BMOL1001

Biomolecules

Session 1, In person-scheduled-weekday, North Ryde 2022

School of Natural Sciences

Contents

General Information

Unit convenor and teaching staff
Abidali Mohamedali
abidali.mohamedali@mq.edu.au

Credit points
10

Prerequisites
Admission to BClinSc

Corequisites

Co-badged status

Unit description
This unit 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 four major groups of biomolecules (lipids, proteins, 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 'Molecules' workshops, students will work with biochemically active 'real-life' biomolecules of clinical importance and build a portfolio of biochemical properties of several biomolecules 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:

ULO1: Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.

ULO2: Name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
ULO3: Describe the structure and properties of biomolecules using chemical and biochemical concepts.
ULO4: Predict chemical and physical behaviours of molecules from their structures.
ULO5: Define and describe key biochemical concepts for the major biological systems involved in metabolism and energy production pathways in the living cell.
ULO6: Utilise foundational learning skills including active engagement in their learning processes.

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

Late submissions will only be accepted for the Molecule project report and workshop reports.

Online quizzes, in-class activities, or scheduled tests and exam must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, students may apply for Special Consideration.

All other assessments must be submitted by 5:00 pm on their due date. Should these assessments be missed due to illness or misadventure, students should apply for Special Consideration.

Assessments not submitted by the due date will receive a mark of zero unless late submissions are specifically allowed as indicated in the unit guide or on iLearn. If late submissions are permitted as indicated in the unit guide or on iLearn a consistent penalty will be applied for late submissions as follows: A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an

assessment worth 20% is due 5 pm on 1 January. Student A submits the assessment at 1 pm, 3 January. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

Marks released on iLearn

It is your responsibility to check that marks released on iLearn are accurate. Note, marks released on iLearn do not have late penalties applied. Late penalties are applied AFTER marking of the submitted work. See extensions and penalties section of this document.

Attendance at workshops

There are 4 workshops in total. These are 4 offerings of the workshops in weeks 3 (lipids), 6 (proteins), 9 (sugars) and 12 (nucleic acids). You must attend the workshop you have been allocated. Attendance at all 4 workshops is **compulsory** The GAMSAT style quiz can **only** be done during the 2 hour workshop.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 first OR last 30 minutes of the Workshop and is worth 5% of the total grade.

If you are absent from a workshop, then a Special Consideration Request must be submitted (see above). Workshops are also a **hurdle requirement**: you must attend and participate in at least 3 of the 4 workshops to pass the unit. If your absence from a workshop is approved by special consideration then an average mark from all other workshop reports will be given. An unexplained absence from a workshop (ie your absence was not approved by special consideration) will result in ZERO marks for the missed workshop. Missing two or more workshops will result in failure of the unit.

Further details of workshop content and workshop questions are available through the iLearn site.

Final Exam

The final exam (45%) will be 2 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. It will cover ALL material from the lectures and workshops.

Supplementary Exam

If you apply for a supplementary examination, you must make yourself available for the formal examination period. 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 advised at a later date.

Assessment Tasks

Name	Weighting	Hurdle	Due
Final Examination	45%	No	Exam Week

Name	Weighting	Hurdle	Due
Molecule Project Report	15%	No	Week 7 and Week 11
Short Quizzes	5%	No	10am on Day of Workshop
Workshop reports	20%	Yes	One week after every workshop
Mid-semester test	15%	No	Friday 15th April 10am

Final Examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 18 hours
Due: **Exam Week**
Weighting: **45%**

The final exam (45%) 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:

- Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.
- Name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Describe the structure and properties of biomolecules using chemical and biochemical concepts.
- Predict chemical and physical behaviours 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.
- Utilise foundational learning skills including active engagement in their learning processes.

Molecule Project Report

Assessment Type [1]: Essay
Indicative Time on Task [2]: 12 hours
Due: **Week 7 and Week 11**
Weighting: **15%**

One short written essay (~1,000 words). The essay is in two parts: Part A (bibliography/literature search) is due at the end of week 7 and is worth 5%. Part B (essay) is due at the end of week 11 and is worth 10%. Details of the assignment will be given on ilearn by end of week 3. Assignments will be submitted through ilearn and checked through turnitin.

On successful completion you will be able to:

- Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.
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- Describe the structure and properties of biomolecules using chemical and biochemical concepts.
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Short Quizzes

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 2 hours
Due: **10am on Day of Workshop**
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 for entire workshop 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 first OR last 30 minutes of the Workshop and is worth 5% of the total grade.

On successful completion you will be able to:

- Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.
- Name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Describe the structure and properties of biomolecules using chemical and biochemical

concepts.
- Predict chemical and physical behaviours of molecules from their structures.
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Workshop reports

Assessment Type [1]: Report
Indicative Time on Task [2]: 20 hours
Due: **One week after every workshop**
Weighting: **20%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Four reports based on the four workshops on: 1. Lipids; 2. Proteins; 3. Sugars; 4. Nucleic Acids.

On successful completion you will be able to:
- Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.
- Name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.
- Describe the structure and properties of biomolecules using chemical and biochemical concepts.
- Predict chemical and physical behaviours 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.
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Mid-semester test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 12 hours
Due: **Friday 15th April 10am**
Weighting: **15%**

A mid-semester test (multiple choice) will be held as detailed on iLearn.

On successful completion you will be able to:

- Explain and relate general chemistry and organic chemistry principles applicable to the discipline of clinical science.
- Name and write (or describe) structures for representative molecules of the major classes of biochemicals/biomolecules found in the human body.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

BMOL1001 is a 10-credit-point, one semester unit, comprising:

- Lectures: two one-hour lectures a week.
- Workshop: four two-hour workshops (enrol into one of four sessions available). Bring your own laptop (labcoats are not required).
- 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 (and do well) in this unit you must:

- Participate in all workshop sessions and submit workshop reports by the specified dates. To pass the unit, you must participate in at least 3 out of 4 workshops (unless special consideration is approved).
- Attempt the 4 short quizzes (GAMSAT style) held at the end/beginning 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 in week 7.
- Sit the final examination of (2 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.

BMOL1001 Unit Web Site

The web page for BMOL1001 can be found at ilearn.mq.edu.au. The BMOL1001 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 BMOL1001. 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.

Recommended Texts

For GAMSAT preparation and chemistry background covered in this unit, the following text is recommended.

- Chemistry: The Central Science in SI Units, Expanded Edition, Global Edition, 15th Edition (https://www.pearson.com/uk/educators/higher-education-educators/program/Brown-Chemistry-The-Central-Science-in-SI-Units-Expanded-Edition-Global-Edition-15th-Edition/PGM100003100828.html?tab=overview) "(from Booktopia https://www.booktopia.com.au/chemistry-theodore-l-brown/book/9781442554603.html) or ebook (from Pearson https://www.pearson.com.au/9781442554603).

Alternatively, most first year Chemistry text books should be suitable. It is also highly recommended that students have access to a Biochemistry text and we recommend the following text.

- Fundamentals of Biochemistry: Life at the Molecular Level, 5th Edition by Donald Voet, Judith G. Voet, Charlotte W. Pratt, Wiley. Electronic access: eBook : from http://www.wileydirect.com.au/ - case studies and exercises are on WileyPLUS.

The texts can be purchased via online bookshops such as Booktopia, Amazon or as listed above. A few copies of the prescribed text are available in the library.

Lectures:

- **Lecture Attendance-** Students are required to attend the live lectures to ensure optimal learning and create a rapport with your conveners and lecturers who are all pre-eminent researchers in their respective fields of study.
- **Lecture Recordings:** *Will be available an hour after the lecture and should be used for reference. On the odd occasion that a live lecture cannot be conducted, pre-recorded lectures will be available.*
- **Asking Questions:** There is a discussion thread for every lecture for you to ask

questions and engage with the lecturer. Please post your questions in the appropriate discussion thread.

As content for this unit does not closely follow a text, it is strongly advised that you listen to ALL lectures. Students who do not attend all lectures often find it difficult to pass the Unit. It is expected that students have completed HSC Chemistry (or an equivalent bridging course). Some basic knowledge of how to perform chemistry calculations is expected.

Workshops: Workshops give you an opportunity to work with your peers to put your knowledge of biomolecules learnt from the lectures into practice. One 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. You will also review basic chemical calculations and solve problems in the workshops. Additional revision material (ie HSC chemistry level) will be provided to you via ilearn to help you prepare for the workshops.

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 (or beginning) of the workshop, a 'GAMSAT' style quiz will be done. You must attend the 2-hour workshop to participate in the quiz.

Technology Used: We expect all students to own a laptop and this must be bought to the workshop sessions. You are expected to have access to the ilearn site and be able to download PDF files on your laptop. **If you do not have your own laptop**, then please advise teaching staff on this unit **PRIOR** to the workshop sessions. A laptop will be provided to you to use during the workshop session if you have notified the staff in advance. Acrobat Reader can be used to view lecture material and can be downloaded from 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.

Additional learning resources/ Self Directed Learning & Study: You are expected to spend some time reading a relevant textbook and other sources of information on fundamental chemistry and biochemistry, reviewing lecture material, and to self-assess your degree of understanding. An approximate estimate of the time commitment for a 10 credit point undergraduate unit of study such as BMOL1001 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. We will provide some additional material on ilearn to help students without HSC chemistry or those requiring the review of general chemistry concepts. Details of these resources

will be given on the ilearn site and can help you with your preparation for the workshops.

Consultation times - Students are encouraged to approach the convener for any problems or issues that arise. Dr Abidali will be available for consultations on Tuesdays and Fridays 9-10 am. However, for pressing issues, students are encouraged to email the convener and arrange online consultation.

Off-shore students: Off-shore students must email the convenor as soon as possible to discuss study options.

COVID Information and on-campus classes On-campus teaching continues to be scheduled for Session 1, 2022. Masks are compulsory for all classes in indoor spaces and social distancing will be implemented wherever possible. Students will also be required to sanitise surfaces before and after use.

Students are requested to minimise the risk of spreading COVID to themselves and others in accordance with the university and NSW Health guidelines: https://www.mq.edu.au/about/coronavirus-faqs and https://www.nsw.gov.au/covid-19/stay-safe.

Any further requirements or changes to units in relation to COVID will be communicated to students via iLearn.

Unit Schedule

Details of each topic and objectives will be available on ilearn.

WEEK	Date (week starting)	Lecture 1 Tuesday: 9-10		Lecture 2 Friday: 10-11pm		Tuesday 11-1 and 1-3: Workshop Groups A, B and C	Friday 11-1 and 1-3: Workshop Groups D and E
1	21-Feb	L1. Intro lecture	AM	L2. Lipids 1	RW		
2	28-Feb	L3. Lipids 2	RW	L4. Lipids 3	RW		
3	7-Mar	L5. Proteins 1	AM	L6. Proteins 2	AM	W1: Lipids	W1: Lipids
4	14-Mar	L7. Proteins 3	AM	L8. Proteins (Enzymes 1)	AS		
5	21-Mar	L9. Proteins (Enzymes 2)	AS	L10. Sugars 1	AM		
6	28-Mar	L11. Sugars 2	AM	L12. Sugars 3	AM	W2: Proteins	W2: Proteins
7	11-Apr	L13. Sugars 4	MA	Mid-semester test (15%)			
Break: 11-24th April							
8	25-Apr	L14. Sugars 5	MA	L15. Nucleic Acids 1	AM		
9	2-May	L16. Nucleic Acids 2	AM	L17. Nucleic Acids 3	AM	W3: Sugars	W3: Sugars

10	9-May	L18. Nucleic Acids 4	AM	L19. Cellular Energy Processes 1	RW		
11	16-May	L20. Cellular Energy Processes 2	RW	L21. SI units	AL		
12	23-May	L22. Kingdoms and Viruses	JA	L23. Genome Evolution	IB	W4: Nucleic Acids	W4: Nucleic Acids
13	30-May	no lecture (study week)		no lecture (study week)			
AM	Dr Abidali Mohamedali						
RW	Prof Rob Willows						
AS	Prof Anwar Sunna						
MA	A/Prof Morten Anderson						
AL	Dr Albert Lee						
JA	Prof Julie Atkin						
IB	Prof Ian Blair						

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study

- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Changes since First Published

Date	Description
21/02/2022	Lecture time changed