FACULTY OF HEALTH SCIENCES AND SPORTS

BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY

(MEDICAL LABORATORY TECHNOLOGY)

LEARNING MODULE OUTLINE

Academic Year	2024/2025	Semester	1
Module Code	BSLT1101-111		
Learning Module	Basic Laboratory Techniques I (基本檢驗實驗技術 I)		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese & English		
Credits	4	Contact Hours	60
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MODULE DESCRIPTION

This subject is one of the fundamental subjects of the biomedical program. A brief explanation of 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.	Understand the principles behind basic laboratory techniques, as well as the applications in biomedical research.
M2.	Identify potential hazards in the laboratory and take appropriate measures to protect themselves and others. Able to follow standard operating procedures for handling biological materials, such as wearing personal protective equipment and using appropriate disinfectants.
M3.	Familiarity with liquid handling equipment accurately and precisely. They should be able to calibrate and maintain these tools, as well as troubleshoot common issues.
M4.	Master the heating and cooling equipment, such as incubators, ovens, water baths, and freezers, to perform basic laboratory tasks as well as calibrate and troubleshoot common issues.
M5.	Ability to analyze and interpret laboratory data, such as collect and analyze experimental data, and interpret the results in the context of the research question.
M6.	Able to work effectively and responsibly, both as individuals and in groups.

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
0	00 - Course outline	1
1	01 - PPE, Glassware & plasticware	3
2	02 - Liquid handling	5
3	03 - Reagent grade water	3
4	04 – Cooling equipment	4
5	05 – Heating equipment	2
6	Lab practices	10
7	Midterm exam	2
8	Introduction to Clinical laboratory and introduction to Clinical laboratory professional	4
9	Physical, chemical, and biological hazards	5
10	Laboratory measurement and calculation	2
11	Analytical balance	2
12	Centrifuge	2
13	Density	2
14	Lab practices	10
15	Written exam	1
16	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 report	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 11th ed. /2021, James W. Zubrick, Wiley
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/.