FACULTY OF HEALTH SCIENCES AND SPORTS

BACHELOR OF SCIENCE IN BIOMEDICAL TECHNOLOGY (PHARMACY TECHNOLOGY)

LEARNING MODULE OUTLINE

Academic Year	2024/2025	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
	Chapter 23. Pituitary and Thyroid (2h) 23.1 Overview 23.2 Hypothalamic and anterior pituitary hormones 23.3 Hormones of the posterior pituitary 23.4 Thyroid hormones	2
	Chapter 24. Drugs for Diabetes (3h) 24.1 Overview 24.2 Diabetes mellitus 24.3 Insulin 24.4 Insulin preparations 24.5 Amylin analog 24.6 Glucagon-like peptide receptor agonists 24.7 Oral agents	3
	Chapter 25. Estrogens, Progestogens and Androgens (4h) 25.1 Overview 25.2 Estrogens 25.3 Selective estrogen receptor modulators 25.4 Progestogens 25.5 Contraceptives 25.6 Androgens	4
	Chapter 26. Adrenal Hormones (2h) 26.1 Overview 26.2 Corticosteroids	2
	Chapter 27. Drugs affecting Bone Metabolism (2h) 27.1 Overview 27.2 Bone remodeling 27.3 Prevention of Osteoporosis 27.4 Treatment of osteoporosis	2
	Test I (2h)	2

	Active learning and presentation 1: Menopause and andropause (1h) **Active learning and presentation 2:** Antimicrobial resistance (1h)	2
	Chapter 28. Principles of Antimicrobial Therapy (3h) 28.1 Overview 28.2 Selection of antimicrobial agents 28.3 Route of administration 28.4 Determinants of rational dosing 28.5 Chemotherapeutic spectra 28.6 Combinations of antimicrobial drugs 28.7 Drug resistance 28.8 Prophylactic use of antibiotics 28.9 Complications of antibiotic therapy 28.10 Classification of antimicrobial agents	3
	Chapter 29. Cell Wall Inhibitors (4h) 29.1 Overview 29.2 Penicillins 29.3 Cephalosporins 29.4 Other β-lactam antibiotics 29.5 β -lactamase inhibitors 29.6 Vancomycin 29.7 Lipoglycopeptides 29.8 Daptomycin 29.9 Fosfomycin 29.10 Polymyxins	4
	Chapter 30. Protein Synthesis Inhibitors (4h) 30.1 Overview 30.2 Tetracyclines 30.3 Glycylcyclines 30.4 Aminoglycosides 30.5 Macrolides 30.6 Fidaxomicin 30.7 Clindamycin 30.8 Oxazolidinones 30.9 lefamulin 30.10 Chloramphenicol 30.11 Quinupristin/dalfopristin	4
	Chapter 31. Quinolones, Folic Acid Antagonists and Urinary Tract Antiseptics (3h) 31.1 Fluoroquinolones 31.2 Folate antagonists 31.3 Sulfonamides 31.4 Trimethoprim 31.5 Trimethoprim/Sulfamethoxazole 31.6 Urinary tract antiseptics/antimicrobials	3
	Chapter 32. Antimycobacterial Drugs (2h) 32.1 Overview 32.2 Chemotherapy for tuberculosis 32.3 Drugs for leprosy	2
	Chapter 33. Antifungal Drugs (2h) 33.1 Overview	2

	33.2 Drugs for subcutaneous and systemic mycotic infections 33.3 Drugs for cutaneous mycotic infections	
	Active learning and presentation 3: Influenza and influenza vaccine (1h) **Active learning and presentation 4:** Hepatitis B (1h)	2
	Chapter 34. Antiviral Drugs (6h) 34.1 Overview 34.2 Treatment of respiratory viral infections 34.3 Treatment of hepatic viral infections 34.4 Treatment of Hepatitis B 34.5 Treatment of Hepatitis C 34.6 Treatment of herpesvirus infections 34.7 Treatment of HIV infection 34.8 NRTIs used to treat HIV infection 34.9 NNRTIs used to treat HIV infection 34.10 Protease inhibitors used to treat HIV infection 34.11 Entry inhibitors used to treat HIV infection 34.12 Integrase inhibitors used to treat HIV infection 34.13 Pharmacokinetic Enhancers	6
	Chapter 35. Antiprotozoal Drugs (2h) 35.1 Overview 35.2 Chemotherapy for Amebiasis 35.3 Chemotherapy for Malaria 35.4 Chemotherapy for Babesiosis 35.5 Chemotherapy for Trypanosomiasis 35.6 Chemotherapy for Leishmaniasis 35.7 Chemotherapy for Toxoplasmosis 35.8 Chemotherapy for Giardiasis	2
	Chapter 36. Anthelmintic Drugs (2h) 36.1 Overview 36.2 Drugs for the Treatment of Nematodes 36.3 Drugs for the Treatment of Trematodes 36.4 Drugs for the Treatment of Cestodes	2
	Active learning and presentation 5: Breast cancer and its treatment (1h) **Active learning and presentation 6:** Lung cancer and its treatment (1h)	2
	Chapter 37. Anticancer Drugs (6h) 37.1 Overview 37.2 Principles of cancer chemotherapy 37.3 Antimetabolites 37.4 Antitumor Antibiotics 37.5 Alkylating and adducting agents 37.6 Microtubule inhibitors 37.7 Steroid hormones and their antagonists 37.8 Topoisomerase inhibitors 37.9 Antibodies 37.10 Kinase inhibitors 37.11 Immunotherapy 37.12 Cellular and gene therapy products 37.13 Miscellaneous agents 37.14 Other Immunosuppressant Medications	6

	Active learning and presentation 7: Organ transplantation (1h) Chapter 38. Immunosuppressants (2h) 38.1 Overview 38.2 Immunosuppressant Drugs for Induction and Rejection 38.3 Maintenance Immunosuppressant Medications	3
	Test II (2h)	2
	Chapter 39. histamines and Serotonin (2h) 39.1 Overview 39.2 Histamine 39.3 Histamine H_1-receptor blockers (antihistamines) 39.4 Histamine H_2-Receptor Blockers 39.5 Serotonin 39.6 Drugs used to treat headache disorders	2
	Active learning and presentation 8: Rheumatoid Arthritis (1h) Chapter 40. Anti-inflammatory, Antipyretic, and Analgesic Agents (4h) 40.1 Overview 40.2 Prostaglandins 40.3 Nonsteroidal Anti-inflammatory Drugs 40.4 Acetaminophen 40.5 Traditional Disease-Modifying Antirheumatic Drugs 40.6 Biologic Disease-Modifying Antirheumatic Drugs 40.7 Other Drugs for Rheumatoid Arthritis 40.8 Drugs Used for the Treatment of Gout	5
	Active learning and presentation 9: asthma and chronic obstructive pulmonary disease (1h) Chapter 41. Drugs for Disorders of the Respiratory System (3h) 41.1 Overview 41.2 Preferred drugs used to treat asthma 41.3 Alternative drugs used to treat asthma 41.4 Drugs used to treat chronic obstructive pulmonary disease 41.5 Inhaler technique 41.6 Drugs used to treat allergic rhinitis 41.7 Drugs used to treat cough	4
	Active learning and presentation 10: Peptic ulcer disease and gastroesophageal reflux disease (1h) Chapter 42. Gastrointestinal and Antiemetic Drugs (3h) 42.1 Overview 42.2 Drugs used to treat peptic ulcer disease and gastroesophageal reflux disease 42.3 Drugs used to control chemotherapy-induced nausea and vomiting 42.4 Antidiarrheals 42.5 Laxatives 42.6 Irritable Bowel Syndrome 42.7 Drugs Used to Treat Inflammatory Bowel Disease	4

	Active learning and presentation 11: erectile dysfunction (1h) **Active learning and presentation 12:** Benign prostatic hyperplasia (1h) Chapter 43. Drugs for Urologic Disorders (2h) 43.1 Overview 43.2 Drugs used to treat erectile dysfunction 43.3 Benign prostatic hyperplasia	4
	Chapter 44. Drugs for Anemia (2h) 44.1 Overview 44.2 Agents used to treat anemias 44.3 Agents used to treat neutropenia 44.4 Agents used to treat sickle cell disease Chapter 45. Drugs for Dermatologic Disorders (2h) 45.1 Overview 45.2 Topical preparations 45.3 Agents for acne 45.4 Agents for superficial bacterial infections 45.5 Agents used for rosacea 45.6 Agents for pigmentation disorders 45.7 agents for psoriasis 45.8 Agents for alopecia	4
	Chapter 46. Clinical Toxicology (2h) 46.1 Overview 46.2 Emergency treatment of the poisoned patient 46.3 Select pharmaceutical and occupational toxicities 46.4 Antidotes	2
	Chapter 47. Drugs of abuse (1 hours) 47.1 Overview 47.2 Sympathomimetics 47.3 Hallucinogens 47.4 Cannabis (Marijuana) 47.5 Ethanol and agents for treatment of alcohol dependence 47.6 Prescription drug abuse Chapter 48. Pharmacogenomics (2 hours) 48.1 Overview 48.2 Pharmacogenomics 48.3 Drug-metabolizing enzymes 48.4 Drugs transporters 48.5 Hypersensitivity reactions 48.6 Implementation	3
	Final (2h)	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	9	M4, M5, M6
A2. In Class oral Tests	8	M1, M2, M3, M4, M5, M6
A3. Group discussions	8	M1, M2, M3, M4, M5, M6
A4. Test I	25	M1, M2, M3, M4, M5
A5. Test II	25	M1, M2, M3, M4, M5
A6. Final exam	25	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. 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. In Class oral Tests	Demonstrate the ability to answer questions on topics covered in the outline	Excellent	Good/ Very Good	Satisfactory	Marginal Pass	Fail; not reaching marginal levels
A3. 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
A4. 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
A5. 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
A6. 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, Trevor A. 2020, Basic and clinical pharmacology. 15th ed. New York: McGraw-Hill Medical.

Brunton L, Knollman B. 2022, Goodman and Gilman's the pharmacological basis of therapeutics. 14th ed. New York: McGraw-Hill Professional.

Lexicomp. 2018, *Drug information handbook: a clinically relevant resource for all healthcare professionals.* 27th ed. Lexi-Comp.

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/.