

PHAR2011

Introductory Pharmacology and Toxicology

Course Outline

Term 3, 2022

School of Medical Sciences
Faculty of Medicine & Health

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1. Staff

Note: for course related enquiries, please contact us at phar2011@unsw.edu.au

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor	A/Prof Lu Liu	lu.liu@unsw.edu.au	By appointment	90655578
Convenor	A/Prof Nicola Smith	nicola.smith@unsw.edu.au	By appointment	9065 0370
Lecturer	Dr Trudie Binder	w.binder@unsw.edu.au	By appointment	
Lecturer	Dr Nicole Jones	n.jones@unsw.edu.au	By appointment	
Lecturer	Mr. Martin Le Nedelec	m.lenedelec@unsw.edu.au	By appointment	
Lecturer	Dr. Matthew Perry	m.d.perry@unsw.edu.au	By appointment	

2. Course information

Units of credit: 6

Pre-requisite (s): 6 UOC Level 1 Mathematics, 6 UOC level I Biology (BABS1201 preferred), 12 UOC level I Chemistry, 6 UOC Physiology 1A*. *Note: 3999 Medicinal Chemistry (Honours) students receive a special exemption from requiring Physiology 1A, but must complete 6 UOC Biochemistry (BIOC2101 preferred)

Teaching times and locations: <http://timetable.unsw.edu.au/2022/PHAR2011.html>

2.1 Course summary

This course will cover the basic principles of pharmacology with an emphasis on drug action from the molecular and cellular levels to tissue, organ, and whole organism levels. The course will provide an understanding of the principles of drug action (pharmacodynamics) in terms of drug chemistry, drug-receptor interaction, receptor theory and dose-response relationships. An introduction to receptor-mediated signal transduction, membrane receptors and autonomic pharmacology will be covered. The handling of drugs by the body through the processes of absorption, distribution, metabolism, and excretion (pharmacokinetics) will be covered in some detail, along with drug analysis and the adverse effects of drugs. The laboratory classes will involve students performing real and computer-simulated pharmacological experiments.

2.2 Course aims

Through this course, we will help students attain skills, qualities, understanding and attitudes that promote lifelong learning that students should acquire during their university experience. The objectives of the PHAR2011 course are to:

- develop an understanding of how drugs/therapeutics are developed, work and are used safely

- cultivate skills that allow students to critically analyse, interpret and effectively communicate pharmacology data and literature
- acquire skills to be able to design and/or execute experiments or other activities to address pharmacological scenarios.

2.3 Course learning outcomes (CLO)

At the successful completion of this course, you (the student) should be able to:

1. Describe basic pharmacological concepts, including pharmacokinetics and pharmacodynamics.
2. Describe the specific pharmacology of common drug classes currently used in medical practice including their mechanisms of action, indications, clinical uses, contraindications, and major adverse effects.
3. Describe basic principles of toxicology, including the mechanisms by which excess exposure to certain drugs, toxins, chemicals, and poisons can lead to toxic effects.
4. Effectively communicate scientific information, organise the information in a written assignment, and implement effective peer review.
5. Apply analytical skills to pharmacological data.

2.4 Relationship between course learning outcomes and assessments

Course Learning Outcome (CLO)	CLO Statement	Related Tasks & Assessment
CLO 1	Describe basic pharmacological concepts, including pharmacokinetics and pharmacodynamics	Mid-session exam Continuous Assessment - Quizzes End of session examination
CLO 2	Describe the specific pharmacology of common drug classes currently used in medical practice including their mechanisms of action, indications, clinical uses, contraindications, and major adverse effects	Mid-session exam Continuous Assessment - Quizzes End of session examination
CLO 3	Describe the basic principles of toxicology, including the mechanisms by which excess exposure to certain drugs, toxins, chemicals, and poisons can lead to toxic effects	Mid-session exam Continuous Assessment - Quizzes End of session examination
CLO 4	Effectively communicate scientific information, organise the information in a written assignment, and implement effective peer review	Written Commentary Assignment
CLO 5	Apply analytical skills to pharmacological data	Mid-session exam Written Commentary Assignment Continuous Assessment - Quizzes End of session examination

3. Strategies and approaches to learning

3.1 Learning and teaching activities

This 6 UOC course consists of:

- 2-3 lecturing topics (lectures) per week
- Practical / tutorial sessions of up to 4 hours per week
- Self-directed learning

Learning activities occur on the following days and times:

Lectures: Topics being covered each week can be found in *Part 4 Course schedule and structure* and on the course timetable on Moodle. The topics will be covered via pre-recorded lectures or online modules and will be available online prior to the week scheduled.

Laboratory practicals: The practicals are a core part of your learning experience in the sciences. You should attend the laboratory practicals to be held face to face (or online for approved students) on Tuesday 10 am – 1 pm or 2 – 5 pm. Students should all attend the practical lab in Week 1 and then attend the rest of the labs fortnightly. Please check your timetable on myUNSW and information on Moodle to find out if your labs are in odd weeks or even weeks.

Collaborative learning session: You should attend one session per week, delivered face to face (or online for approved students) on Thursdays at either 3 – 4 pm or 4 – 5 pm or Friday at 10 - 11 am, or 11 am – 12 pm

Q & A sessions: Online on Monday 11 am – 12 pm unless specified.

Mid-term exam: The test covers content from weeks 1-4 and will be held on Wednesday 12 October at 5 – 6 pm.

Information regarding weekly activities will be available via the interactive Course Schedule on Moodle and in weekly announcements via Moodle.

3.2 Expectations of students

Students enrolled in this course are expected to attend all scheduled activities for the full duration. Students are reminded that UNSW recommends that a 6 units-of-credit course should involve about 150 hours of study and learning activities. The formal learning activities total approximately 50 hours throughout the term, and students are expected (and strongly recommended) to do at least the same number of hours of additional study.

Lectures will provide you with the concepts and theories essential for understanding Introductory Pharmacology.

Q&A sessions are provided to allow you the opportunity to clarify points covered in each week's topics. You should review the week's topics and make notes well in advance of the Q&A session. You should then review your notes and write down any questions you have about these topics and bring those questions along to the Q&A session.

Practical classes are provided to support lecture materials and practise analytical and critical evaluation skills.

Tutorials are designed not only to consolidate lecture materials but also to help you with your commentary assignment.

As practical and tutorial classes are relatively small and face to face, they allow you to engage in a more interactive form of learning. These classes help you to achieve CLO 1-5. You need to complete any preparation work set prior to attending these classes. This might include pre-lab modules, reading of information sheets or answering pre-tutorial class questions. Attendance at practical and tutorial classes will be recorded at the start of each class.

If you wish to contact the course convenors or staff, you can do so by e-mail, using the details provided in section 1 of this document and on the course Moodle page. We are committed to providing the best experience and outcome for all students and will therefore endeavour to respond to e-mails as soon as possible, but please consider the following:

- Standard work hours are Monday to Friday from 8 am to 6 pm. E-mail correspondence received outside of this time may be dealt with from the next working day.
- All staff and students have busy schedules and multiple commitments, so while staff will endeavour to answer e-mail correspondence as quickly as possible, please apply appropriate expectations in this regard (i.e., within 48 hours and on a workday).
- Please only use Teams messaging to communicate with the course staff during class. Outside of class, please use e-mail.
- All digital correspondence, including e-mail, Teams messages, and messages on discussion forums, should be respectful, courteous, and polite.

To help us improve the course, please consider providing us with feedback by acting as a student liaison and/or by completing the MyExperience survey later in the term.

4. Course schedule and structure

This course consists of ~50 hours of class contact hours. You are expected to take additional non-class contact hours to complete assessments, readings and exam preparation.

Week [Date/Session]	Topic [Module]	Activity [Learning opportunity]	Related CLO
Week 1 (12 Sept)	<ul style="list-style-type: none"> • What is pharmacology? Agonists and antagonists • Quantifying drug action • Pharmacodynamics 	Practical: Introduction to the course and practicals Tutorial: Commentary introduction and paper presentation	1, 2, 4, 5
Week 2 (19 Sept)	<ul style="list-style-type: none"> • Sites of drug action • Cell signalling 	Practical: Concentration response: agonists Tutorial: Receptors & receptor signalling Q & A (week 1 topics)	1, 2, 5
Week 3 (26 Sept)	<ul style="list-style-type: none"> • Introduction to autonomic pharmacology • Cholinergic mechanisms • Modulation of autonomic neurotransmission to treat disease 	Practical: Concentration response: agonists Tutorial: Cholinergic mechanisms Q & A (week 2 topics)	1, 2, 5

Week 4 (3 Oct)	<ul style="list-style-type: none"> • Drug selectivity: adrenergic receptors • Selective targeting of adrenergic receptors in asthma & angina 	Practical: Concentration response: antagonists Tutorial: Adrenergic mechanisms Q & A (week 3 topics)	1, 2, 5
Week 5 (10 Oct)	<ul style="list-style-type: none"> • Neurotransmitter regulation to treat disease • Drugs of addiction 	Practical: Concentration response: antagonists Tutorial: Commentary peer review exercise Q & A (week 4 topics)	1, 2, 4, 5
Week 7 (24 Oct)	<ul style="list-style-type: none"> • Autacoids • Modulation of autacoid signalling to treat disease 	Practical: Autocoids Tutorial: Response to peer review exercise for commentary Q & A (week 5 topics)	1, 2, 4, 5
Week 8 (31 Oct)	<ul style="list-style-type: none"> • Anti-inflammatory mechanisms • Use of anti-inflammatory drugs to treat disease 	Practical: Autocoids Tutorial: Anti-inflammation drugs Q & A (week 7 topics)	1, 2, 5
Week 9 (7 Nov)	<ul style="list-style-type: none"> • Pharmacokinetics: drug chemistry & absorption • Drug metabolism 	Practical: Ion trapping & drug excretion Tutorial: Drugs & diseases - case studies Q & A (week 8 topics)	1, 2, 5
Week 10 (14 Nov)	<ul style="list-style-type: none"> • Toxicology & toxic effects of drugs • Drug safety/ pharmacovigilance 	Practical: Ion trapping & drug excretion Tutorial: Drug metabolism & drug safety Q & A (Mon 11am -12 pm week 9 topics) Q & A (Wed 5-6 pm week 10 topics /exam revision)	1, 2, 3, 5

Exam Period: 25 November – 8 December

Supplementary Exam Period: 9 January – 13 January

5. Assessment

5.1 Assessment tasks

Assessment 1: Mid-session Exam (online via Inspira):

The mid-term exam will be held in Week 5 on Wednesday, 12th of October, 5:00 – 6:00 pm (50 minutes duration plus 10 minutes reading time). This exam will give you feedback on how you are succeeding in the course. The test will consist of 15x MCQs (worth 1 mark each) and 3x 10 minutes SAQs (you should choose 2 SAQs to answer) with total marks of 35. This test will be based on the materials covered in the lectures, practical classes, and tutorials between Week 1 and Week 4. The materials covered prior to the mid-term exam may be again examined in the final exam.

Assessment 2: Written Commentary Assignment

The written commentary assignment task will allow you to develop your research, information literacy, communication, peer review and time management skills.

The whole process will be divided into 4 steps:

Step 1: Note-taking submission

Your tutor will select a newly published research article for you to comment on. During Week 1's tutorial class, your tutor will explain and present the research components of the article and explain the requirement and the entire process of the commentary assignment. Based on the selected article, you need to identify 3 key ideas, start your own literature search to elaborate on the key ideas and take notes. Your notes should be submitted via Moodle by Friday 30th September 11.55 pm. Your tutor will provide feedback to ensure you are on the right track.

Step 2: Original commentary submission

Upon receiving feedback from your tutor, you should start to draft your commentary (850-1000 words, refer to "Instructions for Commentary Assignment" for detailed information). Your first (original) version of commentary is due to submit via Moodle by Monday 24 October 11.55 pm.

Step 3: Peer review feedback

You will be assigned two of your peers' original commentary assignments on different topics to review. You should read their work and provide written feedback. Likewise, your assignment will be reviewed by two of your peers. You need to complete your peer reviews by Monday 31st October 11.55 pm.

Step 4: Final commentary submission

You should revise your commentary, taking into account the feedback you received from your peers. You will also be required to write 150-300 words of "Response to feedback". Submit your final version together with the "Response to feedback" via Turnitin on Moodle before Friday 11th November 11.55 pm for marking and feedback.

Please check Moodle under "Written Commentary Assignment" for detailed information about this assessment task.

Assessment 3: Continuous Assessment - Quizzes (online via Inspira):

There will be 3 quizzes to help you revise the materials learned in all teaching activities, including lectures, tutorials, and practicals, and also help you practice answering the types of questions you will be getting in your mid-term and final exams. Each quiz has a different weighting to reflect the amount of course content covered in the quiz.

Quiz A (1% of total mark) will examine the content from Week 1, including the online module of pharmacodynamics and the introductory practical. The quiz will consist of 5x MCQs worth 1 mark each with a duration of 10 minutes. The quiz will take place in week 2 and open for access between Thursday 22nd September 6.00 am and Friday 23rd September 11.55 pm.

Quiz B (3% of total mark) will examine all the content from Weeks 2-3. The quiz will consist of 5x MCQs and 1x SAQ worth 5 marks (total of 10 marks) with a duration of 15 minutes. The quiz will take place in week 4 and open for access between Thursday 6th October 6.00 am to Friday 7th October 11.55 pm.

Quiz C (6% of total mark) will examine the content from Weeks 4-9 (excluding week 9's practical on "ion trapping & drug excretion". This quiz will consist of 10x MCQs and 2x 5-mark SAQs (total of 20 marks) with a test duration of 30 minutes. The quiz will be open between Thursday 17th November 6.00 am and Friday 18th November 11.55 pm.

Assessment 4: End of Session Exam (online via Inspera)

The end of term examination will be held during the official examination period (25th November - 8th December 2022) with a duration of 2 hours. The exam consists of 15x MCQs and 12x 10 minutes SAQs (you should choose 8 SAQs to answer). All content from Weeks 1-10, including lectures, online modules, tutorials, and practicals, are examinable.

Summary of Assessment Tasks

Assessment task	Length	Weight	Mark	Due date and time
Assessment 1: Mid-session Exam	50 min	20%	35	Wed 12 Oct, 5 - 6 pm
Assessment 2: Written Commentary Assignment		Σ20%	Σ100	
Step 1. Note-taking	See task description for details	2%	10	Fri 30 Sep 11.55pm
Step 2. Original version		2%	10	Mon 24 Oct 11.55pm
Step 3. Peer review		4%	20	Mon 31 Oct 11.55pm
Step 4. Final version		12%	60	Fri 11 Nov 11.55pm
Assessment 3: Continuous Assessment - Quizzes		Σ10%	Σ35	
Quiz A	10 min	1%	5	Thur 22 Sept 6.00am - Fri 23 Sept 11.55pm
Quiz B	15 min	3%	10	Thur 6 Oct 6.00am - Fri 7 Oct 11.55pm
Quiz C	30 min	6%	20	Thur 17 Nov 6.00am - Fri 18 Nov 11.55pm
Assessment 4: End of Session Exam	120 min	50%	100	Exam period

Further information

UNSW grading system: <https://student.unsw.edu.au/grades>

UNSW assessment policy: <https://student.unsw.edu.au/assessment>

5.2 Assessment criteria and standards

Details regarding the assessment tasks will be provided to you during the first laboratory practical session in week 1, as well as being available on the course Moodle page. A detailed marking rubric for each step of the commentary assignment will be provided to you via the course Moodle page.

5.3 Submission of assessment task

Late Submission

UNSW has standard late submission penalties as outlined in the UNSW Assessment Implementation Procedure, with no permitted variation. All late assignments (unless extension or exemption previously agreed) will be penalised by 5% of the maximum mark per day (including Saturday, Sunday and public holidays). For example, if an assessment task is worth 30 marks, then 1.5 marks will be lost per day (5% of 30) for each day it is late. So, if the grade earned is 24/30 and the task is two days late the student receives a grade of 24 – 3 marks = 21 marks.

Late submission is capped at 5 days (120 hours). This means that a student cannot submit an assessment more than 5 days (120 hours) after the due date for that assessment.

Special Consideration

If you experience a short-term event beyond your control (exceptional circumstances) that impacts your performance in a particular assessment task, you can apply for Special Considerations.

You must apply for Special Consideration **before** the start of your exam or due date for your assessment, except where your circumstances of illness or misadventure stop you from doing so.

If your circumstances stop you from applying before your exam or assessment due date, you must **apply within 3 working days** of the assessment, or the period covered by your supporting documentation.

More information can be found on the [Special Consideration website](#).

Missed Assessment Items

If your request for special consideration is approved, the following permissions may be granted:

- i). For missed Mid-term Exam: NO supplementary test will be offered. Your mark in the final exam will be re-weighted to include the mark reserved for the missed mid-term exam (i.e., the weight of the final exam would be adjusted from 50% to 70%).
- ii) For missed Quizzes: NO supplementary test will be offered. Your mark in the final exam will be re-weighted to include the mark reserved for the missed quiz.
- iii) For missed Final Exam: a supplementary final examination will be held between 9 Jan 2022 - 13 Jan 2022. The dates for the supplementary exams will be updated at:

<https://student.unsw.edu.au/exams/supplementary>

Please note: Normally, if you miss an exam (without valid reasons), you will be given an absent fail. If you are late for an exam, no time extension will be granted. It is your responsibility to check timetables.

iv) Failure to submit Commentary Assignment: If in any circumstances you cannot conduct your assignment activities and fail to submit the final version of the assignment, your final grade for the course will NOT be re-weighted to include the mark reserved for the assignment.

5.4. Feedback on assessment

Assessment 1. Mid-term Exam: Individual marks are provided via Moodle once the exams have been graded. Cohort feedback will be provided in the form of a post or podcast via the course Moodle page in week 7.

Assessment 2. Commentary Assignment: A marking rubric will be used to evaluate each step of your submission. Written feedback on your note-taking and final version of commentary will be provided by your tutor. You will also receive feedback from two of your peers on your original version of the commentary.

Assessment 3. Quizzes: you will receive assessment results and feedback for MCQs once the task is closed. Cohort feedback for SAQ(s) will be provided in the form of a post or podcast via the course Moodle page in the week following the quiz.

Assessment 4: Final Exam. Cohort feedback is provided once the exams are completed in the form of a post in Moodle.

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas, or research. Not referencing other people's work can constitute plagiarism. Further information about referencing styles can be located at <https://student.unsw.edu.au/referencing>

For commentary assignment, you should use the Nature Medicine referencing format, in which the reference list must be arranged numerically in the order in which they appear (refer to Instruction to Commentary Assignment Writing for details).

Academic Integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility, and courage.¹ At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The Current Students site <https://student.unsw.edu.au/plagiarism>, and
- The ELISE training site <https://subjectguides.library.unsw.edu.au/elise>

The Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: <https://student.unsw.edu.au/conduct>.

7. Readings and resources

Prescribed textbook:

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

Katzung et al., Basic and Clinical Pharmacology. 15th ed. McGraw-Hill. ©2021 (The e-book is available through UNSW Library Resources database: Access Medicine): <https://accessmedicine-mhmedical-com.wwwproxy1.library.unsw.edu.au/Book.aspx?bookid=2988>

Recommended textbooks:

Rang and Dale's Pharmacology. 9th ed. Churchill Livingstone/Elsevier. ©2020.

Print book is available in UNSW library, or can be purchased from the UNSW Bookshop or via the link below for online ordering: <https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780702074486>.

An eBook of 2016 version is available in UNSW library:

<https://ebookcentral.proquest.com/lib/unsw/detail.action?docID=2072200>

Goodman and Gilman's The Pharmacological Basis of Therapeutics. 13th ed. McGraw-Hill Companies, ©2018. (The e-book is available through UNSW Library Resources database: Access Medicine):

<https://accessmedicine.mhmedical.com/book.aspx?bookID=2189>

See also medicallsciences.med.unsw.edu.au/students/undergraduate/learning-resource

8. Administrative matters

Student enquiries should be submitted via student portal <https://portal.insight.unsw.edu.au/web-forms/>

9. Additional support for students

- The Current Students Gateway: <https://student.unsw.edu.au/>
- Academic Skills and Support: <https://student.unsw.edu.au/academic-skills>
- Student Wellbeing and Health <https://www.student.unsw.edu.au/wellbeing>
- UNSW IT Service Centre: <https://www.myit.unsw.edu.au/services/students>
- UNSW Student Life Hub: <https://student.unsw.edu.au/hub#main-content>
- Student Support and Development: <https://student.unsw.edu.au/support>
- IT, eLearning and Apps: <https://student.unsw.edu.au/elearning>
- Student Support and Success Advisors: <https://student.unsw.edu.au/advisors>
- Equitable Learning Services (Formerly Disability Support Unit): <https://student.unsw.edu.au/els>
- Transitioning to Online Learning <https://www.covid19studyonline.unsw.edu.au/>
- Guide to Online Study <https://student.unsw.edu.au/online-study>