School of Biological Sciences

BIOL332: Ecological and Evolutionary Physiology

Subject Outline
Autumn, 2015
On-Campus
Wollongong

Subject Information
Credit Points: 8
Pre-requisite(s): BIOL103 and BIOL105
Co-requisite(s): Nil
Restrictions: Nil
Contact Hours: 2h lectures per week, 2h practical (most weeks), 1h tutorial (most weeks)

Subject Contacts
Subject Coordinator/Lecturer
Name: Prof Sharon Robinson
Location: Building 15, Room G14
Telephone: 61 2 4221 5753
Email: sharon_robinson@uow.edu.au
Consultation mode and times: Email for appointment

Lecturer/Demonstrator/Tutor
Name: Dr Adam Munn
Location: Building 35, Room G10A
Telephone: 61 2 4221 4459
Email: adam_munn@uow.edu.au
Consultation mode and times: Email for appointment

Student Support and Advice
For general enquiries please contact the Student Centre:
Location: 41.152
Telephone: 61 2 4221 3492
Email: smah-students@uow.edu.au
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Section A: General Information

Subject Learning Outcomes

<table>
<thead>
<tr>
<th>On completion of this subject, students should be able to:</th>
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<tbody>
<tr>
<td>a) Understand the physiological and biochemical responses of animals and plants to environmental variation</td>
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<tr>
<td>b) Identify how marine, aquatic &amp; terrestrial environments select for biochemical and physiological adaptations in animals and plants</td>
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<td>c) Explain aspects of the evolution of biochemical and physiological processes in organisms</td>
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<td>d) Understand the influence of size and phylogeny in animal energetics</td>
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<tr>
<td>e) Complete an experiment to answer a specific physiological question</td>
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<tr>
<td>f) Analyse physiological data in an appropriate manner and present these effectively in both written and lecture formats</td>
</tr>
<tr>
<td>g) Appreciate the use of computers for data logging and analysis</td>
</tr>
<tr>
<td>h) Show concern for accuracy, precision, honesty and respect for organisms under study</td>
</tr>
<tr>
<td>i) Show concern for the safety and welfare of others in the lab (OH&amp;S awareness)</td>
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<tr>
<td>j) Critically evaluate information sources</td>
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<tr>
<td>k) Work in a group towards a common goal</td>
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</table>

Subject Description

Physiological and biochemical characterisation of organisms in relation to size, metabolic intensity, and response to environmental variables. Physiological responses of plants and animals to variations in light intensity, spectral quality and temperature, solar radiation, temperature, gas composition, and pressure. Evolution of aerobic metabolism, aerobic capacity and endothermy. Physiological processes associated with phenotypic plasticity and adaptive traits. Physiological correlates of life-history variation. This subject may involve the use of animals, animal tissues or animal-derived products in order to achieve specific learning objectives.

Graduate Qualities

The University of Wollongong has developed five graduate qualities (http://www.uow.edu.au/student/qualities/index.html), which it considers express valuable qualities that are essential for UOW graduates in gaining employment and making an important contribution to society and their chosen field. Student development of the following graduate qualities will be enhanced by their participation in this subject:

1. **Informed**: Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.
2. **Independent learners**: Engage with new ideas and ways of thinking and critically analyse issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.
3. **Problem solvers**: Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.
4. **Effective communicators**: Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings. Recognise how culture can shape communication.
5. **Responsible**: Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.

eLearning Space

This subject has materials and activities available via eLearning. To access eLearning you must have a UOW user account name and password, and be enrolled in the subject. eLearning is accessed via
SOLS (student online services). Log on to SOLS and then click on the eLearning link in the menu column. For information regarding the eLearning spaces please use the following link: http://uowblogs.com/moodlelab/files/2013/05/Moodle_StudentGuide-1petpo7.pdf

Lecture, Tutorial, Laboratory Times
All timetable information is subject to variation. Check the latest information on the university web timetable via the Timetable link under Study Resources on the Current Students webpage or log into SOLS to view your personal timetable prior to attending classes.

Readings, References and Materials

Textbooks
The following text(s) will need to be purchased by students enrolled in this class.
Nil

Prescribed Readings
Nil

Materials
Dissection Kit
Laboratory Coat

Recommended Readings (includes eReadings)
There are a number of text chapters and articles that are required reading for this subject (see below), but students are not expected to purchase these. They are available to students through the library on the subjects eLearning site. The appropriate sections will be highlighted during classes.

Recommended readings are not intended as an exhaustive list, students should use the Library catalogue and databases to locate additional resources. You are expected to use more than these books and to find and use both review articles as well as the primary scientific literature (i.e. scientific research papers) in your assignments. A reference list of articles related to each practical will be made available through eLearning. You should also use the library database searches to find information on your research paper topic and current literature related to it.

Library: http://www.library.uow.edu.au/

Ask our friendly librarians for help with your research, in the library or on line: http://www.library.uow.edu.au/helptraining/index.html

Reference Texts:


Moyes, C.D. and Schulte, P.M. (2008) Principles of animal physiology. 2nd Ed. Benjamin Cummings,
London.


General Comparative Physiology Books:


More Specialised Books:


Writing about Biology: These books will help you to write better reports etc.
and Company, Sunderland, USA.) (808.06657/2).


Lindsay, D. 1995, A guide to scientific writing. 2nd Ed. Longman, Melbourne Australia.

Recent Changes to this Subject
i. Update to subject assessment tasks

Ethical Objection to the Use of Animal and Animal Products
In order to achieve specific learning objectives, the use of animals, animal tissues, and or animal-derived products (such as sera) is inherent and unavoidable. Students with conscientious objections to this use should not enrol in this subject.

Students who intend to avoid a particular learning activity on the basis of conscientious objection should notify the subject coordinator in writing as soon as possible and not later than the end of Week 1 of the session. Students who do not participate in a particular learning activity are required to complete an alternative exercise (a CD-ROM is available) or attend the practical and “observe”. The material involved is examinable and the prac must be written up and completed in your workbook. For further information, refer to http://www.uow.edu.au/about/policy/UOW058708.html

Laboratory Safety Guidelines
The rules below are general rules that are required in laboratories.

• Before commencing your project you are to ensure that you understand specific procedures for the laboratory in which you work.
• You will need to fill out a risk assessment form before commencing any experiments (confer with your supervisor).
• Never use any equipment or attempt any experiment without checking the safety implications with your supervisor or experienced delegated laboratory worker.
• Undergraduate students are not permitted to work after hours unless there is appropriate approval and supervision.

List of Topics Covered
The following are examples of the topics to be covered in this course. This is not an exhaustive list and will be subject to change.

Lecture Topics
• Plants, pigments and light
• Gas Exchange & Measuring Photosynthesis
• Introduction to chlorophyll fluorescence
• Do plants need sunscreens
• Plants & temperature stress
• Plants in warm places (C4)
• Plants in hot, dry places (CAM)
• Plants in the understory (sunflecks)
• Plants in a changing climate
• Plants, UV radiation & the ozone hole
• Hot Plants
• Animal physiological ecology – what is it?
• Energetics and respiration
• Scaling in biology – are there universal biological laws?
• Temperature: endothermy and ectothermy
• Digestion
• Water metabolism
• Locomotion
• Phenotypic plasticity
• Applied animal physiology
Section B: Assessment

Assessment Summary

<table>
<thead>
<tr>
<th>Assessment Item</th>
<th>Form of Assessment</th>
<th>Due Date</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>Mini Report 1</td>
<td>15th April, 2015 (by 11.59pm)</td>
<td>12.5%</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Mid-session Quiz</td>
<td>30th April, 2015 (during lecture time)</td>
<td>25%</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Mini Report 2</td>
<td>4th May, 2015 (by 11.59 pm)</td>
<td>12.5%</td>
</tr>
<tr>
<td>Assessment 4</td>
<td>Group Presentation</td>
<td>21st May, 2015 during prac</td>
<td>10%</td>
</tr>
<tr>
<td>Assessment 5</td>
<td>Final Examination</td>
<td>During exam period</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Details of Assessment Tasks

Assessment tasks will be marked using explicit criteria that will be provided to students prior to submission.

**Assessment 1**
- Mini Report 1
- **Due date**: 15th April, 2015 (by 11.59pm)
- **Weighting**: 12.5%
- **Submission**: Submit an electronic copy of your assessments via upload to eLearning
- **Type of Collaboration**: Individual Assessment
- **Length**: TBA
- **Style and format**: Report

**Assessment 2**
- Mid-session Quiz
- **Due date**: 30th April, 2015 (during lecture time)
- **Weighting**: 25%
- **Submission**: Submit a hardcopy of your assessment to your lecturer in class.
- **Type of Collaboration**: Individual Assessment
- **Length**: 90mins
- **Details**: Part A: Essay type questions answer 1/2. Worth 9 marks each.
  Part B: Short answer questions answer 4/5. Worth 4 marks each.
- **Style and format**: In-class test

**Assessment 3**
- Mini Report 2
- **Due date**: 4th May, 2015 (by 11.59 pm)
- **Weighting**: 12.5%
- **Submission**: Submit an electronic copy of your assessments via upload to eLearning
- **Type of Collaboration**: Individual Assessment
- **Length**: TBA
- **Style and format**: Report

**Assessment 4**
- Group Presentation
- **Due date**: 21st May, 2015 (during prac)
- **Weighting**: 10%
- **Submission**: Present to group
- **Type of Collaboration**: Group Project
- **Length**: 5 min group presentation based on an Applied Physiology paper
- **Style and format**: Presentation
- **Marking Criteria**: (Peer and lecturer marked)
Assessment 5  
Final Examination  
Due date  
During exam period  
Weighting  
40%  
Submission  
Exam papers and answers must be submitted at the conclusion of the exam.  
Type of Collaboration  
Individual Assessment  
Length  
See below  
Details  
Practical Part A: Answer all 4 short answer questions. Worth 4 marks each.  
Theory Part B: Essay type questions answer 1/2. Worth 8 marks each.  
Theory Part C: Short answer questions answer 4/5. Worth 4 marks each.  
Style and format  
Final Exam

Minimum Requirements for a Pass in this Subject
To receive a clear pass in this subject a total mark of 50% or more must be achieved. In addition, failure to meet any of the minimum performance requirements is grounds for awarding a Technical Fail (TF) in the subject, even where total marks accumulated are greater than 50%.

The minimum performance requirements for this subject are:

- Obtain a grade of 45% or higher on the final examination

Minimum Student Attendance and Participation
It is expected that students will allocate 16 hours per week to this subject, including any required class attendance, completion of prescribed readings and assessment tasks.

Student attendance at tutorials, practicals, seminars and/or simulations is not compulsory but is strongly recommended.

Scaling
Scaling may occur in this subject at the end of session by the Unit Assessment Committee and/or Faculty Assessment Committee (FAC). Marks will only be scaled to ensure fairness/parity of marking across groups of students. Scaling will not affect any individual student’s rank order within their cohort. For more information refer to Assessment Guidelines – Scaling: http://www.uow.edu.au/about/policy/UOW058609.html

Late Submission
Late submission of an assessment task without an approved extension of the deadline is not acceptable. If you are unable to submit an assessment due to extenuating circumstances (e.g. medical grounds or compassionate grounds), you can make an application of academic consideration. Not all circumstances qualify for academic consideration. For further details about applying for academic consideration visit the Student Central webpage: http://www.uow.edu.au/student/central/academicconsideration/index.html

Late Submission Penalty
Late submission of an assessment task without an approved extension of the deadline is not acceptable. Marks will be deducted for late submission at the rate of 10% of the total possible marks for that particular assessment task per day. This means that if a piece of work is marked out of 100, then the late penalty will be 10 marks per day (10% of 100 possible marks per day). The formula for calculating the late penalty is the total possible marks x 0.10 x number of days late. For the purposes of this policy a weekend (Saturday and Sunday) will be regarded as two days.

No marks will be awarded for work submitted after the assessment has been returned to the students.
Supplementary Assessments
Supplementary assessment may be offered to students whose performance in this subject is close to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of supplementary assessment will be determined at the time the offer of a supplementary assessment is made.

Students can log on to SOLS and click on the link titled “Supplementary Assessment” to view any applicable offers. Additional information on supplementary assessments is available at: http://www.uow.edu.au/student/exams/suppassess/index.html

System of Referencing Used for Written Work
The Author-Date (Harvard) referencing system should, unless otherwise specified for a particular assessment (check Details of Assessment Tasks), be utilised. A summary of the Harvard system can be accessed on the Library website at: http://public01.library.uow.edu.au/refcite/style-guides/html/

Use of Internet Sources
Students are able to use the Internet to access the most current information on relevant topics and information. Internet sources should only be used after careful critical analysis of the currency of the information, the role and standing of the sponsoring institution, reputation and credentials of the author, the clarity of the information and the extent to which the information can be supported or ratified by other authoritative sources.

Plagiarism
The full policy on Academic Integrity and Plagiarism is found in the Policy Directory on the UOW website.

"The University's Academic Integrity and Plagiarism Policy, Faculty Handbooks and subject guides clearly set out the University's expectation that students submit only their own original work for assessment and avoid plagiarising the work of others or cheating. Re-using any of your own work (either in part or in full) which you have submitted previously for assessment is not permitted without appropriate acknowledgement. Plagiarism can be detected and has led to students being expelled from the University.

The use by students of any website that provides access to essays or other assessment items (sometimes marketed as 'resources'), is extremely unwise. Students who provide an assessment item (or provide access to an assessment item) to others, either directly or indirectly (for example by uploading an assessment item to a website) are considered by the university to be intentionally or recklessly helping other students to cheat. This is considered academic misconduct and students place themselves at risk of being expelled from the University."

Submission of Assessments
Refer to the submission requirements under the details of the individual assessments. Students should ensure that they receive a receipt/evidence acknowledging assessment submission. Students will be required to produce this in the event that an assessment task is considered to be lost. Students are also expected to keep a copy of all their submitted assignments in the event that re-submission is required.

Assessment Return
Students will be notified when they are able to view their marked assessment. In accordance with University Policy marked assignments will usually only be held for 21 days after the declaration of marks for that assignment.
Section C: General Advice

Students should refer to the Faculty of Science, Medicine and Health website for information on policies, learning and support services and other general advice.

University Policies

Students should be familiar with the following University policies:

a. Code of Practice – Teaching and Assessment

b. Code of Practice – Research, where relevant

c. Code of Practice – Honours, where relevant

d. Student Charter

e. Code of Practice – Student Professional Experience, where relevant

f. Academic Integrity and Plagiarism Policy

g. Student Academic Consideration Policy

h. Course Progress Policy

i. Graduate Qualities Policy

j. Academic Grievance Policy (Coursework and Honours Students)

k. Policy and Guidelines on Non-Discriminatory Language Practice and Presentation

l. Workplace Health and Safety, where relevant

m. Intellectual Property Policy

n. IP Student Assessment of Intellectual Property Policy, where relevant

o. Policy on Ethical Objection by Students to the Use of Animal and Animal Products in Coursework Subjects, where relevant

p. Human Research Ethics Guidelines, where relevant

q. Animal Research Guidelines, where relevant
r. Student Conduct Rules and accompanying Procedures or Research Misconduct Policy for research students

Student Support Services and Facilities
Students can access information on student support services and facilities at the following link. This includes information on “Academic Support”, “Starting at University”, “Help at University” as well as information and support on “Career’s and Jobs”. http://www.uow.edu.au/student/services/index.html

Student Etiquette
Guidelines on the use of email to contact teaching staff, mobile phone use in class and information on the university guide to eLearning ‘Netiquette’ can be found at http://www.uow.edu.au/student/elearning/netiquette/index.html

Version Control Table

<table>
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<tr>
<th>Version Control</th>
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<th>Author/Reviewer</th>
<th>Approved By</th>
<th>Amendment</th>
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<tr>
<td>1</td>
<td>20150123</td>
<td>Prof Sharon Robinson Subject Coordinator</td>
<td>Ashleigh Rae ADE Nominee</td>
<td>Final BIOL332 Autumn 2015 outline.</td>
</tr>
</tbody>
</table>