



CHEM1002

Foundations of Chemical and Biomolecular Sciences 2

Session 1, In person-scheduled-infrequent, North Ryde 2025

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Unit Co-Convenor

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By appointment (please email)

Co-Convenor

Koushik Venkatesan

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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

General Assessment Information

To successfully pass this unit, you are required to:

1. Achieve a minimum total unit mark of 50%.
2. Complete the **hurdle activities** to a satisfactory standard, as outlined below.

Practical Competency (Practice-based task) (30%):

Your average score over the five practicals must be 50% (= 15% of your unit mark) or greater to meet the hurdle threshold.

The practical assessment comprises:

- **prelab exercises**
- **in-lab execution and the “prac report”**
- **postlab exercises**

These **practical classes** are designated as **hurdle assessments** for several reasons:

- **Hands-on Experience:** Laboratory classes provide essential hands-on experience that cannot be replicated through theoretical study alone. This practical exposure is crucial for understanding chemical concepts and techniques.
- **Skill Development:** These classes help you to develop critical laboratory skills, including accurate measurement, data analysis, bench skills, and the use of specialised equipment. These skills are fundamental for any aspiring chemist and/or biomolecular scientist and are best learned through direct practice.
- **Safety Training:** Laboratory work involves handling potentially hazardous materials and equipment. Mandatory practical classes ensure that you receive proper safety training, understand risk management, and can conduct experiments safely.
- **Application of Theory:** Practical classes bridge the gap between theory and practice. They allow you to apply theoretical knowledge in real-world scenarios, reinforcing your understanding and retention of the material.
- **Problem-Solving Abilities:** Laboratory experiments present unexpected challenges. By working through these problems, you enhance your critical thinking and problem-solving abilities, which are valuable skills in any career.
- **Collaboration and Communication:** Laboratory classes require teamwork and effective communication. These experiences help to prepare you for collaborative work environments and help you develop interpersonal skills.
- **Assessment of Competence:** Hurdle assessments ensure that all students meet a

minimum standard of competence in practical skills. This is essential for maintaining the integrity and quality of the chemistry program.

- **Accreditation Requirements:** The Royal Australian Chemical Institute (RACI) mandates practical laboratory classes as part of the accreditation process for chemistry programs. This ensures that the program meets professional standards and adequately prepares students for careers in chemistry.

Prelab questions must be completed with a minimum score of 60% prior to your practical classes. Failure to meet this requirement will result in denial of entry to the laboratory. These questions are designed to ensure you have adequately prepared for the laboratory class, including understanding the associated risks and safety issues, and becoming familiar with the apparatus and techniques to be used.

The prelabs will be done online via iLearn Quizzes and will be due at least **48 hours before the start of your lab class**, i.e. if you have a 9 am class the prelab will be due at 9 am 2 days prior to your class.

The **practical report** will be completed during the lab class and submitted to your demonstrator **before you leave that class**. Part of your practical report mark will be based on your:

- **Preparation:**
 - **Personal Protective Equipment (PPE):** Ensure you have all necessary PPE, including a lab coat, safety glasses, and enclosed shoes. This is crucial for your safety and the safety of others.
 - **Laboratory Notes:** Bring your laboratory manual or notes, which include the experiment procedures and safety guidelines.
 - **Understanding Safety Protocols:** Familiarise yourself with the laboratory's safety rules and emergency procedures. Know the location of safety equipment such as fire extinguishers, eye wash stations, and first aid kits.
 - **Knowledge of the Experiment:** Review the experiment's background, objectives, and procedures. Understand the theory behind the experiment and the steps you will be performing.
 - **Materials and Equipment:** Ensure you have all the necessary materials and equipment for the experiment. Check that all equipment is in working order and that you know how to use it properly.
 - **Time Management:** Plan your time effectively to ensure you can complete the experiment within the allotted class period. This includes setting up, conducting the experiment, and cleaning up.
 - **Mental Preparedness:** Approach the lab with a focused and attentive mindset. Be ready to engage actively with the experiment and follow instructions carefully.

- **Safety Conduct:** Demonstrating the ability to conduct yourself in a safe manner.
- **Ethical Conduct:** Demonstrating the ability to conduct yourself in an ethical manner.
- **Engagement:** Showing a high level of engagement with the activities.

The **postlab exercise** for your first experiment will be due Monday Week 6, and the postlabs of all the other practicals will be due by Monday Week 12.

If you miss a Practical class you are NOT entitled to automatically rescheduling or a make-up class. Such an opportunity may be offered, if possible, provided sufficient warning is provided. Justification for rescheduling or make-up (Special Consideration requests) must be lodged via a special consideration request. If possible, you may be provided the opportunity to attend another practical class in the same block of prac classes.

A make-up class for one missed class may be offered in Week 12.

Principles of Chemistry and Biomolecular Sciences (Problem Set) (20%):

The Principles of Chemistry and Biomolecular Sciences Problem Set will contribute 20% to your overall mark. It will be completed through the Mastering Chemistry system, accessed via iLearn, but external to it.

The Problem Set will be due on the Saturday of Week 7.

The Problems Set will cover all topics up to and including those delivered in Week 7.

Final Examination (Examination) (50%):

- The final examination will be two (2) hours, with 10 minutes reading time, consisting of multiple choice and long answer questions. The final examination will cover **all sections** of the unit (lectures, lab practicals, workshops and assignments) and is designed to address specific understanding of all the concepts presented within the course.

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 requesting a special consideration for the final exam you are declaring yourself available for a re-sit 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.

Gradebook

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

Special Considerations

If you have difficulty attending and participating in a hurdle assessment task, please contact the Unit Convenor, in ADVANCE if possible, and immediately after if not, as there may be alternatives available to make up a missed task. In the circumstances that you miss a hurdle assessment task, you must apply for a special consideration. To support your extension, you must submit a "Special Consideration Request". See the [SPECIAL CONSIDERATIONS](#) web page for instructions on how to do this. Please note that evidence must be given to support your request for an extension. You have a limited time after the event to submit a special consideration request (see [SPECIAL CONSIDERATIONS](#) web page).

Submission Deadlines:

Scheduled assessments and examinations must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, you may apply for Special Consideration.

Late Assessment Submission

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

Attendance and Participation

We strongly encourage all students to actively participate in all learning activities. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final Examination	50%	No	Formal Examination Period
Practical Competency	30%	Yes	31 March (Exp 1 postlab), 26 May (Exp 2-5 postlabs)
Principles of Chemistry and Biomolecular Sciences	20%	No	12/04/2025

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 24 hours

Due: **Formal Examination Period**

Weighting: **50%**

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

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: **31 March (Exp 1 postlab), 26 May (Exp 2-5 postlabs)**

Weighting: **30%**

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 set

Indicative Time on Task ²: 15 hours

Due: **12/04/2025**

Weighting: **20%**

Questions designed to assess understanding of the lecture, practical and workshop materials.

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
- 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

Workshop Classes commence in Week 1. See the iLearn site for more details.

Methods of communication:

General communications about the unit during semester will be via the **Announcements page on iLearn**.

As this unit is an infrequent offering with weekly workshops as the only regular contact, the **Discussion forum on iLearn** should be used to ask *and answer* questions. This forum is a means to communicate both between students and the teaching staff about unit content or issues with iLearn or Mastering Chemistry.

Email may also be used but if the enquiries are of a general nature you will be directed to the Discussion forum so that all students can benefit. The unit convenors will email you individually from time to time using your university email address.

Required Textbook:

"Chemistry the Central Science- Global Edition" by Brown and Lemay

Lectures (RECORDED ON ECHO360 SYSTEM)

Lecture recordings and supplementary shorter summaries will be available through iLEARN ECHO, and powerpoint slides via iLearn. Lectures will also include working through examples of problems, to strengthen and increase understanding of the concepts. Learning is an active process, and as such, you must engage with the material. This means watching the Echo recordings and downloading and reading the lecture notes and relevant sections of the textbook (and beyond) before and after attending the workshops is strongly recommended. You will be given regular practice quizzes (not assessed) to attempt, plus a problem based task (assessed) that will build on these quizzes. It is strongly recommended that you listen and work through lecture examples prior to attempting these quizzes and problem based task. These tasks, along with the regular workshops are designed to allow you to continuously learn and to identify what you understand and the areas that you need to spend more time on.

Workshops

Workshops will be run weekly (along with a special session in the mid-session break) to assist your understanding of the course material. Attempting the questions before the Workshop class to identify what you need assistance on is highly recommended. You will often be asked to assist in answering questions throughout the class. Anonymous teaching evaluations from past students have identified these teaching activities as a valuable learning tool.

Laboratory classes (On campus and are compulsory)

Practical classes are designed to develop basic laboratory skills, general safety practices and 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 safety practices necessary. The pre-practical questions MUST be submitted on-line through iLearn by the due date as in iLearn PRIOR to the scheduled practical class. In-lab and post-lab work are designed to allow you to appropriately record your experimental observations and your calculations in a detailed and accurate manner and assess your understanding of the theory behind the experiments conducted and to use this understanding to solve related problems. The practicals are scaffolded such that the expectations of pre-practical, in-practical and post-practical reports increase throughout the course as understanding of the concepts and skill in how to record the data and interpret results develops.

Unit Schedule

A detailed schedule is provided in the unit iLearn site.

Workshops begin Week 1 (Monday February 24)

Workshops will be held weekly on Mondays across Weeks 1-7 (February 24 - April 7) and Weeks 8-13 (April 28 - June 2). A 2 hour workshop will also be provided during the mid-session break (9-11 am April 17).

Practical 1 is on Sunday March 23, 1 pm - 5 pm in 14SCO Room 308.

Practicals 2-5 are from Tuesday April 15 - Thursday April 17 in 14SCO Room 308.

Policies and Procedures

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

The Writing Centre

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

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [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 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

In alignment with the recently introduced Macquarie University Assessment Policy, which limits assessments to only three assessment types, we have revised the assessment structure for this unit. This change ensures compliance with the policy.

The new assessment structure will include the following three types of assessments:

1. **Problem Set:** These will evaluate students' understanding and application of theoretical concepts.
2. **Practical Reports:** These will assess students' hands-on skills and ability to conduct and report on laboratory experiments.
3. **Examination:** These will test students' comprehensive knowledge and problem-solving abilities.

The unit also has two new co-convenors (Joanne Jamie and Koushik Venkatesan).

We value student feedback to be able to continually improve the way we offer this unit. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

We look forward to meeting and teaching our students in CHEM1002.

Joanne and Koushik

Unit information based on version 2025.04 of the [Handbook](#)