



CBMS104

Biomolecules

S1 Day 2017

Dept of Chemistry & Biomolecular Sciences

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Disclaimer

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

General Information

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Credit points 3
Prerequisites Admission to BClinSc
Corequisites
Co-badged status
Unit description CBMS104 is an intensive blended unit which provides students with an understanding of fundamental concepts and principles in chemistry and biochemistry in a clinical context. The unit commences with Module 1 “Biomolecules”. The focus of this first module is on the structure and reactivity of the five major groups of Biomolecules (lipids, proteins, enzymes, nucleic acids, and carbohydrates). Discussion of each of these five groups allows for the integration of topics from the three traditional areas of general chemistry, introductory organic chemistry and biochemistry. The second module “Metabolism” draws on the concepts presented in the “Biomolecules” module and re-integrates them to fully develop the concepts of biomolecules as energy yielding compounds. Discussion in this second module is focused on metabolic considerations of carbohydrates, proteins and fats, and leads to discussion of topics such as obesity, dieting, fitness and disease. Through the participation in an integrated series of hands-on workshops called the ‘Molecule Project’, students will adopt a biochemically active ‘real-life’ biomolecule of clinical importance and build a portfolio of biochemical properties for their biomolecule throughout the unit.

Important Academic Dates

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

Learning Outcomes

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

Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.

Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.

Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.

Define and describe key biochemical concepts for the major biological systems involved

in metabolism and energy production pathways in the living cell.

General Assessment Information

Assignment Submission

In general, this is a paperless unit so no assignments or quizzes will be physically handed in. You will be required to submit all assignments through iLearn via a Turnitin link. Turnitin is an online program that detects plagiarised pieces of work. It compares not only work between students in the current year but also across previous years, across institutions, with all published materials, and the internet. Do not under any circumstances lend your work to another student. If that student plagiarises your work you too will be liable.

The penalties imposed by the University for plagiarism are serious and may include expulsion from the University. **ANY evidence of plagiarism WILL be dealt with according to University policy.** A full outline of the Universities policy on plagiarism is found at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html.

It is your responsibility to ensure all documents submitted or uploaded in ilearn are the correct file(s) and readable by the person marking your assignment. If files cannot be read, then late penalties will apply until re-submission of the work occurs.

Extensions and penalties

10% will be deducted for each day (up to and including any time in the 24 hr period) if an assignment is late. This includes each day of a weekend. If you are unable to submit the assignment by the due date then an extension must be sought **BEFORE** the due date unless this is absolutely impossible. Notification after the event of an anticipatable absence will not be looked upon favourably. To support your extension, you must submit a "Disruption to studies" request via www.ask.mq.edu.au. See http://www.students.mq.edu.au/student_admin/manage_your_study_program/disruption_to_studies/ for instructions on how to do this. Please note that evidence must be given to support your request for an extension.

Attendance

Attendance at all 4 workshops is **compulsory**. The GAMSAT style quiz can **only** be done during the 2 hour workshop. If you are absent from a workshop, then a [Disruption to Studies](#) must be submitted.

Final Exam - Supplementary Exam

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

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Workshop reports x 4</u>	20%	No	Due 1 week after workshop
<u>Short Quiz x 4 (GAMSAT prep.)</u>	5%	No	During workshops
<u>Molecule Project Report</u>	15%	No	Week 8 & Week 11
<u>Mid-semester test</u>	10%	No	Week 7
<u>Final Exam</u>	50%	No	University Examination Period

Workshop reports x 4

Due: **Due 1 week after workshop**

Weighting: **20%**

Four x 2hr Workshops will be held in E4B 218 Faculty PC Lab as follows:

Week 2 - 9th March (due 16th March 2017): Lipids

Week 5 - 30th March (due 6th April 2017): Proteins

Week 8 - 4th May (due 11th May 2017): Nucleic Acids

Week 11 - 25th May (due 1st June 2017): Sugars

The workshop material will be provided through ilearn. Attendance is **compulsory** at all workshops. Reports will be due 1 week after the workshop and are to be submitted through ilearn. Each workshop report is worth 5% of the total grade.

On successful completion you will be able to:

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Short Quiz x 4 (GAMSAT prep.)

Due: **During workshops**

Weighting: **5%**

During each Workshop, you will complete a short multiple-choice GAMSAT style quiz (4 in total). The quiz can only be done in the workshops and attendance is **compulsory**. There is a strict time limit for each quiz (15 minutes) to simulate the pace/pressure required when sitting the GAMSAT exam. The quiz will only be available during the last 30 minutes of the Workshop and is worth 5% of the total grade.

On successful completion you will be able to:

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.

Molecule Project Report

Due: **Week 8 & Week 11**

Weighting: **15%**

One short written assignments (~1,000 words). The assignment is in two parts: Part A (literature searching) is due in week 8 and is worth 5%. Part B (essay) is due in week 11 and is worth 10%. Details of the assignment will be given on ilearn before the mid-semester break. Assignments will be submitted through ilearn and checked through turnitin.

On successful completion you will be able to:

- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Mid-semester test

Due: **Week 7**

Weighting: **10%**

A multiple choice mid-semester test will be held during class time in Week 7 (12th April: 2-3pm). The test will only cover material from the Lipids and Proteins topics only (Weeks 1 to 5).

On successful completion you will be able to:

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.

Final Exam

Due: **University Examination Period**

Weighting: **50%**

The final exam (50%) will be 3 hours in length with 10 minutes reading time. It is designed to address specific understanding of all the topics presented within the course and to show that the knowledge obtained can be applied to new problems.

On successful completion you will be able to:

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Delivery and Resources

CBMS104 is a 3-credit-point, one semester unit, comprising:

- Lectures: two one-hour lectures a week.
- Workshop: four two-hour computer-lab.
- Self-Study: there is an expectation that you will also engage in study of the material outside of the formal face-to-face contact.

In order to complete this unit you must:

- Participate in all workshop sessions and submit workshop reports by the specified dates.
- Attempt the 4 short quizzes held at the end of each workshop.
- Submit Part A and Part B of the written assignment.
- Attempt the mid-session test (50 minutes), held during a standard lecture time.

- Sit the final examination of (3 hours), held during the examination period.

An unsatisfactory performance in the final examination or the written assignments (including workshop reports) may result in a fail grade being given, regardless of your overall aggregate score.

CBMS104 Unit Web Site The web page for CBMS104 can be found at ilearn.mq.edu.au. The CBMS104 iLearn web site is your primary source of data and information for this unit and will be used as a repository of lectures and workshop materials, and as a means of communication.

Login to iLearn and follow the prompts to CBMS104. 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. 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/>.

Announcements on ilearn are also emailed to your student email account. It is your responsibility to ensure your settings in iLearn are active to receive all announcements.

Technology Used You are expected to have access to the ilearn site and be able to download PDF files. If you do not have your own computer, then access can be obtained on campus using the PC computers in the Library or in the C5C computer laboratories. Acrobat Reader can be used to view lecture material and can be downloaded from the Adobe at get.adobe.com/reader/.

Communication: All communication will be given via the iLearn site. Alerts for new announcements will also be sent to your student email account (unless you turn this feature off which is NOT recommended). It is your responsibility to check the ilearn site and your email account on a frequent basis. It is not uncommon for mail from iLearn to be initially recognised as spam. All unit-related correspondence must be conducted using your official university account. E-mails sent to teaching staff from your private email accounts will be IGNORED.

Additional learning resources: will be provided to support students without HSC chemistry or those struggling with general chemistry concepts. Details of these resources will be given on the ilearn site.

Unit Schedule

LECTURE SCHEDULE 2017

Week	Date (wk starting)	Lecture 1: 1-2pm E7B 100 Theaterette Wednesday		Lecture 2: 2-3pm E7B 100 Theaterette Wednesday		Workshop: 4-6pm E4B 218 Faculty PC Lab Thursday
1	27-Feb	Intro lecture	LB	Lipids 1	RW	
2	6-Mar	Lipids 2	RW	Lipids 3	RW	1: Lipids Workshop + Quiz 1
3	13-Mar	Proteins 1	LB/ PP	Proteins 2	LB/ PP	
4	20-Mar	Proteins 3	LB	Proteins (Enzymes)	AS	

5	27-Mar	Proteins (Enzymes)	AS	Nucleic Acids 1	JJ	2: Proteins Workshop + Quiz 2
6	3-Apr	Nucleic Acids 2	JJ	Nucleic Acids 3	HN	
7	10-Apr	Nucleic Acids 4	HN	Mid-semester test (10%)	LB/ PP	
Easter & Mid-semester break: 14-30 April						
8	1-May	Sugars 1	JJ	Sugars 2	JJ	3: Nucleic Acids Workshop + Quiz3
9	8-May	Sugars 3	JJ	Sugars 4	MA	
10	15-May	Sugars 5	MA	Respiration	DK	
11	22-May	Cellular Energy Processes 1	RW	Cellular Energy Processes 2	RW	4: Sugars Workshop + Quiz 4
12	29-May	Glucose regulation	MS	Digestion	MS	
13	5-Jun	Revision/catch up lecture		Revision/exam prep		

Lecturers

LB	Dr Louise Brown
RW	Prof Robert Willows
JJ	Assoc Joanne Jamie
HN	Prof Helena Nevalainen
AS	Dr Anwar Sunna
DK	Dr Dane King
MS	Dr Mirjana Strkalj
MA	Dr Morten Anderson
PP	Dr Phani Potluri

*Note: This schedule is approximate and may be altered as required. Locations/lecturers may change. Any updates will be communicated via ilearn.

Learning and Teaching Activities

Mastering Chemistry - additional learning support for 100 level chemistry

There is the option to access the "Mastering Chemistry" online system for further practice for general chemistry. A licence to access this resource must be purchased. It can be purchased with the "Chemistry: The Central Science" textbook or separately from the Mastering Chemistry website.

Lectures

Lecture notes containing copies of material used in lectures will be available for download as pdf files from iLearn. As content for this unit does not closely follow a text, it is strongly advised that you attend ALL lectures. Students who do not attend all lectures often find it difficult to pass the Unit.

Workshops

Workshops give you an opportunity to work with your peers to put your knowledge of biomolecules learnt from the lectures into practice. The aim of the workshops is to give you an understanding of the chemical structure and the importance of the four major biomolecules in our body and their relation to how we function/live, process food and their involvement in disease. Each workshop will begin with a short introduction and expected outcomes. You will then work through an online based workshop in small groups and perform short activities that require an individual online response. At the end of the workshop, a 'GAMSAT' style quiz will be done. You must attend the 2 hour workshop to participate in the quiz.

Self Directed Learning and Study

You are expected to spend some time in reading the textbook and other sources of information on fundamental chemistry and biochemistry, to review lecture material, and to self-assess your degree of understanding. An approximate estimate of the time commitment for a 3 credit point undergraduate unit of study such as CBMS104 is 150 hours over 15 weeks (including the break) ~10 hours per week. This includes contact and non-contact hours. Some students (especially students who do not have HSC chemistry) may find that they need to devote more time than this.

Policies and Procedures

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

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

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

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

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

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

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

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

Student Code of Conduct

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

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit ask.mq.edu.au.

Student Support

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

Learning Skills

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

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

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

Student Enquiries

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

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

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

This graduate capability is supported by:

Assessment task

- Workshop reports x 4

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:

Assessment task

- Workshop reports x 4

Commitment to Continuous Learning

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

This graduate capability is supported by:

Learning outcome

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.

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

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.

- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Assessment tasks

- Workshop reports x 4
- Short Quiz x 4 (GAMSAT prep.)
- Molecule Project Report
- Mid-semester test
- Final Exam

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

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Assessment tasks

- Workshop reports x 4
- Short Quiz x 4 (GAMSAT prep.)
- Molecule Project Report
- Mid-semester test
- Final Exam

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

- Demonstrate a fundamental understanding of general chemistry and introductory organic chemistry principles applicable to the discipline of clinical science.
- Demonstrate an ability to name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Apply knowledge of the chemistry and biochemistry concepts to describe the structure and properties of biomolecules and be able to predict the behaviour of molecules from their structures.
- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Assessment tasks

- Workshop reports x 4
- Short Quiz x 4 (GAMSAT prep.)
- Molecule Project Report
- Final Exam

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 outcome

- Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.

Assessment tasks

- Workshop reports x 4

- Molecule Project Report

Changes from Previous Offering

There has been a change in weighting of the workshops/quizzes and written assignments to better reflect the workload for each of these activities. The assignment weighting has decreased from 20% to 15%. The workshops and quizzes have increased from 20% to 25%.

Recommended Texts

For GAMSAT preparation and chemistry background covered in this unit, the following text is strongly recommended. (Note, this is the text used for CBMS102.)

- Brown, LeMay, Bursten, Murphy, Woodward, Langford, Sagatys and George, Chemistry: The Central Science, 3rd Ed, Pearson Australia, 2013, ISBN:9781442554603

It is also highly recommended that students have access to a Biochemistry text and we recommend the following text. (Note, this is the text used for CBMS223.)

- Fundamentals of Biochemistry: Life at the Molecular Level, 4th Edition by Donald Voet, Judith G. Voet, Charlotte W. Pratt, Wiley.

Alternatively, students can use the following Biochemistry text: Biochemistry (5th Edition) Reginald H. Garrett (Author), Charles M. Grisham.

The texts can be purchased through the Co-op bookstore on campus.

Changes since First Published

Date	Description
19/03/ 2017	The room number for the workshops was incorrect - it is E4B-218 (not E4B-118)
06/03/ 2017	Clarification of dates for workshop dates and workshop reports
18/02/ 2017	The textbook has been updated to 5th edition for "Fundamentals of Biochemistry"