO: Learning Objectives PQ: Program Qualifications** | | | | | | | | | | | | | | | | |
| **Contribution Level:** | **1 very low** | | **2 low** | | | **3 Medium** | | | **4 High** | | | **5 Very High** | | | | |