

**Macao Polytechnic Institute**  
**School of Health Sciences and Sports**  
**Bachelor of Science in Biomedical Technology**  
**(Medical Laboratory Technology & Pharmacy Technology)**

**Module Outline**

**Academic Year 2021/ 2022 Semester 1**

<b>Learning Module</b>	General Biology (基礎生物)		<b>Class Code</b>	BSGB1101
<b>Pre-requisite</b>	Nil			
<b>Medium of Instruction</b>	Cantonese & English		<b>Credit</b>	3
<b>Lecture Hours</b>	37 hrs	<b>Lab Practice Hours</b>	8 hrs	<b>Total Hours</b> 45 hrs
<b>Instructor</b>	Grace, Meng Li Rong Professor		<b>E-mail</b>	<a href="mailto:lmeng@ipm.edu.mo">lmeng@ipm.edu.mo</a>
<b>Office</b>	M730, Meng Tak Building, Main Campus		<b>Telephone</b>	85993447

**Description**

This is a three-credit fundamental learning module for the biomedical technology students. Students will study the scientific principles and basic concepts of biology. Students will also learn the basic operations in laboratory and will perform several experiments to improve their understanding of different scientific concepts.

**Learning Outcomes**

After completing the learning module, students will be able to:

1. Develop a conceptual framework for modern biology
2. Design scientific experiments and interpret experimental results
3. Recognize unifying themes that integrate major topics of biology
4. List and describe the fundamental characteristics of living organisms
5. Explain the chemical processes underlying life processes
6. Describe the structure and function of cells as the fundamental unit of life
7. Apply biological knowledge and critical thinking skills to environmental and social concerns

## **Content**

1. Introduction (4 class hours)
  - 1.1 The properties of life
  - 1.2 Living organisms
    - Cellular organization
    - Ordered complexity
    - Sensitivity
    - Grow, develop and reproduce
    - Energy utilizat
    - Homeostasis
    - Evolutionary adaptation
  
2. The Cell & microscope (4 class hours)
  - 2.1 Prokaryote and eukaryote
  - 2.2 Cite the three tenets of the cell theory.
  - 2.3 Describe the structure and function of each organelle.
  - 2.4 Compare and contrast the three commonly used types of microscopes.
  - 2.5 Compare and contrast various types of cells.
  - 2.6 Diagram the path of light through a compound microscope.
  - 2.7 Define total magnification and resolution.
  - 2.8 Identify a use for darkfield, phase-contrast, differential interference contrast, fluoresce and scanning acoustic microscopy, and compare each with brightfield illumination.
  - 2.9 Explain how electron microscopy differs from light microscopy.
  
3. Functions of Cell Division (4 hour)
  - 3.1 DNA And Chromosomes
  - 3.2 Chromosome Duplication
  - 3.3 Mitotic Division of an Animal Cell
  - 3.4 Cytokinesis In Animal And Plant Cells
  
4. Evolution (2 hours)
  - 4.1 Contributor's to Darwin's thinking
  - 4.2 Darwin's Theory
  
5. Life and classification (4 class hours)
  - 5.1 Discuss seven characteristics of life.
  - 5.2 List out the levels of biological organization.
  - 5.3 List the three taxonomic domains and the six kingdoms of organisms.

- 5.4 Given its distinguishing characters, classify an organism in the appropriate domain and kingdom.
- 5.5 Compare the main types of epithelial, connective, and muscular tissue, and relate their structure to their functions.
- 5.6 State the levels of biological organization with reference to a particular organ system in complex animals.
- 5.7 Describe the structure of a virus, and compare a virus with a free-living cell.
- 5.8 Characterize bacteriophages, and contrast a lytic cycle with a lysogenic cycle.
- 5.9 Compare and contrast viroids and prions.

6. The Human Genome Project (2 hour)

7. Life Development (8 hour)

- 7.1 Phases of Embryonic Development
- 7.2 Spermatogenesis
- 7.3 Oogenesis
- 7.4 Process of Ovulation
- 7.5 Assisted reproductive techniques, ART

8. Review, Presentation and final exam (9 class hours)

**Laboratory Practice (8 hours)**

1. Light microscope (6 hours)  
Onion cell lab and read tissue slide
2. Lab test (2 hours)

**Teaching Method**

Lectures, videos, group discussion, laboratory Practice

**Attendance**

Attendance requirements are governed by the “Academic Regulations Governing Bachelor’s degree programmes of Macao Polytechnic Institute”. Students are not eligible to attend the final examination and re-sit examination, moreover, an “F” will be given as the final grade to students who have less than the stated attendance for the enrolled learning module.

## **Assessment**

This learning module is graded on a 100 point scale, with 100 being the highest possible score and 50 the pass score. Any students scoring less than 35% of the total mark in the final examination will be given an “F” grade for the learning module even if the overall grade is 50% or higher.

	<b>ITEM</b>	<b>DESCRIPTION</b>	<b>PERCENTAGE</b>
1.	Lab Test		30 %
2.	Group presentation		20 %
3.	Final Exam		50 %
		<b>Total Percentage:</b>	100 %

## **Teaching Material(s)**

### **Textbook(s)**

傅松濱，醫學生物學 (Medical Biology) 第9版，2019，人民衛生出版社。(“十二五”普通高等教育本科國家級規劃教材)

Campbell NA, Reece JB, Taylor MR, et al. 2009, *Biology: concepts & connections*. San Francisco: Benjamin Cummings

## **Reference**

### **Reference book(s)**

1. Robert J.Brooker, Eric P. Widmaier, Linda E.Graham, Peter D.Stiling. 2011, *Biology* (second edition). Mc Graw Hill
2. Huang Guenin. 2014. *Assisted Reproductive Techniques*. People’s Medical Publishing House.
3. James D.Watson, Andrew Berry. 2005. *DNA: The secret of life*. Shanghai Medical Publishing House.
4. Sharon Moalem. 2016. *Inheritance: our genes change our lives, and our lives change our genes*. Grand Central Publishing, New York, USA
5. Pedro Ferrira. 2015. *The Perfect Theory*. Commonwealth Publishing Co.Ltd