BIOL605

Organismal Biology

S1 Day 2017

Dept of Biological Sciences

Contents

General Information

Unit convenor and teaching staff
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Credit points
4

Prerequisites
Admission to MBiotech or MConsBiol or GradDipConsBiol or GradCertConsBiol or MSc

Corequisites

Co-badged status
BIOL228

Unit description
This unit explores the biological diversity of plants and animals. Relationships between structure and function are emphasised. The unit also discusses how organisms have adapted to specific environments. There is a heavy emphasis on evolutionary processes and how these have generated biological diversity. A comparative approach is taken, with adaptation discussed in the context of evolutionary trees and the fossil record. The unit is suitable for students interested in organismal biology, science education, and research.

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:

1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of

organisms

2. Give examples of individual organisms that belong to the major animal and plant groups
3. Identify the key anatomical traits used to define major groups
4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
5. Analyse experimental findings and present them in the format of a scientific report
6. Critically evaluate information from the scientific literature

General Assessment Information

Weekly Assessment (25%)

Your progress will be tracked on a weekly basis by means of a 20-question online quiz. Content from the lectures, textbook, and practicals will be covered. Because the unit is rich on information, if you do not study on a regular basis your grades will be impacted.

Lectures in this unit are based on both the textbook and primary scientific literature. You will be expected to learn fundamental concepts in organismal biology such as the intellectual basis of phylogenetics and taxonomy, the causes and consequences of adaptive radiations and mass extinctions, and the functional roles of anatomical structures. You will also learn a considerable amount of specific detail concerning the names, relationships, evolutionary histories, and key anatomical adaptations of major taxonomic groups such as phyla, classes, and orders.

Practical work constitutes a large proportion of the unit, and the weekly prac sessions are intended to lead on from the lecture. All prac sessions will be up to 3 hours in duration. The prac sessions will held in E8A 160 on Wednesdays, Thursdays, and Fridays. Students are expected to attend the prac session every single week, and you must attend at least six pracs to pass the unit. If you attend fewer, you will automatically be failed.

Note that there are no pracs during weeks 1, 7, 12, and 13.

Literature Analysis (20%)

The 1500 word Literature Analysis will provide an opportunity to read and evaluate recently published scientific papers that will be assigned to you. You will have to discuss their strengths and weaknesses in a short and succinct manner in your own words. This task will allow you to become familiar with the primary way scientists communicate their ideas.

A Turnitin link for the assignment will be made available on iLearn early during the semester. Hard copies may not be submitted. An announcement will be made once the detailed instructions have been released, including the list of papers to be analysed.

Do not simply summarise each paper. Any copied words, no matter how few, must be placed in quotation marks. If you copy anything without attribution or without using quotation marks you will not receive credit for the relevant parts of the assignment. If you have copied without attribution, then depending on the severity of the case you may be reported to the Faculty Student Administration Manager, in accord with the Academic Honesty Procedure (see the Policies and

Procedures section).

You may want to consult the short, simple volume by W. Strunk and E.B. White called The Elements of Style.

Marks will be allotted for the following:

• Scientific evaluation (50%): Organisation and coherence of the text, factual correctness, discussion of citations, and clarity and justification of the overall assessment. You must present your own arguments in your own words and they must be grounded in the references.

• Adherence to the 1500 word limit (10%): Marks will be deducted for going either under or over the limit by 10%.

• Presentation (30%): Spelling, grammar, conciseness, and sensible use of subheadings. Use 12 point font and double space the text. 30%

• References (10%): Matching of citations to the text and the alphabetical ordering, formatting, and completeness of the references. You must use the Harvard Referencing Style. Numbering of references in the text and use of footnotes is not allowed.

Practical Report (20%)

The 1000 word Practical Report will be based on data collected during the Skull Allometry exercise during Week 11 (internals) or the second On Campus Session (externals). The report will be due at the end of Week 13. It will be in the format of a real-world scientific research journal article, except that references are not required. As with the Literature Analysis, further details will be announced via iLearn during the semester and a Turnitin link will be provided (no hard copies).

Marks will be allotted for scientific evaluation (50%), adherence to the word limit (10%), and presentation (30%), as discussed in the preceding section. The scientific evaluation marks will consider whether you included enough details regarding data collection and data analysis procedures to allow replicating your analysis. The presentation marks will additionally assess the use of proper, standardised subheadings (Introduction, Data, Methods, Results, Discussion, References). An abstract should not be included.

The assignment must also include a graph showing a scatter plot with a fitted regression line, accompanied by an accurate and informative caption (10%).

Final Examination (35%)

The Final Examination will cover all the major concepts introduced in the unit. It will include multiple choice questions, short answer questions, and essays. Details will be given in the unit's final lecture.

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

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly Assessment	25%	No	each week
Literature Analysis	20%	No	14/04/17
Practical Report	20%	No	09/06/17
Final Examination	35%	No	exam period

Weekly Assessment

Due: **each week**
Weighting: **25%**

20 question quizzes regarding the content of the lectures, textbook, and practicals

On successful completion you will be able to:

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments

Literature Analysis

Due: **14/04/17**
Weighting: **20%**

1500 word written assignment based on provided scientific papers

On successful completion you will be able to:

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 6. Critically evaluate information from the scientific literature

Practical Report

Due: **09/06/17**
Weighting: **20%**

1000 word practical report based on analysis of data collected in Practical 9

On successful completion you will be able to:

- 5. Analyse experimental findings and present them in the format of a scientific report

Final Examination

Due: **exam period**
Weighting: **35%**

Examination based on the contents of the lectures, textbook, and practicals.

On successful completion you will be able to:

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments

Delivery and Resources

Introduction

Welcome to BIOL228 Organismal Biology, a 3 CP unit that explores the diversity of life on Earth. This unit will probe the form and function, classification, and phylogeny of key plant and animal groups.

Prerequisites for this unit are 12 cp at 100 level or above including BIOL114 and BIOL116.

Unit Description

This unit explores the biological diversity of plants and animals. Relationships between structure and function are emphasised. The unit also discusses how organisms have adapted to specific environments. There is a strong emphasis on evolutionary processes and how these have generated biological diversity. A comparative approach is taken, with adaptation discussed in the context of evolutionary trees and the fossil record. The unit is suitable for students interested in organismal biology, science education, and research.

Unit Delivery and Attendance Requirements

Workload: Since BIOL228 is a 3 cp unit, you are expected to spend about 9 hours per week (including face-to-face teaching time) working on this unit for the duration of the semester. Please note that Macquarie University defines a semester as being 15 weeks in duration: 13 weeks of face-to-face teaching plus the two week mid-semester break.

Lectures: There will be two one hour lectures each week. The first will be held every Wednesday at 9:00 AM in W6A T2. The second will be held every Friday at 9:00 AM in W5A T1. They will be recorded live and posted on Echo360 (accessed via the BIOL228 iLearn site). The weekly quizzes will include material from the lectures. Because many of the questions are based on material only presented in the lectures, if you do not attend or view the lectures you may receive poor grades on the quizzes.

See the Unit Schedule for the topics to be covered each week. For the following reasons, it is in your best interests to attend every one of the lectures:

• Lectures are easier to understand if you can see the instructor.

• Attending lectures gives you an opportunity to ask questions.

• You need to prepare every week anyway because of the quizzes, and you might as well not put it off.

• Students who attend lectures regularly tend to perform better than those students who attend lectures infrequently.

• Lecturers very much appreciate interacting with you personally.

Weekly practical laboratory sessions: Each internal student is expected to attend a 3 hour prac session each of nine weeks. Sessions will be held in E8A 160 and will run either from 10:00 AM to 1:00 PM or from 2:00 to 5.00 PM. You must attend at least six pracs to pass the unit.

iLearn: PDFs and recordings of the lectures will be available on iLearn (https://ilearn.mq.edu.au), which is the primary method of communication for this unit. The site is also used for making announcements, answering questions, and uploading assignments via Turnitin links.

Materials: It is recommended that you maintain a notebook to document your work during the practical sessions. A dissecting kit is not required.

Occupational health and safety: Due to OH&S regulations, all students must wear fully enclosed footwear (i.e. no thongs) at all times during practical laboratory sessions. Students without proper footwear will not be allowed to enter the lab. Food and drink may not be consumed in the lab at any time either.

Recommended Reading

The textbook is entitled Organismal Biology, and it has been specially compiled from three sources for use in this unit. Chapter 1 is an introduction to systematics with an emphasis on phylogenetics, and it comes from Raven et al. (2017). Chapers 2 through 10 are on plants and come mostly from Bidlack and Jansky (2014) with one chapter on eukaryotes from Hickman et al. 2015). Chapters 11 through 19 are on invertebrates and come from Hickman et al. Chapter 20 through 25 are on vertebrates and are also from Hickman et al.

It is strongly recommended that you purchase and regularly consult the textbook. The lectures cover the same topics, so the textbook complements them well. Consulting the textbook will help you to prepare for the weekly quizzes that constitute a major part of your grade.

Unit Schedule

Lecture Schedule

	Date	Lecture
1	1 March	Introduction
2	3 March	Biodiversity
3	8 March	Microbes
4	10 March	Plant Evolution
5	15 March	Cyanobacteria
6	17 March	Algae
7	22 March	Mosses and Liverworts
8	24 March	Ferns
9	29 March	Porifera and Cnidaria
10	31 March	Basal Protostomes
11	5 April	Molluscs
12	7 April	Deuterostomes
13	12 April	Marine Arthropods
	14 April	no lecture (Good Friday)
		recess
14	3 May	Gymnosperms
15	5 May	Angiosperms I
16	10 May	Angiosperms II
17	12 May	Angiosperms III
18	17 May	Terrestrial Arthropods
19	19 May	Fishes
20	24 May	Amphibians
21	26 May	Reptiles I
22	31 May	Reptiles II
23	2 June	Mammals

	Date	Lecture
24	7 June	Human Evolution
25	9 June	Summary

Practical Schedule

	Week	Topic
1	2	Plant Evolution
2	3	Algae and Seaweeds
3	4	Mosses, Liverworts, and Ferns
4	5	Invertebrate Body Plans
5	6	Arthropod Diversity
6	8	Leaf Morphology
7	9	Butterflies
8	10	Vertebrate Body Plans
9	11	Skull Allometry

Policies and Procedures

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

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

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

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

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

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

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

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

Student Code of Conduct

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

Results

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

Student Support

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

Learning Skills

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

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

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

Student Enquiries

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

IT Help

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

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

Graduate Capabilities

Creative and Innovative

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

This graduate capability is supported by:

Learning outcomes

- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Literature Analysis
- Practical Report

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Literature Analysis
- Practical Report

Commitment to Continuous Learning

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

This graduate capability is supported by:

Learning outcomes

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Analyse experimental findings and present them in the format of a scientific report

- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Weekly Assessment
- Literature Analysis
- Practical Report
- Final Examination

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Weekly Assessment
- Literature Analysis
- Practical Report
- Final Examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to

have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Weekly Assessment
- Literature Analysis
- Practical Report
- Final Examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Weekly Assessment

- Literature Analysis
- Practical Report
- Final Examination

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- 5. Analyse experimental findings and present them in the format of a scientific report
- 6. Critically evaluate information from the scientific literature

Assessment tasks

- Literature Analysis
- Practical Report