



CHEM1001

Foundations of Chemical and Biomolecular Sciences 1

Session 2, Infrequent attendance, North Ryde 2020

Department of Molecular Sciences

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Notice

As part of [Phase 3 of our return to campus plan](#), most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to [timetable viewer](#). To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff

Unit Convenor

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Lecturer

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Credit points

10

Prerequisites

Corequisites

Co-badged status

CHEX1001

Unit description

Foundations of Chemical and Biomolecular Sciences 1 introduces students to the principles and practical aspects of the molecular sciences, from the smallest of chemical substances through to the molecules of life - the biomolecules. This unit does not assume prior knowledge of chemistry or biology and is ideal for any student that wants to understand the atomic and molecular world within and around them. It will commence with the language of chemistry by introducing atoms and molecules and elements and compounds and using representative inorganic and organic compounds, including biomolecules, to show how their structures, functions and reactions are described. It will build on this language to allow prediction of the reactivity, behaviour and function of different classes of compounds, with a focus on acids and bases and organic compounds including biomolecules. Contemporary applications will be highlighted to show the role of chemical and biomolecular sciences in our lives, now and in the future, including in helping to achieve a sustainable environment, understanding health and disease, and advancing new molecular technologies. Practical sessions and tutorials will reinforce learning throughout this unit.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Use the language and principles of chemical science to explore the composition and properties of matter and discuss how molecular sciences are important in our lives.

ULO2: Name and write (or describe) the chemical structures for representative inorganic and organic compounds, including peptides, carbohydrates and nucleic acids.

ULO3: Analyse the chemical structure of chemical compounds to predict their function, reactivity and physical properties.

ULO4: Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.

ULO5: Demonstrate laboratory skills used for the preparation, separation and analysis of chemical compounds, including an understanding of general laboratory safety procedures.

ULO6: Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

General Assessment Information

General Assessment Information

Attendance at practical and tutorial classes:

- You must attend and participate in all four practical classes to pass the unit.
- You must attend and participate in all four SGTA sessions to pass the unit.
- Please note that if you miss a practical class or tutorial class, **we are not required to offer you a make-up class.**

Tutorial Quizzes (20%):

- A 1hr quiz online or on-paper will be held after each SGTA session. Note that the quiz questions will be based on the lecture material, text book and tutorial question sets available on ilearn.

Practical class exercises (20%):

- Four practical classes worth 5% each. The pre-practical classes (30%), performance in the practical, the practical report (50%), and the post-practical exercises (20%) will be

used to calculate the final mark for each practical class.

Mid-session test (20%):

- The mid-session test will be held during the mid-session break, as this will allow failing students to withdraw without academic penalty. Note that the **last day to withdraw without academic penalty is 28 September 2020**.
- Students that are unable to re-sit the test during the semester break (e.g. they are overseas) will be allowed to sit the test in Week 8. This option is not optimal and should be avoided, as students failing to pass the mid-semester test won't be able to withdraw without academic penalty.
- The mid-semester test is a hurdle assessment and you will need to get $\geq 40\%$ to meet the hurdle. In the event that you make a serious first attempt at the mid-semester test, you will be provided with an opportunity to sit a new test to meet the hurdle. The faculty define a serious attempt as a mark of 10% below the hurdle, which in this instance is a mark between 30-40%. You will NOT be given a second attempt to pass the mid-semester test if you get below 30% in your first attempt.

Final Exam (40%):

- The final examination will be a three-hour written examination (plus ten minutes' reading time) and will be held during the examination period.
- The final exam is a hurdle assessment and you will need to get $\geq 40\%$ to meet the hurdle. In the event that you make a serious first attempt at the final exam, you will be provided with an opportunity to sit a new test to meet the hurdle. The faculty define a serious attempt as a mark of 10% below the hurdle, which in this instance is a mark between 30-40%. You will NOT be given a second attempt to pass the final exam if you get below 30% in your first attempt.

Information on Supplementary exams:

- If you receive a special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure that you are familiar with the policy prior to submitting an application.

Your marks will be displayed on iLearn. It is your responsibility to regularly verify that the records displayed at iLearn (Tools->Grades) are correct.

If you have difficulty attending and participating in an assessment task, please contact

the Unit Convenor as soon as possible as, there may be alternatives available to make-up a missed task. If there are circumstances that mean you miss an assessment task, you can apply for a special consideration. To support your extension, you must submit a "Special Consideration Request" request via www.ask.mq.edu.au. See <https://students.mq.edu.au/study/my-study-program/special-consideration> for instructions on how to do this. Please note that evidence **must be given** to support your request for an extension. Note that **special consideration applications must be made within five working days of the assessment task due date**.

Decisions to approve/not approve a special consideration request are made by the university (and NOT the unit convenor).

Assessment Tasks

| Name | Weighting | Hurdle | Due |
|--|-----------|--------|---|
| Final Examination | 40% | Yes | Exam period |
| Practical Class Exercises | 20% | No | Within one week of the schedule practical class |
| Mid Semester Test | 20% | Yes | 19/09/2020 |
| Tutorial and Practical Participation | 0% | Yes | Wk3, 4, 6, 9,10,12 |
| Tutorial Quizzes | 20% | No | Wk3, 6, 9, 12 |

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 14 hours

Due: **Exam period**

Weighting: **40%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

The final exam will be designed to address specific understanding of all topics presented within the course and to show that the knowledge obtained can be applied to new problems.

On successful completion you will be able to:

- Use the language and principles of chemical science to explore the composition and properties of matter and discuss how molecular sciences are important in our lives.
- Name and write (or describe) the chemical structures for representative inorganic and organic compounds, including peptides, carbohydrates and nucleic acids.

- Analyse the chemical structure of chemical compounds to predict their function, reactivity and physical properties.
- Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.

Practical Class Exercises

Assessment Type ¹: Lab report

Indicative Time on Task ²: 20 hours

Due: **Within one week of the schedule practical class**

Weighting: **20%**

Practical classes are designed to develop laboratory skills and scientific data analysis capabilities. The pre-practical, practical and post-practical exercises will be used to calculate the final mark for each practical class.

On successful completion you will be able to:

- Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.
- Demonstrate laboratory skills used for the preparation, separation and analysis of chemical compounds, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Mid Semester Test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 7 hours

Due: **19/09/2020**

Weighting: **20%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

There will be a mid-session test in Week 7 that will be designed to give you specific feedback on your understanding of the topics up to this stage of the unit.

On successful completion you will be able to:

- Use the language and principles of chemical science to explore the composition and properties of matter and discuss how molecular sciences are important in our lives.
- Name and write (or describe) the chemical structures for representative inorganic and organic compounds, including peptides, carbohydrates and nucleic acids.

- Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.

Tutorial and Practical Participation

Assessment Type ¹: Participatory task

Indicative Time on Task ²: 0 hours

Due: **Wk3, 4, 6, 9,10,12**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

You must attend and participate in all practical classes.

You must attend and participate in at least nine tutorial classes.

On successful completion you will be able to:

- Use the language and principles of chemical science to explore the composition and properties of matter and discuss how molecular sciences are important in our lives.
- Name and write (or describe) the chemical structures for representative inorganic and organic compounds, including peptides, carbohydrates and nucleic acids.
- Analyse the chemical structure of chemical compounds to predict their function, reactivity and physical properties.
- Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.
- Demonstrate laboratory skills used for the preparation, separation and analysis of chemical compounds, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Tutorial Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 3 hours

Due: **Wk3, 6, 9, 12**

Weighting: **20%**

Ten weekly quizzes based on the tutorial question sets available at iLearn.

On successful completion you will be able to:

- Use the language and principles of chemical science to explore the composition and properties of matter and discuss how molecular sciences are important in our lives.

- Name and write (or describe) the chemical structures for representative inorganic and organic compounds, including peptides, carbohydrates and nucleic acids.
 - Analyse the chemical structure of chemical compounds to predict their function, reactivity and physical properties.
 - Calculate the physical quantities that characterize chemical composition, including solids and solutions, as well as chemical reactions.
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¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Communication

During the semester, the CHEM1001 iLearn site will be used to communicate important information to you. In addition, email will be sent by email to your student email account on a frequent basis.

We cannot overstate the importance of **regularly checking your email and the iLearn site, in particular the student forum.**

Classes

A daily schedule of activities for the on-campus sessions will be provided at iLearn.

- **Lectures:**

Recordings from first semester are available at the CHEM1001 iLearn site.

- **Tutorials:**

During tutorials, the problems assigned (available at the iLearn site) will be discussed. We recommend that you work on the tutorial question sets before coming to class, so that you can take full advantage of the exercises.

- **Practicals:**

The practical classes for CHEM1001 are run in 14SCO 320 and 14SCO 308 (note that these rooms are connected). **You are not be allowed to enter the laboratory unless you are wearing enclosed footwear and laboratory coats.** Safety glasses, and disposable gloves are supplied. We no longer provide laboratory coats.

Teaching and Learning Strategy

CHEM1001 is a 10 credit-point, half-year unit and will require an average of 9 hours study per week (contact hours plus self-study time). For students with weak chemistry backgrounds, more than 9 hours per week will be necessary to perform satisfactorily in this unit.

CHEM1001 is designed to introduce you to the principles of the molecular sciences, including developing an understanding of the practical skills required to undertake simple chemistry experiments in an efficient and safe manner. The lecture materials, tutorials and practical classes complement each other, and along with quizzes, have been developed to increase your understanding of the topics so that you can achieve the learning outcomes.

The unit expectation is that you will:

- Watch the lecture recordings and attend the SGTA sessions presented at the on-campus sessions
- Actively engage in the tutorial classes and attempt the set exercises
- Demonstrate reasonable competence in all practical exercises
- Spend an average of no less than 4 hours per week of private study in addition to class contact

If you prepare for, and attend, all components of the unit and work consistently and continuously throughout the semester, you should be able to develop a strong understanding of the general chemistry and organic chemistry presented, and perform satisfactorily in this unit. Students who try to memorise just before exams do not do well in this unit - this is especially true for organic chemistry content.

- **Lectures** Recordings of all the lectures will be provided from S1. Lectures will be used to emphasise key points and concepts. Please note that based on observations of related units, we know that students fall behind and perform poorly if they do not listen to the lectures. Learning is an active process, and as such, you must engage with the material. Reviewing lecture notes and relevant sections of the textbook (and beyond) before and after the on-campus sessions is strongly recommended.
- **Tutorials (SGTA) classes** are run to assist your understanding of the course material. Attempting the questions before the tutorial class to identify areas in which you need assistance is highly recommended. Past experience has demonstrated that there is a strong correlation between success in the unit and the level of effort put in to preparing for SGTA classes.
- **Practical classes** are designed to develop basic laboratory skills, general safety practices, as well as critical and analytical thought. Pre-practical questions are designed to make sure you are ready for the practical work and have grasped the relevant theory and necessary safety practices. In-lab work is designed to teach you to appropriately record your experimental observations and to present your calculations in a detailed manner. Post-lab exercises are designed to assess your understanding of the experiments conducted.

Recommended Textbooks:

Resources used by lecturers:

- **Openstax Chemistry 2e**–

Download for free at <https://openstax.org/details/books/chemistry-2e> or view the copy at

https://d3bxy9euw4e147.cloudfront.net/oscms-prodcms/media/documents/Chemistry2e-OP_ZIUdkjH.pdf

- Text: **Fundamentals of organic chemistry** / John McMurry. 7th ed., Belmont, CA:Brooks/Cole,C 2011 **QD251.2.M4 2011**
- Text: **Pushing electrons: a guide for students of organic chemistry** by Daniel P. Weeks, Fourth Edition, 2014, Brooks/Cole,C engage Learning.

*These are the resources used by the lecturers but other general and organic chemistry textbooks are useful substitutes.

Other Additional Resources:

Text: **INTRODUCTORY CHEMISTRY** by Nivaldo J. Tro, Fifth Edition (Pearson New International Edition), 2015, Pearson Education **QD33.2 .T76 2015**

Unit Schedule

| Week | Lecture Topics (Recordings provided from S1) | SGTA sessions | SGTA Quiz | Practical |
|------|---|---|--------------------|--|
| 1 | Introduction, Matter & Change, Periodic table | | | |
| 2 | Stoichiometry, Molarity, Structure and shape | First on-campus SGTA session Saturday and Sunday 9am-5pm (8 th & 9 th August) | | |
| 3 | Reactions, Stoichiometry and equilibria | Zoom sessions on Saturday & Sunday | Quiz 1 (5%) | |
| 4 | Acids & Bases; titrations & buffers | | | Practical 1 (22 nd & 23 rd August) |
| 5 | Organic chemistry: Functional groups and drawing structures; Non-organic and organic compounds naming | | | |

| | | | | |
|-------------------|--|---|--------------------|--|
| 6 | Organic compound naming; Conformations, Isomerism and stereochemistry | SGTA session 2-ONLINE | Quiz 2 (5%) | |
| 7 | Predicting reactivity and electron pushing; Alkanes, alkenes and alkynes reactivities. | Zoom sessions on Saturday & Sunday for mid-sem revision | | |
| Mid-Sem Break Wk1 | Mid-session test (20%) | 19 th September (ONLINE), timing t.b.c | | |
| Mid-Sem Break Wk2 | | | | Practical 2 (21 st & 22 nd September) Practical 3 (23 rd & 24 th September) |
| 8 | Organic chemistry: Alkyl halides | | | |
| 9 | Alcohols, ethers, phenols, aldehydes and ketones | SGTA session 3- ONLINE | Quiz 3 (5%) | |
| 10 | Carbohydrates, carboxylic acids and derivatives | | | Practical 4 (17 th & 18 th October) |
| 11 | Amines, amino acids, peptides and proteins | | | |
| 12 | | SGTA session 4 - ON CAMPUS (Saturday & Sunday) | Quiz 4 (5%) | |
| 13 | Revision | Revision zoom sessions | | |

Please refer to iLearn for more details on scheduled timing for on-campus and online sessions.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)

- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central>).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/study/getting-started/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Changes from Previous Offering

The value of tutorial quizzes has been changed from 5% to 20%. The value of final exam has been changed 50% to 40%.