



Faculty of Medicine & Health
School of Medical Sciences

PHAR 3101

Drug Discovery, Design and Development

COURSE OUTLINE

Term 3, 2021

CRICOS Provider Code 00098G

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PHAR3101 Course Information

Drug Discovery, Design and Development (PHAR3101) is a 3rd year Science course worth six units of credit (6 UOC). The course is usually undertaken as part of a major in Pharmacology for the Bachelor of Science (Adv.) or Bachelor of Medical Sciences or as part of the Bachelor of Medicinal Chemistry. The course builds on the knowledge you have gained in Introductory Pharmacology and Toxicology (PHAR2011).

OBJECTIVES OF THE COURSE

This course will explore the process of drug development, from target identification to final drug registration. It will present drug development as a process involving target selection, hit discovery using computer-based methods, combinatorial chemistry/high-throughput screening. Lead identification and optimisation via the use of structure activity series and computational methods will be covered. Safety evaluation, bioavailability, clinical trials, and the essentials of intellectual property, regulatory affairs and commercialisation will also be discussed. Along the way, you will learn about screening assays, computer-aided drug design, and toxicology as applied to the development of new medicines.

COURSE CO-ORDINATOR and LECTURERS

Course Convener:

Dr. Angela Finch
a.finch@unsw.edu.au
ph: 9065 1017

Co-Convener:

Dr Nicole Jones
n.jones@unsw.edu.au

Students wishing to talk to the course staff should make an appointment via email we will then organize to meet you via MS-teams at a mutually convenient time.

Lecturers in this course:

Dr Matthew Perry	m.d.perry@unsw.edu.au
Prof Peter Gunning	p.gunning@unsw.edu.au

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 medicallsciences.med.unsw.edu.au)

COURSE STRUCTURE and TEACHING STRATEGIES

In 2021 due to the ongoing COVID-19 outbreak PHAR3101 will be delivered online.

Learning activities occur on the following days and times:

- Lectures: pre-recorded and available before the start of the week they are timetabled.
- Practicals: Wednesday 2-5 pm
- Q&A sessions: Thursday 1-2 pm
- Tutorials: Friday 9-10 am or 1-2 pm

Students are expected to actively engage with all scheduled activities for their full duration - 2 hours of lecture material per week and 4 hours of practical and tutorial sessions per week, plus complete any online activities provided. Students are reminded that UNSW recommends that a 6 units-of-credit course should involve about 125-150 hours of study and learning activities. The formal learning activities are approximately 70 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 the processes involved in drug development. A weekly Q&A session will be held in which students can ask for clarification of concepts presented in the lectures and to facilitate discussion between the students and staff on points covered. To assist in the development of research and analytical skills practical classes and tutorials will be held. These classes and tutorials allow students to engage in a more interactive form of learning than is possible in the lectures. The skills you will learn in practical classes are relevant to your professional development.

The practicals are provided to support lecture material and practise analytical skills. You will submit a written report covering three of these practical sessions. The report should be in the form of a technical report. There will be opportunities to request and receive feedback on the tasks performed during practical classes each week via your electronic laboratory notebook.

In the tutorials, students will work in teams to evaluate projects at different stages of the drug discovery process, deciding if the project should progress or not and planning the approach that you will take to progress the project. The tutorials will provide you with ongoing feedback on your ability to apply your drug discovery knowledge as well as developing your communication and time management and teamwork skills.

APPROACH TO LEARNING AND TEACHING

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

Although the primary source of information for this course is the material covered in lectures, tutorials, and practical classes, effective learning can be enhanced through self-directed use of other resources such as textbooks and Web based sources. Your practical classes will be directly related to the lectures and it is essential and required 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.

TEXTBOOKS AND OTHER RESOURCES

Recommended Primary Texts:

- Drug Discovery and Development - Technology in Transition. Hill & Rang. Elsevier Ltd 2nd edition 2013.

- Pharmacology in Drug Discovery: understanding drug response T. P. Kenakin. Elsevier, 2nd Edition 2012.

These textbooks will be available at the UNSW bookshop. They are also available in print and online formats from the library.

Other Resources:

The following electronic journals are accessible via the UNSW library.

- Nature Reviews: Drug Discovery.
- Drug discovery today.
- Pharmacology & Pharmaceutical Medicine Study guide
<http://subjectguides.library.unsw.edu.au/medicine/pharmacology>

Links to additional sources to supplement the material covered in the lectures will be placed on the lecture pages on Moodle.

STUDENT LEARNING OUTCOMES

PHAR3101 will develop those attributes that the Faculty of Science has identified as important for a Science Graduate to attain and the Learning Objectives of the Pharmacology Major.

Pharmacology Major 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.

PHAR3101 Learning Outcomes

On completion of this course students should be able to:

1. demonstrate an understanding of the steps involved in drug development from bench to bedside.
2. apply knowledge of the drug development process and identify challenges and benefits of different approaches to address novel scenarios.
3. critically analyse scientific literature and experimental data and communicate their findings.
4. show an understanding of teamwork and the contributions of different discipline areas to drug development

ASSESSMENT PROCEDURES

- | | |
|--|------|
| • Mid Term Test (50 min duration): | 10 % |
| • Research Report | 20 % |
| • Team Assessment Task (Therapeutic Product Development History) | 15 % |
| • End of Session Examination (2 hours duration) | 55 % |

A penalty will apply for late submissions of assessment tasks (10% per day).

Research Report: Technical or study reports play a critical role in the drug development process. providing a summary of research findings succinctly and unambiguously and can be used by team members, team leaders and senior management to inform 'go/no-go' decisions for a drug or even an

entire research program. You will submit a written report covering three of the practical sessions. The report should be in the form of a technical report. This will enable you to demonstrate your mastery of learning outcome 3.

Team Assessment Task: You will work in teams to research the drug discovery process of a given drug and the teamwork involved in that process. These assessment tasks will allow you to develop your research, information literacy, communication, and time management skills, as well as allowing you to demonstrate your ability to work in a team and collaborate successfully and enable you to demonstrate your mastery of learning outcomes 1, 2, 3 & 4.

The *Mid-Term Test* will be held in the lecture slot on Thursday the 14th of October, 1 pm. This test will give you feedback on how you are succeeding in the course. This exam will give you feedback on how you are succeeding in the course. The *Mid-Term Test* and *End of Session Examination* will test your ability to apply the knowledge you have acquired from multiple lectures, practicals, and tutorials to drug development scenarios. The test and examination will be in the format of short and long answer questions. The questions will be based on the material covered in the lectures, practical classes, and tutorials. Material covered prior to the mid-term test may be examined again in the final exam. The examinations will enable you to demonstrate your mastery of learning outcomes 1, 2 & 3. The end of session examination will be held during the official examination period.

COURSE EVALUATION AND DEVELOPMENT

Each year feedback is sought from students about the courses offered in the Department of Pharmacology and continual improvements are made based on this feedback. The UNSW myExperience survey is the way in which student feedback is evaluated and significant changes to the course will be communicated to subsequent cohorts of students. Also, a staff-student liaison group will be set up and students will be invited to become class representatives to seek feedback from their colleagues and meet with academic staff to discuss any issues that arise. Based on feedback given in these meetings changes will be implemented during the course and for future years.

We appreciate student feedback because we are always looking for ways to improve your learning experience in this course. Below is a summary of the feedback from the previous student cohort in this course and our response to how we improved this year's course delivery.

Previous students told us that: They liked the course simulates a real pharmaceutical company. They liked the structure and content of the course, especially the real-life examples and that all the components were integrated. Especially that the course covers the Drug Discovery, Design and Development process from start to end providing an understanding of how the industry functions. They commented on the enthusiasm and passion of the teaching staff and that they liked they got to hear from researchers and workers in the field presenting relevant and current content. They also liked that the tutorials gave them an opportunity to consolidate the course content and practice applying their knowledge. They particularly enjoyed the careers in pharmacology workshop that included guest speakers who shared their experiences in the pharmaceutical industry.

When asked what could be improved in the course the most frequent responses were regarding allowing more time and directions for the technical report assignment. Students suggested that more help be provided, possibly in the form of more videos, to help them understand how to use Prism and the other software used in the practical classes.

In the last couple of years, we have responded to this feedback by reducing the word count of the practical technical report along with an online module being developed to help student to complete this task. More explanation of each step of using the software has been provided in the practical manual along with online "how-to" videos.

GENERAL INFORMATION

The Department of Pharmacology is part of the School of Medical Sciences and is within the Faculty of Medicine and Health. It is located in the Wallace Wurth building.

Professor Margaret Morris is Head of Department and appointments to meet with her may be made via email (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), Ph: 9385 8679. Any students considering an Honours year should discuss the requirements with the convenor.

Postgraduate degrees

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

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

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

<http://unsw.to/webforms>

Attendance Requirements

Please see the University's [Policy on Class Attendance and Absence](#).

Special Consideration

Please see [UNSW-Special Consideration](#)

Final exam period for Term 3 2021 is Friday, 26 Nov to Thursday, 9 Dec 2021 - Supplementary exam period for Term 3 2021 is Monday, 10 January to Friday, 14 January 2022

If you unavoidably miss the progress exam in PHAR3101, you must lodge a special consideration application via myUNSW or contact [The Nucleus Student Hub](#). If your request for consideration is granted an alternative assessment will be organised which will take the form of an increased weighting of the final exam.

Student Support Services

Details of the available student support services can be found at [Student Advice-Student support services](#).

The following resources can provide help with online learning

- Transitioning to Online Learning <https://www.covid19studyonline.unsw.edu.au/>
- Guide to Online Study <https://student.unsw.edu.au/online-study>
- 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. <https://student.unsw.edu.au/els>

Appeal Procedures

Details can be found at [Student-Advice-Reviews and Appeals](#)

Academic Integrity and Plagiarism

The School of Medical Sciences will not tolerate plagiarism in submitted written work. The University regards this as academic misconduct and imposes severe penalties. Evidence of plagiarism in submitted assignments, etc. will be thoroughly investigated and may be penalized by the award of a score of zero for the assessable work. Flagrant plagiarism will be directly referred to the Division of the Registrar for disciplinary action under UNSW rules.

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](#)
