DEPARTMENT OF CHEMISTRY AND BIOMOLECULAR SCIENCES

UNIT OUTLINE - GUIDE, SYLLABUS AND TIMETABLE

CBMS103

ORGANIC AND BIOLOGICAL CHEMISTRY – THE CHEMISTRY OF LIFE

THREE (3) CREDIT POINTS

SEMESTER 1, 2014, X1 (external mode)

UNIT CONVENER – A/PROF JOANNE JAMIE

F7B231, PH 9850 8283, EMAIL joanne.jamie@mq.edu.au

PREREQUISITE CBMS101 (P) OR HSC CHEMISTRY BAND 4

OR ADMISSION TO GCERTBIOTECH

URL ilearn.mq.edu.au

(login and follow prompts to CBMS103 Organic and Biological Chemistry)
Year and Semester: Semester 1, 2014
Unit convenor: A/Prof Joanne Jamie
Prerequisite: CBMS101 (Pass or above) or HSC Chemistry Band 4 or admission to GCertBiotech
Assumed Knowledge: This unit requires good theoretical and practical skills in fundamental chemistry.

Students in this unit should read this unit guide carefully. It contains important information about the unit. If anything in it is unclear, please consult the unit convenor, A/Prof Joanne Jamie.

ABOUT THIS UNIT
Credit Points: 3 (equivalent to at least 150 hours commitment to this unit)
Contact Hours: The unit consists of three on-campus sessions involving workshops (9am-1pm) and four-hour practical classes (2pm-6pm) each day. The on-campus sessions will be 15 and 16 March, 12-14 April and 24 and 25 May. All on-campus sessions are compulsory.
When Offered: X1 - Day; First Half-Year
Staff Contact: A/Prof Joanne Jamie
            Department of Chemistry and Biomolecular Sciences
            Phone: 9850 8283
            Fax: 9850 8313
            Email: joanne.jamie@mq.edu.au

Welcome to CBMS103 - Organic and Biological Chemistry – The Chemistry of Life.
CBMS103 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, environmental, medical and health sciences. The mechanistic 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, amines). This includes the basic chemical properties of important biomolecules such as amino acids, carbohydrates and nucleic acids.

TEACHING STAFF
- A/Prof Joanne Jamie F7B 231, ph 9850 8283, email joanne.jamie@mq.edu.au
- Dr Fei Liu 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.

**REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS**

**Prescribed Texts and Materials:**


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 CBMS103 Laboratory Manual will also be available for purchase from the Co-op bookshop or can be downloaded from the unit web site. Lecture notes are downloadable from the unit web site, along with many other 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).
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.

iLearn is the name for Macquarie University’s Learning Management System (LMS). The iLearn online learning environment enables learning, teaching, communication and collaboration. It is used to make lecture notes, laboratory notes, discussion forums, digital lecture recordings and other learning resources available to students online. You will need to use your Macquarie OneID to login (see https://oneid.mq.edu.au/).

You are expected to access the ilearn 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.

EXPECTED LEARNING OUTCOMES

By the conclusion of this unit, students should 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 synthetic sequence using key reactions to achieve the synthesis of a target molecule
• Identify major biomolecules and understand their functional group chemistry
• Explain organic and biological chemistry concepts clearly in the workshop classes and in written format in exams and laboratory reports
• 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
• Work with colleagues to undertake experiments in a safe and harmonious way
• Analyse experimental results to solve related problems
• Have a deep understanding of fundamental organic and biological chemistry concepts and be able to apply those to new problems.

In addition to the discipline-based learning outcomes above, this unit will also help develop graduate capabilities. These are the building blocks for developing the attributes valued in a university graduate. Some of the attributes and skills that CBMS103 can help you develop are:

• Basic skills of time management and organisation: It is essential prior to each on-campus session that you have prepared well for the workshop and laboratory sessions to be able to address the ongoing assessment of this unit (at least one assessment task each day of the on-campus sessions). The laboratory classes require considerable preparation prior to the class and good time management within the class to conduct the experiments in a satisfactory fashion within the 4 hour timeframe. On-going assessment, especially the laboratory assessment and in-class/online quizzes, and the preparation for the workshops, also ensure that you will need to be working on CBMS103 consistently throughout the semester to perform satisfactorily in the unit. Developing a proper study schedule is encouraged in this unit (and a guide for this is provided) to ensure satisfactory performance.

• Effective communication and interpersonal skills: CBMS103 will help equip you with both oral and written communication skills, through especially laboratory reports and communications you will be engaged in within your workshop and laboratory classes. You will also be working with people from a variety of cultural, social and economic backgrounds, giving you the opportunity to develop your ability to work and communicate with others.

• Problem solving and research capability, critical, analytical and integrative thinking: Within this unit you will have the opportunity to develop your problem solving and research skills through laboratory classes and the associated reports, workshop sessions and working through exam tasks. The problem solving will include situations where there are clear solutions as well as situations demanding critical, analytical and integrative thinking.

• Ethical practice: Scientific honesty is important and you will practice this within this unit through especially the laboratory work where you will need to record observations and report on results in an accurate and truthful manner.
**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.

**Relationship Between Assessment and Learning Outcomes**

**Assessment:** The grades you achieve at Macquarie University are descriptive rather than numeric. The assessments and conditions on your performance (attendance, completion, etc) help to decide which of these descriptive grades applies to your work for the entire unit.

Your raw marks from assessments are combined into a weighted sum. The weighted sums for the whole class are ranked, and compared with rankings for the same unit in previous offerings and across other units for appropriate consistency. This process of comparison allows for the identification of any unusual influences on class performance that might warrant the weighted sums of marks being scaled or otherwise altered. The numerical cut-offs for each descriptive grade are then determined. The numerical value with which you will be issued (the Standardised Numerical Grade, SNG) is determined to match your descriptive grade by standardising the weighted sums of raw marks to match standard scores out of 100. The SNG gives you an indication of how you have performed within the band for your descriptive grade. As the SNG is the result of scaling the weighted sum of your raw marks, you won't be able to:

- work out your exam mark based on the assignment marks you already know and the SNG;
- determine that you were "one mark away" from a different grade.

It is our professional responsibility as your teachers to assign you a descriptive grade that accurately reflects your performance in a unit. Our grading decisions are subject to scrutiny from our academic colleagues at the Department, Faculty and University Senate level.

The Grades range from High Distinction to Fail, and are defined in the Handbook as follows:

<table>
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<tr>
<th>Grade</th>
<th>SNG</th>
<th>Description</th>
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<tbody>
<tr>
<td>HD</td>
<td>85-100</td>
<td>Work of outstanding quality. This may be demonstrated in areas such as criticism, logical argument, interpretation of materials or use of methodology. This grade may also be awarded to recognise a high order of originality or creativity in student performance.</td>
</tr>
<tr>
<td>D</td>
<td>75-84</td>
<td>Work of superior quality in the same areas of performance as above. This grade may also be awarded to recognise particular originality or creativity in student performance.</td>
</tr>
<tr>
<td>Cr</td>
<td>65-74</td>
<td>Work of predominantly good quality, demonstrating a sound grasp of content together with efficient organisation, selectivity and use of techniques.</td>
</tr>
<tr>
<td>P</td>
<td>50-64</td>
<td>Satisfactory achievement of unit objectives.</td>
</tr>
<tr>
<td>F</td>
<td>0-49</td>
<td>Failure to achieve unit objectives.</td>
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</tbody>
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Your grade awarded at the completion of the unit will be based on marks obtained as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weightage</th>
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<tbody>
<tr>
<td>In-class and online quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>15%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
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- **Workshop and online quizzes:** 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.

- **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%).

- **Laboratory:** 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.

**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.

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 **CANNOT** 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 CMB103 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.**

**UNIVERSITY POLICY ON ASSESSMENT**

The University considers that assessment “of student learning performance and feedback on progress are pivotal and important processes in University learning and teaching. Assessment tasks communicate to students what must be learned and are vehicles by which the University assures itself, and society, of its graduates’ capabilities” and is based on the “premise that it is important that through assessment students are encouraged to engage in their education, rather than merely pursue grades. Student engagement is best facilitated by learner managed learning in which students are active partners in the process through undertaking challenging responsibilities and making choices.” There are responsibilities and rights for both staff and students in respect to assessment. These include, but are not limited to, the right of academic staff to require that students:

- be focused on learning rather than merely the achievement of grades;
- make the effort to be informed of the rules and requirements for progression in their degree program;
- get assistance from the department, faculty and/or institution if they so require it;
- behave ethically and responsibly in their conduct of assessment tasks;
- engage in critical self evaluation in terms of their progress towards the espoused learning expectations;
- submit work on time that is their own except when shared ownership is part of the task;
- notify their lecturers as soon as possible if difficulties arise with timing, online access, availability of resources or other requirements of the task;

Students have a right to:
be informed about all aspects of assessment policy and practices in each unit of study including 
criteria, standards and procedures to be met and penalties for breaches;
have consistent application of policies, procedures and penalties;
timely return of results with feedback to enable improved performance;
information that allows them to calibrate their own performance against the expected 
performance standards;
The full statement on the Assessment Policy, Code of Practice and Procedure can be found at:
  • www.mq.edu.au/policy/docs/assessment/policy.html
  • www.mq.edu.au/policy/docs/assessment/procedure.html

ACADEMIC HONESTY

The University declares that it is a “fundamental principle” that “all staff and students act with integrity
in the creation, development, application and use of ideas and information”. This means that:
  • all academic work claimed as original is the work of the author making the claim
  • all academic collaborations are acknowledged
  • academic work is not falsified in any way
  • when the ideas of others are used, these ideas are acknowledged appropriately

You should be familiar with the University’s Policy on Academic Honesty practices and its Statement
on Ethics. For further details see:

Academic Honesty Policy: www.mq.edu.au/policy/docs/academic_honesty/policy.htm

The policies and procedures explain what academic dishonesty is, how to avoid it, the procedures that
will be taken in cases of suspected dishonesty, and the penalties if you are found guilty. Penalties may
include a deduction of marks, failure in the unit, and/or referral to the University Discipline Committee.

Examples of dishonest academic behaviours are:

Plagiarism: Using the work or ideas of another person and presenting this as your own without clear
acknowledgement of the source of the work or ideas. This includes, but is not limited to, any of the
following acts:

a) copying out part(s) of any document or audio-visual material or computer code or web site content
   without indicating their origins
b) using or extracting another person’s concepts, experimental results, or conclusions
c) summarising another person’s work
d) submitting substantially the same final version of any material as another student in an assignment
   where there was collaborative preparatory work
e) use of others (paid or otherwise) to conceive, research or write material submitted for assessment
f) submitting the same or substantially the same piece of work for two different tasks (self-
   plagiarism).
Deception: includes, but is not limited to, false indication of group contribution, false indication of assignment submission, collusion, submission of a work previously submitted, creating a new article out of an existing article by rewriting/reusing it, using the same data to form the same arguments and conclusion, presenting collaborative work as one’s own without acknowledging others’ contributions, cheating in an examination or using others to write material for examination.

Fabrication: includes, but is not limited to, creating fictitious clinical data, citation(s), or referee reports.

Sabotage: includes, but is not limited to, theft of work, destruction of library materials.

Assignments are to be your own work. Using someone else’s words (either another student’s or from a book or journal article or a web site) without clear acknowledgement is plagiarism and can incur serious penalties. If it is ever necessary to use someone else’s words for a phrase or sentence, they should be placed in quotation marks and acknowledged at the end of the sentence. If you use or modify a diagram or figure from another author, that must be acknowledged underneath (e.g. Figure 3 from Fundamentals of Organic Chemistry, McMurry et al., 2010). Lecturers want to read your own words and ideas.

In the event that a lecturer identifies a case of academic dishonesty, the student will be advised, either on the submitted work or by a separate letter, and a record kept in the Faculty office. Students will always have the opportunity to discuss each case with their Lecturer if they indicate they wish to do so by either contacting the Lecturer or the Head of Department. Proven cases of academic dishonesty may result in the immediate award of an “F” grade.

OTHER UNIVERSITY POLICIES

Macquarie University is developing a number of policies in the area of learning and teaching. Approved policies and associated guidelines can be found at Policy Central: www.mq.edu.au/policy

STUDENT SUPPORT SERVICES

Macquarie University provides a range of Student Support Services. Details of these services can be obtained at http://students.mq.edu.au/support/. The Faculty of Science also provides support via Helene Seddon-Glass, Science Student Support Officer, who can assist for non-discipline specific support.

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.

FEEDBACK

We are always open to suggestions for improving the content and delivery of this course. We are very happy to receive any constructive criticism that you may wish to provide. We hope you find this course both educational and fun!

Joanne Jamie and Fei Liu
UNIT SYLLABUS, TIMETABLE AND STUDY PLAN

In the weeks prior to each on-campus session you should read the ‘lecture’ notes (and are encouraged to listen to the echo recordings and/or view the video capture lectures) on the relevant topics, read the corresponding chapters in the text book, and attempt the practice problems at the end of the ‘lecture’ notes and the set problems as detailed below from McMurry Fundamentals of Organic Chemistry (7e)\(^1\). You are strongly advised to get the textbook study package from the bookstore to aid your study and successful completion of this unit. A study plan is provided at the end of this document to also assist you. The set problems below will be discussed in the on-campus sessions. Additionally, if in your preparation you find that there are areas that you need further help on, you should provide the details to the lecturer in charge of the relevant on-campus session (preferably BEFORE the on-campus session) by email so the lecturer can also address these issues with the class (if you are having difficulties it is probable that other students will also have similar difficulties).

On-Campus Session 1 Day 1 (Saturday 15th March) Dr Fei Liu

Please note that this session starts at the end of week 2 of classes, so you will need to get organised as soon as you can to be prepared for the workshop and laboratory component and maximise the learning benefit of this first on-campus session.

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

Structure and Bonding (Ch 1) - Atomic structure, orbitals, electronic configuration, nature of chemical bonds (covalent vs ionic bonds, Lewis and Kekule structures, single and multiple bonds), valence bond theory (hybridisation of atomic orbitals), polar molecules ( electronegativity, bond polarity and molecule polarity).

Acids and Bases (Ch 1) - Arrhenius definition, Brønsted-Lowry definition, Lewis Definition, acids and bases “electron giving or taking”.

Alkanes and Cycloalkanes (Ch 2) - Structures and isomers, nomenclature.

Submit pre-labs of Experiment 1 and 2 (E1 and E2) by 1pm to Dr Liu. E 1 and 2 will be performed in the afternoon.

On-Campus Session 1 Day 2 (Sunday 16th March) Dr Liu

Alkanes and Cycloalkanes continued (Ch 2) - Conformations, properties, reactions.

Stereochemistry (Ch 3.3-3.4, Ch 6) *Bring in your model kit - Constitutional isomerism, stereoisomers (enantiomers, diastereomers), chirality (sequence rules, measurement of chirality).

Submit E3, E4 pre-labs by 1pm to Dr Liu. E3 and E4 will be performed in the afternoon.

\(^1\) Copies of the problems will also be placed on the unit web site.

CBMS103 – Organic and Biological Chemistry – The Chemistry of Life, 2014, XI
On-Campus Session 2 Day 3 (Saturday 12th 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

Reaction Mechanisms, Alkenes and Alkynes (Ch 3 and Ch 4) – Bonding, structures and isomers, nomenclature, introduction to reaction mechanisms and electron pushing (use of curved arrows), describing reactions - equilibria and energy changes. Addition reactions, alkene oxidation and polymerisation, alkyne acidity.

Submit E5, E6 pre-labs and E3, E4 post-labs by 1pm to A/Prof Jamie. E5 and E6 will be performed in the afternoon.

On-Campus Session 2 Day 4 (Sunday 13th April) A/Prof Jamie

Aromatic Compounds (Ch 5) Structure and bonding, resonance, nomenclature of substituted benzenes, electrophilic substitution, directing and activating effects, oxidation of alkylbenzenes.

Submit E7, E8 pre-labs before 1pm to A/Prof Jamie. E7 and E8 will be performed in the afternoon.

On-Campus Session 2 Day 5 (Monday 14th April) A/Prof Jamie

MID-TERM TEST 9.05am - Examination of material from Days 1 – 4 (up to end of aromatics inclusive).

Alkyl Halides (Ch 7) – Structure and bonding, nomenclature, preparation, Grignard reagents, nucleophilic substitution reactions, elimination reactions.

Alcohols, Phenols and Ethers (Ch 8) – Structure and bonding, naming, physical properties, acid/base properties, preparation, reactions including dehydration, conversion to alkyl halides, oxidation, ether synthesis.

Submit E9, E10 pre-labs before 1pm to A/Prof Jamie. E9 and E10 will be performed in the afternoon.

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


Aldehydes and Ketones (Ch 9) - Structure and bonding, nomenclature, properties, preparation, oxidation, nucleophilic addition - reduction, hydration, acetal and ketal formation, imines, Grignard reaction.

Carbohydrates (Ch 9 and 14) - Classifications, stereochemistry (D- and L-sugars, aldoses, ketoses), cyclic structures, introduction to complex carbohydrates including O- and N-glycosides.
Carboxylic Acids & Derivatives (Ch 10) - Structure and nomenclature, properties (boiling points, solubility, acid-base reactivity), preparation, reaction of carboxylic acid derivatives and their interconversions.

Submit E5-E10 post-labs by 1pm to A/Prof Jamie. Practice for Practical exam will be performed in the afternoon.

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

Carboxylic Acids & Derivatives (Ch 10) continued.

Amines (Ch 12) - Structure and nomenclature, properties (water solubility, basicity), preparation, reactions (nucleophilic).


Practical exam will be performed in the afternoon.
To-Do Lists Before Residential Sessions

Before First On-Campus Session

(1) Carefully read the whole of these notes
(2) Buy the textbooks, model kit and Laboratory Manual (or download)
(3) Read McMurry Chapters 1, 2, 3.3, 3.4 and 6 and attempt practice and set problems
(4) Review (if necessary) CBMS101/HSC knowledge
(5) Attempt relevant problems in D. P. Weeks (up to p35)
(6) Read Laboratory Introduction notes, E1 – 4 and relevant appendices
(7) Complete pre-lab work for E1 - 4
(8) Purchase a lab coat if you don’t already have one

Before Second On-Campus Session

(1) Carefully read these notes again
(2) Study Chapters 3, 4, 5, 7 and 8
(3) Attempt the allocated problems. Make notes on any difficulties you encounter for discussion during the on-campus workshops.
(4) Read E5 - 10
(5) Complete pre-lab work for E5 - 10. Look at relevant ‘lecture’ notes and Chapters 9, 10 and 12 to assist.
(6) Complete the post-labs for E3 and 4
(7) Attempt relevant problems in D. P. Weeks (Ch3)
(8) Download, print and attempt the past mid-term tests

Before Third On-Campus Session

(1) Complete post-lab work for E5 - 10
(1) Study Chapters 9, 10, 12, 14, 15 and 16 of the text book and attempt allocated problems
(2) Make notes on any difficulties you encounter for discussion during the on-campus workshop
(3) Review Chapters 1-8 and make notes on difficulties
(5) Reread the safety notes and the Appendix of the lab notes
(6) Start revising all topics
CBMS103X – 2014 – SUGGESTED STUDY SCHEDULE

As a three credit point subject CBMS103 requires at least 150 hours (contact and study time) over the 15 week semester. **As your first on-campus session starts at the end of week 2, it is hoped that you would have devoted significant time prior to that on-campus session to be most prepared for the two days on-campus. It is best to start as soon as you can to prepare for that session.** It is important that you get into a regular study pattern for this unit and don’t try to cram in the days just prior to the on-campus session or final exam. Try to establish regular study periods and adhere to them strictly. Follow all the usual recommendations for establishing sound study habits, *i.e.*, have your own desk or table; always sit in the same place; when it is “study time”, sit down at your desk even if you don’t feel inclined to do so. **Attempting the problems at the end of each chapter without looking at the solution manual first will be essential for you to self-assess if you have really understood the material.** Contact A/Prof Joanne Jamie on any topic or Dr Fei Liu for the topics relevant to the first on-campus session as soon as you feel that you are struggling so that we can provide advice before it is too late.

<table>
<thead>
<tr>
<th>Week</th>
<th>Week Starting</th>
<th>Study Tasks</th>
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<tbody>
<tr>
<td>1 and 2</td>
<td>3 March – 14 March</td>
<td>Read the ‘lecture’ notes and look at the video capture files on Structure and Bonding, Acids and Bases AND read McMurry Chapter 1.</td>
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<td>Read the laboratory notes from the start to the end of Experiment 2 (E2), including relevant appendices. Do pre-labs for E1-2.</td>
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<tr>
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<td>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.</td>
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<tr>
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<td>Read the laboratory notes for E3 and E4, including relevant appendices. Commence pre-labs for E3 and 4.</td>
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<td>Attempt the set workshop problems. Use your model kits to help visualise the cycloalkane conformations and isomers and for examples in the stereochemistry topic.</td>
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<td>Note any “problem areas” you have to A/Prof Jamie or Dr Fei Liu (preferably beforehand) for discussion at the first on-campus session.</td>
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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.
<table>
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<tr>
<th>Week</th>
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</table>
| 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. |
<table>
<thead>
<tr>
<th>Week</th>
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<tr>
<td><strong>6</strong></td>
<td><strong>6 April – 12 April</strong></td>
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<tr>
<td><strong>Starting</strong></td>
<td><strong>Study Tasks</strong></td>
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<tr>
<td><strong>7</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>To prepare for the laboratory E7</strong>, 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.</td>
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<tr>
<td><strong>Do pre-labs for E7, E8 and E9.</strong></td>
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<tr>
<td><strong>To prepare for the laboratory E10</strong>, read the ‘lecture’ notes on the Carboxylic Acids and Derivatives and Amines topics AND McMurry Chapter 10 and 12.</td>
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<td><strong>Do prelab for E10.</strong></td>
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<tr>
<td><strong>Continue to prepare for the mid semester exam.</strong></td>
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<tr>
<td><strong>Note any ‘problem areas’ to A/Prof Jamie for the second on-campus session.</strong></td>
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| **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.** |

<p>| <strong>7</strong> | <strong>28 April – 5 May</strong> |
| <strong>Week Starting</strong> | <strong>Study Tasks</strong> |
| <strong>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.</strong> |
| <strong>Revise all notes.</strong> |
| <strong>Note any ‘problem areas’ to A/Prof Jamie for the third on-campus session.</strong> |</p>
<table>
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<tr>
<th>Week</th>
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<th>Study Tasks</th>
</tr>
</thead>
</table>
| 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.  
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! |