

Organic Chemistry 2

Syllabus Number

5D257

Special Subjects

Elective 2 credit

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1. Course Description

Organic compounds are classified according to functional groups, and the physiological/chemical properties, methods for chemical synthesis and chemical reactions of the organic compounds will be studied.

The following subjects will be studied during the course.

- (1) carboxylic acid
- (2) carboxylic acid derivatives
- (3) aldehyde and ketone
- (4) amine

2. Course Objectives

The organic compounds are important in the field of chemistry, biochemistry and pharmaceutical sciences. The objectives of this course are to understand basic chemistry which will be required to pursue other chemistry-related courses. It is also intended to lead students to have interests in reaction properties and the chemical synthesis methodology of organic compounds.

3. Grading Policy

Reports and occasional test (20%) results are considered with final examination results (80%).

4. Textbook and Reference

Textbook

Harold Hart, Leslie E. Craine, David J. Hart

(translated by Kinya Akiba and Akira Oku) "Organic Chemistry : A Short Course [10th Edition]"

(Hart Kisoyukikagaku (in Japanese))

Baifukann

ISBN978-4-563-04587-6

5. Requirements(Assignments)

(Preparation of lecture) The students are required to read the corresponding part of the text in advance, make it clear what they don't understand, and be ready to ask during the lecture (1.5 hr.).

(Review of lecture) The students should check any contents, which they could not understand, after the lecture (1.5 hr.).

6. Note

It is strongly suggested for students to study "Chemistry 1", "Fundamentals of Organic Chemistry" and "Organic Chemistry 1" beforehand in classes. Studying beforehand is strongly suggested because you will learn many chemical reactions in this class.

7. Schedule

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| [1] | Carboxylic acid (1) Ionization / Acidity constants / Inductive effects |
| [2] | Carboxylic acid (2) Oxidation of alcohols and alkyl benzenes |
| [3] | Carboxylic acid (3) Grignard reactions / Nitrile synthesis |
| [4] | Carboxylic acid (4) Conversion of functional groups |
| [5] | Carboxylic acid derivatives (1) Nucleophilic acyl substitution / Acid chlorides |
| [6] | Carboxylic acid derivatives (2) Acid anhydrides / Amides and imides |
| [7] | Carboxylic acid derivatives (3) Esters and lactones |

- [8] Aldehyde and ketone (1) Oxidation of alcohols
- [9] Aldehyde and ketone (2) Nucleophilic addition / Oxidations and reductions
- [10] Aldehyde and ketone (3) Cyanohydrins / Acetals / Cannizzaro reactions
- [11] Aldehyde and ketone (4) Carbanions 1 (Aldol condensations)
- [12] Aldehyde and ketone (5) Carbanions 2 (Reformatsky reactions)
- [13] Aldehyde and ketone (6) Carbanions 3 (Wittig reactions and Claisen condensations)
- [14] Amine (1) Reductive aminations / Reduction of nitro compounds
- [15] Amine (2) Hofmann eliminations / Reaction of diazonium salts