



CBMS603

Organic and Biological Chemistry - The Chemistry of Life

S2 Day 2016

Dept of Chemistry & Biomolecular Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	3
<u>Assessment Tasks</u>	4
<u>Delivery and Resources</u>	7
<u>Unit Schedule</u>	10
<u>Learning and Teaching Activities</u>	12
<u>Policies and Procedures</u>	13
<u>Graduate Capabilities</u>	14
<u>Changes from Previous Offering</u>	26
<u>Non-attendance of assessment</u>	26
<u>Teaching staff</u>	27
<u>Tutorial Classes</u>	27

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff

Unit Convenor

Joanne Jamie

joanne.jamie@mq.edu.au

Contact via joanne.jamie@mq.edu.au

F7B231

Students are encouraged to arrange a meeting via email.

Tutor

A/Prof Andrew Try

andrew.try@mq.edu.au

Contact via 9850 8291

F7B 228

Tutor

Dr Fei Liu

fei.liu@mq.edu.au

Contact via 9850 8312

F7B330

Tutor

Dr Damian Moran

damian.moran@mq.edu.au

Contact via 9850 8299

F7B329

Tutor, demonstrator

Roy McBurney

roy.mcburney@mq.edu.au

Contact via 9850 8214

E8C308

Credit points

4

Prerequisites

Admission to MLabQAMgt or MRadiopharmSc or MSc or MBiotech or MBiotechBus

Corequisites

Co-badged status

this unit is co-badged with cbms103

Unit description

This unit presents the fundamentals of organic chemistry, which is the study of chemical compounds containing carbon. Such compounds are the major components of living systems. The themes presented are relevant to molecular transformations in both the living world and in the laboratory. The coursework encompasses a systematic study of the structures and typical reactions of the major classes of functional groups (alkanes; alkenes; aromatic compounds; alkyl halides; alcohols; aldehydes and ketones; carboxylic acids; and amines). This includes the chemical properties of important biomolecules such as amino acids, proteins, carbohydrates and nucleic acids.

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:

By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level

By the end of this unit students should be able to undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices

By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in a manner commensurate with professional chemistry

By the end of this unit students should be able to analyse experimental results to solve related problems

By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports

By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

By the end of this unit students should be able to work with colleagues to undertake experiments in a safe and harmonious way

Assessment Tasks

Name	Weighting	Due
<u>In-class and on-line quizzes</u>	10%	Week 4, 6, 8, 10, 12, 13
<u>Mid-term Exam</u>	15%	Week 7
<u>Laboratory</u>	25%	every 2nd week
<u>Final Examination</u>	50%	University Examination Period

In-class and on-line quizzes

Due: **Week 4, 6, 8, 10, 12, 13**

Weighting: **10%**

There will be two in-class quizzes run in the lecture timeslots and lecture room, one on **Monday** of **week 4** (Aug 22) and one on **Friday** of **week 12** (Nov 4) and four on-line quizzes due on **Friday** of **week 6** (Sept 9), **Friday** of **week 8** (Oct 7), **Friday** of **week 10** (Oct 21) and **Friday** of **week 13** (Nov 11). You will find that these quizzes assist you in revising the course material as the course progresses. All quizzes contain only multiple choice questions. For the in-class quizzes, the answers will be explained immediately afterwards. For the on-line quizzes, further specific details on how to access these will be provided in week 1.

Medical certificates or official documents must be lodged as part of a disruption to studies request at ask.mq.edu.au as soon as possible if you are absent for any of the in-class quizzes or miss the due date for any of the on-line quizzes. If your reason is regarded as valid and one or both in-class quizzes are missed, you will be given an average of the other quizzes done; with the on-line quizzes an extension of time will be provided if the disruption to studies request is approved.

On successful completion you will be able to:

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level

Mid-term Exam

Due: **Week 7**

Weighting: **15%**

There will be a 50 minute test (/15%) in Week 7, Friday September 16, 3.05pm sharp. This will be run in the lecture room (unless approved special conditions are obtained via Wellbeing) and will cover lectures up to the end of aromatic compounds. 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.

Medical certificates or official documents must be lodged with a disruption to studies request at ask.mq.edu.au as soon as possible if you are absent for the mid-term. If your disruption to studies request is approved, you will be given the opportunity to sit a supplementary exam.

On successful completion you will be able to:

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports

Laboratory

Due: **every 2nd week**

Weighting: **25%**

Full details on the breakdown of the laboratory assessment are given in the laboratory manual. The mark includes pre-lab, in-lab and post-lab reports and a practical exam. **There are a total of 5 laboratory sessions that you need to attend. These are typically done in alternate weeks (excluding the mid session break and week 8). A passing grade or better (50% or greater) in the practical component is required to pass the unit.** The assessment tasks start off simple and build on skills and knowledge developed throughout the course.

Medical certificates or official documents must be lodged along with a disruption to studies request at ask.mq.edu.au as soon as possible if you are absent for a laboratory class or need an extension on submission of the reports. You should also contact the unit convenor straight away by email to organise for an alternative laboratory session to attend to complete the laboratory experiments. There will be a number of available catch up sessions for the practicals.

On successful completion you will be able to:

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in

a manner commensurate with professional chemistry

- By the end of this unit students should be able to analyse experimental results to solve related problems
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- By the end of this unit students should be able to work with colleagues to undertake experiments in a safe and harmonious way

Final Examination

Due: **University Examination Period**

Weighting: **50%**

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.

Your marks (in-class and online quizzes, mid-term exam, laboratory) will be placed on the CBMS603 web site.

Your final grade will be based on the mark from the aggregation of the individual assessments, but you must obtain a Pass grade or better in the **laboratory** component to be awarded an overall Pass grade or better. That is, you must pass the laboratory component to be able to pass overall.

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. However, it is advisable to be available the week beyond this just in case extenuating circumstances cause you to miss the exam and you need to do a supplementary exam.

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.

On successful completion you will be able to:

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to analyse experimental results to solve related problems
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

Delivery and Resources

Classes

- **Timetable:** Please check www.timetables@mq.edu.au for the official timetable of the unit.
- **Lectures:** Monday 11.05–11.55am and Friday 3.05pm–3.55pm and 4.05pm–4.55pm, all at Macquarie Theatre W2.4A.
- ALL LECTURE MATERIAL WILL BE EXPECTED TO BE DOWNLOADED FROM THE WEB SITE at ilearn.mq.edu.au. Lecture recordings and video capture links (under echo) are also found at the unit website. 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 2. During tutorial time, the problems assigned (see tutorial list at the end of this document) 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 and should bring in the textbooks, lecture notes and accompanying resources such as the model kit to assist the session.**
- Laboratory classes: The laboratory classes run from **weeks 2-13** in E7B308 and E7B320. These are **compulsory**. You will be allocated ONE laboratory class **every 2nd week**. This will be based on the details provided during your enrolment. Laboratory classes will begin in **week 2** for students allocated **Group A** laboratory classes and **week 3** for students allocated **Group B** laboratory classes. **Please refer to the laboratory manual for further details.**
- Your allocated laboratory day and group (A or B) and tutorial time will be available on the unit web page. During week 1 you can email A/Prof Joanne Jamie (joanne.jamie@mq.edu.au) if your allocation is in conflict with other academic timetables or commitments that are beyond your control. In your email you must include the following information: your name; student

number; phone number; email address; the reason why the assigned laboratory and/or tutorial day/time is not appropriate for you; and possible alternative allocation(s). A/Prof Jamie will reallocate you as appropriate.

Required and Recommended texts and/or materials

Prescribed Texts and Materials:

J. McMurry, "Fundamentals of Organic Chemistry" (7th Edition)

S. McMurry, "Study Guide and Solutions Manual" (7th Edition)

D. P. Weeks, "Pushing Electrons", 3rd Edition

Molecular Modelling Kit

(The above are a bundled package at the Co-op bookshop. Upon request they may also be sold separately). The text is also available as an e-book - please enquire with the bookshop.

Laboratory Manual downloadable from the unit web site.

Lecture notes can be obtained from the unit web site.

Unit web page

The web page for this unit can be found at ilearn.mq.edu.au. Just login and follow the prompts to CBMS603. You can use any web browser such as Firefox, Internet Explorer or Safari to login.

You will be asked for a username and password. Your User Name is your Macquarie Student ID Number, which is an 8-digit number found on your Campus Card. The password is your myMQ Student Portal password. This will be the original MQID password (2 random characters followed by your date of birth in ddmmyy format) that was sent to you on enrolment, unless you have already changed your password in the myMQ Student Portal. 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 mid-session exam; and past exam papers, including with answers. 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 are expected to access the unit web site on a frequent basis and download pdf files. If you do not have your own computer you may wish to access the CBMS603 web resources on campus using the PC computers in the Library or in the C5C computer laboratories.

To view notes on all the topics and past exams on the unit web site, you will require Adobe Acrobat Reader Version 9 or later to be installed on your computer. Acrobat Reader can be downloaded from the Adobe web site <http://get.adobe.com/uk/reader/>. If you are using the computers in the library, then Acrobat has already been installed.

Please note information will also be sent by email to your student email account so please look at your email account on a frequent basis.

You will also be required to use an Online Web Learning (OWL) System for assessment tasks and practice problems. Further details on this will be provided on the first day of the first on-campus session.

Teaching and Learning Strategy

CBMS603 is a 4 credit point half year unit and will require an average of 9 hours of work per week (contact hours plus self study time). For students with weak chemistry backgrounds, more time than the 9 hours per week will probably be necessary to perform satisfactorily in this unit.

CBMS603 consists of 3 hours of lectures and a 1 hour tutorial every week (except week 1) and a 4 hour laboratory class every 2nd week. CBMS603 is designed to allow you to develop an understanding of organic and biological chemistry and the practical skills to undertake simple organic 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 laboratory 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 laboratory preparation exercises and attend each laboratory class
- Demonstrate reasonable competence in the post-laboratory exercises submitted by the due dates
- Actively engage in the laboratory 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 chemistry of organic compounds, including of biological significance, 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 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.

Quizzes and a mid session test will be run in the lecture classes. The quizzes 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. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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 are designed to develop basic laboratory skills, general safety practices and critical and analytical thought. Pre-laboratory questions are designed to make sure you are ready for the laboratory 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 laboratory experiments are scaffolded such that the expectations of pre-lab, in-lab and post-lab reports increase throughout the course as understanding of the concepts and skill in how to record the data and interpret results develops.

Unit Schedule

Week	Mon	Fri 3-4	Fri 4-5
1	L1 - Introduction	L2 Structure and Bonding (McMurry Ch1)	L3 - Structure and Bonding (McMurry Ch1)
2	L4 - Structure and Bonding, Acids and Bases (McMurry Ch1)	L5 - Alkanes and Cycloalkanes (McMurry Ch2)	L6 - Alkanes and Cycloalkanes (McMurry Ch2)
3	L7 - Isomerism and stereochemistry (McMurry Ch6)	L8 - Isomerism and Stereochemistry (McMurry Ch6)	L9 - Isomerism and Stereochemistry (McMurry Ch6)

4	Quiz 1 (in-class L2-stereochemistry inclusive) L10 – Reaction Mechanisms, Alkenes (McMurry Ch3)	L11 - Reactions of Alkenes (McMurry Ch4)	L12 -Reactions of Alkynes (McMurry Ch4)
5	L13 Aromatic Compounds (McMurry Ch5)	L14 – Aromatic Compounds (McMurry Ch5)	L15 - Aromatic Compounds (McMurry Ch5)
6	L16 – Alkyl Halides (McMurry Ch7)	L17 – Alkyl Halides (McMurry Ch7)	Quiz 2 (on-line alkenes, alkynes, aromatic compounds) L18 – Alkyl Halides (McMurry Ch7)
7	L19 -Alcohols, Ethers & Phenols (McMurry Ch8)	L20 - Mid-TermTest (up to end of aromatics)	L21 - Alcohols, Ethers & Phenols (McMurry Ch8)
	Mid-semester break		
8	NO LECTURE AS PUBLIC HOLIDAY	L22 - Aldehydes and Ketones (McMurry Ch7, Ch 9)	L23 – REVIEW OF MID SESSION TEST Quiz 3 (on-line alkyl halides, alcohols, phenols and ethers)
9	L24 - Aldehydes and Ketones (McMurry Ch7, Ch 9)	L25 - Carbohydrates (McMurry Ch14)	L26 – Carbohydrates (McMurry Ch14)
10	L27 - Carboxylic Acids and Derivatives (McMurry Ch10)	L28 – Carboxylic Acids and Derivatives (McMurry Ch10)	L29 – Amines (McMurry Ch12) Quiz 4 (on-line alcohols, phenols, ethers, aldehydes and ketones)
11	L30 - Amino acids and Peptides (McMurry Ch15)	L31 - Amino Acids and Peptides (McMurry Ch15)	L32 - Amino Acids and Peptides (McMurry Ch15)
12	L33 - Amino Acids and Peptides, Nucleic Acids (McMurry Ch15)	L34 – Summary and Review Quiz 5 (in-class carbohydrates, carboxylic acids and derivatives)	L35 - Summary and Review
13	L36 - Summary and Review	L37 – Summary and Review	Quiz 6 (on-line amines, amino acids and Peptides) L38 - Summary and Review

Timetable may be subject to minor changes

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. Quizzes and a mid session test will be run in the lecture classes. The quizzes 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. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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

Laboratory classes are designed to develop basic laboratory skills, general safety practices and critical and analytical thought. Pre-laboratory questions are designed to make sure you are ready for the laboratory 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 laboratory experiments are scaffolded such that the expectations of pre-lab, in-lab and post-lab 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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.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 http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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:

Learning outcome

- By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

Assessment tasks

- Laboratory
- Final Examination

Learning and teaching activities

- Tutorials will be run to assist your understanding of the course material. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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

- By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in a manner commensurate with professional chemistry
- By the end of this unit students should be able to work with colleagues to undertake experiments in a safe and harmonious way

Assessment task

- Laboratory

Learning and teaching activity

- Tutorials will be run to assist your understanding of the course material. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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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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 outcomes

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

Assessment tasks

- In-class and on-line quizzes
- Mid-term Exam
- Laboratory
- 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. Quizzes and a mid session test will be run in the lecture classes. The quizzes 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. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- By the end of this unit students should be able to analyse experimental results to solve related problems
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and

laboratory reports

- By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

Assessment tasks

- In-class and on-line quizzes
- Mid-term Exam
- Laboratory
- 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. Quizzes and a mid session test will be run in the lecture classes. The quizzes 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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- Laboratory classes are designed to develop basic laboratory skills, general safety practices and critical and analytical thought. Pre-laboratory questions are designed to make sure you are ready for the laboratory 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 laboratory experiments are scaffolded such that the expectations of pre-lab, in-lab and post-lab 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 outcomes

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- By the end of this unit students should be able to analyse experimental results to solve related problems
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Assessment tasks

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post-lab 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

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
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Assessment tasks

- In-class and on-line quizzes
- Mid-term Exam
- Laboratory
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Learning and teaching activities

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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

- By the end of this unit students should be able to identify and name the major classes of organic compounds, including biomolecules, identify stereochemistry and conformational properties of these molecules and understand their reactivity at a mechanistic level
- By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in a manner commensurate with professional chemistry
- By the end of this unit students should be able to analyse experimental results to solve related problems
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- By the end of this unit students should be able to apply the developed knowledge of organic functional group chemistry to new advanced organic and biological chemistry problems including multiple step syntheses and identification of unknown compounds

Assessment tasks

- Mid-term Exam
- Laboratory
- Final Examination

Learning and teaching activities

- Tutorials will be run to assist your understanding of the course material. Suggested questions to be covered for each tutorial class are provided at the end of this document. 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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experiments conducted and to use this understanding to solve related problems. The laboratory experiments are scaffolded such that the expectations of pre-lab, in-lab and post-lab 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

- By the end of this unit students should be able to undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in a manner commensurate with professional chemistry
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- By the end of this unit students should be able to work with colleagues to undertake experiments in a safe and harmonious way

Assessment task

- Laboratory

Learning and teaching activity

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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

- By the end of this unit students should be able to accurately record laboratory observations and interpret and communicate the outcomes in formal laboratory reports in a manner commensurate with professional chemistry
- By the end of this unit students should be able to explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
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Learning and teaching activity

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Changes from Previous Offering

Since its previous internal offering, there has been a reduction in the number of laboratory experiments and some minor changes have been made with the lecture material. The assessment requirements have also been updated in line with the new assessment policy.

Non-attendance of assessment

Non-attendance and extensions

Non-Attendance for Assessable Tasks: Students unable to attend a laboratory class, tutorial class, quizzes or exams or submit the practical reports on time due to illness or other extenuating circumstances must fill in a disruption to studies request (ask.mq.edu.au) and provide formal documentary evidence as soon as possible.

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 laboratory session is missed, you should organise with the 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. This will be seen as a -1 in your view marks. If more than one laboratory class is missed overall you must speak to A/Prof Jamie to discuss alternative options. If the mid-term exam is missed, there will be a make up exam organised if you receive approval through ask.mq.edu.au. If the final exam is missed due to a valid reason a Supplementary Examination can be granted. If a Supplementary Examination is granted, the examination will be scheduled after the conclusion of the official examination period.

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.

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: Students unable to complete a form of assessment (laboratory reports, quizzes) on time due to illness or other extenuating circumstances must fill in a disruption to study form (ask.mq.edu.au) and provide formal documentary evidence as soon as possible and contact A/Prof Joanne Jamie to discuss possible extensions. Extensions will be granted based on merit and will be more favourably considered if consultation with the unit coordinator on the need for an extension occurred BEFORE the due date. **If there is no acceptable reason for a late submission, marks will be deducted (10% per day) for every day late.**

Teaching staff

- **A/Prof Joanne Jamie** Unit Convenor, Lecturer and Tutor, F7B 231, ph 9850 8283, email joanne.jamie@mq.edu.au
- **A/Prof Andrew Try**, Tutor, F7B 228, ph 9850 8291, email andrew.try@mq.edu.au
- **Dr Fei Liu**, Tutor F7B 330, ph 9850 8312, email fei.liu@mq.edu.au
- **Dr Damian Moran**, Tutor F7B 329, ph 9850 8299, email damian.moran@mq.edu.au
- **Dr Roy McBurney**, Tutor, Demonstrator E8C 308, ph 9850 8214, roy.mcburney@mq.edu.au

A/Prof Joanne Jamie is the coordinator of this unit and should be consulted if you have administrative or organisational problems.

A/Prof Jamie will be presenting the lectures. All the staff listed above will be involved in tutorial classes.

The staff have an open door policy for any questions best dealt in person on their topics. However, it is best to organise an appointment first by phoning or emailing beforehand (put CBMS603 in the header of the email message).

Tutorial Classes

Tutorial classes

Tutorial classes run weekly and begin in **week 2**. Tutorial attendance is compulsory. Your allocated tutorial time will be given on the ilearn unit web page.

During tutorial time the problems assigned below may be discussed. It is most likely that the tutor will choose a selection of the questions assigned based on class requests, rather than attempting every question. **You MUST work on these problems on your own before the tutorial so as to fully take advantage of this exercise and should bring in the textbooks, lecture notes and accompanying resources such as the model kit to assist the session and be prepared to ask questions on sections that you wish to have clarified.**

Session	Tutorial questions from McMurry 7th edition
Week 2	Structure and Bonding: 1.31, 1.33, 1.35, 1.37, 1.42, 1.41, 1.45, 1.48, 1.51, 1.52, 1.64
Week 3	Acids and Bases, Alkanes and Cycloalkanes: 1.59, 1.60, 2.45, 2.46, 2.47, 2.52, 2.56, 2.59, 2.60
Week 4	Stereochemistry, Alkenes Naming and Isomerisation, Reaction Mechanisms: 6.29, 6.32, 6.36, 6.41, 6.42, 3.29, 3.30, 3.31, 3.42, 3.11
Week 5	Naming and Reactions of Alkenes and Alkynes: 4.27, 4.28, 4.33, 4.39, 4.42, 4.44, 4.45a,b
Week 6	Aromatic Compounds: 5.26, 5.27, 5.32, 5.33, 5.36, 5.47, 5.48, 5.58
Week 7	Alkyl halides: 7.25, 7.26, 7.30, 7.33, 7.34, 7.36, 7.44, 7.51, 7.54
Week 8	Alcohols, Ethers and Phenols: 8.26a-d, 8.27a-e, 8.34, 8.35, 8.42, 8.46, 8.67a,b
Week 9	Aldehydes and Ketones: 9.25, 9.29a-e, 9.30, 9.32, 9.39, 9.43, 9.48
Week 10	Aldehydes and Ketones continued and Carbohydrates: 9.34, 9.42, 9.53, 14.34, 14.35, 14.37
Week 11	Carboxylic Acids and Derivatives: 10.33a-c,e-f, 10.34, 10.39, 10.44, 10.56
Week 12	Amines: 12.24, 12.25, 12.35, 12.38, 12.39, 12.47, 12.51
Week 13	Amino Acids, Peptides and Nucleic Acids: 15.26, 15.29a, 15.30, 15.32, 15.33, 15.56, 16.32, 16.11

These questions will also be placed on the CBMS603 ilearn web site.