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

Academic Year	2024-2025	Semester	I
Module Code	BSAP1101		
Learning Module	Anatomy and Physiology		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese & English		
Credits	4	Contact Hours	60
Instructor	Grace, Meng Li Rong	Email	lrmeng@mpu.edu.mo
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MODULE DESCRIPTION

Anatomy and physiology is a compulsory course for biomedical engineering. This course is the science of studying the normal form and life activity of human body from the system, organ, cell and molecule level, combined with human anatomy and physiology. The anatomy of the human body is divided into general anatomy and histology, which is the relationship between the morphology, structure, location, and structure and function of the normal human body, and is the morphological basis of the study of physiology. Physiology is the science of studying the law of normal human life activity and physiological function, how these functions are realized and what factors they are subjected to. The course enables students to obtain human anatomy and physiology of basic theory, basic knowledge and basic skills; master the basic form and structure of each organ system, and each organ system mainly physiological process and its mechanism. The goal of this course is to provide the basics of human physiology --that is, the mechanisms by which the organ systems of the human body function, with a unique emphasis on the quantitative aspects of the human systems. Another goal of this course is to provide quantitative ways in which biomedical engineering and cell biology are being used to address problems of health and disease based on the principles of physiology.

MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	To master the knowledge base and understanding of the physiological processes underlying health and disease in the major organ systems of the body.
M2.	Summarize the major functions of the nervous system, muscular system, cardiovascular system, respiratory system, renal system, gastrointestinal system, and endocrine system.
M3.	To master the concept of homeostasis as it applies to physiological systems.
M4.	To master the knowledge base and understanding of the molecular and cellular mechanisms of physiological processes, in order to provide a foundation for understanding biomedical engineering in subsequent courses.

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

PILOs	**M1**	**M2**	**M3**	**M4**
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. General introduction (2 class hours) 1.1 General description to human body 1.2 The cells, tissues and organisation of the body 1.3 Physiology of the cells 1.31 Transport across cell membranes 1.32 Intercellular communication 1.33 Electrical phenomena of the nerve cells 1.34 Contraction of the skeletal muscle 1.4 Regulation of body functions 2. Locomotor system (4 class hours) 2.1 Osteology 2.2 Arthrology 2.3 Myology	6

2	3. Blood (4 class hours) 3.1 The composition of blood 3.2 Hemostasis 3.3 Blood types	4
3	4. Cardiovascular system (6 class hours) 4.1 Structure of cardiovascular system 4.11 General description 4.12 Heart 4.13 Arteries 4.14 Veins 4.15 Lymph 4.2 Function of cardiovascular system 4.21 electrical properties of the cardiac muscle 4.22 The electrocardiogram 4.23 The heart as a pump 4.24 Dynamics of blood and lymph flow 4.25 Cardiovascular regulatory mechanisms 4.26 Circulation through special regions 4.27 Cardiovascular homeostasis in health and disease	6
4	5. Digestive system (6 class hours) 5.1 Structure of digestive system 5.11 General description 5.12 Oral cavity / Pharynx / Esophagus / Stomach / Small intestine / Large intestine / Liver / Pancreas 5.2 Function of digestive system 5.21 Functional anatomy of the Gastrointestinal tract 5.22 Mouth and esophagus 5.23 Digestion in stomach 5.24 Digestion in small intestine 5.25 Absorption in the small intestine 5.26 Function of the colon	6
5	6. Respiration system (6 class hours) 6.1 Structure of respiration system 6.11 General description 6.12 Nose / Larynx / Trachea and bronchi / Lungs / Pleura / Mediastinum 6.2 Function of respiration system 6.21 Pulmonary function 6.22 Gas exchange in the lungs 6.23 Gas transport between the lungs and tissues 6.24 Regulation of respiration 6.25 Respiratory adjustments in health and disease	6
6	7. Urinary System (4 class hours) 7.1 Structure of urinary system 7.11 General description 7.12 Kidneys / Ureters / Urinary bladder / Urethra 7.2 Function of urinary system 7.21 Functional anatomy of kidney 7.22 Glomerular filteration 7.23 Tubular reabsorption and secretion	4

	7.24 Regulation of urine formation 7.25 Micturition	
7	8. Nervous system (6 class hours) 8.1 Structure of nervous system 8.11 General description 8.12 Spinal nerves 8.13 Cranial nerves 8.14 Autonomic nervous system 8.15 Meninges of brain and spinal Cord 8.16 Blood vessels of brain and spinal Cord Blood-brain barrier 8.2 Function of nervous system 8.21 Nerve cells and neuroglia 8.22 Synaptic transmission 8.23 Reflexes 8.24 Sensory functions of the nervous system 8.25 Control of posture and movement 8.26 Central regulation of visceral function 8.27 Neural basis of instinctual behaviour and emotions 8.28 Electrical activity of the brain, sleep and wakefulness 8.29 Higher functions of the nervous system	6
8	9. Reproductive System (4 class hours) 9.1 Male reproductive system 9.11 Internal reproductive organs 9.12 External reproductive organs 9.13 Male urethra 9.14 Function of male reproductive system 9.2 Female reproductive system 9.21 Internal reproductive organs 9.22 External reproductive organs 9.23 Appendix: mamma / perineum 9.24 Function of female reproductive system 10. Sensory Organs (4 class hours) 10.1 Structure of sensory organs 10.11 General description 10.12 Visual organ: eyeball / accessory organs of eye / blood vessels and nerves of eye 10.13 Vestibulocochlear organ: external ear / middle ear / internal ear / conduction of sound waves 10.2 Function of sensory organs 10.21 Initiation of impulses in sense organs 10.22 Vision 10.23 Hearing 10.24 Vestibular function 10.25 Smell and taste	8
9	11. Endocrine system (4 class hours) 11.1 Structure of endocrine system 11.11 General description 11.12 Hypophysis / thyroid gland / parathyroid glands /suprarenal glands /pineal body /	6

	pancreatic islets / thymus / gonads 11.2 Function of endocrine system 11.21 The hypothalamo-hypophysial system 11.22 The thyroid gland 11.23 The parathyroid glands and other calcium metabolism-related hormones 11.24 The adrenal glands 11.25 Endocrine functions of the pancreas 11.26 Endocrine functions of other organs and tissues 12. Energy metabolism and body temperature (2 class hours) 12.1 Energy metabolism 12.2 Body temperature	

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**
T1. Lectures and videos	✓	✓	✓	✓
T2. Case study	✓	✓	✓	✓
T3. Group discussion	✓	✓	✓	✓

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. Mid-term Test	40%	M1-M4
A2. Final Exam	60%	M1-M4

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

Marks Ranges	Grade	Grade Point	Grade Definitions**
93–100 88 – 92	A A-	4.0 3.7	Excellent
83 – 87	B+	3.3	Very Good
78–82 73 – 77	B B-	3.0 2.7	Good
68–72 63–67 58 – 62	C+ C C-	2.3 2.0 1.7	Satisfactory
53 – 57 50 – 52	D+ D	1.3 1.0	Passed
0 – 49	F	0	Failed

REQUIRED READINGS

柏樹令（2018）。系統解剖學 (第九版)。北京：人民衛生。

朱大年（2013）。生理學 (第八版)。北京：人民衛生。

Bai Shuling.(2007). Textbook of Anatomy. Beijin: People's Medical Publishing House.

Yao Tai.(2008). Textbook of Physiology. Beijin: People's Medical Publishing House.

REFERENCES

Alcamo, E. (2004). Anatomy and Physiology (2nd ed.).

郭光文（編）（2000）。人體解剖彩色圖譜。北京：人民衛生。

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/.