CBMS107

Foundations of Chemical and Biomolecular Sciences 1

S2 External 2017

Dept of Chemistry & Biomolecular Sciences

Contents

General Information

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

Lecturer
A/Prof Joanne Jamie
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F7B 231
Students are encouraged to arrange a meeting via email.

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 participate in a practical class, attend an exam or quiz, or submit 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. In addition, please contact the Unit Convenor as soon as possible and notify them of your absence.
- You may only attend the practical classes for which you are enrolled, as shown at 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).

Assessment Tasks

Name	Weighting	Hurdle	Due
Practical class participation	0%	Yes	Each on-campus session
Practical assessment	20%	No	Each on-campus session
In-class and on-line quizzes	15%	No	As listed
Mid-term exam	15%	No	24/09/17
Final examination	50%	Yes	University Examination Period

Practical class participation

Due: **Each on-campus session**
Weighting: **0%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Participation in the four CBMS107 practicals is a hurdle required to pass CBMS107. If you fail all attempts at a hurdle task, you will fail the unit (grade F or FH).

If you are unable to participate in a practical class 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. In addition, please contact the Unit Convenor as soon as possible and notify them of your absence.

On successful completion you will be able to:

- 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.

Practical assessment

Due: **Each on-campus session**
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.

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: **As listed**
Weighting: **15%**

There will be four 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 Sunday 20th August 2017
- Quiz 2 (on line) due Sunday 1st October 2017
- Quiz 3 (on line) due Sunday 22nd October 2017
- Quiz 4 (on line) due Sunday 5th November 2017

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: **24/09/17**
Weighting: **15%**

There will be a 50 minute test in the lecture room (unless approved special conditions are

obtained via Wellbeing) during the second on-campus session. 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 is worth 50% of your total assessment. 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 and you will need to get >= 40% to meet the hurdle. In the event that you make **a serious first attempt at the final exam**, you will be provided with the opportunity to sit a new final exam to meet the hurdle. The Faculty define a serious attempt as a mark that is 10% below the hurdle, which in this instance is a mark between 30-40%. You will NOT be given a second attempt to pass the exam if you get below 30% in your first attempt. **If you fail all attempts at a hurdle task, you will fail the unit (grade F or FH).**

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 during the week of Dec 4-8, 2017. If you are not available at that time, there is no guarantee that an additional examination time will be offered.**

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 frequently be sent by email to your student email account. **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

Please check https://timetables.mq.edu.au/2017 for the official timetable of the unit. Scheduled on-campus sessions:

1. **on-campus session (12-13 August 2017)**
2. **on-campus session (22-24 September 2017)**
3. **on-campus session (21-22 October 2017)**

The on-campus sessions will consist of lectures, tutorials and practical classes. Please arrive each day at 8.50 am for commencement at 9 am. You will NOT be required to sign-on at the Centre for Open Education.

Attendance at on-campus sessions is compulsory. Repeat students may request an exemption from the practical classes, but it is at the discretion of the unit coordinator as to whether an exemption is granted.

- **Lectures:**

Lecture slides and recordings (under Echo360 Active Learning Platform) from the internal first semester unit are available at the CBMS107 iLearn site. It is advisable to bring the printed lecture slides for the relevant sections to the on-campus sessions. Many of them will be used in the external lectures but not all. 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:**

It is very important to prepare well and in advance for the on-campus sessions including the first one. Complete the set tutorial questions in advance of each on-campus session, as you will only benefit fully from the tutorials if you have prepared in advance. The tutorial 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.

- **Practicals**:

Practical class details are available at the CBMS107 iLearn space. For safety reasons you will not be permitted to participate in laboratory sessions unless you are wearing a lab coat and sturdy shoes which cover your feet (enclose your toes). Please read the Laboratory Notes before you attend the laboratory session and complete the pre-laboratory tasks as required.

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)

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, as it 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). Thus, in order to successfully complete this unit, students will need to work hard, consistently and continuously throughout the semester. 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 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 on-campus sessions
- Attend each practical class
- Listen to all the recorded lectures
- Attempt all the tutorial exercises
- Demonstrate reasonable competence in all practical exercises
- Actively engage in the practical and coursework assessment tasks
- Spend an average of no less than 10 hours per week of study on CBMS107

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. In our experience, there is a **clear correlation between student engagement and satisfactory completion of first year subjects like CBMS107.** While students that try to memorise just before exams typically do not do well, as a deeper understanding of the concepts is required.

Unit Schedule

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

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)
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
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
Lecture 10 Acids and Bases - Buffers	**Lecture 11 Elements & Compounds** - Solids, liquids and gases - Intermolecular forces, Mp, Bp - Solubility, viscosity, surface tension	**Lecture 12 Elements & Compounds** - Formula and naming - Binary molecular - Ionic compounds
On-campus session (12-13 Aug 17)	**On-campus session (12-13 Aug 17)**	**On-campus session (12-13 Aug 17)**
Lecture 13 Elements & Compounds - Formula and naming - Binary molecular - Ionic compounds	**Lecture 14 Organic Chemistry** - Introduction - Functional groups	**Lecture 15 Organic Chemistry** - Shape/VSEPR - Multiple bonds - Hybridization
Census date 26 August 2017	**Census date 26 August 2017**	**Census date 26 August 2017**
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

Lecture 19 Alkanes and cycloalkanes - Isomerism - Stereochemistry	**Lecture 20** Preparation for Mid-Session Exam (15%)	**Lecture 21** No lecture
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
Lecture 25 Alkyl Halides - Preparation - S_N1/S_N2	**Lecture 26 Alkyl Halides** - E1/E2	**Lecture 27 Alcohols** - Preparation - Reactions
On-campus session (22-24 Sep 2017)	**On-campus session (22-24 Sep 2017)**	**On-campus session (22-24 Sep 2017)**
Lecture 28 Aldehydes and Ketones - Preparation - Reactions	**Lecture 29 Aldehydes and Ketones** - Preparation - Reactions	**Lecture 30 Carbohydrates** - Terminology - Properties
Lecture 31 Carbohydrates - Properties - Biological importance	**Lecture 32 Carboxylic Acids and Derivatives** - Preparation - Reactions	**Lecture 33 Amines and Amino acids** - Properties - Biological importance
Lecture 34 Peptides and Proteins - Properties - Biological importance	**Lecture 35 Nucleic acids** - DNA - RNA	**Lecture 36 Nucleic acids** - DNA - RNA
Lecture 37 Summary & Review	**Lecture 38 Summary & Review**	**Lecture 39 Summary & Review**
On-campus session (21-22 Oct 2017)	**On-campus session (21-22 Oct 2017)**	**On-campus session (21-22 Oct 2017)**

Learning and Teaching Activities

Lectures

Lecture material is available at the unit iLearn site. We recommend that you download the lecture material and bring it to the on-campus sessions, so that 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 on-campus 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 class participation
- Practical assessment
- 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 class participation

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 assessment
- In-class and on-line quizzes
- Mid-term exam
- Final examination

Learning and teaching activities

- Lecture material is available at the unit iLearn site. We recommend that you download the lecture material and bring it to the on-campus sessions, so that 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 on-campus 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 class participation

- Practical assessment
- In-class and on-line quizzes
- Mid-term exam
- Final examination

Learning and teaching activities

- Lecture material is available at the unit iLearn site. We recommend that you download the lecture material and bring it to the on-campus sessions, so that 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 on-campus 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 class participation
- Practical assessment
- In-class and on-line quizzes
- Mid-term exam
- Final examination

Learning and teaching activities

- Lecture material is available at the unit iLearn site. We recommend that you download the lecture material and bring it to the on-campus sessions, so that 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 on-campus 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 class participation
- Practical assessment

- In-class and on-line quizzes
- Mid-term exam
- Final examination

Learning and teaching activities

- Lecture material is available at the unit iLearn site. We recommend that you download the lecture material and bring it to the on-campus sessions, so that 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 on-campus 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.

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 class participation
- 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.
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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.

Learning and teaching activities

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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.

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.
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Non-attendance of assessment

Absence during an exam, quiz or practical class, that is not approved by a Disruption to Studies notification will result in a zero mark for that assessment task. Similarly, any failure to complete an assessment task on-time, that is not approved by a Disruption to Studies notification, will result in a zero mark for that assessment task.

Students unable to attend a practical class, quiz, exam, or submit a practical report 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. In addition, please contact the Unit Convenor as soon as possible and notify them of your absence.

Remember, practical class participation and the final exam are set as hurdle tasks for CBMS107. If you fail all attempts at these hurdle tasks, you will fail the unit (grade F or FH).

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)**.