Unit Outline 2010
Faculty of Applied Science

Concepts in Biology
0483
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.

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1:  **General Information**

1a  Unit title: Concepts in Biology

1b  Unit number: 0483

1c  Semester and year offered: Semester 1, 2010

1d  Credit point value: 3 cp

1e  Unit level: Level 1

1f  Name of Unit Convener and contact details (including telephone and email)  
Jim Woolnough:  [jim.woolnough@canberra.edu.au](mailto:jim.woolnough@canberra.edu.au), 6201 2259, Room 3B22

1g  Administrative contact details (including name, location, telephone and email)  
Janet Palmer-Allen:  [Janet.Palmer-Allen@canberra.edu.au](mailto:Janet.Palmer-Allen@canberra.edu.au), 02 6201 5785, Room 3C50  
**Deputy Director, Science Resource Centre**: Imi Moore, 62012298,  
imi.moore@canberra.edu.au

Technical support for the laboratory classes is provided by Patrick Ceeney. Patrick is available in Room 3A35a, phone 6201 2508 and via email at [patrick.ceeney@canberra.edu.au](mailto:patrick.ceeney@canberra.edu.au). He will post a time schedule on his door and will be available during office hours as posted for questions regarding laboratory facilities and lockers.
2: Academic Content

2a Unit description and learning outcomes

**Unit Description:** Biology is the study of life and is concerned with the structure, function, interactions and evolution of organisms. The complexity and diversity of the living world is immense; even a single cell of the simplest organism is incredibly intricate and there are at least several million different species. Underlying this diversity, are processes of metabolism, reproduction, inheritance and evolution that are exhibited by all forms of life. *Concepts in Biology* introduces these basic processes and uses them to provide a conceptual framework for understanding humans and the living world.

In recent years our knowledge of the living world has increased rapidly. Biology is playing an increasingly important role in our society. An understanding of the concepts of biology will enable you to make more informed decisions about issues such as those related to medicine, your own body, food production, education, pollution, conservation and genetic engineering. We hope that you will be encouraged to engage in the processes of science by asking questions about biological phenomenon and to critically analyse the scientific ideas presented to you. You should expect that your understanding of the world will begin to change as you increase your knowledge and understanding of the concepts in biology.

**Syllabus:** *Concepts in Biology* introduces many of the basic processes exhibited by living organisms. It offers an in-depth introduction to biology and serves as a foundation for later studies in areas related to human biology, ecology and the environmental sciences. The unit examines the characteristics of living organisms, the chemical basis of life and the structure of cells; energy flow and metabolism; information storage and gene expression; reproduction and inheritance; and evolution. Emphasis is placed on concepts, underlying processes and interrelationships among different levels of organisation in biology. The level of instruction assumes a prior knowledge of biology as presented in Year 10 general biology classes, an inquiring mind, a willingness to think outside the square, and a commitment to work hard.

**Learning outcomes:** Students who have successfully completed *Concepts in Biology* should be able to;

1. apply knowledge of basic concepts in the areas of cellular function, metabolism, genetics and evolution to interpret biological phenomena;
2. collect, record, analyse and interpret biological data related to these concepts and communicate these interpretations both in writing and orally; and
3. design and conduct experiments which examine some of these concepts.

2b Generic skills

Students who have successfully completed *Concepts in Biology*, should have developed further the following University’s expected **generic skills**: (see general comment on generic skills)

(i) express knowledge, ideas and opinions in their professional field, both orally and in written form, with confidence and clarity – assessed in all Assessments.
(ii) present arguments and ideas effectively - assessed in Reports in Assessments 1 & 2.
(iii) actively listen and respond to the ideas of other people – experienced in the Symposium which contributes to Assessment 2.
(iv) locate, identify, collate, analyse, manipulate, evaluate, interpret and present information and numerical data – assessed in Assessment 2.
(v) select and use appropriate information and communication technology to retrieve, manipulate and present information – assessed Assessment 2.
(vi) apply appropriate problem solving processes, arguments, critical and creative thinking – experienced in laboratory exercises, assessed in Assessment 2.
(vii) work with others as part of a group – experienced throughout the laboratory classes and contributes to assessment in Assessments 1 & 2.
(viii) take responsibility for carrying out agreed tasks – assessed in Assessments 1 & 2.
(ix) be aware of different roles and responsibilities of group members – experienced through laboratory classes.
(x) evaluate group performance – experienced in Symposium, which contributes to Assessment 2.
(xi) respect the rights of others irrespective of their cultural background, race or gender – experienced through laboratory classes.
(xii) have confidence to challenge existing ideas – experienced in Drosophila project.
(xiii) be confident in themselves and their own skills and knowledge – developed throughout unit, with support in these specific areas provided through the SRC as required.

2c  Prerequisites and/or co-requisites
None.

3:  Delivery of Unit and Timetable

3a  Delivery mode
There will be up to 35 one-hour lectures and 13 three-hour laboratory classes. The dates of the lectures and laboratory classes are shown in the timetable below. Lectures will often take the form of interactive sessions where you will be expected to engage in a variety of activities designed to explore your understanding of the required reading. It is essential, therefore, that you study the relevant topics before attending the lectures. You should prepare for lectures and laboratory classes using the unit handbook as well as questions and exercises on the Moodle site, in the textbook and the textbook linked website (Mastering Biology).

The laboratory classes will take the form of inquiry-based learning within a framework of experimental research, problem solving and discussions. Students will be divided into groups with a tutor for each group. You will be assigned to a tutor during your first class and you are expected to stay with this tutorial group for the rest of the semester.

<table>
<thead>
<tr>
<th>Classes</th>
<th>Day</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture 1</td>
<td>Monday</td>
<td>10:30-11:20 am</td>
<td>14B1</td>
</tr>
<tr>
<td>Lecture 2</td>
<td>Monday</td>
<td>2:30-3:20 pm</td>
<td>14B1</td>
</tr>
<tr>
<td>Lecture 3</td>
<td>Friday</td>
<td>10:30-11:20 pm</td>
<td>14B1</td>
</tr>
<tr>
<td>Laboratory Classes</td>
<td>Monday</td>
<td>3:30-6:30</td>
<td>3B11</td>
</tr>
<tr>
<td>Classes 1/week as</td>
<td>Tuesday</td>
<td>9:30-12:20; 1:30-4:20</td>
<td></td>
</tr>
<tr>
<td>assigned</td>
<td>Wednesday</td>
<td>9:30-12:20; 2:30-5:20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Thursday</td>
<td>9:30-12:20; 1:30-4:20</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>5:30-8:30</td>
<td></td>
</tr>
</tbody>
</table>

**Extra Tutorials:** Students who experience difficulty understanding the unit material or who have not studied science or biology for some time are strongly encouraged to participate in the **Extra Tutorial Program** run through the **Science Resource Centre**. This program is subsidised by the Faculty of Science and covers at least 3 hours of extra tutorials per week for all 13 weeks of semester. Tutorial times will be posted on Moodle and in the Science Resource Centre (3A36). In these sessions you will work in small groups with a student tutor who has recently completed Concepts in Biology.

**Animal Experimentation:** This unit does not involve any animal dissection but it will involve experiments with the vinegar fly, *Drosophila melanogaster*. During some laboratories you will be required to examine dead vinegar flies, and animal cells under a microscope as well as other live animals.
### Timetable of activities, such as lectures/ tutorials/ practicals/ field classes, showing key dates and topics

<table>
<thead>
<tr>
<th>Week</th>
<th>Activity</th>
</tr>
</thead>
</table>
| 1 8–12 Feb | L1 – Introduction to the Unit - (Introductory Chapter) Jim Woolnough  
L2 – Intro to Biology (& arthropod world) - (Introductory Chapter) – Imi Moore  
L3 – What is a Living Thing? Imi Moore  
Lab – Laboratory Techniques, Microscopes. Introduction to the *D. melanogaster* Experiment |
| 2 15-19 Feb | L1 – Intro to Drosophila Jim Woolnough  
L2 – Intro to Cell Theory (Chapter 4) - Jim Woolnough  
L3 – Water, the Medium of Life (Chapter 1) – Jim Woolnough  
Lab – *D. melanogaster* Experiment, Intro to mutant flies, (trait and cross Parent generation) |
| 3 22-26 Feb | L1 – Structure and Function of Molecules (Chapter 2) – Jim Woolnough  
L2 – Carbohydrates (Chapter 2) – Jim Woolnough  
L3 – Lipids (Chapter 2) – Jim Woolnough  
Lab – Microscopy (dissecting, transmission, and electron micrograph interpretation) |
| 4 1-5 Mar | L1 – Proteins and Nucleic Acids (Chapter 2) – Jim Woolnough  
L2 – Functioning Cells (Chapter 4) – Jim Woolnough  
L3 – Cell Membranes (Chapter 4) – Jim Woolnough  
Lab – Chemistry of Life (*Laboratory Assessment 1 due 9 am TUESDAY 9th March*) |
| 5 8-12 Mar | L1* – Canberra Day: No Lectures  
L2* – Canberra Day: No Lectures  
L3 – The Energy of Life (Chapter 3) – Jim Woolnough  
Lab – *D. melanogaster* Experiment (trait F1 generation) |
| 6 15-19 Mar | L1 – Enzymes (Chapter 3) – Jim Woolnough  
L2 – Introduction to Metabolism (Chapter 3) – Jim Woolnough  
L3 – TBA (Possible catch up lecture).  
Lab – Osmosis (*Laboratory Assessment 2 due 9 am Tuesday 23rd March*) |
| 7 22-26 Mar | L1 – Cellular processes: Photosynthesis & Respiration I (Chapter 6) – Jim Woolnough  
L2 – Cellular processes: Photosynthesis & Respiration II (Chapter 6) – Jim Woolnough  
L3 – MID SEMESTER TEST (Knox Chapters 1 – 4)  
Lab – *D. melanogaster* trait F2’s |
| 8 | CLASS FREE STUDY PERIOD |
| 9 6-9 Apr | L1 – Easter Monday: No Lectures  
L2 – Easter Monday: No Lectures  
L3 – Cell Division (Chapter 8) – Jim Woolnough  
Lab – Photosynthesis. |
| 10 12-16 Apr | L1 - Inheritance I - Inheritance of combinations of genes. (Chapter 9) – Tariq Ezaz  
L2 –Inheritance II - Linkage, crossing, chromosome mapping,(Chapter 9) – Tariq Ezaz  
L3 –DNA Structure and Replication (Chapter 10) – Brett Lidbury  
Lab – Cellular Respiration and Exercise (*Laboratory Report 1 due 9 am MONDAY 11th May*) |
| 11 19-23 Apr | L1 –DNA Function (Chapters 10 and 11) – Brett Lidbury  
L2 –Transcription and Translation (Chapter 11) – Brett Lidbury  
L3 –Genomes (Chapter 13) – Brett Lidbury  
Lab – Cell Division & Inheritance |
| 12 26-30 April | L1* – ANZAC Day: No lecture  
L2* – ANZAC Day: No lecture  
L3 –Mutations (Chapter 13) – Brett Lidbury  
Lab – *D. melanogaster* Symposium  
*D. melanogaster* report due at beginning of lab Week 13 (i.e., 1 week after your symposium) |
| 13 | L1 - Advances in Genetics (Chapter 14) – Brett Lidbury |
### 3-7 May

L2 – Evolving Life & Evidence for Evolution (Chapter 31) – Tariq Ezaz
L3 – Evolution by Natural Selection (Chapter 33) – Tariq Ezaz
Lab - DNA extractions

### 10-14 May

L1 – Genes in Populations (Chapter 33) – Tariq Ezaz
L2 – Theories of Speciation (Chapter 33) – Tariq Ezaz
L3 – From atoms to cells to evolution – Tariq Ezaz

*Lab – No Lab class this week.*

### Exam Period

19 May to 4 June

Final Exam (Knox – All Chapters covered in Lectures and Laboratory Classes)

## 4: Unit Resources

### 4a Lists of required texts/readings

*Biology: An Australian Focus* (4th edition) by B. Knox, P. Ladiges, B. Evans, and R. Saint (2010), McGraw-Hill Publisher. [Copies are also available in the library].

The Concepts in Biology Laboratory Manual will provide material required for lab classes throughout the semester. It is available for purchase through the Coop Bookstore. [It is also available in digital form on the Moodle website].

### 4b Materials and equipment

Classroom Performance System (CPS Pulse) handsets will be provided to each student studying in first year units and the system will be used in several units. The handsets (clickers) will be issued in laboratory classes in Weeks 1 & 2 and will be recorded centrally as a library loan for the year. CPS Pulse is a wireless response system that is a way to assist you in learning interactively. It allows each student to participate directly during lectures and laboratory classes by answering questions and then by comparing their answers to the instant replay of group responses. We will be using the CPS pulse system extensively throughout the semester.

You will need to register your CPS handset (you only need to do this once) at the first lecture you attend in each unit:

Laboratory coats and safety glasses should be worn in laboratories at all times. These will be available for purchase. [Please let us know if this presents any problem for you]. Covered shoes must also be worn at all times in laboratories.

### 4c Unit website

There is a Moodle site for the Unit with online quizzes; information regarding the *D. melanogaster* experiment and other laboratory classes when appropriate; a bulletin board on which announcements are often made to the class; a ‘my grades’ facility that allows you to monitor your marks; and outlines of most lectures. Note that lecture outlines do not provide a complete coverage of lecture material but are meant to aid in note-taking and can be used to determine what will be emphasised in the unit.
## 5: Assessment

### 5a Assessment overview

<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>Addresses generic skill(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Assessments</td>
<td>Weeks 5, 7 &amp; 13.</td>
<td>20%</td>
<td>1 &amp; 2</td>
<td>i, ii, vii, viii, ix, xi.</td>
</tr>
<tr>
<td>Drosophila Project</td>
<td>Week 14.</td>
<td>20%</td>
<td>1, 2, &amp; 3.</td>
<td>All listed in 2b.</td>
</tr>
<tr>
<td>Quizzes and Exams</td>
<td>Weekly, 19 March, Exam period</td>
<td>60%</td>
<td>1</td>
<td>i</td>
</tr>
</tbody>
</table>

### 5b Details of each assessment item

<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>
</tr>
</thead>
<tbody>
<tr>
<td>LABORATORY ASSESSMENTS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Laboratory Assessments &amp; reports.</td>
<td>Written work due in Weeks 5, 7 and 13.</td>
<td>20%</td>
</tr>
<tr>
<td>NOTE: These items may contain integrative questions that require concepts from previous laboratory classes. Participation includes both laboratory and clicker participation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drosophila PROJECT:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data made available to whole class</td>
<td>Week 9.</td>
<td></td>
</tr>
<tr>
<td><em>D. melanogaster</em> Symposium - Group Discussion of results to help support your own analysis and reporting.</td>
<td>Week 12 during your normal laboratory class time.</td>
<td></td>
</tr>
<tr>
<td>2. Individual Report</td>
<td>Due at the start of your laboratory class in week 14</td>
<td>20%</td>
</tr>
<tr>
<td>EXAMS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a. Weekly quizzes (*Moodle and clickers).</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>3b. **Mid-semester exam: Chp. 1-4</td>
<td>Friday 19 March: <strong>10:30-11:20</strong> in the usual lecture theatre</td>
<td>20%</td>
</tr>
<tr>
<td>3c. <strong>Final exam: Chp. 1-6, 8-11, 13, 14, 31, 33</strong></td>
<td>14B1.Exam Period (TBA).</td>
<td>30%</td>
</tr>
</tbody>
</table>

*The weekly quiz will open each Friday and will contain questions relating to theory covered in the previous week and to the laboratory activity being covered in the following week. Short quizzes using the clickers will occur from time to time during lectures. (The best 50% of quiz results will be used, so as not to penalise students who have to miss some quizzes).

** Both exams may include questions related to your laboratory work. **You may bring your lab diary into each exam.**
5c **Special assessment requirements**
Students must achieve 50% on aggregate or higher to pass this unit. Dictionaries and calculators are not permitted in examinations. No late submissions are permitted except by negotiation with presentation of appropriate documentation. If late submission is approved by the unit convener there will be no late submission penalty.

5d **Supplementary assessment**
Not offered in this unit.

5e **Academic Integrity**
Students should 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 which contravene academic values.

5f **Text-matching software**
None

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 **Special needs**
Students who need assistance in undertaking the unit because of disability or other circumstances should inform their Unit Convener or UC AccessAbility (formerly the Disabilities Office) as soon as possible so the necessary arrangements can be made.

6c **Attendance requirements**
**Attendance and participation in group activities and laboratory classes is a compulsory condition of this unit.** In the event that you cannot attend your assigned laboratory class due to illness or unavoidable commitments and you wish to make up the lab, contact the unit convenor as soon as possible so that an alternative session can be arranged later in the week. You will need to provide the unit convenor with a medical or counsellor's certificate or a letter from your employer to be permitted into an alternate laboratory class. In some cases, it is possible to do a make-up lab at a later date.

If you have to miss an examination because of illness or personal problems, you must submit a medical or counsellor's certificate to the unit convenor as soon as possible once you are well. If possible, please contact the unit convenor by email or phone PRIOR to the exam so that you are not disadvantaged in any way and we can make alternative arrangements in a timely fashion.

In all cases of absence, sickness or personal problems the onus is on you to ensure that the unit convenor is informed. If you feel that any problems are interfering with your work please let the unit convenor know. We will do our best to help you get the most out of *Concepts in Biology* and University life in general. Furthermore, the University has extensive counselling services that are available free of charge to all students. These are found in the Health and Counselling Centre (Room: 1B124, phone: 6 201–2351). The Centre offers help and advice in...
areas such as relaxation, financial and personal problems. The Study Skills unit (Room 1B26, phone: 6 201–2361) offers help, advice and extra courses on effective study skills and general course guidance.

If you have a serious dispute with the School or with the University there are a number of experienced mediators who are available to help. Details of how to use this facility are available from your Division Student Information Office or the Student Association. For any conflicts regarding the Concepts in Biology unit, please feel free to discuss your concerns with the unit convenor.

6d Withdrawal
If you are planning to withdraw please discuss with your unit convenor. Please see this link for further information on deadlines.

6e Required IT skills
Familiarity with Microsoft Office software Word, Excel and PowerPoint or equivalent is necessary.

6f Costs
None

6g Work Integrated Learning
Not applicable

6h Additional information
Most information relevant to the unit will be posted on the Moodle website or be included in the Concepts in Biology Laboratory Manual.

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 will be presented to you on OSIS. Your lecturer or tutor may also invite you to provide more detailed feedback on their teaching through an anonymous in-class questionnaire administered through the University’s Teaching and Learning Centre (TLC).

In response to feedback received in 2009 a Laboratory Manual has been introduced for the unit, bringing together all the laboratory materials in one document.

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 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.