CBMS107

Foundations of Chemical and Biomolecular Sciences 1

S1 Day 2017

Dept of Chemistry & Biomolecular Sciences

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General Information

Unit convenor and teaching staff
Unit Convenor
Dr Damian Moran
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F7B 329
Students are encouraged to arrange a meeting via email.

Lecturer
A/Prof Joanne Jamie
joanne.jamie@mq.edu.au
F7B 231
Students are encouraged to arrange a meeting via email.

Tutor
Dr Gurpreet Kaur
gurpreet.kaur@mq.edu.au
E8A 174

Tutor
Dr Roy McBurney
roy.mcburney@mq.edu.au
E8C 308

Credit points
3

Prerequisites

Corequisites

Co-badged status
This unit is co-badged with CBMS617

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

Important Academic Dates

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

Learning Outcomes

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

Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
Apply knowledge of chemistry concepts to describe the structure and properties of inorganic and organic compounds to predict their reactivity, behaviour and function.
Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.
Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.
Discuss the central role and impact of the chemical and biomolecular sciences in our lives and its modern applications.

General Assessment Information

Attendance at 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 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 Damian Moran (damian.moran@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-term exam, practical), but you must obtain a Pass grade or better **(50% or greater)** in the practical component to be awarded an overall Pass grade or better. That is, **you must pass the practical component to be able to pass overall.**

Assessment Tasks

Name	Weighting	Hurdle	Due
Practical	20%	Yes	every 3rd week
In-class and on-line quizzes	15%	No	Weeks 4, 10 and 13
Mid-term Exam	15%	No	Week 7
Final Examination	50%	Yes	University Examination Period

Practical

Due: **every 3rd week**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

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.

Participation and successful completion of four practicals and practical reports is required to pass CBMS107. The practical classes are a hurdle assessment, which means that you will be provided with a second chance to meet the hurdle requirement provided that you have made a serious first attempt at the practical that you missed. However, **please note that if after missing a first practical, that you miss a subsequent practical, you will not be offered a second chance to meet the hurdle requirement and you will fail CBMS107.**

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 Damian Moran (damian.moran@mq.edu.au).**

See General Assessment Information below for further information on the requirements for the CBMS107 assessment tasks.

On successful completion you will be able to:

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Apply knowledge of chemistry concepts to describe the structure and properties of inorganic and organic compounds to predict their reactivity, behaviour and function.
- Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.
- Discuss the central role and impact of the chemical and biomolecular sciences in our lives and its modern applications.

In-class and on-line quizzes

Due: **Weeks 4, 10 and 13**
Weighting: **15%**

There will be one in-class quiz run during a lecture, as well as two 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 CBMS107 iLearn site.

- Quiz 1 (on line) due Thur 23/03/17 at 11 pm
- Quiz 2 (on line) due Thur 18/05/17 at 11 pm
- Quiz 3 (in class) due Thur 08/06/17 at 2 pm

See General Assessment Information below for further information on the requirements for the CBMS107 assessment tasks.

On successful completion you will be able to:

- Use the language and principles of chemical science to be able to explain the

composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.

Mid-term Exam

Due: **Week 7**
Weighting: **15%**

There will be a 50 minute test in Week 7 in the lecture room (unless approved special conditions are obtained via Wellbeing) and will cover lectures up to the end of buffers. 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 General Assessment Information below for further information on the requirements for the CBMS107 assessment tasks.

On successful completion you will be able to:

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Final Examination

Due: **University Examination Period**
Weighting: **50%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The final exam (50%) will be 3 hours in length with 10 minutes reading time. It 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.

The final exam is a hurdle assessment. In the event that you make **a serious first attempt at the final exam** and achieve a fail mark (less than 50%), you will be provided with an opportunity to sit a new final exam and attempt to achieve a pass (mark >=%50).

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. **NOTE: If you apply for a supplementary examination, you must make**

yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

The only exception to sitting an examination at the designated time is because of documented illness or unavoidable disruption. Absence from the final exam will result in a grade of F except in the case of a genuine medical emergency or misadventure as defined by the University (see below). In these circumstances you should apply for a Supplementary Exam at ask.mq.edu.au.

See General Assessment Information below for further information on the requirements for the CBMS107 assessment tasks.

On successful completion you will be able to:

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Delivery and Resources

Communication

- Information will also be sent by email to your student email account on a frequent basis. **Please check your University email account daily.**
- In addition to email communication, the CBMS107 iLearn site will be used to communicate important information to you. **You are expected to access the unit web site regularly.**

Classes

- **Timetable:** Please check https://timetables.mq.edu.au/2017 for the official timetable of the unit.
- **Lectures:**
  - **Monday 10:00am - 11:00am** 27 Wallys Walk (W6D) Lotus Theatre
  - **Tuesday 12:00pm - 1:00pm** 27 Wallys Walk (W6D) Lotus Theatre
  - **Thursday 2:00pm - 3:00pm** 21 Wallys Walk (W2.4A) Macquarie Theatre

Note that lecture recordings and video capture links (under echo) are available at the CBMS107 iLearn site. Lectures will be used to emphasise key points and concepts with relevant examples. Studying the material to be covered BEFORE coming to a lecture will strongly help

you get the most out of the lectures.

- **Tutorials:**

These are compulsory, with one class every week, commencing from week 1. During tutorials, the problems assigned (available at the CBMS107 iLearn site) will be discussed. These problems closely resemble the types of problems in exams and are designed to help you gauge how much command you have on the materials covered. **You MUST work on these problems on your own before the tutorial so as to fully take advantage of this exercise.**

- **Practicals**:

The practical classes for CBMS107 run from **weeks 2-13** in E7B308 and E7B320. These are compulsory. **Your eStudent timetable will list when you have your practical class** - remember that there is four practicals in total, which means that you will have a practical class every 3rd week.

Required and Recommended texts and/or materials

Please check with the friendly staff in the Co-op bookshop for availability of the items listed below. The primary text, Fundamentals of Organic Chemistry by John McMurry, is available at the Co-op store on-campus. Do not forget that you can purchase most titles as e-books, which is a great way to lighten the load in your book bag. If you wish to review a title before making a purchasing decision, remember that the Macquarie University library has all the titles listed, although not always in the latest edition.

- **Primary Text:**

Fundamentals of Organic Chemistry / John McMurry. Edition: 7th ed. ISBN: 1439049718; ISBN: 9781439049716

- **Secondary Texts:**

Chemistry : The Central Science / Theodore L. Brown, H. Eugene LeMay Jr., Bruce E. Bursten, Catherine J. Murphy, Patrick M. Woodward, Stephen J. Langford, Dalius S. Sagatys, Adrian V. George. Edition: 3rd ed. Identifier: ISBN: 9781442554603 (paperback)

Introductory Chemistry / Nivaldo J. Tro ; global edition contributions by Ho Yu Au-Yeung. Edition: 5th ed. Global edition. Identifier: ISBN: 9781292057811 (paperback)

- **Supplementary Texts and Materials:**

Study Guide with Solutions Manual for McMurry's Fundamentals of Organic Chemistry / Susan McMurry. Edition: 7th ed. Identifier: ISBN 9781439049723

Pushing Electrons : A Guide for Students of Organic Chemistry / Daniel P. Weeks. Edition: 4th ed. Identifier: ISBN 9781133951889

Molecular Modelling Kit (available from the Co-op bookshop)

CBMS107 Laboratory Manual notes (available at the CBMS107 iLearn site).

CBMS107 Lecture Notes (available at the CBMS107 iLearn site).

- **Unit web site**

The web site for this unit is found at ilearn.mq.edu.au. Just login and follow the prompts to CBMS107. If you have any problems with iLearn log a ticket with OneHelp at onehelp.mq.edu.au. More information about OneHelp can be found at http://informatics.mq.edu.au/help.

You are expected to access the unit web site frequently. This contains important information including notes on ALL the topics to be covered; What You Need to Know Sheets; your marks for practicals, quizzes and the mid-session exam. Additionally, the web site will also be used to post important messages and links to internet facilities and sites of relevance to the course, downloadable software, and lots of other interesting material.

Technology Used

You will also be required to use an Online Web Learning (OWL) System for assessment tasks and practice problems. Further details regarding OWL are provided at the CBMS107 iLearn site.

Teaching and Learning Strategy

CBMS107 is a 3 credit point half year unit and will require an average of 10 hours of work per week (contact hours plus self study time). For students with weak chemistry backgrounds, more time than the 10 hours per week will probably be necessary to perform satisfactorily in this unit.

CBMS107 consists of 3 hours of lectures and a 1 hour tutorial every week and a 4 hour practical class every 3rd week. CBMS107 is designed to introduce you to the principles of the molecular sciences, including developing an understanding of the practical skills required to undertake simple chemistry experiments in an efficient and safe manner. The lecture material, tutorials and laboratories complement each other, and along with quizzes (in lectures, on-line and in practical classes), have been developed to increase your understanding of the topics so you can achieve the learning outcomes.

The unit expectation is that you will:

· Attend all lectures or when not possible listen to the recorded lectures

· Attend all tutorials and attempt the set exercises

· Demonstrate reasonable competence in all practical preparation exercises and attend each practical class

· Actively engage in the practical and coursework assessment tasks

· Spend an average of no less than 3 hours per week of private study in addition to class contact

If you prepare and attend all components of the unit and work consistently and continuously throughout the semester, you should be able to develop a strong understanding of the general chemistry and organic chemistry presented, and perform satisfactorily in this unit. **A clear correlation has been seen between student attendance and satisfactory completion of this**

subject. Students who try to memorise just before exams typically do not do well in this unit. Instead a deeper understanding of the concepts is required.

· **Lectures** will be presented formally, although quizzes and general questions may be asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available at the unit web site, while other material will be provided in the lecture class. Based on observations of related units, we know that students fall behind and perform poorly if they do not attend the lecture classes. Furthermore, as further material is often provided in the lecture class, a student that does not attend the class will not be as well prepared as they would otherwise be. Learning is an active process, and as such, you must engage with the material.

· **Tutorials** 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.

· **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. 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

Timetable may be subject to minor changes. All changes will be announced at the CBMS107 iLearn site.

Week	Monday 10:00am 11:00am	Tuesday 12:00pm 1:00pm	Thursday 2:00pm 3:00pm
1	**Lecture 1** Matter and Change - Unit Orientation - Matter - Compounds vs. mixtures - Chemical change	**Lecture 2** Atoms and Orbitals - Atomic theory and structure - Protons, neutrons and electrons - Mass #, proton #, isotopes - Periodic table, groups, periods	**Lecture 3** Atoms and Orbitals - Electron configuration - Valence electrons - Octet rule/noble gas config. - Molecular orbitals (s, p)

2	**Lecture 4** Elements and Compounds - Lewis symbols - Ways to obtain an octet - Bonding (covalent, ionic)	**Lecture 5** Stoichiometry - Reaction types - Chemical and physical change - Moles, mass, molar mass	**Lecture 6** Stoichiometry - Concentration - Molarity - Dilution
3	**Lecture 7** Equilibrium - Equilibrium - Equilibrium constants - Le Chatelier's	**Lecture 8** Acids and Bases - Acids and bases - Titrations - pK_a	**Lecture 9** Acids and Bases - Acids and bases - pH and pOH
4	**Lecture 10** Acids and Bases - Buffers	**Lecture 11** Elements and Compounds - Solids, liquids and gases - Intermolecular forces, Mp, Bp - Solubility, viscosity, surface tension	**Lecture 12** Elements and Compounds - Formula and naming - Binary molecular - Ionic compounds
	Census date 26/03/17	**Census date 26/03/17**	**Census date 26/03/17**
5	**Lecture 13** Elements and Compounds - Formula and naming - Binary molecular - Ionic compounds	**Lecture 14** Organic Chemistry - Introduction - Functional groups	**Lecture 15** Organic Chemistry - Shape/VSEPR - Multiple bonds - Hybridization
6	**Lecture 16** Organic Chemistry - Electronegativity - Polar bonds - Molecular dipoles	**Lecture 17** Alkanes and cycloalkanes - Structures and nomenclature - Properties	**Lecture 18** Alkanes and cycloalkanes - Reactions - Isomers and conformations
7	**Lecture 19** Alkanes and cycloalkanes - Isomerism - Stereochemistry	**Lecture 20** Preparation for Mid-Session Exam (15%)	**Lecture 21** **L21: Mid-Session Exam (15%)**
	Mid-session break	**Mid-session break**	**Mid-session break**
8	**Lecture 22** Getting Reactive - Predicting function - Reactivity - Electron pushing	**Lecture 23** Alkenes and Alkynes - Naming alkenes and alkynes - Addition reaction mechanisms	**Lecture 24** Alkenes and Alkynes - Addition reactions

9	**Lecture 25** Alkyl Halides - Preparation - S_N1/S_N2	**Lecture 26** Alkyl Halides - E1/E2	**Lecture 27** Alcohols - Preparation - Reactions
10	**Lecture 28** Aldehydes and Ketones - Preparation - Reactions	**Lecture 29** Aldehydes and Ketones - Preparation - Reactions	**Lecture 30** Carbohydrates - Terminology - Properties
11	**Lecture 31** Carbohydrates - Properties - Biological importance	**Lecture 32** Carboxylic Acids and Derivatives - Preparation - Reactions	**Lecture 33** Amines and Amino acids - Properties - Biological importance
12	**Lecture 34** Peptides and Proteins - Properties - Biological importance	**Lecture 35** Nucleic acids - DNA - RNA	**Lecture 36** Nucleic acids - DNA - RNA
13	**Lecture 37** Summary & Review	**Lecture 38** Summary & Review	**Lecture 39** Summary & Review

Learning and Teaching Activities

Lectures

Lectures will be presented formally, although quizzes and general questions may be asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available on the unit web site, while other material will be provided in the lecture class. You are expected to download the lecture material and bring it into the lecture class so you can spend most of the time listening to the lecturer rather than transcribing. Do not assume these notes or recordings/video capture are a suitable substitute to attending the lectures. Students historically fall behind and perform poorly if they do not attend the lecture classes and often further material is provided in the lecture class, so a student that does not attend the class will not be as well prepared as they would otherwise be. 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 lectures is strongly recommended. A quiz and a mid session test will be run in the lecture classes. The quiz will be multiple choice and short, but cover material in recent weeks prior to that days lecture, therefore all students are expected to keep up to date with lecture material through revision each week. Additional on-line quizzes will also be provided. 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.

Tutorials

Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.

Laboratory classes

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. 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.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, 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.

Student Support

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

Learning Skills

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

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

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

Student Enquiries

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

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.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Assessment tasks

- Practical
- Final Examination

Learning and teaching activities

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
- Discuss the central role and impact of the chemical and biomolecular sciences in our lives and its modern applications.

Assessment task

- Practical

Learning and teaching activity

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
- 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. 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.

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

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

Assessment tasks

- Practical
- In-class and on-line quizzes
- Mid-term Exam
- Final Examination

Learning and teaching activities

- Lectures will be presented formally, although quizzes and general questions may be asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available on the unit web site, while other material will be provided in the lecture class. You are expected to download the lecture material and bring it into the lecture class so you can spend most of the time listening to the lecturer rather than transcribing. Do not assume these notes or recordings/video capture are a suitable substitute to attending the lectures. Students historically fall behind and perform poorly if they do not attend the lecture classes and often further material is provided in the lecture class, so a student that does not attend the class will not be as well prepared as they would otherwise be. 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 lectures is strongly recommended. A quiz and a mid session test will be run in the lecture classes. The quiz will be multiple choice and short, but cover material in recent weeks prior to that days lecture, therefore all students are expected to keep up to date with lecture material through revision each week. Additional on-line quizzes will also be provided. 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.

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Apply knowledge of chemistry concepts to describe the structure and properties of inorganic and organic compounds to predict their reactivity, behaviour and function.
- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Assessment tasks

- Practical
- In-class and on-line quizzes
- Mid-term Exam
- Final Examination

Learning and teaching activities

- Lectures will be presented formally, although quizzes and general questions may be

asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available on the unit web site, while other material will be provided in the lecture class. You are expected to download the lecture material and bring it into the lecture class so you can spend most of the time listening to the lecturer rather than transcribing. Do not assume these notes or recordings/video capture are a suitable substitute to attending the lectures. Students historically fall behind and perform poorly if they do not attend the lecture classes and often further material is provided in the lecture class, so a student that does not attend the class will not be as well prepared as they would otherwise be. 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 lectures is strongly recommended. A quiz and a mid session test will be run in the lecture classes. The quiz will be multiple choice and short, but cover material in recent weeks prior to that days lecture, therefore all students are expected to keep up to date with lecture material through revision each week. Additional on-line quizzes will also be provided. 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.

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
- 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. 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.

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcome

- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.

Assessment tasks

- Practical
- In-class and on-line quizzes
- Mid-term Exam
- Final Examination

Learning and teaching activities

- Lectures will be presented formally, although quizzes and general questions may be asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available on the unit web site, while other material will be provided in the lecture class. You are expected to download the lecture material and bring it into the lecture class so you can spend most of the time listening to the lecturer rather than transcribing. Do not assume these notes or recordings/video capture are a suitable substitute to attending the lectures. Students historically fall behind and perform poorly if they do not attend the lecture classes and often further material is provided in the lecture class, so a student that does not attend the class will not be as well prepared as they would otherwise be. 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 lectures is strongly recommended. A quiz and a mid session test will be run in the lecture classes. The quiz will be multiple choice and short, but cover material in recent weeks prior to that days lecture, therefore all students are expected to keep up to date with lecture material through revision each week. Additional on-line quizzes will also be provided. 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.

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
- 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. 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.

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Apply knowledge of chemistry concepts to describe the structure and properties of inorganic and organic compounds to predict their reactivity, behaviour and function.
- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.

Assessment tasks

- Practical
- In-class and on-line quizzes

- Mid-term Exam
- Final Examination

Learning and teaching activities

- Lectures will be presented formally, although quizzes and general questions may be asked in class, demonstrations provided, and examples of problems worked through, to strengthen and increase understanding of the concepts. Most lecture material will be available on the unit web site, while other material will be provided in the lecture class. You are expected to download the lecture material and bring it into the lecture class so you can spend most of the time listening to the lecturer rather than transcribing. Do not assume these notes or recordings/video capture are a suitable substitute to attending the lectures. Students historically fall behind and perform poorly if they do not attend the lecture classes and often further material is provided in the lecture class, so a student that does not attend the class will not be as well prepared as they would otherwise be. 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 lectures is strongly recommended. A quiz and a mid session test will be run in the lecture classes. The quiz will be multiple choice and short, but cover material in recent weeks prior to that days lecture, therefore all students are expected to keep up to date with lecture material through revision each week. Additional on-line quizzes will also be provided. 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.
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- 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. 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.

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Use the language and principles of chemical science to be able to explain the composition and properties of matter and name and write (or describe) structures and reactions for representative inorganic and organic compounds including biomolecules.
- Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
- Acquire basic laboratory skills in the chemical and biomolecular sciences, including an understanding of general laboratory safety procedures.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.

Assessment tasks

- Practical
- Mid-term Exam
- Final Examination

Learning and teaching activities

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
- 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. 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.

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Apply knowledge of chemistry concepts to describe the structure and properties of inorganic and organic compounds to predict their reactivity, behaviour and function.
- Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.
- Discuss the central role and impact of the chemical and biomolecular sciences in our lives and its modern applications.

Assessment task

- Practical

Learning and teaching activity

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
- 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. 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.

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcomes

- Use the principles of chemical and biomolecular sciences to solve problems, process and interpret data, and have an understanding of where to apply these principles.
- Record and analyse scientific data, as well as communicate conclusions using the basic elements of scientific report preparation.
- Discuss the central role and impact of the chemical and biomolecular sciences in our lives and its modern applications.

Assessment task

- Practical

Learning and teaching activity

- Tutorials 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. Attendance records will be kept. While tutorials do not contribute formally to your mark, anonymous teaching evaluations from past students have identified tutorials as a valuable learning tool.
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Non-attendance of assessment

Non-Attendance for Assessable Tasks: Students unable to attend a practical class, tutorial class, quizzes or exams or submit the practical reports on time **due to illness or misadventure, 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 Damian Moran (damian.moran@mq.edu.au).**

For students who do have a valid reason for the non-attendance formally approved by the unit convenor, if in-class quizzes are missed, you will get an average mark of your other quizzes. If a practical class is missed, you should organise with the Unit Convenor for an alternative session to attend. If this is unable to be found, and your Disruption to Studies has been approved, you will get an average mark of your other laboratory reports. If more than one practical class is missed overall you must speak to Dr Damian Moran to discuss alternative options.

If the mid-term exam is missed, there will be a make up exam organised if you receive a Disruption to Studies approval through ask.mq.edu.au.

If the final exam is missed due to a valid reason, you can apply for a Supplementary Examination. **Please note that if you are sick at or in the days just prior to the scheduled exam time you should contact the unit coordinator as soon as possible to discuss the possibility of a supplementary exam.** It is normally unwise to sit an exam if illness or other circumstances will significantly affect your performance. **NOTE: If you apply for a supplementary examination, you must make yourself available for the week of July 24 – 28, 2017. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.** If an absence is **anticipated** (perhaps for a mandatory religious or University associated sporting event) you must inform the unit convenor **in advance** that this will be the case and discuss alternative arrangements. It is your responsibility to undertake this. Notification after the event of an anticipated absence will not be looked upon favourably. For any unjustified absences students will receive a zero mark for the assessment task.

Extensions: If you are unable to complete a form of assessment (practical reports, quizzes) on time **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 Damian Moran (damian.moran@mq.edu.au)** to discuss possible extensions.

Teaching staff

- **Dr Damian Moran**, Unit Convenor, F7B 329, ph 9850 8299, email damian.moran@mq.edu.au
- **A/Prof Joanne Jamie**, Lecturer, F7B 231, ph 9850 8283, email joanne.jamie@mq.edu.au

Dr Damian Moran is the coordinator of this unit and should be consulted if you have administrative or organisational problems.

Dr Damian Moran and A/Prof Jamie will be presenting the lectures.

The staff have an open door policy for any questions best dealt in person on their topics. However, **you are strongly advised to organise an appointment first by emailing beforehand (put CBMS107 in the header of the email message)**.