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	2025/2026	Semester	2
Module Code	BSHM2102		
Learning Module	Clinical Hematology		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese / English		
Credits	6	Contact Hours	90
Instructor	Ye Qianhong,Ivy Lei Chon Leng	Email	yeqianhong@mpu.edu.mo t1620@mpu.edu.mo
Office	Rm709A. MengTak Building	Office Phone	85993433

MODULE DESCRIPTION

This subject is one of the foundation subjects of the biomedical sciences program. It will introduce basic concepts of clinical hematology and basic technique of clinical hematological laboratory. It includes theory of blood cell formation, disease states, hemostasis, microscopic examination of blood/bone marrow films, and practical experience with instruments and techniques which determine major hematologic and clotting parameters, quality control. The course is 6 credits, 90 hours, includes 70 lecture hours and 20 practical hours.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	Acquire basic knowledge and advanced knowledge of clinical hematology.
M2.	Understand the basic principles in hematology and the investigations of hematological disorders.
M3.	Emphasis is placed on laboratory techniques used to diagnose disorders and monitor treatment.
M4.	Gain visual knowledge on physiologic blood and bone marrow cells, to learn to differentiate between physiology and pathological cells in differential counts and bone marrow smears.
M5.	Learn routine work in a clinical hematological laboratory.

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

PILOs	**M1**	**M2**	**M3**	**M4**	**M5**
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
1-2	1**. Introduction of clinical hematology (2hours).** 1.1Clinical hematology laboratory rules 1.2 safety policy, safety equipment **2. Haematopoiesis (4hours).** 2.1 Origin and development of blood forming tissues; 2.2 Maturation sequence of normal blood cells and factors influencing it; 2.3 Enumeration of blood cells; 3. **Maturational characteristics of hematopoietic cells (8hours)** 3.1 Normal cells morphology 3.2 functions of the bone marrow	14
3-4	**4. Bone marrow smears examination (6 hours)** Bone marrow aspiration and biopsy examination 5**. Cytochemical stains (6 hours)** Peroxidase stain, Sudan black B reactions, neutrophil alkaline phosphatase stain…	12
5-6	**6. Basic hematological techniques and a general examination of blood (10hours)** • Collection and handling of blood • Preparation of blood films on slides • Blood film staining • Complete blood count • White blood cell differential count • Determination of hemoglobin concentration • Hematocrit • Sedimentation rate • Reticulocyte count • Normal and abnormal morphology of peripheral blood cells	10
7-8	**7. Theory of the erythrocytes(2hours):** Production, structure, metabolism and function of the normal erythrocytes; production and role of erythropoietin; role of vitamin B12 and folate; role of the spleen… **8. Laboratory methods used in the erythrocytes & Anemia (6hours)**	10

	• Laboratory methods used in the erythrocytes; • Iron deficiency anemia; megaloblastic anemia; thalassemia; sickle cell anemia; haemolytic anemia and laboratory investigation of these disorders **Test (2hours)**	
9-10	9. **Leukaemia (10hours):** • Classification of hematological malignancies • Leukaemias • Cytochemistry • Other diagnostic tests **Presentation (4hours)**	14
11-12	**10. Hemostasis (8hours):** • Principles of hemostatic mechanism; function and disorders of the platelet; coagulation mechanism and hereditary coagulation disorders; • Laboratory investigation of haemostatic disorders; Therapeutic anticoagulation and its laboratory monitoring	8
13-14	11**. Experiment (20hours)** • Erythrocyte and leucocyte count and differential count • Reticulocyte count, POX-stain, hematocrit • Bone marrow smear examination • Determination of hemoglobin concentration, hematology analyzer, capillary fragility test) **12. Lab exam**	20
15	**13. Final Examination**	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**
T1. Lectures and videos	✓	✓	✓	✓	✓
T2. Case studies	✓	✓	✓		✓
T3. Review writing and presentation	✓	✓	✓		✓
T4. 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:

Assessment Activities	**Weighting (%)**	**ILOs to be Assessed**
A1. Homework (Review of literature)	5	M1 –M3
A2. Presentation	5	M1-M3
A3. Experimental Skills Exam	10	M4-M5
A4. Experimental Report	10	M4-M5
A5. Mid-term Test	20	M1-M3
A6. Final Exam	50	M1-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. 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

1. Mary L. Turgeon. (2011) Clincal hematology:theory and procedures, 5th ed . Lippincott williams & wilkins
2. Barbara J. Bain & Imelda Bates & Mike A Laffan (2016). Dacie and Lewis Practical Haematology, 12thed. Elsevier.
3. 許文榮 王建中.（2012 年）臨床血液學和血液檢驗（供醫學檢驗專業用教材第 5 版）人民衛生出版社
4. A.Victor Hoffbrand, John E.Pettit, Paresh Vyas(2010). Color Atlas of Clinical Hematology, 4th ed. Mosby,LTD.
5. 葉千紅 徐國成 韓秋生.（2010 年）實驗診斷學彩色圖譜. 遼寧科技出版社

REFERENCES

Ye,Q.H.,Han,Q.S.,Xu,G.C.(2015) Colour atlas of laboratory diagnostics .Hubei Science& Technology press.

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/.