# Faculty of Medicine

## Major: Doctor of Medicine

## Academic Year: 2023/2024

## Subject: General Pharmacology

# COURSE SYLLABUS

## Student's Copy

+962 6 479 5555 info@isums.edu.jo
Qastal - Amman 16197 Jordan القسطل - عمّان 16197 الأردن

www.isums.edu.jo

## 1. Course information:

| Theory | | Practical | |
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| **Course Title:** | General Pharmacology | **Course Title:** | - |
| **Course Code:** | 1001220 | **Course Code:** | - |
| **Co-Requisite:** | | **Co-Requisite:** | |
| **Prerequisite:** | | **Prerequisite:** | |
| **Course Credit Hours:** | 3 hours | **Course Credit Hours:** | - |
| **Class Location:** | | **Class Location:** | |
| **Department:** | | Basic medical sciences | |
| **Final Qualification:** | | | |

## 2. Instructor Contact Information:

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| **Coordinator:** | Prof. Salah AbuRuz | |
| **Instructor(s):** | Dr. Sameh Ahmad Muhammad<br>Dr. Rami Beiram | |
| **Email:** | saburuz@uaeu.ac.ae<br>sameh.abdulghany@ismus.edu.jo<br>rbeiram@uaeu.ac.ae | |
| **Office:** | | |
| **Office Hours:** | Sunday: 11.30-12.0 / 2.30-3.00 , Monday: 11.30-12.0 / 1.30-3.00, Tuesday: 11.30-12.0 / 2.00-3.00, Wednesday: 11.30-12.0 / 2.00-3.00 , Thursday: 10.30-11.30 / 2.00-3.00 | |

## 3. Course Description:

This is a general pharmacology module for second year medical students. In this seriesof lectures, students will be introduced to the fundamental concepts of Pharmacology including pharmacokinetics, pharmacodynamics, drug metabolism, toxicology, and druginteractions. In addition, the course will introduce students to the pharmacology of the central and autonomic nervous systems. Students will also be introduced to the major drug classes that are used to treat diseases of the cardiovascular system. This course will provide an introduction to the pharmacology and clinical use of antibiotic drugs usedin the treatment of infectious diseases. Additional lectures will also cover drugs used in chemotherapy and the treatment of cancer. Other topics will include drugs used for painmanagement.

This course is 3 credit hours, with a total of 45 lectures per semester. The main method of teaching is through lectures that are given three times per week. Students are encouraged for critical thinking and asking questions to enhance their understanding of the course. There are no labs in this course; however, simulation lab for the effects of drugs workingon the autonomic nervous system may be given optionally for students. Although this course is a general pharmacology course, subjects such as antibiotics and analgesics are discussed extensively for students. The main method of assessment is through theoretical exams throughout the semester (Midterm and final exams).

## 4. Resources Available to Students:

1. Goodman and Gilman's: The Pharmacological basis of therapeutics, latest edition. McGraw-Hill.
2. Pharmacology, H.P. Rang M. M. Dale and J.M. Ritter, latest edition, Churchill Livingstone.
3. Elsevier's Integrated Pharmacology, M. Kester, K.E. Vrana, S.A. Quraishi and K.D. Karpa, latest edition
4. Basic and Clinical Pharmacology, Bertram G Katzung and Anthony J Trevor,latest edition, McGraw-Hill

## 5. Teaching Methods

a. Lectures.
b. Discussion and problem solving.
c. Individual and groups activities.
d. In- class coopetition.

## 6. Intended Learning Outcomes (ILOs):

**Upon successful completion of this course students will be able to …**

1. To study the general principles of pharmacology that enables the students to use drugs properly and safely in their practice.
2. To discuss general drugs dealing with the sympathetic and parasympathetic systems in regard of their classifications, actions, indications, side effects, and contraindications.
3. To understand the therapeutic indications, mechanism of action, contraindications, toxic effects, and drug interactions of commonly used antibiotics and analgesics in clinical practice.
4. To explore tools and methods used in drug evaluation and discovery culminating in clinical trials and approval of drugs.

## 7. Course Policies:

**To be explained to students at the first meeting:**

**1. Attendance Policies:**

**A. Attendance Policy (absences and tardiness for a traditional course):**

a. Students must attend all classes of this course.
b. Any student with an absence of 15% of the classes of any course, will be illegible to sit for the final exam and will result in a failing grade being assigned in this course.
c. Excused absences include documented illness, deaths in the family, and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize

students who have valid excuses. Consideration will also be given to students whose dependent children experience serious illnesses.

~~d.~~ Students with a legitimate reason to miss a required activity must request an approved absence through Student Academics. Unexcused absence from a scheduled examination or quiz may result in (0 %) being assigned for that assessment. Unexcused absence from an activity for which attendance is may be considered an issue of Professionalism.

e. Any student who arrives late will not be allowed to attend the class and will be marked absent.

**B. Exam Attendance:**

a. A student who is more than 10 minutes late, will not be permitted to submit the exam.

b. A student who is late more than 30 minutes will not be permitted to submit the final exam, and no student will be permitted to leave the exam center before the elapse of 30 minutes.

**2. Exams Policies:**

a. Students are expected to take their exams on time and as scheduled by their instructors.

b. Student who are unable to take (quiz, midterm or final) exam due to any reason should contact their instructor immediately.

c. Make-up exams are of the responsibility of faculty committee.

d. A final exam, paper, or project is required in all courses.

e. Seminars and workshops are included in evaluation criteria.

f. Only registered undergraduate and graduate credit students are allowed to take final exams.

g. If you are unable to take the final exam at the scheduled time without any acceptable excuse, you may not be allowed to rearrange the final exam separately (Make-up).

h. If you attend the final exam and do not submit the exam sheet, or do not complete the exam for any reason, you are not allowed to complete the final exam at another time or appeal for a final make-up exam and will be assigned falling for the final exam.

i. If you do not take your final exam and did not withdraw from the course by the withdrawal deadline you will assign a failing grade for the final exam.

3. **Cheating Policies:** Cheating is officially defined as giving or attempting to give, obtaining or attempting to obtain, information relative to an examination or other work that the student is expected to do alone and not in collaboration with others, or the use of material or information restricted by the instructor. Plagiarism is no lesser an offense than cheating, it means repeating another's sentences as your own, adopting a particularly apt phrase as your own, paraphrasing someone else's argument as your own, and presenting someone else's line of thinking in the development of a thesis as though it were your own.

4. **Penalty for cheating and plagiarism:** The failing grade, shall be assigned for that piece of work to any students cheating or plagiarizing.

5. **Mobiles:** Mobile phones should be kept turned off or silent while in class. Usage of mobile phones is not allowed in classes in any form (talking and/or texting).

## 8. Course Grading System:

| Assessment Tools | Weight (100%) | Description |
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| Midterm Exam | 40% | - MCQs and fill in the space questions<br>- True/ False<br>- Short essay<br>- Matching<br>- Identifying structures in drawing. |
| Final Exam | 60% | - MCQs and fill in the space questions<br>- True/ False<br>- Short essay<br>- Matching<br>- Identifying structures in drawing. |

## 9. Course Outlines/ Schedule:

| Week | Topic | Chapter | Reference | Estimated number of hours | Teaching method | | ILOs |
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| | | | | | Theoretical Lectures | Practical Laboratories | |
| 1 | Introduction, General Pharmacology I | General Pharmacology | | 1.5 | ✓ | - | **General Pharmacology I & II: Pharmacokinetics**<br>1. Define the science of Pharmacology and its branches including: pharmacognosy, pharmacokinetics, pharmacodynamics, pharmacotherapeutics, and toxicology.<br>2. Introduce students to the principles of pharmacokinetic parameters including: Drug Absorption, Distribution, Metabolism, and Elimination.<br>3. Describe the physicochemical and physiological factors that influence the absorption of drugs from enteral and parenteral routes of administration, their distribution within the body, and their metabolism and mechanisms of elimination.<br>4. Explain how dose, bioavailability, rate of absorption, apparent volume of distribution, total clearance, and elimination half-life affect the<br><br>plasma concentrations of a drug after administration. |
| 1 | General Pharmacology II | | | 1.5 | ✓ | - | |

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| **2** | General Pharmacology III | | | 1.5 | ✓ | - | **Drug–Receptor Interactions and Pharmacodynamics**<br>1. Understand what is meant by pharmacodynamics.<br>2. Describe what is meant by the term 'cell receptor'.<br>3. Understand the concept of receptor occupancy.<br>4. Give examples of different cell receptors.<br>5. Outline how drugs affect the body.<br>6. Understand the drug dose-response relationships.<br>7. Define important drug properties including its affinity for receptor binding, potency, efficacy and therapeutic index.<br>8. Differentiate between a drug that is an agonist and a drug that is an antagonist.<br>9. Use basic maths to calculate simple drug dosages. |
| **2** | General Pharmacology IV | | | 1.5 | ✓ | - | |
| **3** | Principles of antimicrobial therapy | Chemotherapy | | 1.5 | ✓ | - | 1. Know the principles of antimicrobial therapy.<br>2. Know the classification of antimicrobial agents.<br>3. Identify these terms: narrow spectrum antibiotic, broad spectrum antibiotic, superinfection, bacteriostatic, bactericidal, empiric therapy, and prophylactic therapy.<br>4. Know the advantages and disadvantages of antibiotics combination.<br>5. Know the mechanisms of action, indications, adverse effects, contraindication, cautions, and relative |
| **3** | Cell wall inhibitors | | | 1.5 | ✓ | - | |
| **4** | Protein synthesis inhibitors | | | 1.5 | ✓ | - | |
| **4** | Inhibitors of bacterial DNA synthesis | | | 1.5 | ✓ | - | |
| **5** | Folic acid antagonists, New | | | 1.5 | ✓ | - | |

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| | antimicrobial drugs | | | | | | safety in pregnancy and children of antibacterial agents.<br>6. List the B-lactam drugs and non-B-lactam drugs.<br>7. Know the mechanism of action of penicillin's and cephalosporins, their clinical uses, adverse effects, and contraindications.<br>8. List the drugs that inhibit protein synthesis, their actions, clinical uses, contradictions, and adverse effects.<br>9. List the drugs that inhibit bacterial DNA synthesis, their actions, clinicaluses, contradictions, and adverse effects.<br>10. Know the main mechanism of action of folic acid antagonists, theirclinical use, contraindications, and adverse effect. |
| **5** | Antiprotozoal and Anthelmintic Drugs | | | 1.5 | ✓ | - | 1. Understand the major therapeutic options in the treatment of malaria,their mechanisms of action, indications, and adverse effects.<br>2. Understand the concept of combination therapy in the treatment of malaria.<br>3. List the major therapeutic options used in the treatment of majorworms encountered in Jordan.<br>4. Understand the major mechanisms of action of anthelmintic drugs. |
| **6** | Antifungal Agents | | | 1.5 | ✓ | - | 1. Understand the relationship between |

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| | | | | | | | fungal structure and the mechanisms of action of antifungal drugs.<br>2. Outline the general indications, adverse effects profile, and contraindications for the following antifungal drugs: ketoconazole, fluconazole, and nystatin. |
| **6** | Antiviral Agents | | | 1.5 | ✓ | - | 1. Relate the viral life cycle to the mechanisms of action of antiviraldrugs.<br>2. Outline the general indications, adverse effects profile, and contraindications for the following antiviral drugs: amantadine, oseltamivir, and acyclovir |
| **7** | Introduction to CNS Pharmacology | CNS | | 1.5 | ✓ | - | 1. Revise concepts of action potential and its importance in neuronal signalling.<br>2. Discuss different neurotransmitters and their functions in the brain.<br>3. Describe the life cycle of 2 major neurotransmitters: acetylcholine and norepinephrine.<br>4. Describe different types of drugs' mechanism of action, and giveexamples of drug classes in each step.<br>5. Differentiate between agonists, antagonists, biased agonists,inverse agonists, and biased agonists. |

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| **7** | Pharmacology of ANS 1 | ANS | | 1.5 | ✓ | - | 1. Identify the key conceptual similarities and differences between autonomic cholinergic and adrenergic pathways including receptor subtypes, neurotransmitters, transmitter synthesis, storage, and release, and relative specificities of drugs that stimulate or inhibit each branch or activity.<br>2. List the major systems or organs innervated by the autonomiccholinergic and adrenergic systems.<br>3. Describe the organ system effects of cholinergic and adrenergicstimulation or antagonism.<br>4. Relate the tissue expression profiles of cholinergic and adrenergicreceptors to their specific functions. |
| **9** | Pharmacology of ANS 2 | | | 1.5 | ✓ | - | |
| **9** | Introduction to CVS Pharmacology 1 | CVS | | 1.5 | ✓ | - | 1. Understand the major physiological mechanisms regulating cardiacand vascular functions in the body.<br>2. Understand the term: chronotropy, dromotropy, inotropy, andlusitropy.<br>3. Understand the role of renin-angiotensin-aldosterone in the regulationof blood pressure.<br>4. Describe the major pharmacological strategies used in the treatmentof hypertension and ischemic heart diseases, based on the |
| **10** | Introduction to CVS Pharmacology 2 | | | 1.5 | ✓ | - | |
| **10** | Introduction to CVS Pharmacology 3 | | | 1.5 | ✓ | - | |

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| | | | | | | | principles discussed before. |
| **11** | Antineoplastic Drugs | Chemotherapy | | 1.5 | ✓ | - | 1. Discuss the principles of conventional cytotoxic anticancer drugs (Cancer Chemotherapy)<br>2. Understand the pharmacology of conventional cytotoxic anticancer drugs (Cancer Chemotherapy)<br>3. Understand the side effects and limitations associated with the use of conventional cytotoxic drugs<br>4. Review the molecular basis of tumour EGFR signalling and angiogenesis as potential pharmacological targets for therapeutic intervention<br>**5.** Discuss the pharmacology of current molecular targeted anticancer drugs including monoclonal antibodies and tyrosine kinase<br>**6.** Inhibitors and the rationale for their use in cancer therapy |
| **11** | Autocoids | Autacoids | | 1.5 | ✓ | - | 1. Understand the concept of autacoids and their functions in the body.<br>2. Know histamine properties and effects.<br>3. Know histamine receptors and their location in the body.<br>**4.** Identify the types of histamine antagonists and their clinical use and adverse effects. |
| **12** | NSAIDs | Analgesics | | 1.5 | ✓ | - | 1. Understand the physiological pathway of prostanoid biosynthesis |

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| | | | | | | | andlist the therapeutic uses of prostaglandins.<br>2. Understand the mechanism of action of NSAIDs and their chemicalclasses, therapeutic uses, and side effects.<br>3. Compare between different classes of NSAIDs and recognize the<br>4. therapeutic differences with Aspirin and Acetaminophen. |
| **12** | Management of Drug Poisoning 1 | Management of Drug Poisoning | | 1.5 | ✓ | - | 1. Understand the concept of drug-drug interactions, and the pharmacological bases of this phenomenon.<br>2. List common examples of frequently encountered drug interactions in clinical practice.<br>3. Outline the major therapeutic strategies used in the prevention andreversal of drug interactions.<br>4. Describe the process of drug discovery, from the lab into the market.<br>5. Outline major strategies used in the evaluation of new drugs.<br>6. Understand the concept of clinical trials, their phases, requirements,and regulatory laws |
| **13** | Management of Drug Poisoning 2 | | | 1.5 | ✓ | - | |
| **13** | Drug Interactions / Drug Evaluation and Clinical Trials 1 | Drug Interactions / Drug Evaluation | | 1.5 | ✓ | - | |
| **14** | Drug Interactions / Drug Evaluation and Clinical Trials 2 | | | 1.5 | ✓ | - | |
| **14** | Drug Interactions / Drug Evaluation and Clinical Trials3 | | | 1.5 | ✓ | - | |

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