

## Course Syllabus

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

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:**

Name: Dr. Richard Kong Academic Unit: Department of Chemistry

Phone/email: 3442 7794 /  
bhrkong@cityu.edu.hk Date: 30 November 2017

**City University of Hong Kong  
Course Syllabus**

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

---

---

**Part I Course Overview**

<b>Course Title:</b>	Genetics
<b>Course Code:</b>	BCH3012 (and BCH3012A)
<b>Course Duration:</b>	1 semester
<b>Credit Units:</b>	4 (3) credits
<b>Level:</b>	B3
<b>Proposed Area:</b> <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
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	BCH1200 Discovery in Biology
<b>Precursors:</b> <i>(Course Code and Title)</i>	BCH2013 or BCH3013 Microbiology
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

**Note: BCH3012A does not contain any practical component, and has a credit unit value of three (3).**

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

In this course, students will:

- explore the fundamental relationships between genes and traits in “living organisms” ranging from viruses to higher eukaryotes;
- develop an understanding of a range of basic genetic principles and their application to gene mapping in viruses and bacteria;
- explain the activities and functions of DNA;
- critically review and evaluate contemporary issues related to recent advances in applied genetics and recombinant DNA technology;
- This course builds on (and complements) knowledge covered in BCH2003 (Biochemistry), and BCH2013 (Microbiology); and underpins the more advanced concepts and applications that are covered in BCH3017 (Molecular Biology) and final year project (BCH4036).

### 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 <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe the basic structure of DNA, and the processes and importance of DNA replication and genetic recombination in living cells.	20%	✓		
2.	Describe gene and genome organisation and expression in prokaryotes and eukaryotes; and demonstrate an understanding of how genetic information is stored and expressed in cells, and the way in which phenotype is affected by both genetic and environmental effects.	20%	✓		
3.	Demonstrate an understanding of the molecular basis of variation and mutation (and relation to evolution and population genetics), of natural and artificial genetic recombination, of extrachromosomal inheritance, of gene dosage compensation and X inactivation, and of genetic analysis and its importance in biology.	40%	✓	✓	
4.	Discover examples encountered in our daily lives, which involve the application of genetics and recombinant DNA technology and critically evaluate their impact to modern day living. Critically review, discuss and evaluate contemporary issues related to recent advances in applied genetics and recombinant DNA technology.	20%		✓	
		100%			

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

<sup>#</sup> 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	
Group discussion activities, written assignments, quizzes and presentations	Students will undertake large and small group discussion activities, written assignments, quizzes and presentations related to different models of DNA replication and genetic recombination in viruses, bacteria and eukaryotes.	✓				
Written assignments, tutorials and/or laboratory practicals	In large and small group sessions including written assignments, tutorials and/or laboratory practicals, students will examine the structure of prokaryotic and eukaryotic DNA and the environmental factors that govern gene expression.		✓			
Quizzes, tutorials and/or laboratory practicals	Teaching and learning will be primarily by large and small group sessions including quizzes, tutorials and/or laboratory practicals supplemented with case examples to enable students to collect, process, present and interpret molecular genetic data.			✓		
Internet resources and investigation of the literature	Through extensive use of Internet resources and investigation of the literature on genetics, students in small groups will apply their knowledge to provide daily life examples related to recent advances in applied genetics (of their choice; e.g. GM foods, genetic basis of cancer, gene therapy or human cloning, etc) and clearly communicate and evaluate their findings orally and in writing.				✓	

#### 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		
Continuous Assessment: <u>40%</u>						
Short Quizzes		✓	✓		10	
Laboratory Report	✓	✓	✓		10	
Tutorial / Discussion	✓	✓	✓	✓	10	
Oral Presentation / Essay				✓	10	
Examination: <u>60%</u> (duration: 2 hours)						
* 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. Short Quizzes	CAPACITY for the understanding of basic genetic concept and ABILITY of utilising these concepts in real life problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Laboratory Report	ABILITY to REPORT experimental procedures and EXPLAIN the principles behind. CRITICALLY REVIEW the cause of experimental errors and DISCUSS the applications of these procedures in real life problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Tutorial / Discussion	ABILITY to EXPLAIN in DETAIL and with ACCURACY basic concepts in genetics and DISCUSS their implications in real life problems	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Oral Presentation / Essay	ABILITY to APPLY genetic concepts in real life problems especially those involved in topical issues	High	Significant	Moderate	Basic	Not even reaching marginal levels

5. Examination	STRONG COMMAND of genetic concepts, and ABILITY to APPLY these concepts in problem solving	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.)*

- Chemistry of genetic materials
- Gene structure, function and regulation
- Genetic variation, evolution and population genetics
- Genetics of viruses and bacteria
- Eukaryotic genetics
- Population genetics
- Applied Genetics

**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.	Robert J. Brooker (2005) Genetics: analysis and principles. (2 <sup>nd</sup> edition), McGraw-Hill Co., Inc., USA.
2.	Peter D. Snustad and Michael J. Simmons (2006) Principles of Genetics. (4 <sup>th</sup> edition), John Wiley & Sons, Inc.
3.	Online Resources: To be provided, as required, in lectures and tutorials.



A. 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:

<b>GE PILO</b>	<b>Please indicate which CILO(s) is/are related to this PILO, if any (can be more than one CILOs in each PILO)</b>
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](http://www.cityu.edu.hk/edge/ge/faculty/curricular_mapping.htm).)*

B. 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.

<b>Selected Assessment Task</b>