



# CHEM1002

## Foundations of Chemical and Biomolecular Sciences 2

Session 2, In person-scheduled-weekday, North Ryde 2022

*School of Natural Sciences*

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#### **Disclaimer**

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## General Information

### Unit convenor and teaching staff

Unit Convener

Abidali Mohamedali

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Contact via 9850 9292

4WW 119

Monday 9-10am or by appointment

Lecturer

Alf Garcia-Bennett

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Lecturer

Koushik Venkatesan

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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

### **PARTICIPATION in tutorials, quizzes, mid-term exam, practicals:**

- **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 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 tutorial 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%**

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.

Pre-practicals exercises for practicals 1, 3, 4 and 5 must be handed in online on iLearn **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.

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](http://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 ([abiodalimohamedali@mq.edu.au](mailto:abiodalimohamedali@mq.edu.au)).**

## MID SEMESTER TEST

Due: **Wednesday 7th 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 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 the publishing of 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. 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 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.**

**Final Examination Details:** The examination timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations. 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 semester and up until the final day of the official examination period. It is Macquarie University policy to **not 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](http://ask.mq.edu.au).

## Late Assessment Submission

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

## COVID Information and on-campus classes

On-campus teaching continues to be scheduled for Session 2, 2022. Masks are compulsory for all classes in indoor spaces and social distancing will be implemented wherever possible. Students will also be required to sanitise surfaces before and after use.

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>.

Any further requirements or changes to units in relation to COVID will be communicated to students via iLearn.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#"><u>Online Quizzes</u></a>	15%	No	Sunday 11:55pm after SGTA
<a href="#"><u>Mid Semester test</u></a>	15%	No	Wednesday 7th Sept during the Lecture Session
<a href="#"><u>Laboratory work</u></a>	20%	No	Pre-labs 1 week before lab and other work during lab class
<a href="#"><u>Practical and Tutorial participation</u></a>	0%	Yes	Participation as per timetable
<a href="#"><u>Final Examination</u></a>	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 SGTA**

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.

### Mid Semester test

Assessment Type **1**: Quiz/Test

Indicative Time on Task <sup>2</sup>: 6 hours

Due: **Wednesday 7th Sept during the Lecture Session**

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.

## Laboratory work

Assessment Type <sup>1</sup>: Lab report

Indicative Time on Task <sup>2</sup>: 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.

## Practical and Tutorial participation

Assessment Type <sup>1</sup>: Participatory task

Indicative Time on Task <sup>2</sup>: 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)**

You must participate in minimum of 8 tutorial classes and 4 of 5 practical classes. This is a hurdle requirement.

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.

## Final Examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 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.

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<sup>1</sup> 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.

<sup>2</sup> 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)

Lectures will be run in person and students are required to listen to lectures. Inperson 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, and as such, 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 on-line quizzes will also be provided so it is strongly recommended that you listen and work through lecture examples prior to completing these quizzes. The quizzes are timed. The quizzes and mid session test 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, with minimal assessment penalty.

## SGTAs (Weekly in PERSON and are compulsory)

SGTAs will be run to assist your understanding of the course material. Attempting the questions before the tutorial class to identify what you need assistance on is highly recommended. The tutor will often ask for students to assist in answering the questions throughout the class. Participation records will be kept and logged. Anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool and participation is thus a hurdle requirement for passing the unit.

## 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

WEEK	Date (week starting)	Lecture 1 MONDAY 10-11am- 23WW T1		Lecture 2 Wednesday : 2-3pm - 23WW T2		SGTA- MON 11-12PM, Wed 3-4PM or Wed 4-5PM COMPULSORY	PRACTICALS: Tuesday 9AM-12PM or 2PM-5PM or Wednesday 9AM-12PM COMPULSORY
1	25th July	L1. Intro lecture	AGB,AM,KV,AR	L2- Matter & Change	AGB		
2	1st Aug	L3- Modern Atomic Theory I	AGB	L4- Modern Atomic Theory II	AGB	STGA 1- Basic Concepts	PRACTICAL 1- Stoichiometry and Volumetric Analysis
3	8th Aug	L5- Chemical Bonding and Intermolecular Forces -I	AGB	L6- Chemical Bonding and Intermolecular Forces II	AGB	STGA 2- Conversion and Electronic Structure	
4	15th Aug	L7- Transition Metal Complexes I	KV	L8- Transition Metal Complexes II	KV	STGA 3- Electronic Structure and Bonding	PRACTICAL 2- Inorganic chemistry
5	22nd Aug	L9- Gas Laws & Kinetic Theory I	AGB	L10- Gas Laws & Kinetic Theory	AGB	STGA 4- Transition metals	

6	29th Aug	L11- Chemical Kinetics	AM	L12- Chemical Kinetics II	AM	STGA 5- Gases	PRACTICAL 3- Gas Law and Introductory Kinetics
7	5th Sept	L12- Chemical Equilibria	AM	<b>Mid-semester test (15%)</b>		STGA -6- Kinetics	
<b>Break: 12-25th SEPT</b>							
8	26th Sept	Mid-Session Exam Analysis AND Acid- Base Equilibria I	AM	Acid-Base Equilibria II	AM	STGA 7- Equilibria	
9	3rd Oct	<b>LABOUR DAY PUBLIC HOLIDAY</b>		Buffers & Solubility I	AM	NO STGA	PRACTICAL 4- Solubility and Complex Equilibria
10	10th Oct	Buffers & Solubility II	AM	Oxidation & Reduction I	AM	STGA 8- Acids and Bases and Solubility	
11	17th Oct	Oxidation & Reduction II	AM	Thermochemistry I	AGB	STGA 9- Oxidation reduction	PRACTICAL 5- Oxidation-Reduction Reactions
12	24th Oct	Thermochemistry II	AGB	Spectroscopy	AR	STGA 10- Thermodynamics and Spectroscopy	
13	31st Oct	Revision Lecture (past Questions)	AM				
AM	Abidali Mohamedali						
AGB	Alf- Garcia-Bennett						
KV	Koushik Venkatesan						
AR	Alison Roger						

## 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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto: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 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/](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.