



**FACULTY OF HEALTH SCIENCES AND SPORTS**  
**BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY**  
**(MEDICAL LABORATORY TECHNOLOGY)**  
**LEARNING MODULE OUTLINE**

Academic Year	2023-2024	Semester	1
Module Code	BSCB1101		
Learning Module	Cell Biology		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese & English		
Credits	3	Contact Hours	45
Instructor	Lei Iun Fan, Miriam	Email	iflei@mpu.edu.mo
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**MODULE DESCRIPTION**

This is a fundamental course for the biomedical technology students. The fundamental unit of life is the cell; therefore, cell biology forms the base upon which all modern biology and medicine is built. This course will emphasize the study of eukaryotic cell structure and function, including bioenergetics, membrane transport, cellular communication, flow of genetic information and cell division. Experimental techniques used in understanding cell biology will be discussed along with the cellular basis. This will enable students to have a deeper understanding of cell biology and lay a good foundation for further learning of medical knowledge.

**MODULE INTENDED LEARNING OUTCOMES (ILOS)**

On completion of this learning module, students will be able to:

M1.	Understand the relationship between the basic structure and function of cells, the regulatory mechanisms of cell life processes, and use this knowledge to analyze the mechanisms of cell life activities and disease occurrence.
M2.	Understand the development of cell biology and various research methods and techniques currently used in research
M3.	Make connections between the interdisciplinary fusion and applications of cell biology, and clarify the position and role of cell biology in the development of life sciences.
M4.	Discuss how our understanding of cell biology has resulted in medical advances, and discuss current biomedical issues in a cellular context.
M5.	Carry out a range of laboratory practices, demonstrating the various cell types under microscopy. To strengthen students' basic skill training, develop their ability to observe and cultivate their scientific thinking skills.
M6.	Guide students to respect the value of life, and cultivate correct scientific attitudes and scientific literacy.



These ILOs aims to enable students to attain the following Programme Intended Learning Outcomes (PILOs):

PILOs	M1	M2	M3	M4	M5	M6
P1. To demonstrate understanding of a range of subjects, fields, principles and approaches relevant to medical laboratory technology	✓	✓	✓	✓	✓	✓
P2. To demonstrate understanding of theories, analytical approaches and practices that underpin medical laboratory operations and management		✓			✓	
P3. To demonstrate understanding of major trends and issues related to medical laboratory technology	✓		✓	✓		✓
P4. To apply professional knowledge and skills to analyse, interpret and solve problems, challenges and risks in medical laboratory practice	✓		✓	✓		✓
P5. To critically appraise and interpret scientific and clinical literature and apply evidence-based practice	✓		✓			
P6. To acquire and apply research skills in medical laboratory technology	✓	✓			✓	
P7. To demonstrate effective communication and teamwork skills					✓	
P8. To maintain professional and ethical standards in medical laboratory practice and research	✓	✓			✓	✓

#### MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Week	Content Coverage	Contact Hours
2	Cell 00 - course outline welcome (1hr)	1
2	Cell 01 - Introduction (3 hr)	3
3	Cell 02 - Organelles (3 hr)	3
3, 4	Cell 03 - Plasma membrane 1 (3 hr)	3
4	Cell 04 - Plasma membrane 2 (3 hr)	3
5	Cell 05 - Ribosome & protein synthesis (3hr)	3
5	Cell 06 - Protein secretion, sorting (2hr)	2
7	Cell 07 - Mitochondria (2hr)	2
7	Cell 08 - Chloroplasts (2hr)	2
8	Cell 09 - Microtubules (2hr)	2
8	Cell 10 - Microfilaments (2hr)	2
9	Lab 01 – Cloned Cauliflower	2
9	Midterm exam	2
10	Cell 11 - IF (1hr)	1



10	Lab 02 – Plant cells	2
11	Lab 03 – Animal cells	2
11	Cell 12 - Nucleus and Cancer (4hr)	4
12	Lab 04 – cell division: Mitosis	2
13	Lab 05 – Cell division: Meiosis	2
15	Final exam	2

## TEACHING AND LEARNING ACTIVITIES

In this learning module, students will work towards attaining the ILOs through the following teaching and learning activities:

Teaching and Learning Activities	M1	M2	M3	M4	M5	M6
T1. Lectures	✓	✓	✓	✓		✓
T2. Videos and animations	✓	✓	✓	✓		
T3. Assignments	✓	✓				
T4. Lab Practices	✓	✓			✓	

## ATTENDANCE

Attendance requirements are governed by the Academic Regulations Governing Bachelor's Degree Programmes of the Macao Polytechnic University. Students who do not meet the attendance requirements for the learning module shall be awarded an 'F' grade.

## ASSESSMENT

In this learning module, students are required to complete the following assessment activities:

Assessment Activities	Weighting (%)	ILOs to be Assessed
A1. Assignments	10%	M1, M2
A2. Lab Practices	20%	M1, M2, M5
A3. Mid-term exam	30%	M1, M2, M3, M4, M5, M6
A4. Final exam	40%	M1, M2, M3, M4, M5, M6

This learning module is graded on a 100-point scale, with 100 being the highest possible score and 50 being the passing score.

Any students scoring less than 35% of the total mark in the final examination will be given an "F" grade for the module even if the overall grade is 50% or higher.



The assessment will be conducted following the University's Assessment Strategy (see [www.mpu.edu.mo/teaching\\_learning/en/assessment\\_strategy.php](http://www.mpu.edu.mo/teaching_learning/en/assessment_strategy.php)). Passing this learning module indicates that students will have attained the ILOs of this learning module and thus acquired its credits.

## MARKING SCHEME

Assessment Activities	Assessment Criteria	Mark Ranges				
		88-100	73-87	58-72	50-57	<50
A1. Assignments	Demonstrate the ability to answer questions on topics covered in the outline.	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A2. Lab practices	Master relevant experimental skills or operations, data handling and lab report etc.	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A3. Midterm exam and final exam	Demonstrate the ability to identify and apply appropriate concepts, methods and techniques	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels

## REQUIRED READINGS

Bruce Alberts, Karen Hopkin, Alexander D. Johnson, David Morgan, Martin Raff, Keith Roberts, Peter Walter (2018) Essential cell biology, 5<sup>th</sup> edition, Garland Science

## REFERENCES

1. Alberts, Bruce (2022) Molecular Biology of the cell, 7<sup>th</sup> edition, Garland Science
2. Jeff Hardin, Gregory Paul Bertoni, Lewis J. Kleinsmith (2022) Becker's World of the Cell 10<sup>th</sup> ed. Pearsons
3. Lodish H, Berk A, Zipursky SL, et al (2021) Molecular Cell Biology 9<sup>th</sup> edition. New York: W. H. Freeman
4. Cooper, G.M. and Hausman, R.E. (2019). The Cell: A Molecular Approach 8<sup>th</sup> ed. New York, NY: Oxford University Press
5. Gerald Karp (2018) Cell biology 8<sup>th</sup> ed., International student version John Wiley & Sons, Inc.
6. 丁明孝、王喜忠等 (2020) 細胞生物學 第五版 高等教育出版社
7. 翟中和、王喜忠、丁明孝 (2013) 細胞生物學 第四版 高等教育出版社

## STUDENT FEEDBACK

At the end of every semester, students are invited to provide feedback on the learning module and the teaching arrangement through questionnaires. Your feedback is valuable for instructors to enhance the module and its delivery for future students. The instructor and programme coordinators will consider all feedback and respond with actions formally in the annual programme review.

## ACADEMIC INTEGRITY

The Macao Polytechnic University requires students to have full commitment to academic integrity when engaging in research and academic activities. Violations of academic integrity, which include but are not limited to plagiarism, collusion, fabrication or falsification, repeated use of assignments and cheating in examinations, are considered as serious academic offenses and may lead to disciplinary actions. Students should read the relevant regulations and guidelines in the Student Handbook which is distributed upon the admission into the University, a copy of which can also be found at [www.mpu.edu.mo/student\\_handbook/](http://www.mpu.edu.mo/student_handbook/).