



CHEM1002

Foundations of Chemical and Biomolecular Sciences 2

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Natural Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>General Assessment Information</u>	4
<u>Assessment Tasks</u>	7
<u>Delivery and Resources</u>	9
<u>Unit Schedule</u>	10
<u>Policies and Procedures</u>	10
<u>Changes from Previous Offering</u>	12

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Unit Co-Convenor, Lecturer, Tutor
Koushik Venkatesan
koushik.venkatesan@mq.edu.au
Contact via 02 9850 8296
4WW123
By appointment (please email)

Unit Co-Convenor, Lecturer, Tutor
Joanne Jamie
joanne.jamie@mq.edu.au
Contact via 02 9850 8283
4WW231
By appointment (please email)

Lecturer
Alf Garcia-Bennett
alf.garcia@mq.edu.au
Contact via 02 9850 8285
4WW337
By appointment (please email)

Lecturer, Demonstrator
Nial Wheate
nial.wheate@mq.edu.au
Contact via 0414161861
4WW235
By appointment (please email)

Credit points
10

Prerequisites
CHEM1001 or HSC Chemistry Band 5 and above

Corequisites

Co-badged status

Unit description

Molecular sciences underpin the development of new medicines, materials, environmental monitoring, and more. This unit focuses on the properties and reactivity of matter, ideal for students wanting to understand the atomic and molecular world. It covers the chemical and physical properties of solids, liquids, gases, metals, and solutions, and examines reactions such as precipitation, acid-base chemistry, and oxidation/reduction processes. The unit also explores the energetics and rates of chemical change, as well as methods for detecting and analysing matter. Real-world examples related to biology, the environment, and new materials, such as global warming, energy production, and renewable fuels, will be discussed. This unit highlights the role of chemical and biomolecular sciences in achieving a sustainable environment, understanding health and disease, and advancing new molecular technologies. Practical sessions and workshops reinforce learning.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Good Health and Well Being; Clean Water and Sanitation; Climate Action; Industry, Innovation and Infrastructure

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:** Explain the chemical and physical properties of solids, liquids and gases, metals and solutions.
- ULO2:** Predict reactions of matter including precipitation, acid base chemistry, oxidation/reduction processes, and the energetics and rates of chemical change.
- ULO3:** Utilise chemistry and biomolecular sciences concepts covered in this unit to process and interpret relevant chemical data.
- ULO4:** Undertake laboratory investigations requiring basic laboratory skills related to the reactions of matter and the energetics and rates of reaction, and their detection and analysis, and demonstrate an awareness of general laboratory safety procedures.
- ULO5:** Record and analyse scientific data, as well as judge its reliability and significance and interpret and communicate conclusions, including using the basic elements of scientific report preparation.
- ULO6:** Discuss the central role and impact of the chemical and biomolecular sciences concepts covered in this unit in our lives and its modern applications.

General Assessment Information

Assessment Summary

Assessment in this unit consists of:

- Quantitative Analysis Task – Principles of Chemistry and Biomolecular Sciences – 20%
- Practical Competency (Hurdle Assessment) – 30%
- Final Examination – 50%

To successfully pass this unit you must:

- achieve an overall unit mark of 50% or greater; and
- achieve a minimum mark of 50% (15/30) for the Practical Competency assessment, which is a hurdle requirement.

Practical Competency (Hurdle Assessment) (30%)

The Practical Competency assessment consists of:

- Prelab exercises – 5%
- In-laboratory performance and practical reports – 25%

There will be five experiments (equally weighted) and your average mark across the five practical classes must be 50% or greater (15/30) to satisfy the hurdle requirement.

Practical Assessment Schedule:

- Prelab exercises (5%) – completed online in iLearn and submitted at least 48 hours before your scheduled practical class. A minimum score of 90% is required to gain entry to the laboratory.
- In-laboratory performance and practical reports (25%) – practical reports must be submitted to your demonstrator before leaving the laboratory.

The practical assessments are designed to progressively develop your laboratory knowledge, practical skills and data analysis throughout the semester.

Preparing for and Participating in Practical Classes:

Attendance at all five practical classes is expected.

If you are unable to attend a practical class, you must submit a Special Consideration application through Connect (<https://connect.mq.edu.au>) as soon as possible and immediately notify the Unit Convenors:

- A/Prof. Koushik Venkatesan – koushik.venkatesan@mq.edu.au
- Prof. Joanne Jamie – joanne.jamie@mq.edu.au

A make-up practical is not automatically available and will only be offered where feasible. You

may attend only the practical class in which you are enrolled unless prior approval has been granted by the Unit Convenors.

To participate in each practical class you must:

- complete the online prelab quiz in iLearn with a minimum score of 90% at least 48 hours before your scheduled practical class;
- review the experimental procedures, theory, hazards and safety requirements;
- bring your laboratory manual or notes to the laboratory;
- wear appropriate personal protective equipment (lab coat, safety glasses and enclosed shoes); and
- arrive prepared to work safely, ethically and collaboratively.

You will be given three attempts for the prelab quiz. Failure to complete the prelab quiz or achieve the required score by the deadline will result in denial of entry to the laboratory, as the prelab ensures that you have prepared adequately for the experiment and understand the associated hazards and safety requirements.

For each practical you will be assessed on your:

- preparation for the laboratory;
- laboratory technique and practical skills;
- safe and ethical conduct;
- engagement with the practical activities; and
- completion of the in-class practical report.

Why are practical classes a hurdle requirement?

Practical classes are an essential component of your learning and are designated as hurdle assessments because they provide hands-on experience that cannot be replicated through theoretical study alone. They enable you to develop laboratory techniques, experimental design, data analysis, safe laboratory practice, teamwork, communication and problem-solving skills while applying theoretical concepts in an authentic scientific setting. Successful completion of the practical program also ensures that students meet the practical competency standards expected of chemistry, biomolecular and medical sciences and biotechnology graduates and satisfies the accreditation requirements of the Royal Australian Chemical Institute (RACI).

If you receive a fail mark for any of the in-lab practical reports, for which a reasonable attempt was made (30% or above), resubmission of the report will be available following consultation with the convenors.

Quantitative Analysis Task (20%; In-Class)

Due: Week 6 (face-to-face during your registered workshop class)

This invigilated assessment consists of a selection of real-world problems designed to assess your understanding and application of concepts from lectures, workshops and practical classes.

If you can not make your registered workshop class for this task, please contact Joanne Jamie (joanne.jamie@mq.edu.au) as soon as possible.

Final Examination (50%)

Due: University Examination Period

The final examination assesses your understanding of all topics covered in the unit and your ability to apply this knowledge to unfamiliar problems.

You are expected to present for examination at the time and place specified in the University Examination Timetable. Students must remain available until the final day of the official examination period, as examinations may be scheduled on any day within this period. Macquarie University does not schedule early examinations for individuals or groups of students.

Supplementary exam

If you are unable to sit the examination because of documented illness or unavoidable disruption, you should apply for Special Consideration through Connect (<https://connect.mq.edu.au>). Where approved, a supplementary examination will normally be scheduled between the end of the examination period and the commencement of the next teaching session. Please note that pre-existing commitments will not be accepted as grounds for a further special consideration application for the supplementary exam. Please ensure that you are familiar with the policy prior to submitting an application.

Late Assessment Submission

Late assessments are not accepted in this unit unless a [Special Consideration](#) has been submitted and approved.

Final Grade

Your final grade will be determined by the combined marks achieved in:

- Quantitative Analysis Task (20%);
- Practical Competency (30%); and
- Final Examination (50%).

Provided the Practical Competency hurdle requirement has been met, the aggregated mark from these assessments will determine your final grade.

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

Special Considerations

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au/>.

If you have difficulty attending and participating in an assessment task, please contact the Unit Convenor immediately (in ADVANCE if possible) as there may be alternatives available to make up for a missed task.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Final Exam	50%	No	Examination Period	Individual	No	Observed
Practical Competency	30%	Yes	Week 11	Individual	No	Observed
Principles of Chemistry and Biomolecular Sciences	20%	No	Week 6 in workshop	Individual	No	Observed

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 24 hours

Due: **Examination Period**

Weighting: **50%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Explain the chemical and physical properties of solids, liquids and gases, metals and solutions.
- Predict reactions of matter including precipitation, acid base chemistry, oxidation/reduction processes, and the energetics and rates of chemical change.
- Utilise chemistry and biomolecular sciences concepts covered in this unit to process and interpret relevant chemical data.
- Discuss the central role and impact of the chemical and biomolecular sciences concepts covered in this unit in our lives and its modern applications.

Practical Competency

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 20 hours

Due: **Week 11**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

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

A collection of evidence of development of practical skills and scientific data analysis competencies.

On successful completion you will be able to:

- Explain the chemical and physical properties of solids, liquids and gases, metals and solutions.
- Predict reactions of matter including precipitation, acid base chemistry, oxidation/reduction processes, and the energetics and rates of chemical change.
- Utilise chemistry and biomolecular sciences concepts covered in this unit to process and interpret relevant chemical data.
- Undertake laboratory investigations requiring basic laboratory skills related to the reactions of matter and the energetics and rates of reaction, and their detection and analysis, and demonstrate an awareness of general laboratory safety procedures.
- Record and analyse scientific data, as well as judge its reliability and significance and interpret and communicate conclusions, including using the basic elements of scientific report preparation.
- Discuss the central role and impact of the chemical and biomolecular sciences concepts covered in this unit in our lives and its modern applications.

Principles of Chemistry and Biomolecular Sciences

Assessment Type ¹: Problem-based task

Indicative Time on Task ²: 15 hours

Due: **Week 6 in workshop**

Weighting: **20%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

Calculations, analysis and interpretation of data sets from experimental/theoretical work.

On successful completion you will be able to:

- Explain the chemical and physical properties of solids, liquids and gases, metals and solutions.

- Predict reactions of matter including precipitation, acid base chemistry, oxidation/reduction processes, and the energetics and rates of chemical change.
 - Utilise chemistry and biomolecular sciences concepts covered in this unit to process and interpret relevant chemical data.
 - Discuss the central role and impact of the chemical and biomolecular sciences concepts covered in this unit in our lives and its modern applications.
-

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
- [Academic Success](#) 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.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Delivery and Resources

Communication

During the semester, the CHEM1002 iLearn site will be used to communicate important information to you. In addition, emails will be sent to your student email account. Please check your messages frequently.

Please feel free to communicate directly with the unit convenors Koushik and Joanne by email or visit them at their office. Questions about the unit content and administration that may be of general interest will be best posted in the Student Q&A on the iLearn site so that everybody can see the answer.

Recommended Learning Resources

Brown and LeMay, *Chemistry: The Central Science – Global Edition*

OpenStax resources These are open-access and Free and include [OpenStax Chemistry 2e](#), by Flowers et al and [OpenStax Organic Chemistry - A Tenth Edition](#), by McMurry.

Relevant sections of the above textbooks will be identified throughout the semester to support lecture content, workshops and practical classes.

Pushing Electrons: a Guide for Students of Organic Chemistry by Daniel P. Weeks, Fourth Edition, 2014, Brooks/Cole, Cengage Learning. (<https://au.cengage.com/c/isbn/9781133951889/>)

Other general and organic chemistry textbooks may also be useful.

Lectures (Twice a Week, In Person)

Lectures and workshops commence in **Week 1**, with practical classes commencing in **Week 3**. Please refer to iLearn for the detailed timetable and schedule.

Lectures will be delivered **in person** and are an important component of your learning experience. Attending lectures provides opportunities to engage with teaching staff, ask questions, participate in discussions and work through examples that reinforce key chemical concepts.

Lecture recordings through **iLearn ECHO** and supplementary summary materials will be available via iLearn. PowerPoint slides (in pdf format) and supporting resources will also be provided through iLearn.

Learning chemistry requires active engagement. You are strongly encouraged to:

- review lecture materials before and after each lecture;
- read the relevant sections of the textbook;
- attempt example problems and follow worked examples presented in lectures; and
- use additional resources provided through iLearn to strengthen your understanding.

Workshops (Weekly, In Person)

Weekly workshops are designed to consolidate and extend the concepts introduced in lectures. They provide opportunities to apply your knowledge, work through problems and receive guidance from teaching staff.

To gain the maximum benefit from workshops, you should attempt the questions before attending each session and identify areas where you require further assistance. Teaching staff may ask students to contribute to discussions and work through solutions during workshops.

Previous student feedback has identified workshops as a highly valuable component of the unit. Active participation and preparation are strongly encouraged and will support your success in this unit.

Laboratory Classes (5 Experiments, Hurdle)

Practical classes are designed to develop essential laboratory skills, safe laboratory practices, experimental techniques and critical and analytical thinking.

Before each practical class, you must complete the pre-practical questions available through iLearn. These questions are designed to ensure that you are prepared for the laboratory session, including understanding the relevant theory, experimental procedures and safety requirements.

Unit Schedule

Please check the iLearn site for the most up-to-date Unit schedule

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://policycentral.mq.edu.au) (<https://policycentral.mq.edu.au>)

[s.mq.edu.au](https://www.mq.edu.au)). 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

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

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/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 connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

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

Following Session 2, 2026, the 5% post-lab assessment component, previously submitted online as a single assessment item, has been removed. Students' theoretical understanding of practical concepts will continue to be assessed through the **Problem-Based Task** (as in 2025), the **In-Lab practical reports** (increased from 20% to 25%), and the **Final Examination** (remaining unchanged at 50%). This integrated assessment approach strengthens the connection between practical skills, theoretical knowledge and problem-solving, providing students with more authentic opportunities to demonstrate their learning.

Unit information based on version 2026.03 of the **Handbook**