

<b>Course Code</b> MED-308	<b>Course Title</b> Systematic Pharmacology I	<b>ECTS Credits</b> 6
<b>School</b> Medical School	<b>Semester</b> Spring (Semester 6)	<b>Prerequisites</b> MED-303 Pharmacology
<b>Type of Course</b> Required	<b>Field</b> Medicine	<b>Language of Instruction</b> English
<b>Level of Course</b> Undergraduate	<b>Year of Study</b> 3rd	<b>Lecturer(s)</b> Dr Soulla Nicolaou
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### Objectives of the Course:

The main objective of the course is to describe the pharmacological principles governing management of common disorders affecting the cardiovascular, respiratory, gastrointestinal, endocrine and reproductive systems.

In general for each condition studied students should be able to list the main drugs, or classes of drugs, that relieve symptoms, produce a cure or improve prognosis and/or reduce risk of recurrence.

For each drug type, students should be able to describe which patients may benefit from its use, its clinical indications, its mechanism of action and the most common or serious side effects.

### 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 the rationale for pharmacological treatment of hypertension and place in therapy of different anti-hypertensive medication.
2. Describe the clinical indications, mechanism of action and adverse effects of drugs targeting the renin-angiotensin-aldosterone system and calcium channel blockers.
3. Describe the clinical indications, mechanism of action and adverse effects of the different types of diuretics.
4. Explain the pharmacological rationale, adverse effects and place in therapy of hydralazine,  $\beta$ -blockers,  $\alpha$ -blockers, centrally-acting drugs and potassium channel activators in the treatment of hypertension.
5. Describe the place in therapy, mechanism of action and adverse effects of drugs used to treat pulmonary arterial hypertension.
6. Outline the treatment options for hypotension and shock.

#### Week 2

##### **Lobs covered during lectures and tutorials:**

7. Outline the pathophysiology of heart failure and describe the pharmacological basis for its treatment.
8. Describe the mechanism of action, place in therapy and adverse effects of drugs

used to treat heart failure.

9. Outline the phases and ion channels involved in the action potential in cardiac tissue.
10. Describe the indications, mechanism of action, and adverse effects of class I and II anti-arrhythmic drugs.

### Week 3

#### **Lobs covered during lectures and tutorials:**

11. Describe the indications, mechanism of action, and adverse effects of class III and class IV anti-arrhythmic drugs.
12. Outline the pharmacology of other unclassified anti-arrhythmic drugs.
13. Outline the different types of angina.
14. Describe the rationale and considerations for pharmacological treatment of angina.
15. Outline the process of atherogenesis.
16. Outline lipoprotein transport and identify drug targets for dyslipidaemias.
17. Describe the mechanism of action, side effects and place in therapy of statins in antihyperlipidaemic treatment.

### Week 4

#### **Lobs covered during lectures and tutorials:**

18. Describe the mechanism of action, side effects and place in therapy of fibrates, cholesterol absorption inhibitors, niacin and other novel antihyperlipidaemic therapies.
19. Describe the mechanism of action, adverse effects and clinical indications for antiplatelet and anticoagulant drugs.
20. Describe the pharmacology of vitamin K and its analogues, including mechanism of action, adverse effects and clinical indications.

### Week 5

#### **Lobs covered during lectures and tutorials:**

21. Describe the mechanism of action, adverse effects and clinical indications for antiplatelet and thrombolytic drugs.
22. Revise the autonomic innervation of the respiratory system.
23. Outline the pathophysiology of asthma.
24. Describe the mechanism of action, adverse effects and place in therapy of  $\beta$ -2 agonists and methylxanthines in the treatment of asthma.

### Week 6

#### **Lobs covered during lectures and tutorials:**

25. Describe the mechanism of action, adverse effects and place in therapy of leukotriene inhibitors, lipoxygenase inhibitors and anti-inflammatory drugs in the treatment of asthma.
26. Outline the pathophysiology of chronic obstructive pulmonary disease (COPD).
27. Describe the mechanism of action, adverse effects and place in therapy of drugs used to treat COPD.

### **Midterm Exam.**

## Week 7

### **Lobs covered during lectures and tutorials:**

28. Describe the clinical indications, mechanism of action and adverse effects of other drugs affecting the respiratory system, specifically anti-histamines, expectorants, mucolytics, cough suppressants and decongestants.
29. Explain how bleomycin, amiodarone, oxygen, tobacco and cocaine may adversely affect the respiratory system.
30. Outline the regulation of gastric acid secretion.
31. Describe the clinical indications, place in therapy, mechanism of action and adverse effects of drugs used to reduce or neutralize gastric acid.

## Week 8

### **Lobs covered during lectures and tutorials:**

32. Outline the factors and mechanisms that may induce vomiting.
33. Describe the pharmacology of anti-emetic drugs, including clinical indications, mechanism of action and adverse effects.
34. Describe the pharmacology of drugs that alter the motility of the GI tract, including their clinical indications, mechanism of action and adverse effects.
35. Describe the pharmacology of drugs used to treat inflammatory bowel disease, including their clinical indications, place in therapy, mechanism of action and adverse effects.
36. Outline the rationale for pharmacological treatment of chronic pancreatitis and cholestasis.
37. List drugs that may cause pancreatitis or cholestasis.

## Week 9

### **Lobs covered during lectures and tutorials:**

38. Explain why the liver is particularly susceptible to drug-induced damage.
39. Describe how paracetamol overdose can lead to hepatotoxicity.
40. List drugs that may cause hepatotoxicity.
41. Outline the rationale for pharmacological treatment of chronic decompensated liver failure.
42. Outline the considerations for prescribing in hepatic impairment.
43. Briefly revise the physiology of fluid and electrolyte balance.
44. Describe the basic principles of fluid and electrolyte administration.
45. Outline the clinical indications for fluid and electrolyte administration.

## Week 10

### **Lobs covered during lectures and tutorials:**

46. Review the role of insulin, glucagon and incretins in control of blood glucose.
47. Outline the mechanisms resulting in hyperglycaemia in diabetes mellitus.
48. Describe the mechanism of action, adverse effects and place in therapy of drugs used in the treatment of diabetes mellitus.
49. Outline the regulation of food intake and energy expenditure.
50. List drugs that may cause weight changes as a side effect.
51. Describe pharmacological interventions used to treat obesity and the challenges of developing effective drugs.

## Week 11

### **Lobs covered during lectures and tutorials:**

52. Describe the pharmacology of drugs affecting growth hormone (GH) secretion and action, including clinical indications, place in therapy, mechanism of action and adverse effects.
53. Describe the pharmacology of drugs affecting prolactin secretion, including clinical indications, place in therapy, mechanism of action and adverse effects.
54. Describe the effects of drugs on vasopressin action, including mechanism of action, adverse effects and clinical indications.
55. Describe the effects of drugs on the hypothalamic-pituitary-adrenal axis, including mechanism of action, adverse effects and clinical indications.
56. Briefly revise the pharmacology of corticosteroids including mechanism of action, adverse effects and clinical uses.
57. Outline the synthesis, secretion and physiological actions of thyroid hormones.
58. Describe the pharmacology of drugs used to treat hyperthyroidism and hypothyroidism including clinical indications, place in therapy, mechanism of action and adverse effects.
59. List drugs that may alter thyroid function as a side effect.

## Week 12

### **Lobs covered during lectures and tutorials:**

60. Outline the hormonal control of the menstrual cycle.
61. Describe the mechanism of action, route of administration and adverse effects of contraceptives.
62. Outline special considerations when choosing a contraceptive.
63. Outline the rationale for clinical indications of oestrogens and progesterones.
64. List the drugs used in postmenopausal hormone replacement.
65. Describe the benefits and drawbacks of hormone replacement therapy.
66. Describe the pharmacology of androgen and anti-androgen drugs, including mechanism of action, clinical uses and adverse effects.

## **Course Contents:**

### **Topics covered in lectures:**

Drugs used on specific body systems or against specific conditions:

#### **Cardiovascular pharmacology**

- Hypertension
- Pulmonary arterial hypertension
- Hypotension
- Heart failure
- Anti-arrhythmic drugs
- Angina
- Anti-hyperlipidaemics
- Anticoagulant, antiplatelet and thrombolytic drugs

#### **Respiratory pharmacology**

- Asthma
- COPD
- Other drugs targeting the respiratory system

**Gastrointestinal drugs**

- Peptic ulcer
- GORD
- Anti-emetics
- Motility
- Inflammatory bowel disease
- Cholestasis
- Pancreatitis
- Hepatic failure
- Fluids & Electrolytes

**Endocrine Pharmacology**

- Diabetes mellitus
- Obesity
- Drugs affecting somatotrophic, pituitary, hypothalamic and adrenal cortex hormones
- Drugs affecting thyroid function

**Reproductive pharmacology**

- Contraceptives
- Hormone-replacement therapy

**Topics covered in tutorials:**

Case studies/practice questions.

**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	2016	139780702053627

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
Rosenfeld Gary	Pharmacology	Lippincott Williams & Wilkins	2014	9781451175356
Karen Whalen	Lippincott Illustrated Reviews: Pharmacology	Wolters Kluwer	2015	9781451191776
Pavan Bhat, Alexandra Dretler,	The Washington manual of medical therapeutics	Lippincott Williams & Wilkins	2014	9781451188516

Mark Gdowski, Rajeev Ramgopal, Dominique Williams				
Goodman & Gilman	Goodman & Gilman's The Pharmacological Basis of Therapeutics	Mcgraw Hill	2011	9780071624428
Kaplan	USMLE Step 1 Lecture Notes 2017: Pharmacology	Kaplan Medical	2017	9781506200460