

**City University of Hong Kong
Course Syllabus**

**offered by Department of Biomedical Sciences
with effect from Semester B 2020/21**

Part I Course Overview

Course Title: Genes, Inheritance and Genetic Disorders

Course Code: BMS2806

Course Duration: One Semester

Credit Units: 3 credits

Level: B2

Arts and Humanities

Proposed Area:
(for GE courses only)

Study of Societies, Social and Business Organisations

Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites: Completion of all Year 1 courses with C grade or above
(Course Code and Title)

Precursors: Nil
(Course Code and Title)

Equivalent Courses: Nil
(Course Code and Title)

Exclusive Courses: Nil
(Course Code and Title)

Part II Course Details

1. Abstract

(A 150-word description about the course)

This genetics and molecular biology course considers the attributes of genetic material and the role of genes in determining the characteristics of organisms including microbes and vertebrates, individual variation, mechanisms of inheritance, natural selection, and artificial selection in breeding programs. Topics will include: the distinction between genotype and phenotype, meiosis and Mendel's Laws, Mendelian inheritance, modes of inheritance, the Hardy-Weinberg equilibrium, genetic linkage, recombination and genetic mapping, types and sources of genetic variation, heterosis and hybrid vigour, gene structure and function, gene expression and regulation, epigenetics, mutations, inherited defects, genetic testing, and genetically-modified organisms.

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 the composition of chromosomes and distinguish different mechanisms of inheritance in order to describe the relationship between genotype and phenotype. | | ✓ | | |
| 2. | Apply an understanding of population genetics in order to explain the evolutionary forces and population dynamics. | | ✓ | ✓ | |
| 3. | Identify genetic aberrations in order to explain and deduce how genetic dysfunction can lead to disorders. | | ✓ | ✓ | |
| 4. | Perform basic experiments and computer analysis in order to apply knowledge of genetic relevance. | | | | ✓ |
| * 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 | | | |
| Lectures | Learn the components and the mechanisms enabling inheritance and selective breeding | ✓ | ✓ | ✓ | | | | 1 hr/wk |
| Practical classes | Laboratory and computer exercises of genetic relevance | ✓ | | | ✓ | | | 2 hrs x 6 |
| Tutorials | Problem-based learning | ✓ | ✓ | ✓ | | | | 1 hr/wk |

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: 45% | | | | | | | | |
| Quizzes | ✓ | ✓ | ✓ | | | | 15% | |
| Laboratory reports | ✓ | | | ✓ | | | 10% | |
| Problem-based learning reports | ✓ | ✓ | ✓ | | | | 20% | |
| Examination: <u>55%</u> (duration: 3 hours) | | | | | | | | |
| * The weightings should add up to 100%. | | | | | | | 100% | |

The Assessment Tasks and Activities provided above are indicative of those that students will undertake in this course. Final details of the individual assessment, including short quizzes, discussions, essay assignments, laboratory and field reports, and end-of-course examination, will be provided in the student course documents distributed at the commencement of the course.

"Minimum Passing Requirement" for BVM courses:

A minimum of 30% in coursework as well as in examination, and the total minimum passing requirement for the whole BVM course is 50%.

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. Quizzes | Ability to describe and explain the course topics and concepts | Will exhibit high competence in describing and explaining the course topics and concepts | Will exhibit good competence in describing and explaining the course topics and concepts | Will exhibit basic competence in describing and explaining the course topics and concepts | Will exhibit some deficiencies in describing and explaining the course topics and concepts | Will exhibit lack of competence in describing and explaining the course topics and concepts |
| 2. Laboratory reports | Ability to perform basic laboratory techniques and computer analyses relevant to the course | Will exhibit high competence in performing basic laboratory techniques and computer analyses | Will exhibit good competence in performing basic laboratory techniques and computer analyses | Will exhibit basic competence in performing basic laboratory techniques and computer analyses | Will exhibit some deficiencies in performing basic laboratory techniques and computer analyses | Will exhibit lack of competence in performing basic laboratory techniques and computer analyses |
| 3. Problem-based learning reports | Ability to work in a group to apply course topics and concepts to problems | Will exhibit high competence in working in a team to apply course topics and concepts to problems | Will exhibit good competence in working in a team to apply course topics and concepts to problems | Will exhibit basic competence in working in a team to apply course topics and concepts to problems | Will exhibit some deficiencies in working in a team to apply course topics and concepts to problems | Will exhibit lack of competence in working in a team to apply course topics and concepts to problems |
| 4. Examination | Ability to describe the composition of chromosomes and the mechanism of inheritance | Will exhibit high competence in describing and explaining the course topics and concepts in written format | Will exhibit good competence in describing and explaining the course topics and concepts in written format | Will exhibit basic competence in describing and explaining the course topics and concepts in written format | Will exhibit some deficiencies in describing and explaining the course topics and concepts in written format | Will exhibit lack of competence in describing and explaining the course topics and concepts in written format |

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.)

Individual variation, mechanisms of inheritance, natural selection, artificial selection, breeding programs, genotype, phenotype, chromosome, meiosis, Mendel's Laws, Mendelian inheritance, alleles, modes of inheritance, Hardy-Weinberg equilibrium, genetic linkage, recombination, genetic mapping, genetic variation, heterosis, hybrid vigour, inbreeding depression, gene structure, gene function, gene expression, gene regulation, mutations, inherited defects, genetically-modified organisms.

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. | None. |
|----|-------|

2.2 Additional Readings

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

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| 1. | Pierce, B. (2013). Genetics: A Conceptual Approach, 5th Edition. Freeman Publishers. |
| 2. | Brooker, R. (2014). Genetics: Analysis and Principles, 2nd Edition. McGraw-Hill. |