CBMS103

Organic and Biological Chemistry - The Chemistry of Life

S1 External 2014

Chemistry and Biomolecular Sciences

Contents

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.

Lecturer/tutor
Fei Liu
fei.liu@mq.edu.au
Contact via fei.liu@mq.edu.au
F7B 330
Students are encouraged to arrange a meeting via email.

Credit points
3

Prerequisites
(CBMS101(P) or HSC Chemistry Band 4) or admission to GCertBiotech

Corequisites

Co-badged status

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 unit is therefore particularly suitable for students who wish to major in chemistry or biomolecular sciences, as well as those pursuing related disciplines in biological, medical and health sciences. 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:

Identify and understand the key structural and bonding characteristics of organic molecules
Recognise and name key functional groups of organic compounds
Recognise and identify stereochemistry and conformational properties of organic molecules
Correlate the structural and bonding features of key functional groups with their reactivity
Write the mechanisms of key chemical reactions and predict their stereochemical outcome
Recognise reactions suitable for synthesising and interconverting functional groups
Name reagents given starting materials and products
Name and draw the structures of starting materials given reagents and products
Predict and name the structure of a product(s) given starting materials and reagents
Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule
Identify major biomolecules and understand their functional group chemistry
Undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
Accurately record your laboratory observations in an appropriate scientific manner
Analyse experimental results to solve related problems
Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
Work with colleagues to undertake experiments in a safe and harmonious way
Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Assessment Tasks

Name	Weighting	Due
In-class and on-line quizzes	15%	Wks 2, 5, 6, 9, 10, 13
Mid-term Exam	15%	Monday April 14, 9.05am
Laboratory	20%	Each on-campus session

Name	Weighting	Due
Final Examination	50%	University Examination Period

In-class and on-line quizzes

Due: **Wks 2, 5, 6, 9, 10, 13**
Weighting: **15%**

There will be at least one quiz for each of the three on-campus workshop sessions. These may be conducted at any stage of the compulsory workshops. There will additionally be three online quizzes due on **Saturday** of **week 5** (April 5), **Saturday** of **week 9** (May 17) and **Saturday** of **week 13** (June 14). 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 (workshop) quizzes, the answers will be explained immediately afterwards. For the online quizzes, further specific details on how to access these will be provided by an email to your Macquarie email address.

On successful completion you will be able to:

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and name key functional groups of organic compounds
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity
- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
- Name reagents given starting materials and products
- Name and draw the structures of starting materials given reagents and products
- Predict and name the structure of a product(s) given starting materials and reagents
- Identify major biomolecules and understand their functional group chemistry
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Mid-term Exam

Due: **Monday April 14, 9.05am**
Weighting: **15%**

Mid-term Exam: There will be a 50 minute test (/15%) on day 5 of the on-campus session, *i.e.*,

14 April 9.05am sharp. This will cover all topics 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.

There will be no make-up exam for the mid-term exam. Medical certificates or official documents must be lodged as part of a special consideration request on-line at ask.mq.edu.au as soon as possible if you are absent for the mid-term. In this case, if the circumstances are accepted as valid, your final exam mark will be used for the missed mid-term mark (*i.e.* final exam mark will be out of 65%).

On successful completion you will be able to:

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and name key functional groups of organic compounds
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity
- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
- Name reagents given starting materials and products
- Name and draw the structures of starting materials given reagents and products
- Predict and name the structure of a product(s) given starting materials and reagents
- Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Laboratory

Due: **Each on-campus session**
Weighting: **20%**

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. **A passing grade 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.

On successful completion you will be able to:

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- Recognise and name key functional groups of organic compounds
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- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
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- Predict and name the structure of a product(s) given starting materials and reagents
- Undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- Accurately record your laboratory observations in an appropriate scientific manner
- Analyse experimental results to solve related problems
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Work with colleagues to undertake experiments in a safe and harmonious way
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Final Examination

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

Final exam: 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 CBMS103 web site under view marks. The **minimum requirement** to achieve a passing grade for CBMS103 is **satisfactory performance** in **both** the **coursework** component and the **laboratory** component.

Final Examination Details: The examination timetable will be available in Draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations. You are expected to present yourself for examination at the time and place designated by the University in the Examination Timetable. This could be any day after the final week of semester and up until the final day of the official examination period. It is Macquarie University policy to **not set early examinations** for individuals or groups of students. All students are expected to ensure that

they are available until the end of the teaching semester, that is, the final day of the official examination period.

The only exception to sitting an examination at the designated time is because of documented illness, personal circumstances of a nature that have caused significant disruption to the exam preparation or other unavoidable disruption. Absence from the final exam will result in a grade of F except in the case of a genuine medical emergency, trauma or misadventure as defined by the University (see below). In these circumstances you should apply for Special Consideration AND contact the unit convenor as soon as possible. The special consideration process is available at **ask.mq.edu.au**. **Please note you have a limited time to apply for special consideration after the final exam period. You can not wait for the final results and then apply retrospectively for special consideration.**

On successful completion you will be able to:

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and name key functional groups of organic compounds
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity
- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
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- Name and draw the structures of starting materials given reagents and products
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- Identify major biomolecules and understand their functional group chemistry
- Analyse experimental results to solve related problems
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Delivery and Resources

Classes

· **Timetable:** Please check https://timetables.mq.edu.au/2014/ for the official timetable of the unit.

· The on-campus sessions will be **15 and 16 March**, **12-14 April** and **24 and 25 May**. For each day, workshop sessions will run from 9am-1pm and practical classes from 2pm-6pm. Practical classes will be held in E7B308 (First Year Chemistry Laboratory).

· For all 9-1pm workshop classes, they will be run in E6A131 (unless informed otherwise). **Please come straight to the class for commencement at 9am sharp. You will NOT be required to sign-on at the Centre for Open Education.**

· **On-campus sessions are compulsory.** Repeat students may request practical exemption, but it is up to the discretion of the unit coordinator as to whether exemption is granted. **Non-attendance of the on-campus session is only allowed due to medical or other extenuating circumstances, of which details must be formally lodged** (see non-attendance and special request details later).

· There are no formal lectures in CBMS103 (external). Instead, CBMS103 is run as a series of workshops where we will emphasise the important points, address specific areas of difficulty you may have encountered during your private study and go through set problems. 'Lecture' notes on each of the topics covered are available on the unit web site to guide you. You are expected to go through all the relevant notes and sections of the text book and attempt all the set problems BEFORE attending each on-campus session.

· It is highly recommended that you study continuously throughout the semester. At the end of these notes is a suggested study schedule to help you timetable and optimise your study for CBMS103 (external).

Prescribed Texts and Materials:

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

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

D. P. Weeks, "Pushing Electrons", 3^{rd} Edition

Molecular Modelling Kit

(The above are a bundled package at the Co-op bookshop. Upon request they may also be sold separately)

CBMS103 Laboratory Manual (available from Co-op bookshop and downloadable from the unit web site)

CBMS103 lecture notes, and lots of other resources, 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 CBMS103 (external). 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 ilearn site on a frequent basis and download pdf files. If you do not have your own computer you may wish to access the 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. This requires software that is freely downloaded, but is also available for you to use on the library PCs and those in the C5C computer laboratories. You will be sent a code and instructions for accessing OWL.

Teaching and Learning Strategy

CBMS103 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) over the 15 week semester. For students with weak chemistry backgrounds, more time than this will probably be necessary to perform satisfactorily in this unit.

Every on-campus day consists of a 4 hour workshop session and a 4 hour laboratory class. CBMS103 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 workshop material and laboratories complement each other. These, along with quizzes in the workshop and online, have been developed to increase your understanding of the topics so you can achieve the learning outcomes.

The unit expectation is that you will:

· Continuously work before on-campus sessions through reading of recommended material, attempting all set problems and preparing for the laboratory classes

· Attend all on-campus sessions

· 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

· Perform satisfactorily in the final exam

· Spend an average of 10 hours per week on this unit (includes 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 and perform satisfactorily in this unit. 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.

· **Workshops** (9am – 1pm each on-campus day) will cover problems relevant to each topic. The problems to be covered include those listed at the end of this document. You are expected to do the problems BEFORE you attend the on-campus sessions as the lecturer will ask you to participate in answering the problems. 'Lecture' notes and recorded lectures (echo and video capture) on each topic are provided on the unit web site. These are those that were used for the 2013 internal CBMS103 unit. 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 text book (and beyond) **before** and **after** the workshops is strongly recommended. Quizzes and a mid session test will be run in the workshops. The quizzes will be multiple choice and short, but cover material that will be in that on-campus session and/or the previous on-campus sessions. Therefore you need to be up to date with the topics before you come to each on-campus session. Additional online 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.

· **Laboratory classes** are designed to develop basic laboratory skills, general safety practices and critical and analytical thought. Pre-lab 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 an understanding of the concepts and skill in how to record the data and interpret results develops.

Changes to the Unit Since Last Offering

No significant changes have been done since this unit's previous external offering with the theory. A new experiment had been developed for the laboratory component.

Unit Schedule

Week	Week Starting	Study Tasks
1 and 2	3 March – 14 March	Read the 'lecture' notes and look at the video capture files on Structure and Bonding, Acids and Bases AND read McMurry Chapter 1. Read the laboratory notes from the start to the end of Experiment 2 (E2), including relevant appendices. Do pre-labs for E1-2. Read the 'lecture' notes and look at the video capture files on Alkanes and Cycloalkanes and Stereochemistry AND read McMurry Chapter 2, 3.3, 3.4 and 6. Read the laboratory notes for E3 and E4, including relevant appendices. Commence pre-labs for E3 and 4. Attempt the set workshop problems. Use your model kits to help visualise the cycloalkane conformations and isomers and for examples in the stereochemistry topic. Note any "problem areas" you have to A/Prof Jamie or Dr Fei Liu (preferably beforehand) for discussion at the first on-campus session.
15 and 16 March: On-Campus Session 1. Submit E1 and E2 pre-labs to Dr Fei Liu by 1pm on 15 March and E3 and E4 pre-labs on 16 March by 1pm. Bring in model kit on 15 March.		
3	17 March – 23 March	Take some time to review what was covered during the on-campus session. It is very important you come to grips with this material **NOW** as it will be essential for the proper understanding of material to come. Look at the What You Need to Know Sheet on the web site as a guide. Do post-lab for E3. It is always best to do these as soon as you can after the laboratory classes while the information is still fresh. Read the 'lecture' notes and look at the video capture on Alkenes and Reaction Mechanisms and Alkynes AND read McMurry Chapter 3 and Chapter 4 and attempt the recommended practice problems and set workshop problems. Read Chapter 3 of D. P. Weeks and attempt associated problems. Do post-lab for E4. Note any 'problem areas' to A/Prof Jamie for the second on-campus session.

4	24 March – 30 March	Read the 'lecture' notes and look at the video capture on Aromatic Compounds AND read McMurry Chapter 5 and attempt the recommended practice problems and set workshop problems. Read Chapter 2 of D. P. Weeks and attempt problems. Start to prepare for the mid semester exam revise the topics up to and including aromatic compounds and look at the What You Need to Know Sheets and attempt problems and past mid term exams. Note any 'problem areas' to A/Prof Jamie for the second on-campus session.
5	31 March – 6 April	Read the 'lecture' notes and look at the video capture on Alkyl Halides AND read McMurry Chapter 7 and attempt the recommended practice problems and set workshop problems. Do pre-labs for E5 and 6. **Do online quiz (due by midnight Saturday 5 April).** Note any 'problem areas' to A/Prof Jamie for the second on-campus.
6	7 April – 12 April	Read the 'lecture' notes and look at the video capture on Alcohols, Phenols and Ethers AND McMurry Chapter 8 and attempt the recommended practice problems and set workshop problems. To prepare for the laboratory E7, read the section on carboxylic acid structures, naming and properties in the 'lecture' notes Carboxylic Acids and Derivatives and read McMurry 10.1-10.3. To prepare for the laboratories E8 and E9 read the 'lecture' notes on Aldehydes and Ketones AND McMurry Chapter 9. Do pre-labs for E7, E8 and E9. To prepare for the laboratory E10, read the 'lecture' notes on the Carboxylic Acids and Derivatives and Amines topics AND McMurry Chapter 10 and 12. Do prelab for E10. Continue to prepare for the mid semester exam. Note any 'problem areas' to A/Prof Jamie for the second on-campus session.
12-14 April: On-Campus Session 2. Mid Semester Exam on 14 April 9.05am. Submit E5 and E6 pre-labs and E3 and E4 post-labs to A/Prof Jamie by 1pm on 12 April, E7 and E8 pre-labs by 1pm on 13 April, E9 and E10 pre-labs by 1pm on 14 April.		

Remaining week 1 of mid session break plus week 2 of break	15 April – 27 April	Take some time to review what was covered during the second on-campus session. Look at the What You Need to Know Sheet on the web site as a guide. Do post-labs for E5-10. Reread the 'lecture' notes and look at the video capture on Aldehydes and Ketones and Carbohydrates AND read McMurry Chapter 9 and 14 and attempt the recommended practice problems and set workshop problems. Note any 'problem areas' to A/Prof Jamie for the third on-campus session.
7	28 April – 5 May	Read the 'lecture' notes and look at the video capture on Carboxylic Acids and Derivatives AND McMurry Chapter 10 and attempt the recommended practice problems and set workshop problems. Revise all notes. Note any 'problem areas' to A/Prof Jamie for the third on-campus session.
8 and 9	5 May – 18 May	Read the 'lecture' notes and look at the video capture on Amines AND Amino Acids and Peptides and Nucleic Acids AND McMurry Chapter 12, 15 and 16. Attempt the recommended practice problems and set workshop problems. **Do online quiz (due by midnight Saturday 17 May).** Note any "problem areas" to A/Prof Jamie for the third on-campus session.
10	19 May – 23 May	Read the 'lecture' notes and look at the video capture on Nucleic Acids AND McMurry Chapter 16.5-16.6 and attempt the recommended practice problems and set workshop problems. Start to prepare for the final exam and look back over the earlier topics, the What You Need to Know Sheets and look at final exam papers. Review ALL your practical notes in preparation for E11 – the practical exam. Note any 'problem areas' to A/Prof Jamie for the third on-campus session.
24 and 25 May: On-Campus Session 3. Submit E5-10 post-labs to A/Prof Jamie by 1pm 18 May. Note practice practical exam on 24 May and actual practical exam on 25 May. You must attend both practical sessions.		
11	26 May – 1 June	Take some time to review what was covered during the third on-campus session. Start to revise all material. Look at the What You Need to Know Sheets, problems assigned previously and past exam questions to guide you. Attempt OWL quizzes for practice. Ask questions to A/Prof Jamie!

12 -13 up until exam time	2 June -	Revise all material and go through past exams and problems from the text book and look at the What You Know Sheet and OWL to assist in your study. **Do online quiz (due by midnight Saturday 14 June).** Ask questions to A/Prof Jamie!

Timetable may be subject to minor changes

Learning and Teaching Activities

Workshops

CBMS103 is run as a series of workshops where we will emphasise the important points, address specific areas of difficulty you may have encountered during your private study and go through set problems. 'Lecture' notes on each of the topics covered are available on the unit web site to guide you. You are expected to go through all the relevant notes and sections of the text book and attempt all the set problems BEFORE attending each on-campus session. Questions to be covered for each workshop are provided at the end of this document.

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

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

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

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

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.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/

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://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

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

- Accurately record your laboratory observations in an appropriate scientific manner
- Work with colleagues to undertake experiments in a safe and harmonious way

Assessment task

- Laboratory

Learning and teaching activity

- CBMS103 is run as a series of workshops where we will emphasise the important points, address specific areas of difficulty you may have encountered during your private study and go through set problems. ‘Lecture’ notes on each of the topics covered are available on the unit web site to guide you. You are expected to go through all the relevant notes and sections of the text book and attempt all the set problems BEFORE attending each on-campus session. Questions to be covered for each workshop are provided at the end of this document.
- 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.

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

- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Assessment tasks

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

Learning and teaching activities

- CBMS103 is run as a series of workshops where we will emphasise the important points, address specific areas of difficulty you may have encountered during your private study and go through set problems. ‘Lecture’ notes on each of the topics covered are available on the unit web site to guide you. You are expected to go through all the relevant notes and sections of the text book and attempt all the set problems BEFORE attending each on-campus session. Questions to be covered for each workshop are provided at the end of this document.

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

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and name key functional groups of organic compounds
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity

- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
- Name reagents given starting materials and products
- Name and draw the structures of starting materials given reagents and products
- Predict and name the structure of a product(s) given starting materials and reagents
- Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule
- Identify major biomolecules and understand their functional group chemistry
- Undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- Analyse experimental results to solve related problems
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Have a deep understanding of organic and biological chemistry concepts and be able to apply those to new problems

Assessment tasks

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

Learning and teaching activities

- CBMS103 is run as a series of workshops where we will emphasise the important points, address specific areas of difficulty you may have encountered during your private study and go through set problems. ‘Lecture’ notes on each of the topics covered are available on the unit web site to guide you. You are expected to go through all the relevant notes and sections of the text book and attempt all the set problems BEFORE attending each on-campus session. Questions to be covered for each workshop are provided at the end of this document.
- 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

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity
- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
- Name reagents given starting materials and products
- Name and draw the structures of starting materials given reagents and products
- Predict and name the structure of a product(s) given starting materials and reagents
- Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule
- Identify major biomolecules and understand their functional group chemistry
- Analyse experimental results to solve related problems

Assessment tasks

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

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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

- Identify and understand the key structural and bonding characteristics of organic molecules
- Recognise and identify stereochemistry and conformational properties of organic molecules
- Correlate the structural and bonding features of key functional groups with their reactivity
- Write the mechanisms of key chemical reactions and predict their stereochemical outcome
- Recognise reactions suitable for synthesising and interconverting functional groups
- Name reagents given starting materials and products

- Name and draw the structures of starting materials given reagents and products
- Predict and name the structure of a product(s) given starting materials and reagents
- Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule
- Identify major biomolecules and understand their functional group chemistry
- Undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- Analyse experimental results to solve related problems

Assessment tasks

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

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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 outcomes

- Recognise reactions suitable for synthesising and interconverting functional groups
- Propose a short multistep synthetic sequence using key reactions to achieve the synthesis of a target molecule

Assessment tasks

- Laboratory
- Final Examination

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

- Accurately record your laboratory observations in an appropriate scientific manner
- Analyse experimental results to solve related problems
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports

Assessment tasks

- In-class and on-line quizzes
- Mid-term Exam

- Laboratory
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Learning and teaching activities

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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

- Undertake basic laboratory procedures for isolating, synthesising and identifying organic compounds or functional groups, using chemistry specific apparatus and techniques and safe laboratory practices
- Accurately record your laboratory observations in an appropriate scientific manner
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports

- 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

- Accurately record your laboratory observations in an appropriate scientific manner
- Explain organic and biological concepts clearly in the tutorial class to colleagues and the tutor and in written format in exams and laboratory reports
- Work with colleagues to undertake experiments in a safe and harmonious way

Assessment task

- Laboratory

Learning and teaching activity

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Special Consideration Requests

Special Consideration Requests including non-attendance and extensions

The University is committed to equity and fairness in all aspects of its learning and teaching. In stating this commitment, the University recognises that there may be circumstances where a student is prevented by unavoidable disruption from performing in accordance with their ability. The University has a policy on special consideration request that may be found at www.mq.edu.au/policy/docs/special_consideration/policy.html. The University recognises that at times an event or set of circumstances may occur that:

- could not have reasonably been anticipated, avoided or guarded against by the student AND
- was beyond the student's control AND
- caused substantial disruption to the student's capacity for effective study and/or completion of required work AND
- substantially interfered with the otherwise satisfactory fulfilment of a unit or program

requirements AND

- was of at least three (3) consecutive days duration within a study period and/or prevented completion of a formal examination.

This policy is instituted to support students who experience serious and unavoidable disruption such that they do not reach their usual demonstrated performance level. To request special consideration go on-line to ask.mq.edu.au as soon as possible to allow due consideration.

Non-Attendance for On-Campus Sessions: Students unable to attend part of an on-campus session or the final exam due to illness or other extenuating circumstances must fill in a special consideration request on-line at ask.mq.edu.au and provide formal documentary evidence as soon as possible AND contact A/Prof Joanne Jamie. Please note while missing one day of an on-campus session with appropriate formal documentation supplied is allowed, if two or more days of the on-campus session is missed completely then a withdrawal from the unit may be required. **Contact A/Prof Jamie immediately if you miss two or more on-campus days due to illness or other extenuating circumstances.** The intensive nature of the on-campus sessions and significant level of assessment during these sessions means that such non-attendance can significantly impact on progress.

For students who do have a valid reason for the non-attendance (*via* special consideration formally approved by the unit coordinator), if in-class quizzes or one laboratory class is missed, you will get an average mark of your other quizzes or laboratory reports. If more than one laboratory class is missed you must speak to A/Prof Jamie to discuss alternative options. **If the mid-term exam is missed, there will be no make up exam. In this case, your final exam mark will be used for the missed mid-term mark (*i.e.* final exam mark will be out of 65%).** 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. The offer of a supplementary examination is at the discretion of the unit coordinator and you should not assume that it will be provided. Supplementary Examinations are **not make-up exams**, *i.e.*, a poor result in the final examination is not reason to request a supplementary examination. **Please note that if you are sick at or in the days just prior to the scheduled exam time you should see a medical practitioner and 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. Please also note that if you have sat the final exam you **CAN NOT** sit a supplementary exam even if you were ill during the final exam.

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. Please keep in mind that you must make every effort to attend all on-campus sessions. **If you are likely to have more than one day of absence with the on-campus sessions, you should withdraw and undertake the internal version of CBMS103 in session 2.**

Extensions: Students unable to complete a form of assessment (laboratory reports, quizzes) on

time due to illness or other extenuating circumstances must request special consideration at 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 up to 5% per weekday 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
- **Dr Fei Liu** Lecturer and Tutor, F7B 330, ph 9850 8312, email fei.liu@mq.edu.au

A/Prof Joanne Jamie is the coordinator of this unit and should be consulted if you have administrative or organisational problems. Dr Fei Liu will coordinate and present the topics for the first on-campus session (March 15 and 16). A/Prof Jamie will coordinate and present all other topics in the other two on-campus sessions. A/Prof Jamie and Dr Liu are happy to answer any questions on their topics by email – put CBMS103 in the header of the email message. If you are able to come on campus throughout the semester, they have an open door policy for any questions best dealt in person. It is wise to organise an appointment first by phoning or emailing beforehand to ensure they are available.

Tutorial Classes

The 9am-1pm on-campus sessions are run as workshops, using the following questionsfrom **McMurry Fundamentals of Organic Chemistry (7e)**. **You are strongly advised to get the textbook study package from the bookstore to aid your study and successful completion of this unit.** You should try these BEFORE each on-campus session.

On-Campus Session 1 Day 1 and 2 (15-16th March) Dr Fei Liu

Set Problems for Days 1 and 2 - 1.31, 1.33, 1.35, 1.37, 1.42, 1.45, 1.48, 1.51, 1.52, 1.64; 1.59, 1.60; 2.45, 2.46, 2.47, 2.50, 2.52, 2.56, 2.59, 2.60; 6.29, 6.32, 6.36, 6.37, 6.41, 6.42

On-Campus Session 2 Days 3-5 (12-14th April) A/Prof Joanne Jamie

Set Problems for Days 3 - 5 - 3.29, 3.30, 3.31, 3.42, 3.11, 3.26; 4.27, 4.28, 4.33, 4.38a,b, 4.39, 4.42, 4.44, 4.45a,b, 4.58; 5.26, 5.27, 5.32, 5.33, 5.36, 5.47, 5.48, 5.50, 5.58; 7.25, 7.26, 7.30, 7.33, 7.34, 7.36, 7.44, 7.51, 7.54; 8.26a-d, 8.27a-e, 8.34, 8.35, 8.38, 8.42, 8.46, 8.67a,b

On-Campus Session 3 Day 6 and 7 (24-25th May) A/Prof Jamie

Set Problems for Days 6 and 7 – 9.25, 9.29a-e, 9.30, 9.32, 9.39, 9.43, 9.48; 9.34, 9.42, 9.53, 14.34, 14.35, 14.37; 10.33a-c,e,f, 10.34, 10.35a,c-f, 10.39, 10.44, 10.47, 10.56; 12.24, 12.25, 12.35, 12.38, 12.39, 12.47, 12.51; 15.26, 15.30, 15.32, 15.33, 15.29a, 15.56; 16.32, 16.11.