



FACULTY OF HEALTH SCIENCES AND SPORTS

**BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY (MEDICAL LABORATORY TECHNOLOGY)
LEARNING MODULE OUTLINE**

Academic Year	2025/2026	Semester	2
Module Code	BSLT1102		
Learning Module	Basic Laboratory Techniques II (基本檢驗實驗技術 II)		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese & English		
Credits	3	Contact Hours	45
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MODULE DESCRIPTION

This subject is one of the fundamental subjects of biomedical program. A brief explains on the main uses or applications of the various equipment in the biomedical laboratory. This course will introduce the skills and techniques needed to work in the laboratory. Basic principles of various equipment are introduced.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	Explain the properties of light, the optical theory behind image formation, the concept of resolving power and numeric aperture, and the causes and types of image aberrations.
M2.	Apply various techniques for specimen preparation, measurement, counting and staining using a microscope.
M3.	Understand the principles behind special microscopes including dark-field, phase contrast, polarized light, fluorescence, stereomicroscope, and electron microscope and their applications.
M4.	Able to demonstrate the correct safe work practices for operating a biosafety cabinet and fume hood
M5.	Proficiency in blood specimen collection and handling, demonstrating the ability to collect venous and capillary blood, ensuring proper labeling, storage, and transportation. Performing Blood group typing, ESR, and blood cross-matching.
M6.	Comprehend the importance of quality control measures in the laboratory, including using internal and external quality control materials, monitoring instrument performance, and conducting quality assurance procedures to ensure accurate and reliable test results.



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
1	01 - Optical theory	2
2	02 - Light Microscope	2
3	03 - Microscopy	4
4	04 - Special microscope	2
5	05 – Biosafety cabinet	2
6	06 - Chemical fume hood	2
7	07 - Anaerobic systems	1
8	Lab 1: Microscopy	6
9	Lab 2: Special microscope	2
10	Midterm exam	2
10	Capillary puncture, Hematocrit and Reticulocyte count Routine venipuncture and ESR	3
10	Lab 3: Capillary puncture + Hand model routine venipuncture	1.5
11	Lab 4: Routine venipuncture and ESR	3
11	Introduction to Clinical Microbiology (Fungal culture and media preparation) Infection control and transmission-based precautions, nosocomial infection and emerging infectious diseases	3
12	Lab 5: Sabraud's agar, Potato Dextrose Agar preparation	1.5



12	Direct Coomb's test and indirect Coomb's test, and Weak D testing Quality assessment in lab	1.5
13	Lab 6: Fungal inoculation	0.5
14	Immunohematology ABO Grouping , Rh typing Quality assessment in lab	2
14	Lab 7: Fungal subculture	1
15	Lab6: Direct Coomb's test and indirect Coomb's test + Fungal identification, LPCB staining.	1
16	Final exam + technique 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. 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. Lab Practices	20%	M1, M2, M3, M4
A2. Mid-term exam	30%	M1, M2, M3, M4, M5
A3. Lab Practices	10%	M1, M2, M3, M4
A4. Final exam	40%	M1, M2, M3, M4, M5

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). 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. 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
A2. 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

1. The organic chem lab survival manual: a student's guide to techniques 10th ed. /2016, James W. Zubrick, McGraw-Hill
2. World Health Organization, 2008, Maintenance Manual for Laboratory Equipment 2nd edition available at <http://www.who.int/>
3. Chemical Analysis, 2007, Modern Instrumentation Methods and Techniques, Francis Rouessac and Annick Rouessac 2nd Ed. John Wiley & Sons Ltd

REFERENCES

1. Gary S. Coyne (2005) The Laboratory Companion: A Practical Guide to Materials, Equipment, and Technique, Revised Ed., Wiley-Interscience
2. Kathy Barker (2005) At the Bench: A Laboratory Navigator, Updated Ed. Cold Spring Harbor Laboratory Press
3. Instant notes -Analytical Chemistry Instant notes series, series editor B.D Hames, D. Kealey & P.J. Haines School of Biochemistry and Molecular Biology, University of Leeds, Leeds, UK

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/.