Course Title	**Pharmacology**				
Course Code	**MED-303**				
Course Type	Required				
Level	Undergraduate				
Year/ Semester	Year 3 / Semester 5 (Fall)				
Teacher's Name	**Course Lead:** Dr Katerina Prokopiou **Contributor:** Dr Katherine Annabel Alexander				
ECTS	6	Lectures / week	3-4	Laboratories / week	0
Course Purpose and Objectives	The main objectives of this course are: • To describe the principles governing drug actions in humans; i.e. the process of pharmacokinetics and pharmacodynamics. • To illustrate the principles of pharmacodynamics, the receptor theory, different types of drug targets and their relevant use. • To describe the principles of pharmacokinetics; i.e. 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 in a variety of conditions. • To understand the mechanism of action, place in therapy and main side effects of analgesic and anti-inflammatory drugs. • To describe the mechanism of action, indications and main side effects of drugs used in the most common musculoskeletal disorders (gout, rheumatoid arthritis, osteoarthritis, osteomalacia, osteoporosis and systemic lupus erythematosus) and dermatological conditions (psoriasis, eczema and acne). • To briefly describe types of drug interactions and understand the classification of the adverse drug reactions.				
Learning Outcomes	The following list provides the learning objectives that will be covered in the lectures, and tutorials of each week: **Week 1** 1. Describe in general the principles of drug action (pharmacodynamics and pharmacokinetics). 2. Explain the stages of drug discovery, preclinical and clinical development of a drug. 3. Describe the various terms such as agonist, antagonist, affinity, efficacy, and potency with reference to drugs. 4. Outline the interaction between drug and receptor. 5. Describe the effects of drugs on different receptor types and other effector systems at the molecular level. 6. Briefly outline the process of receptor sensitization and desensitization and provide examples of drugs that affect these processes.				

Week 2

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

Week 3

10. Describe the role of the liver in drug metabolism.
11. Describe the role of the kidney in drug excretion.
12. Describe the various routes of administration and outline the considerations for choosing an appropriate route of administration.
13. Describe the terms clearance, steady-state, zero-order and first-order kinetics and understand their clinical relevance.

Week 4

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.
16. Describe the mechanism of action and indication of the main types of cholinergic, anti-cholinergic, adrenergic and anti-adrenergic drugs and their main side effects.

Week 5

17. Describe the effect of drugs on the major neurotransmitters in the central nervous system, their associated receptors and their predominant pathways.
18. Describe the mechanism of action and indication of the main types of sedative/hypnotics and their side effects.
19. Describe the mechanism of action and indication of the main types of anti-seizure drugs and their side effects.
20. Describe the mechanism of action and indication of the main types of general anaesthetics and their side effects.

Week 6

21. Describe the mechanism of action and indication of the main types of local anaesthetics and their side effects.
22. Describe the mechanism of action and indication of the main types of muscle relaxants and their side effects.
23. Describe the mechanism of action and indication of the main types of drugs involved in movement disorders and their side effects.

Formative Midterm Exam

Week 7

24. Describe the mechanism of action and indication of the main types of anti-psychotics drugs and their side effects.
25. Describe the mechanism of action and indication of the main types of anti-depressant drugs and their side effects.
26. Describe the mechanism of action and indication of the main types of analgesics, including opioids and acetaminophen and their side effects.
27. Briefly outline the classes of drugs that are being abused and the biological processes underlying drug dependence.

Week 8

28. Describe the mechanism of action and indication of the main types of anti-inflammatory drugs (including non-steroidal anti-inflammatory drugs and corticosteroids), and their side effects.

Week 9

29. Describe the main principles of anti-microbial drug action, anti-microbial drug resistance and adverse effects of antimicrobial drugs.
30. Describe mechanisms of action of sulfonamides, β-lactams, tetracyclines, amphenicols and aminoglycosides.
31. Describe adverse effects of sulfonamides, β-lactams, tetracyclines, amphenicols and aminoglycosides.
32. Describe the clinical uses, indications and contraindications of sulfonamides, β-lactams, tetracyclines, amphenicols and aminoglycosides.

Week 10

33. Describe the mechanisms of action of macrolides, drugs acting on topoisomerase, anti-mycobacterium and less-common antibacterial drugs.
34. Describe the adverse effects of macrolides, drugs acting on topoisomerase, anti-mycobacterium and less-common antibacterial drugs.
35. Describe the clinical uses, indications and contraindications of macrolides, drugs acting on topoisomerase, anti-mycobacterium and less-common antibacterial drugs.

Week 11

36. Describe the classification and mechanisms of action of anti-viral drugs (HIV, Herpes Simplex Virus, Influenza Virus).
37. Describe the clinical uses and adverse effects of anti-viral drugs (HIV, Herpes Simplex Virus, Influenza Virus).

Week 12

38. Classify anti-fungal drugs and describe their mechanisms of action, clinical uses and adverse effects.
39. Classify anti-protozoal and anti-helminthic drugs and describe their mechanisms of action, clinical uses and adverse effects.

<table>
<tr><td></td><td colspan="3">Revision</td></tr>
<tr><td>Prerequisites</td><td>None</td><td>Required</td><td>None</td></tr>
<tr><td>Course Content</td><td colspan="3">

Introduction to pharmacology
Drug discovery and development
How drugs act: General principles
Drug absorption and distribution
Drug metabolism
Chemical mediators and drug action in the autonomic nervous system
Chemical transmission and drug action in the central nervous system
Drug addiction, dependence and abuse
Analgesics and pain control
Anti-inflammatory drugs
Drugs for disorders of the musculoskeletal system
Drugs for disorders of the skin
Drug interactions and adverse drug reactions

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<tr><td>Teaching Methodology</td><td colspan="3">Lectures, Tutorials.</td></tr>
<tr><td>Bibliography</td><td colspan="3">
Required Textbooks/Reading:
Students have the option to choose one from the following two books:
<table>
<tr><th>Authors</th><th>Title</th><th>Publisher</th><th>Year</th><th>ISBN</th></tr>
<tr><td>Rang, H. P</td><td>Rang and Dale's pharmacology 9th ed.</td><td>Elsevier</td><td>2019</td><td>9780702074486</td></tr>
<tr><td colspan="5">OR</td></tr>
<tr><td>Bertram Katzung and Anthony Trevor</td><td>Basic and Clinical Pharmacology, 15th edition</td><td>McGraw-Hill Education</td><td>2021</td><td>9781260452310</td></tr>
</table>
Recommended Textbooks/Reading:
<table>
<tr><th>Authors</th><th>Title</th><th>Publisher</th><th>Year</th><th>ISBN</th></tr>
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	Kaplan	USMLE Step 1 Lecture Notes 2019: Pharmacology	Kaplan	2022	9781506272962 (for set of all topics)
	Karen Whalen	Lippincott Illustrated Reviews: Pharmacology, 7th edition	Lippincott Williams and Wilkins	2018	9781496384133
	Zachary Crees,	The Washington manual of medical therapeutics, 36th edition	Wolters Kluwer	2019	9781975113513
	E-book Permalink http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=e000xww&AN=2536698&site=eds-live&custid=s1098328				
	Goodman & Gilman	Goodman & Gilman's The Pharmacological Basis of Therapeutics, 13th edition	McGraw Hill 13th edition	2017	9781259584732
	Arthur J Atkinson, Jr, Shiew-Meu Huang, Juan JL Lertora, Sanford P Markey,	Principles of clinical Pharmacology, 3rd edition	Academic Press	2012	9780123854711
	E-book Permalink http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,sso&db=nlebk&AN=477513&site=eds-live&custid=s1098328				
	Rosenfeld Gary C	BRS Pharmacology, 7th edition	Wolters Kluwer Health	2019	9781975105495
Assessment	Formative Midterm Exam and Summative Final Exam. The Summative Final Exam will contribute towards 100% of the course grade. Assessment is by Single Best Answer MCQs (SBAs) and there may also be some Short Answer Questions (SAQs).				
Language	English				