PHRM1021

Introductory Pharmaceutical Sciences

Course Outline

Term 2, 2023

School of Health Sciences

Faculty of Medicine & Health

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1. Staff

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor; Lecturer School of Health Sciences	Branko Radojkovic	b.radojkovic@unsw.edu.au	By appointment	Please contact via email only
Course Convenor School of Health Sciences	Ramesh Walpola	r.walpola@unsw.edu.au	By appointment	Please contact via email only
Senior Lecturer School of Chemistry	Sara Kyne	s.kyne@unsw.edu.au	By appointment	Please contact via email only
Senior Research Associate School of Mathematics and Statistics	Cathy Gray	catheryn.gray@unsw.edu.au	By appointment	Please contact via email only

2. Course information

1. Units of credit: 6
2. Pre-requisite: CHEM1832
3. Teaching times and locations:

https://timetable.unsw.edu.au/2023/PHRM1021.html#S2

Activity	Location	Times
Lectures	E19 Patricia O'Shane G02 (K-E19-G02)	Mondays 3-5pm Weeks 1-2, 4-5, 7-10
Seminars – chemistry	Old Main Building 149 (K-K15-149)	Fridays 10-12pm Weeks 2, 8
Workshops – mathematics	UNSW Business School 219 (K-E12-219)	Tuesdays 9-11am or 11am-1pm or Wednesdays 9-11am or 11am-1pm Weeks 1-5,7-10
Laboratories – **chemistry**	F10 June Griffith 162 (K-F10-162)	Fridays 10am-1pm or 2-5pm Weeks 3-4, 7
In-term tests – chemistry	E19 Patricia O'Shane 104 (K-E19-104)	Fridays 10-11am Weeks 5,9
Laboratories – pharmacy	Wallace Wurth 120 (K-C27-120)	Fridays 10am-1pm or 2-5pm Week 10

2.1 Course summary

This course develops foundational knowledge in mathematics and organic chemistry that will support students' subsequent studies in biochemistry, pharmacology, medicinal chemistry, pharmaceutics, and

nutrition. An important aspect of the course is its series of workshops that are designed to develop essential mathematical skills, with a particular focus on differential and integral calculus. The chemistry content covers a range of fundamental concepts that can be used to explain phenomena in chemistry as well as pharmaceutical and medical sciences. Students who have completed CHEM1832 previously will build on their skills to explore topics such as introduction to functional groups, structure determination, isomerism and stereochemistry. The course concludes with an introduction to pharmaceutics, with an emphasis on drug dosage forms and introductory pharmacokinetics.

2.2 Course aims.

This course aims to provide you with some essential, foundational knowledge in mathematics, pharmaceutical sciences and organic chemistry that will underpin many of your subsequent studies. The laboratory component of the course equips you with the necessary skills to safely handle chemicals and laboratory equipment, perform accurate measurements, meaningful analyses, and to manipulate and present data.

2.3 Course learning outcomes (CLO)

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

4. Apply key mathematical principles required for future pharmaceutical studies and research.
5. Describe the importance of isomerism and stereochemistry in the context of modern drug development.
6. Integrate different types of spectroscopic data to deduce the structures of unknown organic compounds.
7. Describe key structures and reactions of organic molecules in the context of modern pharmaceutical studies.
8. Demonstrate proficiency in defined core chemistry laboratory skills by safely investigating chemical reactions in first-hand scientific investigations.
9. Outline fundamental pharmacokinetic and pharmaceutics principles which govern medicine administration and use.

2.4 Relationship between course and program learning outcomes and assessments

Course Learning Outcome (CLO)	**LO Statement**	**Program Learning Outcome (PLO)**	**Related Tasks & Assessment**
CLO 1	Apply key mathematical principles required for future pharmaceutical studies and research.	3, 6, 8	In-term tests (mathematics)
CLO 2	Describe the importance of isomerism and stereochemistry in the context of modern drug development.	3, 6, 8	Laboratory work (chemistry), in-

			term tests (chemistry)
CLO 3	Integrate different types of spectroscopic data to deduce the structures of unknown organic compounds.	3, 6, 8	Laboratory work (chemistry), in-term tests (chemistry)
CLO 4	Describe key structures and reactions of organic molecules in the context of modern pharmaceutical studies	3, 6, 8	Laboratory work (chemistry), in-term tests (chemistry)
CLO 5	Demonstrate proficiency in defined core chemistry laboratory skills by safely investigating chemical reactions in first-hand scientific investigations.	3, 6, 8	Laboratory work (chemistry)
CLO6	Outline fundamental pharmacokinetic and pharmaceutics principles which govern medicine administration and use	3, 6, 8	Final exam

3. Strategies and approaches to learning

3.1 Learning and teaching activities

The learning and teaching activities in this course consist of multiple teaching methods and modes of instruction which are delivered through a blended approach including Workshops, Lectures, Seminars, and Laboratories.

This course has been designed to engage you in learning by contextualising the material to students' prior experiences and knowledge. In addition, course content will be supplemented with interesting examples from research and industry. The laboratory component of this course will enable you to develop a proficiency in core chemistry laboratory skills while engaging in challenging and interesting laboratory practicals. In addition, this component of the course will contribute to the development of higher-order analytical skills, while providing opportunity for cooperative learning with your peers.

3.2 Expectations of students

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.

It is your responsibility to ensure that you keep up to date with the course material, are aware of the assessments times and details and complete all required tasks by the advertised due date.

Occasionally we may be required to make changes to the course details presented in this document for reasons outside of our control. All changes will be announced via the important announcements on the Moodle page. You must check your UNSW student email (z1234567@unsw.edu.au) and the course Moodle site at least every two days to ensure you are up to date with understand your obligations for the course.

Ignorance of announcements or errors of interpretation of a due date or assessment requirement are not valid excuses for non-completion.

As a general rule, you should plan to do about one hour of independent study for every face-to-face hour of the course (e.g. completing assignments, readings and exam preparation). In addition, you should manage your time so that you can complete your topics lessons and topics quizzes every week throughout the term rather than leaving them to the deadline – you will waste the multiple opportunities we provide to sit certain assessment tasks if you are not prepared early!

Workshops (mathematics): You will have a weekly workshop which will cover the essential mathematical skills required for pharmaceutical science studies. A large focus of the workshops will be to build skills in logarithms and calculus. In these workshops you will then apply key mathematical skills to analytical problems commonly seen in scientific evaluations.

Lectures (chemistry/pharmacy): You are expected to engage with all lectures each week. You should take notes and participate in problem-solving during lectures. The questions asked in lectures are a valuable source of feedback – they will help you to target the areas that will require further clarification in your personal study time.

Seminars (chemistry): attendance at all seminars is compulsory as no worked answers to problems are provided outside of these sessions. Classes are not graded directly but assessment questions are linked to the material. The purpose of seminars is to provide activities for you that consolidate the concepts covered in lectures. You are expected to come prepared by having attempted the assigned pre-work and to engage in problem solving activities and completing work as directed.

Laboratories (chemistry): See the laboratory manual for more details, including what to do if you are unavoidably absent from a lab class, how to prepare for your lab class, complete assessments, and the criteria for grading your laboratory work.

4. Course schedule and structure

This course consists of 52 hours of class contact hours. You are expected to take an additional 98 hours of non-class contact hours to complete assessments, readings and exam preparation.

Week [Date/Session]	Topic [Module]	Activity [Learning opportunity]	Related CLO
Week 1	Maths workshop: Introduction and review Pharmacy: introductory pharmacokinetics (i.e. ADMET)	Workshop (2h); lectures (2h)	1,6
Week 2	Maths workshop: Functions Chemistry: Functional groups and representations	Workshop (2h); lectures (2h); seminar (2h)	1,2,3,4
Week 3	Maths workshop: Differentiation Chemistry: Molecular shape geometric isomerism	Workshop (2h); lectures* (2h, online); laboratory class (3h)	1,2,3,4,5
Week 4	Maths workshop: Applications of differentiation Chemistry: Isomerism and stereochemistry	Workshop (2h); lectures (2h); laboratory class (3h)	1,2,3,4,5
Week 5	Maths workshop: Exponential and logarithmic functions Chemistry: Macromolecules and molecular shape	Workshop (2h); lectures (2h);	1,2,3,4
Week 6	No classes (flexibility week)		
Week 7	Maths workshop: Integration Chemistry: Structure determination I: molecular formula and mass spectrometry	Workshop (2h); lectures (2h); laboratory class (3h)	1,2,3,4,5
Week 8	Maths workshop: Applications of integration Chemistry: Structure determination II: IR and ^{1}H spectroscopy	Workshop (2h); lectures (2h); seminar (2h)	1,2,3,4

Week 9	Maths workshop: Differential equations Pharmacy: drug dosage forms	Workshop (2h); lectures (2h)	1,6
Week 10	Maths workshop: Mathematical modelling Pharmacy: drug dosage forms	Workshop (2h); lectures (2h); laboratory class (3h)	1,6

Exam Period: 12 August – 25 August
Supplementary Exam Period: 5 September – 9 September

*Week 3 lecture will be provided online, due to public holiday

5. Assessment

5.1 Assessment tasks

Assessment task	Length	Weight	Due date and time
1. In-term tests (mathematics)	various	30%	Weeks 4 and 10
2. Laboratory work (chemistry)	various	15%	Continuous throughout the term
3. In-term tests (chemistry)	2 x 45 min	30%	Weeks 5 and 9
4. Exam (pharmacy)	1 h	25%	Exam period

Further information

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

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

5.1.1 Details of each assessment task

1. In-term tests (mathematics)

During the term, you will take two in-term tests (maths), in weeks 4 and 10, which will assess the mathematics content covered in the course. These tests are summative in nature, and you may only attempt each lab test once. The in-term tests (maths) will be conducted on the Möbius platform, which is the same platform utilised for the formative maths assessment tasks. For this assessment task, you will be required to book a lab session at your convenience to complete the test. Further instructions on the process will be published in the learning management system. Feedback will be available via the Möbius gradebook within two weeks of completion.

2. Laboratory work (chemistry)

The laboratory classes are designed to provide you with practical experience in the lab as well as developing your observational and data analysis skills. General feedback provided to help identify areas for further development. You will be provided with personalised feedback on your progress from your demonstrator during lab classes.

Throughout the laboratory classes you will be assessed by your demonstrator on your competency in certain skills (see the laboratory manual for more details). This assessment will be done both in real–time in the laboratory (for manual lab skills) and retrospectively based on your written reports.

3. In-term tests (chemistry)

There are two in-term tests in chemistry that are designed as opportunities to obtain feedback on your learning of the core chemistry concepts covered in the course. In-term test (chemistry) 1 is scheduled in week 5 and in-term test (chemistry) 2 is scheduled in week 9. The in-term test will consist of multiple choice and short-answer questions. The in-term tests will assess all chemistry content covered in the

course at the time of the assessment, similar to the formative quizzes and practice questions completed in class. General feedback will be provided within 2 weeks via the learning management system to help identify areas for further review.

4. Exam (pharmacy)

Formative quiz in week 2 will be provided to assess knowledge gained in week 1.

The final exam will be a 1-hour exam consisting of multiple-choice and short-answer questions. The exam will assess all pharmacy content covered in the course, similar to the formative quizzes, with the final exam structure released to all students in week 9.

The exam will focus on the "mastery" content of the syllabus, but it will also require you to remember the "threshold" concepts as a foundation for answering the mastery questions.

General feedback for the exam will be provided within 2 weeks via the learning management system.

5.1.2 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

Relevant assessment rubrics will be available via the learning management system (Moodle)

5.3 Submission of assessment tasks

This course consists of test style assessment tasks and does not contain any written assessment tasks. You will be required to complete the assessment tasks on the specific dates specified on the learning management system (Moodle).

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 earnt 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.

5.4. Feedback on assessment

You will receive feedback in many different ways throughout this course, including in the online content, the live lectures, the workshops, the in-term tests, and the laboratory classes. See the earlier sections of this course outline for details.

In addition, more information is available on the Teaching Gateway:

Grading and Giving Feedback
http://teaching.unsw.edu.au/grading-assessment-feedback

Giving Assessment Feedback
https://teaching.unsw.edu.au/assessment-feedback

6. Academic integrity, referencing and plagiarism

Students and staff are, of course, governed by the normal laws which regulate our everyday lives. But, in addition, the University has its own code of rules and conduct and can impose heavy penalties on students who breach them. Penalties range from failure in a subject, loss of privileges, fines, payment of compensation, and suspension, to exclusion from study for a certain period or even permanent expulsion from the University.

It is important to realise, however, that misconduct within the University covers a much wider field than simply behaviour which is offensive or unruly, or which may cause damage to other people or property. Misconduct which may lead to a student being disciplined within the University includes anything regarded as academic misconduct according to current academic usage, as well as any conduct which impairs the reasonable freedom of other persons to pursue their studies or research or to participate in University life.

It is most important that students realise just how broad the definition of Academic misconduct may be. It certainly covers practices such as cheating or copying or using another person's work. Sometimes, however, practices which may have been acceptable at school are considered to be misconduct according to current Academic usage within a University. For example academic misconduct can occur where you fail to acknowledge adequately the use you have made of ideas or material from other sources (see the UNSW Student Guide for examples).

The following are some of the actions which have resulted in students being found guilty of academic misconduct in recent years:

- Impersonation in examinations;
- Posting screenshots of digital assessments online;
- Seeking answers to assessment questions online through crowd sourcing websites and forums;
- Failing to acknowledge the source of material in an assessment;
- Taking of unauthorised materials into an examination;
- Submitting work for assessment knowing it to be the work of another person;

- Improperly obtaining prior knowledge of an examination paper and using that knowledge in the examination.
- Providing another students with the means to cheat or collude on an assessment tasks.

Students found guilty of academic misconduct are usually excluded from the University for two years. Because of the circumstances in individual cases, the period of exclusion can range from one term to permanent exclusion from the University.

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.

Please use Vancouver or APA referencing style for this course.

Further information about referencing styles can be located at
https://student.unsw.edu.au/referencing

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.

Artificial Intelligence (AI) tools: Use of generative AI tools such as ChatGPT is not permitted in this course. Please remember that the AI tools generate text output that is superficially reasonable, very confident sounding, and very often wrong. We are setting an expectation that our graduates should out-perform AI, meaning that it is a tool of limited academic use in your degree.

Further information about academic integrity and ***use of generative AI*** *tools can be located at:*

https://www.student.unsw.edu.au/notices/2023/02/academic-integrity-reminder-chatgpt

7. Readings and resources

7.1 Textbooks

- Blackman, A., Bottle, S. E., Schmid, S., Mocerino, M., Wille, U., & Brady, J. E. (2022). Chemistry. (Fifth edition /). John Wiley & Sons, Inc. This book is available in print through the UNSW Bookshop, or as a digital copy from Wiley Direct Online.
- Aylward, G. H., & Findlay, T. J. V. (2008). SI chemical data (6th ed.). John Wiley & Sons Australia.
- Bouwman-Boer, Y., Fenton-May, V., & Le Brun, P. (2015). Practical Pharmaceutics : An International Guideline for the Preparation, Care and Use of Medicinal Products (1st ed. 2015.). Springer International Publishing : Imprint: Springer. E-book available through UNSW Library

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

- Pandit, N. K., & Soltis, R. P. (2012). Introduction to the pharmaceutical sciences : an integrated approach (2nd edition.). Wolters Kluwer Health/Lippincott Williams and Wilkins. E-book available through UNSW Library

7.2 Need help?

There are several people who can help you with problems. The appropriate person may differ depending on the problem.

- First, check the “Important Announcements” and the “Q&A” forums on Moodle – your question may have been asked by another student and answered before.
- For problems relating to lectures – post your question on Moodle or contact your lecturer.
- For workshop related problems – post your question on Moodle or contact your lecturer.
- For laboratory problems – post your question on Moodle, or alternatively ask your lab demonstrator during your lab classes.

8. Administrative matters

All student administrative matters are centrally managed by the Student Nucleus. 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