

Course Syllabus

offered by Department of Chemistry
with effect from Semester A 2022/23

This form is for the completion by the Course Leader. The information provided on this form is the official record of the course. It will be used for the City University's database, various City University publications (including websites) and documentation for students and others as required.

Please refer to the Explanatory Notes on the various items of information required.

Prepared / Last Updated by:

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**City University of Hong Kong
Course Syllabus**

**offered by Department of Chemistry
with effect from Semester A 2022/23**

Part I Course Overview

Course Title:	Natural Product Chemistry and Biosynthesis
Course Code:	CHEM8012
Course Duration:	1 semester
Credit Units:	3 credits
Level:	R8
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	Nil
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5	6	
Lectures and exercises	Students will be given a general introduction to natural product chemistry, classification of natural products, and biosynthetic units of natural products.	✓						
Lectures and exercises	Students will learn several important organic reactions used in the natural product biosynthesis.		✓					
Lectures and exercises	Students will learn the reaction mechanisms to provide the core structures of natural products.			✓				
Lectures and exercises	Students will learn several important enzymes involved in natural product biosynthesis and how they facilitate a variety of biosynthetic reactions.				✓			
Lectures and exercises	Students will learn how to utilize bioinformatic tools to link biosynthetic genes to natural products and vice versa.					✓		
Presentation	Students will pick up or be given a natural product and provide a group or individual presentation on the compound.						✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting*	Remarks
	1	2	3	4	5	6		
Continuous Assessment: <u>30%</u>								
Assignments	✓	✓	✓	✓	✓		15%	
Presentation						✓	15%	
Examination: <u>70%</u> (duration: 3 hours)								
Examination	✓	✓	✓	✓	✓	✓	70%	
							100%	

* The weightings should add up to 100%.

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for CHEM courses:

“A minimum of 40% in both coursework and examination components.”

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Assignment	Ability to explain organic reactions in the natural product biosynthesis as well as the enzymes involved therein.	High	Significant	Basic	Not even reaching marginal levels
2. Presentation	Ability to summarize and present properties, biosynthesis, and potential application of a given natural product.	High	Significant	Basic	Not even reaching marginal levels
3. Examination	Ability to solve problems related to natural product chemistry/biosynthesis, to propose plausible biosynthetic routes to given natural products, and to discuss the possibility of biosynthetic engineering of given compounds.	High	Significant	Basic	Not even reaching marginal levels

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Assignment	Ability to explain organic reactions in the natural product biosynthesis as well as the enzymes involved therein.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Presentation	Ability to summarize and present properties, biosynthesis, and potential application of a given natural product.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	Ability to solve problems related to natural product chemistry/biosynthesis, to propose plausible biosynthetic routes to given natural products, and to discuss the possibility of biosynthetic engineering of given compounds.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

Natural products

Fatty acids and polyketides, terpenoids and steroids, meroterpenoids, aromatic amino acids and phenylpropanoids, alkaloids, nonribosomally and ribosomally synthesized peptides, carbohydrates

Natural product biosynthesis

Acetate pathway, mevalonate and methylerythritol phosphate (MEP) pathways, shikimate pathway, peptide biosynthesis

Biosynthetic enzymes

Polyketide synthases (PKSs), terpene synthases/cyclases, nonribosomal peptide synthetases (NRPSs), oxidoreductases, transferases, isomerases, hydrolases, lyase, ligases

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	
2.	
3.	
...	

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Medicinal Natural Products: A Biosynthetic Approach; Paul M. Dewick (John Wiley & Sons, Ltd, 3 rd Edition). The electronic version of the textbook is available from the CityU Library: https://onlinelibrary.wiley.com/doi/book/10.1002/9780470742761
2.	
3.	
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