Course Code	Course Title	ECTS Credits
MED-303	**Pharmacology**	6
School	**Semester**	**Prerequisites**
Medical School	Fall (Semester 5)	None
Type of Course	**Field**	**Language of Instruction**
Required	Medicine	English
Level of Course	**Year of Study**	**Course Lead**
Undergraduate	3rd	Dr Katerina Prokopiou
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

The main objectives of this course are:

- To describe the principles governing drug actions in humans.
- To illustrate the principles of receptor theory, identify different types of drug targets and their relevant use.
- To describe the process of drug absorption, distribution, metabolism and excretion.
- To identify different types of drug targets in the autonomic and central nervous system and to describe their relevant use.
- To describe types of drug interaction and adverse drug reactions.
- To describe the specific knowledge related to the different classes of drugs in relation to the organ systems they affect, and the diseases for which they are used therapeutically (e.g. drugs used in musculoskeletal disorders and dermatological conditions).

Learning Outcomes:

The following list provides the learning objectives that will be covered in the lectures, and tutorials of each week:

Week 1

Lobs covered during lectures and tutorials:

1. Describe in general the principles of drug action (pharmacodynamics and pharmacokinetics).
2. Describe the various terms such as agonist, antagonist, affinity, efficacy, and potency with reference to drugs.
3. Outline the interaction between drug and receptor.
4. Describe the effects of drugs on different receptor types and other effector systems at the molecular level.
5. Describe the process of receptor sensitization and desensitization and provide examples of drugs that affect these processes.

Week 2

Lobs covered during lectures and tutorials:

6. Describe the effect of liberation, absorption, and first-pass effect on bioavailability.
7. Define distribution, volume of distribution and describe their effects on drug action.
8. Define the blood-brain barrier and list the considerations that determine whether a drug will gain access to the central nervous system.

Week 3

Lobs covered during lectures and tutorials:

9. Describe the role of the liver in drug metabolism.
10. Describe the role of the kidney in drug excretion.
11. Describe the various types of route of drug administration and outline the considerations for choosing an appropriate route of administration.
12. Describe the terms clearance, steady-state, zero-order and first-order kinetics, and explain their importance in clinical use.
13. Outline single-gene pharmacogenetic disorders and pharmacogenomic testing that is clinically available.

Week 4

Lobs covered during lectures and tutorials:

14. Identify the molecular, cellular and biochemical sites where drugs can act to affect the parasympathetic system.
15. Identify the molecular, cellular and biochemical sites where drugs can act to affect the sympathetic system.

Week 5

Lobs covered during lectures and tutorials:

16. Describe the effect of drugs on the major neurotransmitters in the central nervous system, their associated receptors and their predominant pathways.

Revision.

Week 6

Midterm Exam

Lobs covered during lectures and tutorials:

16. Describe the effect of drugs on the major neurotransmitters in the central nervous system, their associated receptors and their predominant pathways.

Week 7

Lobs covered during lectures and tutorials:

16. Describe the effect on drugs on the major neurotransmitters in the central nervous system, their associated receptors and their predominant pathways.
17. Outline the classes of drugs that are being abused and the biological processes underlying drug dependence.

Week 8

Lobs covered during lectures and tutorials:

18. Explain the stages of drug discovery, preclinical and clinical development of a drug.
19. Describe the risks of multiple drug therapy, including those from drug interactions and incorrect usage of medication.
20. Describe changes in pharmacodynamics and pharmacokinetics that may occur with age and explain what is meant by polypharmacy.

Week 9

Lobs covered during lectures and tutorials:

21. Describe the different types of adverse drug reactions and give examples of each type.
22. Describe the mechanism of action and indication of the main types of analgesics and their side effects.

Week 10

Lobs covered during lectures and tutorials:

23. Outline the main mediators involved in the host defence and in the inflammatory response and how drugs can affect these processes.
24. Describe the mechanism of action and indication of the main types of anti-inflammatory drugs and their side effects.
25. Discuss the pharmacological treatment of osteoarthritis (OA) and rheumatoid arthritis (RA) and summarize the major side effects of disease-modifying anti-rheumatic drugs (DMARDs) and corticosteroids.

Week 11

Lobs covered during lectures and tutorials:

26. Give examples of drugs that are used for the management of systemic lupus erythematosus (SLE), describing their mechanism of action and major side effects.
27. Outline the clinical features of drug-induced lupus and give examples of drugs which cause this.
28. Outline strategies for the prevention and treatment of rickets and osteomalacia.

Week 12

Lobs covered during lectures and tutorials:

29. Describe the mechanism of action, place in therapy and side effects of drugs used in the treatment of back pain, gout and osteoporosis.
30. Describe the mechanism of action, place in therapy and major side effects of drugs (including anti-inflammatories, retinoids and biological drugs) for eczema, psoriasis and other common skin conditions.
31. Describe the use of sunscreens and emollients in common skin conditions.

Revision.

Course Contents:

- Introduction to pharmacology
- How drugs act: General principles
- Drug absorption and distribution
- Drug metabolism
- Uses of pharmacokinetics, pharmacogenetics, pharmacogenomics and personalised medicine
- Chemical mediators and drug action in the autonomic nerves system
- Chemical transmission and drug action in the central nervous system
- Drug addiction, dependence and abuse
- Drug discovery and development

- Drug interaction
- Individual variations, aging and polypharmacy
- Harmful effects of drugs
- Analgesics and pain control
- Anti-inflammatory drugs
- Drugs for disorders of the musculoskeletal system
- Drugs for disorders of the skin

Learning Activities and Teaching Methods:

Lectures, Tutorials.

Assessment Methods:

Midterm Exam (35%) and Final Exam (65%). Assessment is by Single Best Answer MCQs (SBAs) and Short Answer Questions (SAQs).

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Rang, H. P	Rang and Dale's pharmacology 8th ed.	Churchill Livingstone	2015	9780702034718

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
Bertram Katzung and Anthony Trevor	Basic and Clinical Pharmacology, 13th edition	Lange	2014	9780071825054
Kaplan	USMLE Step 1 Lecture Notes 2017: Pharmacology	Kaplan Medical	2017	9781506200460
Karen Whalen	Lippincott Illustrated Reviews: Pharmacology	Wolters Kluwer	2015	9781451191776
Pavan Bhat, Alexandra Dretler, Mark Gdowski, Rajeev Ramgopal, Dominique Williams	The Washington manual of medical therapeutics	Lippincott Williams & Wilkins	2014	9781451188516
Goodman & Gilman	Goodman & Gilman's The Pharmacological Basis of Therapeutics	Mcgraw Hill	2011	9780071624428