



BIOL368

Evolutionary Ecology

S1 Day 2017

Dept of Biological Sciences

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>General Assessment Information</u>	3
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	8
<u>Graduate Capabilities</u>	9

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General Information

Unit convenor and teaching staff

Unit Convenor

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By appointment

Caitlin Kordis

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Credit points

3

Prerequisites

BIOL227 and BIOL235

Corequisites

Co-badged status

Unit description

This unit explores the big ideas and questions in ecology and evolution. Why are there so many species? How do species that share resources coexist in the same place? Why are some species rare and others abundant? With a strong emphasis on evolutionary processes and trait-based approaches, the unit scrutinises the general principles proposed to govern the abundance, distribution and characteristics of organisms globally. The unit is suitable for students interested in the big-picture of ecology and the current, cutting-edge ideas, theories and research approaches.

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:

Explain how ecological and environmental interactions drive evolution and shape

community structure and ecosystem function

Analyse collected data using various statistical methods in order to evaluate hypotheses

Interpret observations and present them using figures, tables, and text

Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

General Assessment Information

- Attendance at all activities is expected.
- Students must receive a final mark of >50% to pass this subject.
- While activities, data collection and analyses will often be performed in groups, students are required to use their own words in all written assignments.

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly Quizzes	20%	No	Friday 5 pm, weekly
Practical Reports	20%	No	Friday 5pm, weeks 4, 6, 12
Tutorial Participation	10%	No	Every other week
Fieldtrip Exercises	10%	No	During fieldtrip
Final Exam	40%	No	Examination period

Weekly Quizzes

Due: **Friday 5 pm, weekly**

Weighting: **20%**

Each week there will be an online quiz based on that week's lectures and other activities, which will provide a chance for you to practice applying the concepts you have learnt.

On successful completion you will be able to:

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function

Practical Reports

Due: **Friday 5pm, weeks 4, 6, 12**

Weighting: **20%**

You will write up and submit your answers to each of the practicals online, which

will demonstrate that you understood the material covered in the practical. *One page maximum per practical.*

On successful completion you will be able to:

- Analyse collected data using various statistical methods in order to evaluate hypotheses
- Interpret observations and present them using figures, tables, and text

Tutorial Participation

Due: **Every other week**

Weighting: **10%**

You will demonstrate that you have read and understood the tutorial material by participating in class discussion and debate.

On successful completion you will be able to:

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function
- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Fieldtrip Exercises

Due: **During fieldtrip**

Weighting: **10%**

You will use your ecological detective skills to address a series of challenges at the Australian Museum. The team with the most points at the end of the day will win a short-course in taxidermy*.

On successful completion you will be able to:

- Analyse collected data using various statistical methods in order to evaluate hypotheses
- Interpret observations and present them using figures, tables, and text

Final Exam

Due: **Examination period**

Weighting: **40%**

The final exam will be held during the Semester 1 Exam Period and will be 2 hr (plus 10 min reading time). Please consult the University Handbook to determine the commencement and finishing dates of the compulsory exam period. More details on the structure of the final exam will be given closer to the time.

On successful completion you will be able to:

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function
- Interpret observations and present them using figures, tables, and text
- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Delivery and Resources

UNIT SCHEDULE

Weekly contact hours consist of two lectures and one of either a 3-hour practical, 2-hour tutorial OR full-day field trip to the Australian Museum. The schedule is outlined below and will also be available on iLearn.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Weekly required reading is available on iLearn and should be read prior to each weeks' activities.

There is no required textbook. However, the second-year Ecology (BIOL227) textbook contains excellent background from many of the topics covered in this unit. If you don't have a copy, it is available at the library.

- Begon M, Howarth RW, Townsend CR (2014) *Essentials of ecology*. 4th edition. Blackwell Scientific Publications, Cambridge. The 3rd (2008) edition is also acceptable.

UNIT WEBPAGE AND TECHNOLOGY USED AND REQUIRED

Website

Lecture graphics and iLectures (now called Echo360) will be available on iLearn (<http://ilearn.mq.edu.au>). iLearn is a web-based communication package and can be accessed by most web browsers from inside or outside the University. iLearn and email will be the primary methods of communication in this subject. You are expected to use iLearn for:

- Regularly checking subject announcements;
- Downloading lecture, practical, tutorial and weekly reading materials;
- Checking your grades.

How do you log in? The URL for the iLearn log in page is: <http://ilearn.mq.edu.au>

You must log in to iLearn each time you use it. Your username is your student number, and your password is your myMQ student portal password, provided upon enrolment (unless you've changed it). If you are having trouble accessing your online unit due to a disability or health condition, please go to the Student Services Website at <http://www.students.mq.edu.au/support> for information on how to get assistance.

If you are having problems logging on—that is, if you cannot log in after ensuring you have entered your username and password correctly—you should contact Student IT Help, Phone: (02) 9850 4357 (in Sydney) or 1 800 063 191 (outside Sydney).

Software

The analysis components of practicals will be carried out using the computer programs R (<http://cran.r-project.org>) and R Studio (<https://www.rstudio.com/products/rstudio/download>). Lab computers will have this software installed. However, the software is freely available for download if you wish to install the software on a personal computer.

Quantitative Advice

The Department has a friendly online forum for any questions relating to R and analysis (<http://quantitative-advice.gg.mq.edu.au>). Login and ask a question! You should get a fairly quick response.

Unit Schedule

Week	Theme	Day	Time	Activity	Details	Presenter
1	Scale	Monday	17:00	Lecture 1	Introduction (scale)	Madin
		Tuesday	14:00	Lecture 2	Scale in ecology	Allen
			16:00	Tutorial 1	The problem with scale	Madin
2	Life histories	Monday	14:00	Practical 1A	Allometry	Madin
			17:00	Lecture 3	Introduction (life histories)	Madin
		Tuesday	14:00	Lecture 4	Reproductive values	Griffith
			16:00	Tutorial 1R	The problem with scale	Madin
3	Traits	Tuesday	14:00	Lecture 5	Introduction (trait dimensions)	Wright
			16:00	Tutorial 2	Through the lens of traits	Westoby
4	Populations	Monday	14:00	Practical 1B	Allometry in R	Madin
			17:00	Lecture 6	Introduction (populations)	Madin
		Tuesday	14:00	Lecture 7	Population viability	Madin
			16:00	Tutorial 2R	Through the lens of traits	Westoby
5	Populations	Monday	14:00	Practical 2A	Population growth	Madin
			17:00	Lecture 8	Meta-populations	Madin
		Tuesday	14:00	Lecture 9	Introduction (interactions)	Madin
6	Interactions I	Monday	14:00	Practical 2B	Population growth in R	Madin
			17:00	Lecture 10	Traits and phylogenies	Westoby

		Tuesday	14:00	Lecture 11	Trophic cascades	Madin (E)
			16:00	Tutorial 3	Trophic cascades	Madin (E)
7	Interactions II	Monday	9:00	Fieldtrip	Australian Museum	Madin
		Tuesday	14:00	Lecture 12	Invasions and biocontrol	Leishman
			16:00	Tutorial 3R	Trophic cascades	Madin (E)
Break						
8	Coexistence	Monday	17:00	Lecture 13	Introduction (coexistence)	Madin
		Tuesday	14:00	Lecture 14	Character displacement	Madin
			16:00	Tutorial 4	Game theory	Madin
9	Game theory	Monday	17:00	Lecture 15	Introduction (games)	Madin
		Tuesday	14:00	Lecture 16	Evolutionary games	Kemp
			16:00	Tutorial 4R	Game theory	Madin
10	ESS	Monday	17:00	Lecture 17	Introduction (ESS)	Madin
		Tuesday	14:00	Lecture 18	Plant strategies	Westoby
			16:00	Tutorial 5	Neutral theories	Allen
11	Biodiversity I	Monday	14:00	Practical 3A	Biodiversity	Madin
			17:00	Lecture 19	Introduction (biodiversity)	Madin
		Tuesday	14:00	Lecture 20	Deep time trends	Kosnik
			16:00	Tutorial 5R	Neutral theories	Allen
12	Biodiversity II	Monday	14:00	Practical 3B	Biodiversity in R	Madin
			17:00	Lecture 21	Time scales, neutral models	Allen
		Tuesday	14:00	Lecture 22	Species abundances	Alroy
			16:00	Tutorial 6	Global diversity	Madin
13	Ecosystem services	Monday	17:00	Lecture 23	Energy	Allen
		Tuesday	14:00	Lecture 24	Introduction (services)	Madin
			16:00	Tutorial 6R	Global diversity	Madin
Exams						

- All practicals are run over two weeks (A and B)
- Each tutorial is run twice (R denotes "repeat")

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.

Disruption to Study

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.

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 outcome

- Interpret observations and present them using figures, tables, and text

Assessment tasks

- Practical Reports
- Fieldtrip Exercises
- Final Exam

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 outcome

- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Assessment tasks

- Tutorial Participation
- Final Exam

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

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function
- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Assessment tasks

- Weekly Quizzes
- Tutorial Participation
- Final Exam

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

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function

- Analyse collected data using various statistical methods in order to evaluate hypotheses
- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Assessment tasks

- Weekly Quizzes
- Practical Reports
- Tutorial Participation
- Fieldtrip Exercises
- Final Exam

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

- Analyse collected data using various statistical methods in order to evaluate hypotheses
- Interpret observations and present them using figures, tables, and text

Assessment tasks

- Practical Reports
- Fieldtrip Exercises
- Final Exam

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

- Explain how ecological and environmental interactions drive evolution and shape community structure and ecosystem function
- Interpret observations and present them using figures, tables, and text

- Critically evaluate scientific studies and current controversies on the “big” questions of ecology and evolution

Assessment tasks

- Weekly Quizzes
- Practical Reports
- Tutorial Participation
- Fieldtrip Exercises
- Final Exam