澳門理工大學
Universidade Politécnica de Macau
Macao Polytechnic University

FACULTY OF HEALTH SCIENCES AND SPORTS

BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY (MEDICAL LABORATORY TECHNOLOGY)

LEARNING MODULE OUTLINE

Academic Year	2024/2025	Semester	II
Module Code	BSMD3102		
Learning Module	Molecular Diagnostics(分子診斷)		
Pre-requisite(s)	--		
Medium of Instruction	Chinese & English		
Credits	4 units	Contact Hours	60 hrs
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MODULE DESCRIPTION

This course will cover the principles of Molecular Diagnostics, which is the process of identifying a disease or condition by studying molecules, such as DNA, RNA and protein in tissue or fluid. Molecular diagnostics is a new discipline that captures genomic and proteomic expression patterns and uses the information to distinguish between two or more conditions at the molecular level. The conditions under investigation can be human genetic disease or infectious diseases. Molecular diagnostics is not just confined to human diseases but can also be applied to animals or plants. It can also be used in environmental monitoring, food processing as well.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	Apply knowledge of specimen integrity. Evaluating patient samples for potential pathogens.
M2.	To be known safety rules in clinical laboratory.
M3.	Apply the principles of various molecular techniques used in the clinical laboratory to evaluate different tests.
M4.	Perform extraction , PCR and data interpretation with blood specimen.
M5.	Issue a finalized report (review of literature)
M6.	Knowing cases interpretation in clinical laboratory.

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	1. Introduction to the molecular test for infectious diseases performed in Public Health Laboratory in Macao 2. Introduction to Molecular diagnosis/ Molecular diagnosis of viral hepatitis I 3. Molecular Detection of COVID-19 & MERS 4. Human Papillomavirus(HPV) Genotyping 5. Molecular Detection of COVID-19 &MERS(cont.)	12
2	6. Molecular Detection of Influenza/Avian Influenza and other Respiratory virus 7. Molecular Detection of Mosquito Borne Diseases 8. In situ hybridisation (ISH)	7
3	9. HER-2 dual in situ hybridization (DISH) assay 10. Molecular diagnosis of viral hepatitis II	6
4	11. Fluoresence in situ hybridization (FISH) assay 12. Detection of HBV DNA (Experiment)	6
5	13. Detection of specific mutations in the EGFR oncogene (I)	2
6	14. Detection of specific mutations in the EGFR oncogene (II) 15. Molecular detection of Sexually Transmitted Diseases	6
7	16. Colorectal Cancer Mutation Testing 17. Genetics Detection in Thalassemia	5
8	18. Application of Multiplex PCR system (or Experiment) 19. Molecular diagnosis in leukemia	5

9	20. Molecular Detection of Epstein-Barr virus in Nasopharyngeal Carcinoma	3
10	21. HLA and disease association / DNA Methylation in Cancer	3
11	22. Application of Molecular Diagnosis in Prenatal Diagnosis and Genetic diseases	3
12	23. 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. Case studies					✓	✓
T3. Experiment				✓	✓	

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:

AssessmentActivities	**Weighting (%)**	**ILOs to be Assessed**
A1. Classroom performance	10	M1-M6
A2. Homework (Review of literature)+ Experimental Report	30	M5-M6
A3. Final Exam	60	M1-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). 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. Review of literature Writing	Knowledge and writing skills of frontiers and research in the field of clinical microbiology	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A2. Experimental Report	Report and summary of experimental results	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A3. Final Examination	Demonstrate the ability to understand and apply the subjects covered in the classroom	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels

REQUIRED READINGS

Students will be given power point or PDF file as handout form the instructor before each class.

REFERENCES

1. 臨床分子診斷學，温旺榮、周華友 著，廣東科技出版社

2. 臨床病理學技術，梁英杰、凌啟波、張威，人民衛生出版社

3. 病理學，李玉林主，人民衛生出版社 第八版

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 withactionsformally in the annual programme review.

ACADEMIC INTEGRITY

The Macao Polytechnic Universityrequires 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/.