



Faculty of Medicine  
School of Medical Sciences

# PHAR2011

## Introductory Pharmacology and Toxicology

COURSE OUTLINE

Term 3, 2019

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Please read this manual/outline in conjunction with the following pages on the [School of Medical Sciences website](#):

- [Advice for Students](#)
- [Learning Resources](#)

(or see "STUDENTS" tab at [medicalsciences.med.unsw.edu.au](http://medicalsciences.med.unsw.edu.au) )

# PHAR2011 COURSE INFORMATION

## COURSE DESCRIPTION

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Unit of Credit (UOC): 6

Pre-requisites: 6 UOC level I 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)*

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.

## COURSE AIMS

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To gain:

- an understanding of the principles of Pharmacology
- an appreciation of the mechanisms by which drugs act
- an understanding of indications, contraindications, side effects and toxicity of drugs

## COURSE COORDINATORS

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Course Coordinator:

A/Professor Lu Liu      Room 325, Wallace Wurth East  
Phone: 9385 8762  
Email: [Lu.Liu@unsw.edu.au](mailto:Lu.Liu@unsw.edu.au)  
Consultation times: by appointment via email

Co-coordinator:

Dr Trudie Binder      Room 216, Wallace Wurth  
Phone: 9385 8737  
E-mail: [w.binder@unsw.edu.au](mailto:w.binder@unsw.edu.au)  
Consultation time: by appointment via email

## LECTURERS AND TUTORS IN THIS COURSE

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**Lecturers:**

Dr. Trudie Binder	<a href="mailto:W.Binder@unsw.edu.au">W.Binder@unsw.edu.au</a>
Dr. Angela Finch	<a href="mailto:A.Finch@unsw.edu.au">A.Finch@unsw.edu.au</a>
Dr. Ross Grant	<a href="mailto:R.Grant@unsw.edu.au">R.Grant@unsw.edu.au</a>
Dr. Nicole Jones	<a href="mailto:N.Jones@unsw.edu.au">N.Jones@unsw.edu.au</a>
A/Professor Lu Liu	<a href="mailto:Lu.Liu@unsw.edu.au">Lu.Liu@unsw.edu.au</a>
Dr. Matthew Perry	<a href="mailto:M.Perry@unsw.edu.au">M.Perry@unsw.edu.au</a>

**Tutors:** TBC

## **COURSE STRUCTURE AND TEACHING STRATEGIES**

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This 6 UOC consists of:

- 2 lectures per week
- Practical / tutorial sessions of up to 4 hours per week
- One-line activities up to 1 hour per week

**Lectures:** Thursday 5-6 pm and Fri 3-4 pm (week 1-10)

**Practicals:** Tuesday 10 am-1 pm, or 2-5 pm (week 1-5 & 7-10; week 6 self-directed learning)

**Tutorials:** Thursday 2-3 pm, or 3-4 pm, or 4-5 pm, or Friday 1-2 pm or 2-3 pm (week 1-10)

Students enrolled in this course are expected to attend all scheduled activities for the full duration (lectures, tutorials and practicals). You are reminded that UNSW recommends that a 6 UOC course should involve about 125-150 hours of study and learning activities. The formal learning activities are approximately 54 hours throughout the semester 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 theory essential for understanding Introductory Pharmacology. The practicals and tutorials are provided to support lecture material and practise analytical skills and help you to develop graduate attributes. As these classes are relatively small, they allow you to engage in a more interactive form of learning than is possible in the larger class lectures. The skills you will learn in practical classes are relevant in your development as professional scientists.

## **APPROACH TO LEARNING AND TEACHING**

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The learning and teaching philosophy underpinning this course is centred on student learning and aims to create an environment, which interests, challenges and enthuses students. The teaching is designed to be relevant and engaging in order to prepare students for future careers.

The primary source of information for this course is the lecture material, and the tutorials and practical classes will be directly related to the lectures. Nevertheless, effective learning can also be enhanced through self-directed use of other resources such as textbooks, literature references and web-based sources. Your practical classes will be directly related to the lectures and you are advised to prepare for practical classes before attendance. It is up to you to ensure you perform well in each part of the course; preparing for classes; completing assignments; studying for exams and seeking assistance to clarify your understanding. Past exam questions are provided to assist you in preparing for examinations.

## **TEXTBOOK AND OTHER RESOURCES**

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### ***Prescribed textbook:***

- Rang and Dale's Pharmacology. 9<sup>th</sup> ed. Churchill Livingstone/Elsevier. ©2019

The textbook is available from the UNSW Bookshop or via the link below for online ordering:

<https://www.bookshop.unsw.edu.au/details.cgi?ITEMNO=9780702074486>

### ***Recommended textbooks:***

- Goodman and Gilman's The Pharmacological Basis of Therapeutics. 13<sup>th</sup> 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>

- Katzung et al., Basic and Clinical Pharmacology. 14<sup>th</sup> ed. McGraw-Hill. ©2018 (The e-book is available through UNSW Library Resources database: Access Medicine): <https://accessmedicine.mhmedical.com/Book.aspx?bookid=2249>

See also [medalsciences.med.unsw.edu.au/students/undergraduate/learning-resources](https://medalsciences.med.unsw.edu.au/students/undergraduate/learning-resources)

The Department of Pharmacology has chosen to use the University's central Moodle service to provide teaching materials for all of its courses. See [moodle.telt.unsw.edu.au](https://moodle.telt.unsw.edu.au)

After logging on to Moodle, look for the course PHAR2011. You should have access to it if you are properly enrolled.

## **STUDENT LEARNING OUTCOMES**

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PHAR2011 will develop those attributes that the Faculty of Science has identified as important for a Science graduate to attain. These include; skills, qualities, understanding and attitudes that promote lifelong learning that students should acquire during their university experience.

### **a) Science Graduate Attributes**

- A. Research, inquiry and analytical thinking abilities
- B. The capability and motivation for intellectual development
- C. Ethical, social and professional understanding
- D. Effective communication
- E. Teamwork, collaborative and management skills
- F. Information Literacy – the skills to locate, evaluate and use relevant information

### **b) Pharmacology Discipline Specific Learning Outcomes**

- Demonstrate an understanding of how drugs/therapeutics are developed, work and are used safely
- Critically analyse, interpret and effectively communicate pharmacology data and literature
- Design and/or execute experiments or other activities to address pharmacological scenarios

### **Course learning outcomes (CLO)**

On completion of this course, students should be able to:

1. describe the 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. understand the basic principles of toxicology, 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 into a written assignment, and implement effective peer review
5. apply analytical skills to pharmacological data

## **COURSE EVALUATION AND DEVELOPMENT**

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For course evaluation, the feedback has been gathered at the completion of the course, using, among other means, UNSW's Course and Teaching Evaluation and Improvement Process and myExperience. Student feedback is taken seriously, and continual improvements are made to the course based, in part, on such feedback.

**ASSESSMENT PROCEDURES**

	<b>% total marks</b>
Mid-term test (20 MCQs and 2 SAQs, 45 min duration)	<b>20%</b>
Commentary assignment	<b>20%</b>
Continuous assessment Quizzes:	
[2 x lab quizzes (each 2.5 %), a summative online quiz (5 %)]	<b>10%</b>
Final exam (2 hours duration, 20 MCQs and 10 SAQs)	<b>50%</b>
Formative online quiz	0%

<b>Assessment</b>	<b>Information about the assessment</b>	<b>Related CLO</b>
Mid-term Test	The mid-term test (progress examination) will be held on Friday, 18 <sup>th</sup> of October (week 5) during the lecture time. This exam will give you feedback on how you are succeeding in the course. The test will consist of 20 multiple choice questions (MCQs) and 2 x 5 min short answer questions (SAQs) and will be based on the material covered in the lectures, practical classes and tutorials. The material covered prior to the mid-term test may be again examined in the final exam.	1, 2, 5
Commentary Assignment	<p>The written commentary assignment task will allow you to develop your research, information literacy, communication, peer review and time management skills.</p> <p>The whole process will be divided into a few steps, including the introduction and analysis of a newly published pharmacology article for you to comment on by your tutor during the week 1's tutorial class. You will also learn more on adequately searching and integrating the related literature, note-taking, peer review and response to peer's feedback along the way, through tutorials and online activities. Therefore, attending all the tutorials from week 1 is useful for you to do well in this assessment task.</p> <p>There will involve a few online submissions, including note-taking, the original assignment, peer reviews, and the final revised version of the assignment. The final version must be submitted electronically via Moodle through Turnitin (hard copy submissions are not required). A penalty of 10% per day will apply for any late submissions. Please check Moodle under "Assignment" for the detailed information about the commentary assignment.</p>	4, 5
Quizzes	<p>During the practical classes, you will be required to participate in two on-the-spot <u>Lab Quizzes</u> to test your knowledge learned through the practicals and your preparation for the labs.</p> <p>There will be a <u>Summative Online Quiz</u>, divided into two parts A &amp; B: part A will take place at the end of week 2 and part B at the end of week 4. The summative online quiz is created to help you revise the materials learned in lectures, online activities, tutorials and practicals, and it will also help you</p>	1,2,3,5

	become familiar with the MCQ format, preparing for the mid-term test. You will receive assessment results and feedback immediately once the task is finished. There will be a <u>Formative Online Quiz</u> at the end of the term, which is designed to help you revise the entire learning materials through the term, preparing for the final exam.	
End of Term Examination	The end of term examination will be held during the official examination period. The examinable material consists of what is covered in lectures, tutorials and practicals.	1,2,3,5

## GENERAL INFORMATION

### Attendance Requirements

For details on the Policy on Class Attendance and Absence see [Advice for Students](#) and the [Policy on Class Attendance and Absence](#).

Attendance at practical and tutorial classes will be recorded on the class roll at the start of each class. Arrival more than 15 minutes after the start of the class will be recorded as non-attendance. It is your responsibility to ensure that the demonstrator records your attendance and no discussions will be entered into after the completion of the class.

### Missed Assessment Items

If you need to submit an application for special consideration for an exam or assessment, you must submit the application prior to the start of the exam or before the assessment is due, except where illness or misadventure prevent you from doing so.

Where misadventure has prevented you from submitting or sitting for an assessment, applications must be made within three working days of the assessment or the period covered by the supporting documentation <https://student.unsw.edu.au/special-consideration>

Your request for consideration will be assessed. If approved, the following permissions may be granted:

- i). For missed mid-term test: 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 test (*i.e. the percentage of the final exam would be increased from 50% to 70%*).
- ii). For missed final exam: a supplementary final examination will be held **between 13 Jan 2020 – 17 Jan 2020**. The dates for the supplementary exams will be updated at <https://medicalsciences.med.unsw.edu.au/undergraduate-science> . (**Please note:** a supplementary exam will not be offered to students who have failed the course).

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

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.

For missed lab quiz: NO supplementary test will be offered. Your mark in the final exam will be re-weighted to include the mark reserved for the missed lab quiz.

Students who miss the lab quiz due to absence or being late without an adequate reason /documentation will receive no marks for the missed lab quiz.

### **Repeating Students**

Practical class exemptions may be granted to repeat students, but you **must** check with the course coordinator whether you have exemption **prior** to your first practical class. All students must be familiar with the material covered in the practical classes.

### **Special Consideration**

Please see [UNSW-Special Consideration](#) and [Student Advice-Special Consideration](#)

As mentioned above, if you unavoidably miss the mid-term test, final exam and final assignment submission in PHAR2011, you must lodge an application with UNSW Student Central for special consideration.

See: [Student-Advice-Reviews and Appeals](#)

### **Student Support Services**

See: [Student Advice-Student support services](#)

### **Academic Integrity and Plagiarism**

The [UNSW Student Code](#) outlines the standard of conduct expected of students with respect to their academic integrity and plagiarism.

More details of what constitutes plagiarism can be found [here](#)

### **Handwriting**

Students whose writing is difficult to understand will disadvantage themselves in written assessments. Make every effort to write clearly and legibly. Do not use your own abbreviations.

## **GENERAL INQUIRES**

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General inquiries can be made at the School of Medical Sciences Education Support Team. They are able to provide additional information on any courses offered by the School. [Please](#) submit all enquiries online via UNSW Student Portal Web Forms: <http://unsw.to/webforms>

**Professor Margaret Morris** is Head of the Department of Pharmacology. Prof Morris can be contacted by email [m.morris@unsw.edu.au](mailto:m.morris@unsw.edu.au)

***There is an honours program conducted by the School.*** The Honours program is convened by Dr Cristan Herbert ([c.herbert@unsw.edu.au](mailto:c.herbert@unsw.edu.au)), Ph: 9385 8679. Any students considering an Honours year should discuss the requirements with the convenor.

Honours Administrator: Vicky Sawatt ([v.sawatt@unsw.edu.au](mailto:v.sawatt@unsw.edu.au)) Ph:9385 8195.

### ***Postgraduate degrees***

The Department of Pharmacology offers students the opportunity to enter the following graduate programs:

***Course Work Masters:*** Masters in Pharmaceutical Medicine. For more information contact Dr Orin Chisholm ([o.chisholm@unsw.edu.au](mailto:o.chisholm@unsw.edu.au))

***Research Masters:*** In Pharmacology. Contact the post-graduate co-ordinators A/Prof Pascal Carrive ([p.carrive@unsw.edu.au](mailto:p.carrive@unsw.edu.au)) and Dr Nicole Jones ([n.jones@unsw.edu.au](mailto:n.jones@unsw.edu.au))

**Doctorate (Ph.D):** In Pharmacology. Contact the post-graduate co-ordinators A/Prof Pascal Carrive ([p.carrive@unsw.edu.au](mailto:p.carrive@unsw.edu.au)) and Dr Nicole Jones ([n.jones@unsw.edu.au](mailto:n.jones@unsw.edu.au))

### **Enrolment and administrative help**

The Student Administration Officers are available to help with problems with enrolment and scheduling and should be the first point of contact for administrative problems. They can be contacted via the UNSW Student Portal Web Forms <http://unsw.to/webforms>.

## **REQUIREMENTS FOR PRACTICAL CLASSES**

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The practical class is an opportunity for students to develop graduate attribute C by behaving in an ethical, socially responsible and professional manner within the practical class.

- There will be a pre-recorded video and a few quiz questions on Moodle to help you become familiar with the health and safety issues as well as the important procedures of each practical. You MUST complete the video and the quiz at least 1 hour prior to the start of your practical class. Students who do not successfully complete the module will need to do the pre-lab module in class prior to starting the experiment. This policy will be strictly enforced. At the start of each class a member of staff will check that the pre-lab is completed and record your attendance in the class roll.
- Punctual arrival is expected.
- Turn off mobile phones before entering the class.
- You must read the "Student Risk Assessment" form before the lab starts.
- Enclosed shoes are compulsory for all practical classes. Lab coat must be worn for wet labs.

Students must take due care with biological and hazardous material and make sure all equipment is left clean and functional. In the interests of safety, special attention should be paid to any precautionary measures recommended in the notes. If any accidents or incidents occur, they should be reported immediately to the demonstrator in charge of the class who will record the incident and recommend what further action is required.

Information on relevant Health and Safety policies and expectations will be provided in the practical notes, as outlined at <http://safety.unsw.edu.au>

For more details see [Advice for Students-Practical Classes](#)

## **CONSENT FORMS**

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Practical classes involving your participation as a subject require you to sign a witnessed, informed consent form.

## **LECTURE THEMES**

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The main themes of the lectures will cover

- (1) How drugs act at cellular, tissue and organ levels (Pharmacodynamic; mechanisms of drug actions)
- (2) How the body handles drugs (Pharmacokinetics, side effects of drugs and toxicity)
- (3) How drugs target specific body systems (specific examples of drugs used for therapeutics and social reasons; sources of drugs)

## TIMETABLE

Week	Online activities	Practical* (Tue 10 am or 2 pm, WW115)	Tutorials** (Thur 2, 3, or 4 pm or Fri 1 or 2 pm)	Lecture 1 (Thu 5 pm, Physics Th)	Lecture 2 (Fri 3 pm, Mat A)	Assessments***
<b>1</b> <b>(16 Sep)</b>	Online lesson for research paper notetaking	All groups: Orientation to practical	Scientific commentary	What is pharmacology? Agonists and antagonists	Quantifying drug action	
<b>2</b> <b>(23 Sep)</b>	Drug discovery (Online lecture)	Concentration Response: Agonists	Pharmacodynamics ( <i>self-directed learning</i> )	Sites of drug action	Cell signalling	Summative online quiz A (Fri 27 Sep 18:00 – Fri 4 Oct 23:55)
<b>3</b> <b>(30 Sep)</b>	Introduction to autonomic pharmacology (Online lecture)	Concentration Response: Agonists	Receptors and Receptor Signalling	Cholinergic mechanisms	Autonomic drugs for overactive bladder treatment	Notetaking submission (Due Mon 30 Sep 9:00) Notetaking feedback received (Fri 4 Oct)
<b>4</b> <b>(7 Oct)</b>		Concentration Response: Antagonists	Cholinergic mechanisms	Drug selectivity: the adrenergic receptor family	The targeting of adrenoceptors in the treatment of asthma & angina	Summative online quiz B (Fri 11 Oct 18:00 - Fri 18 Oct 23:55)
<b>5</b> <b>(14 Oct)</b>	Adrenergic mechanisms (Interactive tutorial)	Concentration Response: Antagonists	Peer review exercise	Neurotransmitter regulation	<b>Mid-term test</b>	
<b>6</b> <b>(21 Oct)</b>	Drugs of addiction (Online lecture)	Drugs Alter the Brain's Reward Pathway ( <i>self-directed learning</i> )	Drugs for the CNS	Autacoids	Autacoids related drugs for peptic ulcer / migraine	Commentary original version submission (Due Fri 25 Oct 9 am)
<b>7</b> <b>(28 Oct)</b>		Drugs and the Eye	Response to peer review exercise/ Test review	Anti-inflammatory mechanisms	Asthma/Arthritis	
<b>8</b> <b>(4 Nov)</b>	Toxicology (Online lecture)	Drugs and the Eye	Drugs & Diseases – Case Studies	Pharmacokinetics-Drug chemistry and absorption	Drug absorption and routes of administration	Peer review feedback (Due Mon 8 Nov, 9:00)
<b>9</b> <b>(11 Nov)</b>		Drug Excretion: Aspirin	Anti-inflammation drugs	Drug Metabolism	Alternative medicines	Commentary final version submission (Due Fri 15 Nov, 9 am)
<b>10</b> <b>(18 Nov)</b>	Exam preparation (Online activity)	Drug Excretion: Aspirin	Drug Metabolism	Toxic effects of drugs	Drug safety / Pharmacovigilance	Formative online quiz (from Fri 22 Nov 18:00)

\*LABs: **T10A group**: 10 am in weeks 1, 2, 4, 8 & 10; **T10B group**: 10 am in weeks 1, 3, 5, 7 & 9; **T14A group**: 2 pm in weeks 1, 2, 4, 8 & 10; **T14B group**: 2 pm in weeks 1, 3, 5, 7 & 9.

\*\*Tutorials: **H14A group** (Mat 227); **H14B group** (Mat 226); **H15A group** (Mat 226); **H15B group** (Mat 227); **H16A group** (Mat 106); **H16B group** (Mat 108); **F13A group** (Mat227);

**F13B group** (Mat 308); **F14A group** (Mat 227); **F14B group** (Mat 308)

\*\*\* Assessments: there will be two spot quizzes during the lab time.