



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

Academic Year	2023/2024	Semester	2
Module Code	BSPY2102		
Learning Module	Pharmacology II		
Pre-requisite(s)	Nil		
Medium of Instruction	Chinese / English		
Credits	6	Contact Hours	90
Instructor	Dr. Tao Yi, Aaron	Email	yitao@mpu.edu.mo
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#### MODULE DESCRIPTION

This 90-hour course is the second in a series of courses that equip students with pharmacological knowledge. The course systemically introduces mechanisms of action, pharmacological effects, clinical indications, drug interactions and adverse effects of various drug classes.

#### MODULE INTENDED LEARNING OUTCOMES (ILOS)

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

M1.	Demonstrate an understanding of the basic concepts of pharmacology.
M2.	Analyse and interpret the relationship among mechanisms of action, therapeutic effects and adverse effects of different drugs.
M3.	Describe the classification, clinical indications, mechanism of actions, and significant adverse effects of commonly used drugs.
M4.	Apply pharmacology knowledge to analyse and interpret clinical cases.
M5.	Demonstrate an understanding of the relationship between disease characteristics and pharmacological effects.
M6.	Communicate scientific concepts effectively through oral presentations, demonstrating comprehension of pharmacology principles.

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 pharmacy technology	✓	✓	✓	✓	✓	✓
P2. To demonstrate understanding of theories, analytical approaches and practices that underpin pharmacy operations and management	✓	✓	✓	✓	✓	✓
P3. To demonstrate understanding of major trends and issues related to pharmacy technology	✓			✓	✓	✓
P4. To apply professional knowledge and skills to analyse, interpret and solve problems, challenges and risks in pharmacy practice	✓	✓	✓	✓	✓	
P5. To critically appraise and interpret scientific and clinical literature and apply evidence-based practice	✓	✓		✓	✓	✓
P6. To acquire and apply research skills in pharmacy technology		✓		✓		✓
P7. To demonstrate effective communication and teamwork skills						✓
P8. To maintain professional and ethical standards in pharmacy practice and research	✓	✓	✓	✓	✓	✓

#### MODULE SCHEDULE, COVERAGE AND STUDY LOAD

Week	Content Coverage	Contact Hours
1	1. Pituitary and Thyroid 1.1 Overview 1.2 Hypothalamic and anterior pituitary hormones 1.3 Hormones of the posterior pituitary 1.4 Thyroid hormones	3
2	2. Drugs for Diabetes 2.1 Overview 2.2 Diabetes mellitus 2.3 Insulin and insulin analogs 2.4 Insulin preparations and treatment 2.5 Synthetic amylin analog 2.6 Glucagon-like peptide receptor agonists 2.7 Oral agents 2.8 Other agents  3. Estrogens and Androgens 3.1 Overview 3.2 Estrogens 3.3 Selective estrogen receptor modulators 3.4 Progestogens 3.5 Contraceptives 3.6 Androgens  4. Adrenal Hormones 4.1 Overview 4.2 Corticosteroids	8



Week	Content Coverage	Contact Hours
3	<ul style="list-style-type: none"><li>5. Drugs Affecting Bone Metabolism<ul style="list-style-type: none"><li>5.1 Overview</li><li>5.2 Bone remodeling</li><li>5.3 Prevention of Osteoporosis</li><li>5.4 Treatment of osteoporosis</li></ul></li> <li>6. Principles of Antimicrobial Therapy<ul style="list-style-type: none"><li>6.1 Overview</li><li>6.2 Selection of antimicrobial agents</li><li>6.3 Route of administration</li><li>6.4 Determinants of rational dosing</li><li>6.5 Chemotherapeutic spectra</li><li>6.6 Combinations of antimicrobial drugs</li><li>6.7 Drug resistance</li><li>6.8 Prophylactic use of antibiotics</li><li>6.9 Complications of antibiotic therapy</li><li>6.10 Sites of antimicrobial actions</li></ul></li> <li>7. Cell Wall Inhibitors<ul style="list-style-type: none"><li>7.1 Overview</li><li>7.2 Penicillins</li><li>7.3 Cephalosporins</li><li>7.4 Other <math>\beta</math>-lactam antibiotics</li><li>7.5 <math>\beta</math>-lactamase inhibitors</li><li>7.6 Vancomycin</li><li>7.7 Lipoglycopeptides</li><li>7.8 Daptomycin</li><li>7.9 Fosfomycin</li><li>7.10 Polymyxins</li></ul></li></ul>	8
4	<ul style="list-style-type: none"><li>8. Protein Synthesis Inhibitors<ul style="list-style-type: none"><li>8.1 Overview</li><li>8.2 Tetracyclines</li><li>8.3 Glycylcyclines</li><li>8.4 Aminoglycosides</li><li>8.5 Macrolides and ketolides</li><li>8.6 Fidaxomicin</li><li>8.7 Chloramphenicol</li><li>8.8 Clindamycin</li><li>8.9 Quinupristin/dalfopristin</li><li>8.10 Oxazolidinones</li></ul></li> <li>9. <b>Test I</b></li></ul>	6



Week	Content Coverage	Contact Hours
5	<p>10. Quinolones, Folic Acid Antagonists, and Urinary Tract Antiseptics</p> <ul style="list-style-type: none"><li>10.1 Fluoroquinolones</li><li>10.2 Folate antagonists</li><li>10.3 Sulfonamides</li><li>10.4 Trimethoprim</li><li>10.5 Cotrimoxazole</li><li>10.6 Urinary tract antiseptics/antimicrobials</li></ul> <p>11. Antimycobacterial Drugs</p> <ul style="list-style-type: none"><li>11.1 Overview</li><li>11.2 Chemotherapy for tuberculosis</li><li>11.3 Drugs for leprosy</li></ul>	6
6	<p>12. Antifungal Drugs</p> <ul style="list-style-type: none"><li>12.1 Overview</li><li>12.2 Drugs for subcutaneous and systemic mycotic infections</li><li>12.3 Drugs for cutaneous mycotic infections</li></ul>	3
8	<p>13. Antiviral Drugs</p> <ul style="list-style-type: none"><li>13.1 Overview</li><li>13.2 Treatment of respiratory viral infections</li><li>13.3 Treatment of hepatic viral infections</li><li>13.4 Treatment of Hepatitis B</li><li>13.5 Treatment of Hepatitis C</li><li>13.6 Treatment of herpesvirus infections</li><li>13.7 Treatment of HIV infection</li><li>13.8 NRTIs used to treat HIV infection</li><li>13.9 NNRTIs used to treat HIV infection</li><li>13.10 Protease inhibitors used to treat HIV infection</li><li>13.11 Entry inhibitors used to treat HIV infection</li><li>13.12 Integrase inhibitors used to treat HIV infection</li><li>13.13 Pharmacokinetic Enhancers</li></ul>	6
9	<p>14. Anticancer Drugs</p> <ul style="list-style-type: none"><li>14.1 Overview</li><li>14.2 Principles of cancer chemotherapy</li><li>14.3 Antimetabolites</li><li>14.4 Antibiotics</li><li>14.5 Alkylating agents</li><li>14.6 Microtubule inhibitors</li><li>14.7 Steroid hormones and their antagonists</li><li>14.8 Platinum coordination complexes</li><li>14.9 Topoisomerase inhibitors</li><li>14.10 Antibodies</li><li>14.11 Tyrosine kinase inhibitors</li><li>14.12 Immunotherapy</li><li>14.13 Miscellaneous agents</li></ul>	6



Week	Content Coverage	Contact Hours
10	<p>15. Immunosuppressants</p> <ul style="list-style-type: none"><li>15.1 Overview</li><li>15.2 Induction and Rejection Immunosuppressant Medications</li><li>15.3 Maintenance Immunosuppressant Medications</li></ul> <p>16. Antihistamines and Serotonin</p> <ul style="list-style-type: none"><li>16.1 Overview</li><li>16.2 Histamine</li><li>16.3 H<sub>1</sub> antihistamines</li><li>16.4 Histamine H<sub>2</sub>-Receptor Blockers</li><li>16.5 Serotonin</li><li>16.6 Drugs Used to Treat Headache Disorders</li><li>16.7 Drugs for Obesity</li></ul>	6
11	<p>17. Anti-inflammatory, Antipyretic, and Analgesic Agents</p> <ul style="list-style-type: none"><li>17.1 Overview</li><li>17.2 Prostaglandins</li><li>17.3 Nonsteroidal Anti-inflammatory Drugs</li><li>17.4 Acetaminophen</li><li>17.5 Traditional Disease-Modifying Antirheumatic Drugs</li><li>17.6 Biologic Disease-Modifying Antirheumatic Drugs</li><li>17.7 Other Drugs for Rheumatoid Arthritis</li><li>17.8 Drugs Used for the Treatment of Gout</li></ul> <p>18. <b>Test II</b></p>	6
12	<p>19. Drugs for Disorders of the Respiratory System</p> <ul style="list-style-type: none"><li>19.1 Overview</li><li>19.2 Preferred drugs used to treat asthma</li><li>19.3 Alternative drugs used to treat asthma</li><li>19.4 Drugs used to treat chronic obstructive pulmonary disease</li><li>19.5 Inhaler technique</li><li>19.6 Drugs used to treat allergic rhinitis</li><li>19.7 Drugs used to treat cough</li></ul> <p>20. Gastrointestinal and Antiemetic Drugs</p> <ul style="list-style-type: none"><li>20.1 Overview</li><li>20.2 Drugs used to treat peptic ulcer disease and gastroesophageal reflux disease</li><li>20.3 Drugs used to control chemotherapy-induced nausea and vomiting</li><li>20.4 Antidiarrheals</li><li>20.5 Laxatives</li><li>20.6 Irritable Bowel Syndrome</li><li>20.7 Drugs Used to Treat Inflammatory Bowel Disease</li></ul>	6



Week	Content Coverage	Contact Hours
13	<ul style="list-style-type: none"><li>21. Drugs for Urologic Disorders<ul style="list-style-type: none"><li>21.1 Overview</li><li>21.2 Drugs used to treat erectile dysfunction</li><li>21.3 Benign prostatic hyperplasia</li></ul></li><li>22. Drugs for Anemia<ul style="list-style-type: none"><li>22.1 Overview</li><li>22.2 Agents used to treat anemias</li><li>22.3 Agents used to treat neutropenia</li><li>22.4 Agents used to treat sickle cell disease</li></ul></li></ul>	3
14	<ul style="list-style-type: none"><li>23. Drugs for Dermatologic Disorders<ul style="list-style-type: none"><li>23.1 Overview</li><li>23.2 Topical preparations</li><li>23.3 Agents for acne</li><li>23.4 Topical antibacterial agents</li><li>23.5 Agents used in ectoparasitic infections</li><li>23.6 Agents for pigmentation disorders</li><li>23.7 Drugs for psoriasis</li><li>23.8 Topical corticosteroids</li><li>23.9 Trichogenic agents</li></ul></li></ul>	3
15	<ul style="list-style-type: none"><li>24. Clinical Toxicology<ul style="list-style-type: none"><li>24.1 Overview</li><li>24.2 Emergency treatment of the poisoned patient</li><li>24.3 Select pharmaceutical and occupational toxicities</li><li>24.4 Antidotes</li></ul></li><li>25. Drugs of abuse<ul style="list-style-type: none"><li>25.1 Overview</li><li>25.2 Sympathomimetics</li><li>25.3 Hallucinogens</li><li>25.4 Ethanol</li><li>25.5 Prescription drug abuse</li></ul></li></ul>	6
16	<ul style="list-style-type: none"><li>26. Antiprotozoal Drugs<ul style="list-style-type: none"><li>26.1 Overview</li><li>26.2 Chemotherapy for Amebiasis</li><li>26.3 Chemotherapy for Malaria</li><li>26.4 Chemotherapy for Trypanosomiasis</li><li>26.5 Chemotherapy for Leishmaniasis</li><li>26.6 Chemotherapy for Toxoplasmosis</li><li>26.7 Chemotherapy for Giardiasis</li></ul></li><li>27. Anthelmintic Drugs<ul style="list-style-type: none"><li>27.1 Overview</li><li>27.2 Drugs for the Treatment of Nematodes</li><li>27.3 Drugs for the Treatment of Trematodes</li><li>27.4 Drugs for the Treatment of Cestodes</li></ul></li></ul>	6



Week	Content Coverage	Contact Hours
17	<b>28. Active learning and presentation</b> 28.1 Thyroid disease 28.2 Diabetes 28.3 Hepatitis B 28.4 Breast cancer and its treatment or Lung cancer and its treatment 28.5 Rheumatoid arthritis 28.6 Asthma 28.7 Peptic ulcer disease and gastroesophageal reflux disease 28.8 Erectile dysfunction 28.9 Benign prostatic hyperplasia	6
19	<b>29. Final</b>	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 with case studies and real-life examples	✓	✓	✓	✓	✓	
T2. Literature review and critical analysis	✓	✓	✓	✓	✓	✓
T3. Group discussion and presentations	✓	✓	✓	✓	✓	✓

### 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. Presentation	5	M4, M5, M6
A2. Group discussions	5	M1, M2, M3, M4, M5, M6
A3. Test I	30	M1, M2, M3, M4, M5
A4. Test II	30	M1, M2, M3, M4, M5
A5. Final exam	30	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](http://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. Presentation	Demonstrate the ability to apply pharmacological knowledge to analyse and interpret clinical cases, understand the relationship between disease characteristics and pharmacological effects, and communicate scientific concepts effectively through oral presentations	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A2. Group discussions	Demonstrate the ability to apply pharmacological knowledge to analyse and interpret clinical cases, understand the relationship between disease characteristics and pharmacological effects, and communicate scientific concepts effectively through oral presentations	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A3. Test I	Demonstrate the ability to understand, identify, and apply appropriate pharmacological concepts, knowledge, and methods	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels





A4. Test II	Demonstrate the ability to understand, identify, and apply appropriate pharmacological concepts, knowledge, and methods	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A5. Final exam	Demonstrate the ability to understand, identify, and apply appropriate pharmacological concepts, knowledge, and methods	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels

#### REQUIRED READINGS

Karen Whalen, et al. 2023, Lippincott's illustrated reviews: pharmacology. 8th ed. Baltimore, MD: Lippincott Williams & Wilkins

#### REFERENCES

Katzung B, Masters S, Trevor A. 2015, Basic and clinical pharmacology. 13<sup>th</sup> ed. New York: McGraw-Hill Medical.

Brunton L, Chabner B, Knollman. 2011, Goodman and Gilman's the pharmacological basis of therapeutics. 12<sup>th</sup> ed. New York: McGraw-Hill Professional.

Lexicomp. 2017, *Drug information handbook: a clinically relevant resource for all healthcare professionals*. 26<sup>th</sup> ed. Lexi-Comp.

Joint Formulary Committee. 2017, *British National Formulary 73*. Pharmaceutical 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/](http://www.mpu.edu.mo/student_handbook/).