

City University of Hong Kong
Course Syllabus

offered by Department of Chemistry
with effect from Semester B 2017/18

Part I Course Overview

Course Title:	Microbiology
Course Code:	BCH2013
Course Duration:	1 semester
Credit Units:	3 credits
Level:	B2
Proposed Area: <i>(for GE courses only)</i>	<input type="checkbox"/> Arts and Humanities <input type="checkbox"/> Study of Societies, Social and Business Organisations <input type="checkbox"/> Science and Technology
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	BCH1200 Discovery in Biology (for normative 4-year students) or A Level Biology (for advance standing I students)
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	BCH3013 Microbiology
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Part II Course Details

1. Abstract

(A 150-word description about the course)

This course aims to:

- provide a broad introduction to the diversity of microorganisms including archaea, bacteria, fungi, protists and viruses and what they do in the world at large, in soils, air and waters, in the human body, and in animals and plants;
- develop students' discovery attitude about microbes, skills at searching for and presenting information related to microbiology in clear and concise English;
- develop student skills to apply a problem-based learning approach to study microbiology events in our daily lives.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs [#]	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Identify and describe the diversity of archaea, bacteria, fungi, protists, viruses and their habitats and analyze the environmental factors that affect their growth.		✓		
2.	Identify and discuss the importance of microorganisms in both industry and public health.			✓	✓
3.	Discover the different roles of microbes in our daily lives and apply basic microbiology concepts to solve daily problems related to microbiology issues.				✓
4.	Describe, compare and contrast the different agents and methods for control of microbial growth used <i>in vitro</i> and in humans.		✓		
5.	Gather and appraise information relating to microbiology, analyze and identify important messages from such information and present them in clear and concise English.			✓	

* If weighting is assigned to CILOs, they should add up to 100%.

100%

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

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	
Lectures and tutorials	Teaching and learning will be primarily based on interactive lectures and tutorials with activities designed to develop the discovery attitude in relation to microbes' role in our daily lives, along with complementary in-class and on-line discussions where students will be able to be involved in small group sharing, so they can learn to describe and discuss the related subject matters.	✓	✓	✓			
"Ask a Question" exercise, written assignments and scientific journal article review	Appropriate "Ask a Question" exercise, written assignments, scientific journal article review will be implemented for the students to develop their appraisal, analytical and oral and written communication skills.				✓		
Problem-based learning activities and oral presentations	Problem-based learning activities and oral presentations will be organised for the students to practise their skills in identification of learning issues, analysis and synthesis of collected information, application of synthesised information to solve problems and presentation.				✓	✓	

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		
<u>Continuous Assessment: 45%</u>							
Tests	✓	✓	✓			5%	
Written assignments, scientific journal article review	✓	✓	✓	✓		10%	
PBL contribution, including oral presentations					✓	15%	
"Ask a Question" activity, in-class and online discussions, including discovery activities	✓	✓	✓	✓		15%	
<u>Examination: 55% (duration: 3 hours)</u>							
* The weightings should add up to 100%.						100%	

Starting from Semester A, 2015-16, students must satisfy the following minimum passing requirement for BCH 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.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Tests	To verify the stat of students' learning progress	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Written assignments, scientific journal article review	Encourage students to think critically by allowing them to review and criticize the current scientific article	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. PBL contribution, including oral presentations	To challenge students to collaborate communicate and working together to solve problem as a team	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. "Ask a Question" activity, in-class and online discussions, including discovery activities	Ability to understand the materials in lectures and asking questions from critical thinking	High	Significant	Moderate	Basic	Not even reaching marginal levels
5. Examination	To test students' application of material taught in class and evaluate their performance	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.)

- 1) Microbial diversity of archaea, bacteria, fungi, protists, viruses
 - physiological diversity (chemoorganotroph, chemolithotroph, phototroph, heterotroph, autotroph)
 - microbial systematics (phenotypic, genotypic, phylogenetic analysis)
- 2) Microbial growth
 - exponential growth
 - measuring microbial growth
 - environmental factors affecting growth
- 3) Microbial ecology
 - methods in microbial ecology (isolation, T-RFLP, DGGE)
 - how microbes interact with each other
 - descriptions of major microbial habitats
 - biofilms
- 4) Industrial microorganisms and products for the health and food industry
- 5) Microbial interactions with humans
 - normal microbial flora
 - microbial diseases (airborne, vectorborne, waterborne, foodborne, direct contact transmitted)
- 6) Microbial growth control
 - physical antimicrobial control
 - chemical antimicrobial control
 - antimicrobial drugs, in particular antibiotics and their mode of action

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.	Fungal Biology, J.W. Deacon (Blackwell Publishing Limited, 2006)
2.	Brock Biology of Microorganisms, Michael T. Madigan, John M. Martinko, David Stahl and David P. Clark (13 th ed., Benjamin Cummings, 2010)

Please specify the Gateway Education Programme Intended Learning Outcomes (PILOs) that the course is aligned to and relate them to the CILOs stated in Part II, Section 2 of this form:

GE PILO	Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)
PILO 1: Demonstrate the capacity for self-directed learning	
PILO 2: Explain the basic methodologies and techniques of inquiry of the arts and humanities, social sciences, business, and science and technology	
PILO 3: Demonstrate critical thinking skills	
PILO 4: Interpret information and numerical data	
PILO 5: Produce structured, well-organised and fluent text	
PILO 6: Demonstrate effective oral communication skills	
PILO 7: Demonstrate an ability to work effectively in a team	
PILO 8: Recognise important characteristics of their own culture(s) and at least one other culture, and their impact on global issues	
PILO 9: Value ethical and socially responsible actions	
PILO 10: Demonstrate the attitude and/or ability to accomplish discovery and/or innovation	

GE course leaders should cover the mandatory PILOs for the GE area (Area 1: Arts and Humanities; Area 2: Study of Societies, Social and Business Organisations; Area 3: Science and Technology) for which they have classified their course; for quality assurance purposes, they are advised to carefully consider if it is beneficial to claim any coverage of additional PILOs. General advice would be to restrict PILOs to only the essential ones. (Please refer to the curricular mapping of GE programme: http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm.)

- A. Please select an assessment task for collecting evidence of student achievement for quality assurance purposes. Please retain at least one sample of student achievement across a period of three years.

Selected Assessment Task