THE EDUCATION UNIVERSITY OF HONG KONG

Course Outline

Part I

Programme Title **:** Bachelor of Education (Honours) (Science)
Programme QF Level : 5
Course Title **:** Cells and Microbiology
Course Code **:** SCB3006
Department **:** Science and Environmental Studies
Credit Points **:** 3
Contact Hours **:** 39
Pre-requisite(s) **:** Nil
Medium of Instruction : English
Course Level **:** 3

Part II

The University's Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Sub-degree, Undergraduate, Taught Postgraduate, Professional Doctorate and Research Postgraduate students consist of the following three domains (i.e. in short "PEER & I"):

- **P**rofessional **E**xcellence;
- **E**thical **R**esponsibility; **&**
- **I**nnovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

1. Problem Solving Skills
2. Critical Thinking Skills
3. Creative Thinking Skills

4a. Oral Communication Skills
4b. Written Communication Skills

5. Social Interaction Skills
6. Ethical Decision Making
7. Global Perspectives

1. **Course Synopsis**

The course aims to promote participants' understanding of cell structure and how the cell functions. Fine structures of viruses, eukaryotic and prokaryotic cells, and their cellular metabolism and organisation are covered. Prokaryotes are intensively studied with the introduction of microbial phylogeny and the nomenclature of bacteria. Major genetic phenomena observed in prokaryotes and their significant roles in the environment and the ecosystem are discussed in the domains of microbial genetics and ecology. The discussion of their impacts on industrial development and clinical concerns will provide participants with insights about the application of microbiology and the significance of microorganisms in human development. Scientific investigation skills, clinical diagnostic tests and aseptic technique will be developed through microscopy studies and scientific inquiry. The STSE pedagogical approach will also be integrated into the course curriculum. For example, a topic on microbial metabolism for biodegradation of xenobiotics will be investigated to facilitate the constructive learning of participants from application issues and promote the connection of technology, society and the environment in the study framework. This course equips participants with the essential concepts and skills to teach the topics in cell biology or microbiology (either in Biology, Combined Science or Integrated Science) at senior secondary level.

2. **Course Intended Learning Outcomes** ($CILO_s$) *Upon completion of this course, students will be able to:*

$CILO_1$: Describe and explain the structure and function of cellular components;
$CILO_2$: Understand the vast diversity of microbes which are related to our daily living;
$CILO_3$: Demonstrate understanding of the principles and applications of a wide spectrum of techniques suitable for use in the field of cell biology and microbiology;
$CILO_4$: Apply the knowledge of cell biology and microbiology into the study framework to promote the STSE connection.

3. **Content, CILOs and Teaching & Learning Activities**

Course Content	CILOs	Suggested Teaching & Learning Activities
<u>Cell biology</u> - Molecular constituents of cell; - Tools and methods of cell biology; - Cell growth and proliferation; - Structure and functions of organelles; - Cancer biology; - Stem cells and cloning	$CILO_{1,3}$	Lectures, case study, group discussion, video and laboratory works

<u>Microbiology</u> - Classification of living organisms; - Diversity of microorganisms; - Cultivation of microorganisms; - Control of microbial growth;	CILO2,3	Lectures, case study, group discussion, video and laboratory works
- Microbial ecology; - Application of microorganisms		
Connection of cells and microbiology to STSE	CILO1,2,4	Case study, group discussion and presentation

4. Assessment

Assessment Tasks	Weighting (%)	CILO
(a) Individual laboratory reports of cells and microbiology experiment	30%	*CILO1,2,3,4*
(b) Class participation (quiz, case study and presentation on STSE)	20%	*CILO1,2,3,4*
(c) 1.5-hr written test: Assessment of participants' scientific principles and concepts on cell biology and microbiology	50%	*CILO1,2,3,4*

5. Use of Generative AI in Course Assessments

Please select one option only that applies to this course:

☐ ***Not Permitted***: In this course, the use of generative AI tools is not allowed for any assessment tasks.

☑ ***Permitted***: In this course, generative AI tools may be used in some or all assessment tasks. Instructors will provide specific instructions, including any restrictions or additional requirements (e.g., proper acknowledgment, reflective reports), during the first lesson and in relevant assessment briefs.

6. Required Text(s)

Alberts B., Bray D., Hopkin K., Johnson A.D., Lewis J, Raff M., Roberts K., Walter P. (2013) Essential Cell Biology. (4th ed.) New York: Garland Science.

Tortora G.J., Funke B.R., Case C.L. (2015) Microbiology: An Introduction. (12th ed.) San Francisco, CA: Benjamin Cummings.

7. Recommended Readings

Black J.G., Black L.J. (2015) Microbiology: Principles and Explorations (9th ed.) Hoboken, NJ.: Wiley

Cappuccino J.G., Sherman N. (2013) Microbiology: A Laboratory Manual. (10th ed.) San Francisco, CA: Benjamin Cummings

Chaitanya K. V. (2013) Cell and Molecular Biology: A Lab Manual. New Delhi: PHI Learning Private Limited

Karp G. (2013) Cell and Molecular Biology: Concepts and Experiments. (7th ed.) Hoboken, NJ.: Wiley Global Education.

8. Related Web Resources

Nil

9. Related Journals

Annual Review of Microbiology
Cancer Cell
Cell Stem Cell
Current Opinion in Microbiology
FEMS Microbiology Reviews
ISME Journal
Methods in cell biology
Molecular and cellular biology
Molecular Microbiology
Nature Cell Biology
Nature Reviews Molecular Cell Biology
Trends in Cell Biology
Trends in Microbiology

10. Academic Honesty

The University upholds the principles of honesty in all areas of academic work. We expect our students to carry out all academic activities honestly and in good faith. Please refer to the *Policy on Academic Honesty, Responsibility and Integrity* (https://www.eduhk.hk/re/uploads/docs/00000000001633679892454 8BbN5). Students should familiarize themselves with the Policy.

11. Others Nil

Last update: July 2025