

The Chinese University of Hong Kong  
Faculty of Science  
Science Academy for Young Talent

Autumn Courses 2023  
Course Outline

*SAYT1001 Bondings in Organic Compounds, and  
Reactivity and Selectivity of Organic Reactions*  
有機化合物的鍵合，與有機反應的活性及選擇性

**Introduction:** This course is designed to allow students to have a basic understanding about the bonding and structures of organic molecules and ions, and their influences on the molecular properties of organic compounds, and the reactivity and selectivity of some organic reactions. This course will focus on the stability of reaction intermediates, and the reactivity and selectivity of addition reactions, nucleophilic substitutions, and eliminations.

本課程設計旨在讓同學對有機分子及離子的鍵合及結構，及它們在有機分子的特性和有機反應的活性及選擇性的影響上有基礎的理解。本課程將會集中討論各類反應中間體的穩定性，及加成反應、親核取代反應和消除反應的活性及選擇性。

**Medium of Instruction:** Cantonese supplemented with English  
粵語主講及輔以英語

**Organising Unit:** Department of Chemistry, Faculty of Science, CUHK

**Teachers:**



**Dr. MAK Kin Wah Kendrew (麥建華博士)**

Senior Lecturer

Department of Chemistry, CUHK

Rm. 355, Science Centre South, CUHK

Tel: 3943 8136, Email: [kendrewmak@cuhk.edu.hk](mailto:kendrewmak@cuhk.edu.hk)

## Course Content:

18 November 2023 (Saturday) 9:00 am – 13:00 pm	<p><b><u>Lecture and Activities:</u></b></p> <ul style="list-style-type: none"> <li>Atomic structure, chemical bonding, and shape of molecules</li> <li>Electronic structure of atoms, atomic orbitals (s, p, d, f) and electron configurations</li> <li><math>\sigma</math>-bonds and <math>\pi</math>-bonds</li> <li>Orbital hybridization, bond formation, and molecular geometry</li> </ul> <p><b><u>Assessment:</u></b> Multiple-choice and short-answer test</p>
25 November 2023 (Saturday) 9:00 am – 13:00 pm	<p><b><u>Lecture and Activities:</u></b></p> <ul style="list-style-type: none"> <li>Organic acids and bases</li> <li>How the structure of an acid affects its acid strength</li> <li>Delocalized electrons and resonance</li> <li>Resonance structures and resonance stabilization</li> <li>Nomenclature of organic compounds</li> </ul> <p><b><u>Assessment:</u></b> Multiple-choice and short-answer test</p>
2 December 2023 (Saturday) 9:00 am – 13:00 pm	<p><b><u>Lecture and Activities:</u></b></p> <ul style="list-style-type: none"> <li>Nucleophiles and electrophiles</li> <li>Reaction of alkanes and alkenes</li> <li>Reaction mechanism</li> <li>Reaction selectivity, carbocation stability, and carbocation rearrangement</li> </ul>
9 December 2023 (Saturday) 9:00 am – 12:00 nn	<p><b><u>Lecture and Activities:</u></b></p> <ul style="list-style-type: none"> <li>Nucleophilic substitutions: <math>S_N1</math> and <math>S_N2</math></li> <li>Elimination reactions: E1 and E2</li> <li>Competition between <math>S_N1</math>, <math>S_N2</math>, E1, and E2</li> </ul> <p><b><u>Assessment:</u></b> Multiple-choice and short-answer test</p>
23 December 2023* (Saturday) 9:00 am – 13:00 pm	Make-up class

<b>Duration</b>	4 half day sessions (total 15 contact hours)
<b>Date</b>	18, 25 November 2, 9 December 2023 23 December 2023* (make up class)
<b>Time</b>	9:00 am – 13:00 pm/12:00 nn
<b>Teaching Mode</b>	Face to Face (The Chinese University of Hong Kong)
<b>Enrollment</b>	20 – 30
<b>Expected Applicants</b>	Students who are promoting to or studying S4 – S6
<b>Tuition Fee</b>	HKD 3,000.00
<b>Credit</b>	1 University Unit Certificate of completion will be awarded to students who pass the assessment (if applicable) and attain at least 75% attendance.
<b>Grading Methods</b>	Letter grades range from A to F.

\* This date is reserved for make-up classes in case there is any cancellation of classes due to unexpected circumstances.