



CHEM1002

Foundations of Chemical and Biomolecular Sciences 2

Session 2, In person-scheduled-weekday, North Ryde 2023

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Unit Convener

Abidali Mohamedali

abidali.mohamedali@mq.edu.au

Contact via 9850 9292

4WW 119

Monday 9-10am or by appointment

Lecturer

Alf Garcia-Bennett

alf.garcia@mq.edu.au

Lecturer

Koushik Venkatesan

koushik.venkatesan@mq.edu.au

Credit points

10

Prerequisites

CHEM1001 or CBMS107 or CBMS103 or HSC Chemistry Band 5 and above

Corequisites

Co-badged status

Unit description

Molecular sciences is the basis for the development of new medicines, new materials, new ways of monitoring and improving our environment, and many other fields. This unit will focus on the properties and reactivity of matter and is an ideal unit for any student that wants to understand the atomic and molecular world within and around them. It will introduce chemical and physical properties of solids, liquids and gases, metals and solutions. It will examine specific reactions including precipitation, acid base chemistry and oxidation/reduction processes and will explore the energetics and rates of chemical change. It will also describe methods of detection and analysis of matter. Specific biological, environmental and new materials related to real world examples will be provided, with topics such as global warming, energy production and renewable fuels. This unit will provide an understanding and appreciation of 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: 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

Requirements to Pass this Unit

To pass this unit you must:

- Achieve a total mark equal to or greater than 50% overall, and
- Participate in, and undertake all hurdle activities (practical attendance)
- Achieve at least 40% in the final examination

PARTICIPATION in workshops, quizzes, mid-term exam, practicals:

- **If you are unable to attend a practical class, or exam, or hand in a form of assessment due to illness or misadventure, you must submit a request for special consideration no later than five (5) working days after the assessment task date or due date.** Information for Special consideration can be found

here: <https://students.mq.edu.au/study/my-study-program/special-consideration>

- **You should also immediately contact the Unit Convenor, Dr Abidali Mohamedali (abidali.mohamedali@mq.edu.au).**
- You may only attend the practical classes for which you are enrolled, as shown in your eStudent timetable.

Final grade:

- Your final grade will be based on the mark from the aggregation of the individual assessments (in-class and online quizzes, mid-semester test, practical), but you must exceed the **hurdle threshold mark of 40% or greater** in the final examination to be awarded an overall Pass grade or better. That is, **you must meet this hurdle to be able to pass overall. If you get between 30-40% you will get a second attempt at the exam but ONLY if you can pass the unit with a grade of 40% in the final exam. The SECOND attempt is to demonstrate that you have obtained a minimum level of understanding to pass the unit and your maximum grade in the SECOND attempt will be 40% of the final exam mark. It is university policy that you cannot improve your mark more than the hurdle boundary mark if you are given a SECOND attempt.**

ONLINE QUIZZES

Due: 10 Weekly online quizzes from **Weeks 2-12** (**Check iLearn as any weeks without a SGTA (Small Group Learning Activity) do not have a quiz**). Weighting: **15%**

There will be 10 on-line quizzes. You will find that these quizzes assist you in revising the course material as the course progresses. Further specific details on the quizzes will be provided at the CHEM1002 iLearn site.

PRACTICALS

Due: **To be submitted at the conclusion of every practical class.** Weighting: **20%.** **You must attend all 5 of the practical sessions. If you cannot you must submit a special consideration request.**

The pre-practical (pre-labs) exercises, performance in the practical, the practical report, and the post-practical exercises will be used to calculate the final practical mark. The assessment tasks start off simple and build on skills and knowledge developed throughout the course.

Pre-practicals exercises for practicals 1, 3, 4 and 5 must be handed in online on iLearn **the WEEKEND PRIOR** to your scheduled practical class. See iLearn for dates for online submission prior to the practical class. These "pre-labs" represent 20% of the mark for these 4 lab classes and will guide you in the data analysis for the practical class.

Practical reports are due at the end of the each practical class and post-practical excersises due

ONE WEEK after the scheduled practical session.

Attendance: **If you are unable to attend a practical class, exam, or hand in a form of assessment due to illness or misadventure, you must submit a Disruption to Studies notification at ask.mq.edu.au no later than five (5) working days after the assessment task date or due date. You should also immediately contact the Unit Convenor, Dr Abidali Mohamedali (abiodali.mohamedali@mq.edu.au).**

MID SEMESTER TEST

Due: **Wednesday 6th September during the lecture time.** Weighting: **15%**

Covering lectures up to and including week 6 content. This is designed to give you specific feedback on your understanding of the topics up to this stage to assist you in your further study of the unit. See iLearn for location and details.

FINAL EXAMINATION

Due: **University Examination Period** Weighting: **50%**

The final exam is designed to address a specific understanding of all the topics presented within the course and to show that the knowledge obtained can be applied to new problems. Details of the final exam length will be made available as part of publishing the university exam timetable.

The final exam is a hurdle assessment and you will need to get $\geq 40\%$ in the final exam to meet the hurdle. If you make **a serious first attempt at the final exam**, you will be provided with an opportunity to sit a new final exam 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 meet the exam hurdle of 40% if you get below 30% in your first attempt.** The Final exam is a hurdle requirement as passing it ensures you have met the minimum learning outcomes for this foundational unit. The concepts taught in this unit form the basis of your 2nd and 3rd year units in your degree.

Final Examination Details: You are expected to present yourself for examination at the time and place designated by the University in the Examination Timetable. This could be any day after the final week of the semester and up until the final day of the official examination period. Macquarie University's policy is not to **set early examinations** for individuals or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period. The only exception to sitting an examination at the designated time is because of documented illness or unavoidable disruption. In these circumstances, you should apply for a Supplementary Exam at ask.mq.edu.au.

Late Assessment Submission

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

Hurdle Assessments

Assessment: Practice-based task (0%)

Development of knowledge and skills requires continual practice at authentic problems in a laboratory-based setting. This unit has 5 laboratory classes and you must demonstrate your progress in developing and communicating knowledge and skills all these classes. This is a hurdle assessment meaning that failure to meet this requirement (attendance and participation) may result in a fail grade for the unit.

COVID Information and on-campus classes

Students are requested to minimise the risk of spreading COVID to themselves and others in accordance with the university and NSW Health guidelines: <https://www.mq.edu.au/about/corona-virus-faqs> and <https://www.nsw.gov.au/covid-19/stay-safe>.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Quizzes	15%	No	Sunday 11:55pm after workshop
Practice Based task	0%	Yes	Participation as per timetable
Laboratory work	20%	No	Pre-labs 1 week before lab and other work during lab class
Mid Semester test	15%	No	Week 7- During second lecture
Final Examination	50%	Yes	During the University End Year Examination Period

Online Quizzes

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 13 hours

Due: **Sunday 11:55pm after workshop**

Weighting: **15%**

There will be 10 on-line quizzes during semester. You will find that these quizzes assist you in revising the course material as the course progresses.

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.

Practice Based task

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Participation as per timetable**

Weighting: **0%**

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

Demonstration of practical laboratory skills and knowledge of protocols, and the submission of practical tasks

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.

Laboratory work

Assessment Type ¹: Lab report

Indicative Time on Task ²: 15 hours

Due: **Pre-labs 1 week before lab and other work during lab class**

Weighting: **20%**

The pre-practical exercises, performance in the practical, the practical report, and the post-practical exercises will be used to calculate the final practical mark. The assessment tasks start off simple and build on skills and knowledge developed throughout the course.

On successful completion you will be able to:

- 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.

Mid Semester test

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 6 hours

Due: **Week 7- During second lecture**

Weighting: **15%**

Mid Semester Test

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.

Final Examination

Assessment Type ¹: Examination

Indicative Time on Task ²: 25 hours

Due: **During the University End Year Examination Period**

Weighting: **50%**

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

It 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.

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

Required Textbook:

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

Lectures (IN PERSON)

Week 1 Classes: Lectures commence in week one, with workshops and practicals beginning in week 2. Please refer to llearn for a detailed guide.

Lectures will be run in person, and students must listen to lectures. In-person attendance makes for interactive sessions that enhance learning. 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, so you must engage with the material. This means downloading and reading the lecture notes and relevant sections of the textbook (and beyond) before and after attending the lectures is strongly recommended. Weekly online quizzes will also be provided, so it is strongly recommended that you listen and work through lecture examples before completing these quizzes. The quizzes are timed. The quizzes and mid-session tests allow you to learn continuously and identify what you understand and the areas you need to spend more time on, with minimal assessment penalty.

Workshops (Weekly in PERSON)

Workshops will be run to assist your understanding of the course material. Attempting the questions before the workshop to identify what you need assistance with is highly recommended. Teaching staff will often ask students to assist in answering the questions throughout the course. Participation records will be kept and logged. Anonymous teaching evaluations from past students have identified workshops as a valuable learning tool, and participation is thus critical for passing the unit. Workshops are interactive and are designed to consolidate the lectures. Students are advised to prepare for the workshops by ensuring all previous lectures are studied.

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 ensure you are ready for the practical work and have grasped the necessary theory and safety practices. The pre-practical questions **MUST** be submitted online through iLearn by the due date, as in iLearn before 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 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 an understanding of the concepts and skill in recording the data and interpreting results develops.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn. Dr Abidali also has specific availability for drop-ins please use these to ensure continuous support of your learning.

Unit Schedule

The detailed unit schedule will be available on iLearn. The topics covered, however, are as below:

1. Matter and Change
2. Electronic Structure of the Atom
3. Electronic Orbitals
4. Electronic Configurations and the periodic table
5. Bonding and Geometry
6. Transition metal Complexes
7. Gas Laws and Kinetic Theory
8. Chemical Kinetics
9. Chemical Equilibria
10. Acid-base Equilibria
11. Oxidation and Reduction
12. Buffers and solubility equilibria
13. Thermochemistry
14. Spectroscopy

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 ask.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](#)

PASS sessions

Peer Assisted Study Sessions (PASS) are weekly student-led revision sessions that aim to deepen your understanding of unit content and facilitate your learning. More information on PASS will be available on ilearn.

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 [AskMQ](#), 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

We value student feedback to be able to improve the way we offer our units continually. 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.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from the teaching staff. As such, the workshop sessions have been made more interactive, and time increased from 1hr to 1.5hrs to enhance support and engagement with the unit.

Changes since First Published

Date	Description
03/10/2023	"Tutorials" and "tutors" replaced by "SGTA", "workshops" and "teaching staff"