

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

Summer Courses 2018
Course Outline

CUSA1031 The Chemistry and Chemical Analysis of Biomolecules
生物分子的化學與分析

Introduction:

Biomolecules are loosely defined as molecules found in biological system. In the biological system, carbohydrate, protein, lipid, nucleic acid and enzyme are key biomolecules. This course covers the chemical structures of these biomolecules and their roles in biological systems. Besides, we will talk about some interesting topics that you encounter very often in daily life. For example, how do artificial sweeteners differ from table sugar? Why do artificial sweeteners have low or even zero calorie contents? Can we unboil an egg? What causes aging? Is there any method to reverse the aging process? Finally, we will talk about the basic principles of chemical analysis for various biomolecules in foods. This course comprises of both lectures and experimental sessions.

生物分子一般泛指存在於生物體的分子。碳水化合物、蛋白質、脂類、核酸和酶都是生物體主要的生物分子。本課程將介紹這些重要的生物分子的化學結構與其在生物體中扮演的角色。除此以外，我們會介紹一些在日常生活經常遇到的有趣課題。舉例代糖與一般食用糖的分別是甚麼？為甚麼代糖有較低甚至沒有卡路里？煮熟後的雞蛋能否變回生雞蛋？為甚麼人會變老？有沒有方法可以返老還童？最後，本課程將介紹化學分析的基礎知識，並講解食物中的生物分子的化驗方法。課程以講課及實驗形式進行。

Medium of Instruction: Cantonese supplemented with English

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

Teachers: Dr. Wong Fai George
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Course Content:

<p>23 July 2018 (Monday)</p> <p>9:30 am – 12:30 pm 1:30 pm – 4:30 pm</p>	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Fundamental Organic Chemistry: chemistry of carbon, functional group, isomerism and common organic compounds in daily life.• Carbohydrate Chemistry: chemical structures and stereochemistry, classification and functions, artificial sweeteners, urine sugar test and carbohydrates in biological system.• Fundamental of Chemical Analysis: extraction <p><u>Experiment:</u></p> <ul style="list-style-type: none">• Extraction of food components by liquid-liquid and Soxhlet extraction <p><u>Assessment:</u></p> <ul style="list-style-type: none">• Laboratory report.
<p>24 July 2018 (Tuesday)</p> <p>9:30 am – 12:30 pm 1:30 pm – 4:30 pm</p>	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Lipid Chemistry: chemical structures and functions, biosynthesis of fatty acids, butter and margarine, <i>trans</i>-fat and lipids in biological system.• Fundamental of Chemical Analysis: separation, identification and quantification. <p><u>Experiment:</u></p> <ul style="list-style-type: none">• Determination of total carbohydrates in drinks. <p><u>Assessment:</u></p> <ul style="list-style-type: none">• Laboratory report.
<p>25 July 2018 (Wednesday)</p> <p>9:30 am – 12:30 pm 1:30 pm – 4:30 pm</p>	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Protein Chemistry: chemical structures, classification and functions, organizational levels and protein deficiency.• Enzyme Chemistry: enzyme models, mechanism of action, enzymatic activity, enzyme inhibition and digestive enzymes. <p><u>Experiment:</u></p> <ul style="list-style-type: none">• Demonstration of infra-red spectroscopy.• Determination of protein in foods. <p><u>Assessment:</u></p> <ul style="list-style-type: none">• Laboratory report.
<p>26 July 2018 (Thursday)</p> <p>9:30 am – 12:30 pm</p>	<p><u>Lecture:</u></p> <ul style="list-style-type: none">• Science of Heredity: Chemical structures and functions of nucleic acids, secret of aging, cancer and genetic disease. <p><u>Assessment:</u></p> <ul style="list-style-type: none">• Multiple choice test.
<p>27 July 2018* (Friday)</p> <p>9:30 am – 12:30 pm 1:30 pm – 4:30 pm</p>	<p>Make up Class</p>

Duration	3.5 days (total 21 contact hours)
Date	23 July – 26 July 2018 27 July 2018* (Make-up class)
Time	23 July – 25 July 2018: 9:30 am – 12:30 pm; 1:30 pm – 4:30 pm 26 July 2018: 9:30 am – 12:30 pm 27 July 2018*: 9:30 am – 12:30 pm; 1:30 pm – 4:30 pm (make up class)
Venue	The Chinese University of Hong Kong
Enrollment	25
Expected applicants	S4 – S6 students
Tuition Fee	HKD 3,300.00
Credit	1.5 Academy Unit Certificate or letter of completion will be awarded to students who attain at least 75% attendance and pass the assessment (if applicable)

* This date is reserved for make-up classes in case there is any cancellation of classes due to bad weather or other factors.