Unit Outline 2014
Faculty of Education, Science, Technology and Mathematics

Biochemistry
6530
This Unit Outline must be read in conjunction with:

a) *UC Student Guide to Policies*, which sets out University-wide policies and procedures, including information on matters such as plagiarism, grade descriptors, moderation, feedback and deferred exams, and is available at *(scroll to bottom of page)*

b) *UC Guide to Student Services*, and is available at *(scroll to bottom of page)*

c) Any additional information specified in section 6h.

### 1: General Information

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
</table>
| **1a** | **Unit title**  
Biochemistry |
| **1b** | **Unit number**  
6530 |
| **1c** | **Teaching Period and year offered**  
Semester 1, 2014 |
| **1d** | **Credit point value**  
3 |
| **1e** | **Unit level**  
2 |
| **1f** | **Name of Unit Convener and contact details (including telephone and email)**  
Dr Regan Ashby  
Room 3D49  
(02) 6201 2088  
Regan.ashby@canberra.edu.au |
| **1g** | **Administrative contact details (including name, location, telephone and email)**  
Faculty Administrative Office 6C38  
ESTeM-courseadvice@canberra.edu.au  
(02) 6201 2400 |
2: **Academic Content**

2a **Unit description and learning outcomes**

This unit provides an introduction to the structure and function of biochemical molecules, intercellular communication, and the flow of genetic information.

*Learning Outcomes (LO)*

On successful completion of this unit, students will:

1. Be able to differentiate between major classes of biological molecules;
2. Be able to correlate specific aspects of protein structure with function;
3. Gain an understanding of enzyme catalytic mechanisms;
4. Demonstrate knowledge of the processes and regulation of DNA expression and replication;
5. Develop an awareness of the applications and usefulness of biochemical knowledge; and
6. Be able to perform simple biochemical techniques in the laboratory and to analyse experimental data critically.

2b **Generic skills**

The University recognises that individuals entering its programs bring with them a diversity of personal and professional attributes that should be further developed by their experience as students and graduates of the University. These generic skills can be accessed at: [https://guard.canberra.edu.au/policy/policy.php?pol_id=3030](https://guard.canberra.edu.au/policy/policy.php?pol_id=3030)

By the end of their course, graduates will have developed skills and attributes in:

1. **Communication**
   The ability to present knowledge, ideas and opinions effectively and communicate within and across professional and cultural boundaries

2. **Analysis and inquiry**
   The ability to gather information, and to analyse and evaluate information and situations in a systematic, creative and insightful way

3. **Problem solving**
   The ability to apply problem-solving processes in novel situations; to identify and analyse problems then formulate and implement solutions

4. **Working independently and with others**
   The ability to plan their own work, be self-directed, and use interpersonal skills and attitudes to work collaboratively

5. **Professionalism and social responsibility**
   The capacity and intention to use professional knowledge and skills ethically and responsibly, for the benefit of others and the environment

**Personal attributes**

Individuals entering our programs bring with them a diversity of attributes and experiences. As students of the University, they will develop the qualities of critical thinking, curiosity and reflective practice. They will use foresight, initiative and leadership, and be open to alternative perspectives. As graduates, they will continue to learn and thrive in environments of complexity, ambiguity and change.

Generic skills that are emphasised in this unit are referred to in the assessment overview (5a).
2c **Prerequisites and/or co-requisites**
Chemistry 1A (1516) and Concepts in Biology (483) *OR* Chemistry 1A (1516) and Chemistry 1B (1517)

### 3: Delivery of Unit and Timetable

#### 3a Delivery mode

Delivery of subjects will be in traditional mode, on campus during a standard semester with two hours of lectures and three hours of practical/tutorial per week. This unit is co-taught with Biochemistry G (6480). Lectures and practical/tutorial classes are scheduled as follows:

**Lectures:**  Wednesday  10:30-12:30  Room 2B9

**Practical/Tutorials:**

Five sessions per week have been scheduled; each student is to attend one of these sessions. All sessions will be held in 27B14, except for the computer tutorial sessions in Weeks 3 and 10 to be held in the venues listed below. Scheduled sessions are:

<table>
<thead>
<tr>
<th>Session</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Thursday</td>
<td>10:00-13:00</td>
<td>Lab 27B14</td>
</tr>
<tr>
<td>P2</td>
<td>Thursday</td>
<td>13:30-16:30</td>
<td>Lab 27B14</td>
</tr>
<tr>
<td>P3</td>
<td>Thursday</td>
<td>17:00-20:00</td>
<td>Lab 27B14</td>
</tr>
</tbody>
</table>

Due to space demands, each computer tutorial (weeks 3 and 9) will be run as a 2hr session. Students will be allocated to attend a session that corresponds as closely to their practical time as possible (e.g. those in P1 will be allocated to either the 09:00-11:00 session (CA1) or the 11:00-13:00 session (CA2), those in P2 will be allocated to either the 13:00-15:00 session (CA3) or 15:00-17:00 session (CA4), while P3 will be allocated to the 17:00-19:00 session (CA5)).

**Computer tutorials (weeks 3 and 9 only)**

<table>
<thead>
<tr>
<th>Session</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1/CA1</td>
<td>Thursday</td>
<td>09:00-11:00</td>
<td>11A42/11A45/11A48</td>
</tr>
<tr>
<td>P1/CA2</td>
<td>Thursday</td>
<td>11:00-13:00</td>
<td>11A45/11A49</td>
</tr>
<tr>
<td>P2/CA3</td>
<td>Thursday</td>
<td>13:00-15:00</td>
<td>11A40/11A45</td>
</tr>
<tr>
<td>P2/CA4</td>
<td>Thursday</td>
<td>15:00-17:00</td>
<td>11A40/11A45</td>
</tr>
<tr>
<td>P3/CA5</td>
<td>Thursday</td>
<td>17:00-19:00</td>
<td>11A40/11A45</td>
</tr>
</tbody>
</table>
3b  Timetable of activities, such as lectures/tutorials/practicals/field classes, showing key dates and topics

<table>
<thead>
<tr>
<th>Week, beginning</th>
<th>Lecture Topic</th>
<th>COMPULSORY Laboratory Work/Tutorials</th>
<th>Assessment due</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 17 Feb</td>
<td>Topic 1 Foundations in Biochemistry</td>
<td>No labs</td>
<td></td>
</tr>
<tr>
<td>2 24 Feb</td>
<td>Topic 2 Amino Acids</td>
<td>Lab 1: Lab techniques and calculations</td>
<td></td>
</tr>
<tr>
<td>3 3 Mar</td>
<td>Topic 3 Proteins</td>
<td>Lab 2: Studying proteins #1 Visualising protein structure (computer lab)</td>
<td></td>
</tr>
<tr>
<td>4 10 Mar</td>
<td>Topic 4 Lipids and Membranes</td>
<td>Lab 3: Studying proteins #2 Separating proteins and other molecules</td>
<td>Lab exercise (5%, in class)</td>
</tr>
<tr>
<td>5 17 Mar</td>
<td>Wednesday: Mid-semester Exam</td>
<td>No labs</td>
<td>MSE (30%)</td>
</tr>
<tr>
<td>6 24 Mar</td>
<td>Topic 5 Signal Transduction</td>
<td>Lab 4: Studying proteins #3 Precision and quantitation</td>
<td>Lab exercise (5%, in class)</td>
</tr>
<tr>
<td>7 31 Mar</td>
<td>Topic 6 Enzymes Part 1</td>
<td>Lab 5: Analysing enzyme activity #1: lab</td>
<td></td>
</tr>
<tr>
<td>8 7 Apr</td>
<td>Class free period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 14 Apr</td>
<td>Topic 6 Enzymes Part 2</td>
<td>Lab 6: Analysing enzyme activity #2: (computer lab)</td>
<td></td>
</tr>
<tr>
<td>10 21 Apr</td>
<td>Topic 7 Nucleotides &amp; Nucleic Acids</td>
<td>No labs</td>
<td>Lab Report (15%) Thursday, April 24th, 4pm</td>
</tr>
<tr>
<td>11 28 Apr</td>
<td>Topic 8 DNA replication</td>
<td>Lab 7: Studying DNA: Theory and practice</td>
<td>Lab exercise (5%, in class)</td>
</tr>
<tr>
<td>12 5 May</td>
<td>Topic 9 Transcription</td>
<td>Lab 8: Determination of Rh factor using polymerase chain reaction</td>
<td></td>
</tr>
<tr>
<td>13 12 May</td>
<td>Topic 10 Translation</td>
<td>Lab 8 cont.: Determination of Rh factor using polymerase chain reaction</td>
<td></td>
</tr>
<tr>
<td>Exam Period</td>
<td>Final Exam (40%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4: Unit Resources

4a Lists of required texts/readings


4b Materials and equipment


All students must obtain a copy of the laboratory manual. It contains all the information regarding labs, and details of the lab-based assessment. All students must also bring a lab coat and safety glasses to all lab sessions, and be wearing appropriate footwear (fully enclosed shoes). Laboratory coats can be purchased from the UC Union Shop or disposal stores.

4c Unit website

To find your unit site online, login to LearnOnline(Moodle) using your student ID. Access to the unit website on http://learnonline.canberra.edu.au is a requirement for students enrolled in this unit. Official notices, lecture outlines and other important information will be posted to this website. Note that your unit site has a profiles page that displays your name and email address for the benefit of other students. If you prefer to hide your email address, click here for instructions.

5: Assessment

5a Assessment overview

All staff and students are required to read the document named ‘Assessment Responsibilities’ on the following link to ensure accurate understanding of the various perspectives surrounding assessment at UC. It can alleviate many misunderstandings.


<table>
<thead>
<tr>
<th>Assessment item (including exams held in the exam period)</th>
<th>Due date of assignments</th>
<th>Weighting (total to equal 100%)</th>
<th>Addresses learning outcome(s)</th>
<th>Related generic skill(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-semester exam</td>
<td>10:30 am, Wednesday 19th March (2B9)</td>
<td>30%</td>
<td>1,2</td>
<td>1-3</td>
</tr>
<tr>
<td>Lab exercises (3 x 5%)</td>
<td>During scheduled lab class in Weeks 4, 6, 11</td>
<td>15%</td>
<td>5,6</td>
<td>2-5</td>
</tr>
<tr>
<td>Lab report</td>
<td>4 pm, Thursday 24th April</td>
<td>15%</td>
<td>6</td>
<td>2-5</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Exam Period</td>
<td>40%</td>
<td>1-5</td>
<td>1-3</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Key for UC Generic Skills
1 - Communication
2 - Analysis and Inquiry
3 - Problem Solving
4 - Working independently and with others
5 - Professionalism and Social Responsibility

5b Details of each assessment item

Lab Report 15%

Details of requirements can be found in the unit laboratory manual. A copy of the marking guide used to mark the Lab Report can be located in the laboratory manual and on the unit Moodle site. Students should refer to this when preparing for, and writing, their Lab Report.

The report must be submitted online through Moodle by 4pm, Thursday 24th April. The maximum word limit for the Lab Report is 1450, which is broken into: Introduction (maximum of 400 words), Materials and Methods (maximum 100 words), Results (maximum 400 words, not including figures and tables), Discussion (maximum 400 words), and Conclusion (maximum 150 words).

Introduction and Aims (maximum of 400 words)
This section, written in present tense, contains background information relevant to the topic with the purpose of providing a context for the experiments performed. This introduction should 'set the scene' for the experiment and your later discussion. Make sure that you reference any information that you include from sources such as textbooks. The last part of the introduction should also describe the aim(s) of the experiment.

Materials and Methods (maximum of 100 words)
Written in present tense, for this section you only need to reference the relevant pages of the laboratory manual. You do not need to rewrite the methods section. However, if there are any deviations from the method in the manual, these must be pointed out so that someone who had read your report would be able to repeat the experiment.

Results (maximum of 400 words, not including figures, graphs and tables)
Written in past tense, here you will present your final results in a coherent and logical manner using appropriate tables and graphs. All figures must include a figure number, title and legend, which must be referred to in the text e.g. Figure 1, or Graph 2. A brief description should explain what is observed in each graph or figure. Note the important aspects of your results, but be careful not to discuss your results in this section.

All raw data, data analysis (including standard curves) and example calculations should be included in an appendix.

Requirement for tables (should be prepared in Microsoft Excel):
- Include a table number and a descriptive title at the top of the table, as well as a legend (if necessary) below the table
- Be consistent with your decimal places, think about significant figures!

Requirement for graphs (should be prepared in Microsoft Excel):
- Have a figure number and an appropriate title at the top of each graph.
- All graphs should fill an A4 size page and should be drawn using Excel
- Label both axes, indicating what the variable for that axis is, as well as what units you are using
- Include a key/legend where necessary. This is particularly useful if you have more than one line on the graph.
Discussion (maximum of 400 words)
Write this section in past tense. This is your interpretation of the results given what background information you have available. Do not “rehash” the introduction.

The following points should be addressed, in a logical and coherent manner:
- Briefly, what does the literature suggest the results should be?
- What were your results?
- Are these results consistent with the literature? If not, why not? You should also include reasons for any imprecision or errors encountered

Conclusions (maximum of 150 words)
- Summarise your results and your conclusions. Did you achieve your aims? What were those aims again? Your conclusions should relate back to the aims of the experiment.

Appendix
The tabulated data of your raw results and calculations should appear here.

References
The Lab Report must be referenced appropriately (e.g. acknowledge where you obtained information from) through in-text citation, and then listed at the end in a reference list. You should use the Harvard (author-date) system.

Lab Exercises 15%
Three lab exercises, worth 5% each, will be completed and submitted during lab sessions. Each lab exercise will be uploaded on moodle a week in advance so that you may begin researching the information. Each lab exercise is comprised of data analysis and short answer questions directly related to the lab being undertaken. Please refer to the lab manual for more details.

Mid-Semester Exam 30%
Time/date: 10:30-12:00, Wednesday 19th March (week 5)
Venue: Room 2B9 (normal lecture room)
Duration: 90 minutes
Materials permitted: Pens/pencils/ruler ONLY
Description: The exam will comprise of: structural drawings, definitions and short answer questions directly related to lecture and reading material on Topics 1-4 (Foundations in Biochemistry, Amino Acids, Proteins, Lipids and Membranes) and laboratory based material from practical sessions 1-3.

Final Exam 40%
Time/date: End of semester exam period
Duration: 3 hours
Materials permitted: Calculator – scientific
Unannotated Non-Electronic Dictionary (English/Foreign)
2B Pencil and eraser (for Multiple Choice Questions)
Description: The exam will comprise of multiple choice and short answer questions directly related to lecture and reading material on Topics 5-10: Signal Transduction, Enzymes, Nucleotides & nucleic acids, DNA replication, Transcription and Translation.
Submission of assessment items

All lab exercises will be completed and submitted in class. The lab report will be submitted online via the unit Moodle site. The first page of each assessment submission should include the following information:

Student Name:  
Student ID:  
Assessment Name:  

Date of Submission:  
Word Count:  

Late submission of assignments

In extenuating circumstances a late submission may be considered upon the production of supporting documentation and at the discretion of the unit convener Late submission of assignments without an approved extension will result in the assignment not being marked and zero being recorded for that particular assignment.

Extensions

Extensions must be applied for before the due date.

Students can apply for an extension to the due date for submission of an assessment item on the grounds of illness or other unavoidable and verifiable personal circumstances. Documentary evidence will be expected in order that an extension is granted.

It should be noted that such documentation will be considered but will not guarantee that the application will be successful. The Unit Convenor will decide whether to grant an extension and the length of the extension.

Responsibility for understanding

If there is any doubt with regard to the requirements of any particular assignments or assessment procedure, the onus for clarifying the issue rests with the student who should contact the unit convenor or tutor. Further, it is the responsibility of students to ensure that they are correctly enrolled in the unit and that the tutor and Student Administration have their correct contact details.

Deferred examinations

Provisions will be made for students who are unable to sit either the mid-semester test or end of semester examination and produce appropriate medical certificates or other documentation. In the event a student misses the mid-semester test due to illness or other exceptional circumstances (refer to eligibility criteria), they must submit a Faculty of ESTeM Science Deferred Examination Request form (available on Moodle), along with appropriate documentation (original or certified copy), within 3 working days to the Unit Convener. If their request is approved students will be allowed to sit a deferred mid-semester test at a later date (as chosen by the unit convener). In the event a student misses the end of semester examination due to illness or other exceptional circumstances, the procedures outlined on http://www.canberra.edu.au/student-services/examinations/alternative-exams must be followed (including submitting deferred application form within 3 days of scheduled exam to the Examinations Office).
5d  **Special assessment requirements**

The final mark for this subject will be calculated by an accumulation of marks from each assessment item. **To achieve a passing grade or higher in this subject**, students must:

- Attempt all assessment items;
- Participate in all laboratory and computer sessions;
- Achieve a combined mid-semester and final exam mark of greater than 40%; and
- Achieve a final aggregate mark of 50% or higher.

5e  **Supplementary assessment**

Supplementary assessment will usually only be offered to students who have failed a single unit in their final semester with a final mark between 45-49%. (The unit must be required for course completion.) Refer to the UC [Supplementary Assessment Policy](#).

5f  **Academic Integrity**

Students have a responsibility to uphold University standards on ethical scholarship. Good scholarship involves building on the work of others and use of others’ work must be acknowledged with proper attribution made. Cheating, plagiarism, and falsification of data are dishonest practices that contravene academic values. Please see UC's [Academic Integrity Policy](#).

To enhance understanding of academic integrity, it is expected that all students will complete the LearnOnline Academic Integrity Module (AIM) at least once during their course of study. The module is automatically available as a listed site when students log into LearnOnline.

5g  **Use of text-matching software**

The University of Canberra has available, through LearnOnline (Moodle), text-matching software that helps students and staff reduce plagiarism and improve understandings of academic integrity. Known as URKUND, the software matches submitted text in student assignments against material from various sources: the internet, published books and journals, and previously submitted student texts. [Click here for further information on the URKUND text-matching software](#).

### 6: Student Responsibility

6a  **Workload**

The amount of time you will need to spend on study in this unit will depend on a number of factors including your prior knowledge, learning skill level and learning style. Nevertheless, in planning your time commitments you should note that for a 3cp unit the total notional workload over the semester or term is assumed to be 150 hours. These hours include time spent in classes. The total workload for units of different credit point value should vary proportionally. For example, for a 6cp unit the total notional workload over a semester or term is assumed to be 300 hours.

6b  **Inclusion and Welfare**

Students who need assistance in undertaking the unit because of disability or other circumstances should inform their Unit Convenor or [Inclusion and Welfare](#) as soon as possible so the necessary arrangements can be made.

6c  **Participation requirements**

Attendance and active participation in all scheduled laboratory classes (Labs 1-8) is compulsory. In the case of illness, medical or counselling certificates must be presented to the unit convenor for every missed laboratory class to avoid penalty. Students who possess a
medical or counselling certificate will be required to obtain raw data from the missed lab from another student, and complete the lab exercises or lab report requirements as if they had attended the relevant lab class missed.

Attendance at lectures is recommended but not compulsory. Lecture outlines will be available through the unit website. These notes are not a substitute for attending lectures or reading the prescribed textbook.

6d **Withdrawal**

If you are planning to withdraw please discuss with your unit convenor. Please see Withdrawal of Units for further information on deadlines.

6e **Required IT skills**

Basic knowledge of word processing software.

6f **In-Unit Costs**

Besides the purchasing of the Laboratory Manual, there are no specific costs associated with this unit.

(Note: To calculate your unit fees see: How do I calculate my fees?. The online UC Co-op Textbook Search is available for purchasing text books.)

6g **Work placements, internships or practicums**

Learning in this unit will be integrally linked to experiences in professional contexts.

6h **Additional information**

Potentially hazardous materials will be used as part of this unit. Risk assessments have been performed and control measures implemented to manage hazards and risks. Students have an obligation to comply with any safety directions issued by staff and to inform staff if incidents of a potentially hazardous nature occur. With respect to chemicals, staff will provide students with access to Material Safety Data Sheets.

It is essential that students be alerted to the potential danger of chemicals to which they may be sensitive. For example, if they should experience symptoms such as dizziness, headaches, a dry or sore throat, stinging or burning sensation in their eyes, fatigue or loss of concentration, students must inform their tutor and leave the laboratory immediately. Students may need to go to the University Health Centre if symptoms persist.

In all cases of absence, sickness or personal problems it is the student’s responsibility to ensure that the unit convenor is informed. The minimum participation requirement must be met in order to pass the unit (regardless of supporting documentation).
7: **Student Feedback**

All students enrolled in this unit will have an opportunity to provide anonymous feedback on the unit at the end of the Semester via the Unit Satisfaction Survey (USS) which you can access by logging into MyUC via the UC homepage: [http://www.canberra.edu.au/home/](http://www.canberra.edu.au/home/). Your lecturer or tutor may also invite you to provide more detailed feedback on their teaching through an anonymous questionnaire.

As a result of student feedback, the following changes have recently been made to the unit:

(i) Increased access to laboratory equipment
(ii) Further details of the grading scheme used for lab exercises

8: **Authority of this Unit Outline**

Any change to the information contained in Section 2 (Academic content), and Section 5 (Assessment) of this document, will only be made by the Unit Convener if the written agreement of Head of Discipline and a majority of students has been obtained; and if written advice of the change is then provided on the unit site in the learning management system. If this is not possible, written advice of the change must be then forwarded to each student enrolled in the unit at their registered term address. Any individual student who believes him/herself to be disadvantaged by a change is encouraged to discuss the matter with the Unit Convener.