**II.2.4 ORGANIC AND GREEN CHEMISTRY**

**A. Course description**

**1. Credit points: 4 ECTS**

**2. Time commitment:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/Exercise | Practice/Assignment | Lab-work | Total |
| No. of hours | 28 | 3 | 9 |  | 40 |

**3. Prerequisites:** Already took Organic Chemistry1 subject in the first academic year

**4. Recommended background knowledge:**

**5. Subject description:**

This course is designed to provide USTH undergraduate students with understanding Organic chemistry—a science—which began as a tentative attempt to understand the chemistry of life. It has grown into the confident basis of vast multinational industries that feed, clothe, and cure millions of people

**6. Objectives & Outcome**

Students will be to solve and understand problems from various areas of organic chemistry, including reactivity patterns and mechanism of reactions.

Student will also develop learning strategies, critical-thinking, and problem-solving skills.

**7. Assessment/ Evaluation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Practice | Reports | Midterm | Final |
| Percentage % |  |  |  |  | 30 | 70 |

**8. Prescribed Textbook(s)**

N/A

**B. Course content & schedule:**

**Part 1: Organic Chemistry**

1 Radical and their reactions

2 Electrophilic and Nucleophilic addition to C=C

3 Electrophilic substitution in Aromatic systems

4 Nucleophilic Substitution at a saturated carbon atom

5 Elimination reactions

6 Nucleophilic addition to C=O

7 ENOLATES: Condensation reaction

8 Nucleophilic Acyl Substitution reaction

9 Basicity and reactions of amines

10 Classification and Reaction of Carbohydrates

11 LIPIDS: Fats and oils

12 Classification of aminoacids and sequence analysis of peptides

**Part 2: Green Chemistry**

1. Green Chemistry and Clean Technology: Principles of Green Chemistry; Specific activation methods

2. Anionic activation methods: Use of polar aprotic solvents; Phase transfer catalysis; Reactions on solid supports under dry medium

3. Salt effects in organic synthesis: Electrophile assistance

4. Microwave-assisted organic synthesis: Microwave generality; Microwave effects in organic synthesis (thermal affect and non-thermal or specific effect); Applications in organic synthesis

5 Ionic liquids in organic synthesis: Proprieties of ionic liquids; Preparation of ionic liquids; Applications in organic synthesis and catalysis

*Notes:*

*Abbreviation: Lect. (lecture), Exr. (Exercise), Prc. (Practise).*

*Exercises may include assignment, reports, student’s presentation, homework, class exercises ...for each class sessions*

*Practicals mostly refer to Lab- work or outside practice such as field trip*

**C. Reference Literature:**

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| [1]. Selected reading paragraphs together with presentation handouts will be sent to students. |
| [2]. Bruice, Organic Chemistry, 4th ed |