



BIOL368

Evolutionary Ecology

S1 Day 2018

Dept of Biological Sciences

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General Information

Unit convenor and teaching staff

Unit Convenor

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E8B213

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
<u>Weekly Quizzes</u>	20%	No	Friday 5 pm, weekly
<u>Practical Reports</u>	20%	No	Friday 5pm, weeks 4, 7, 12
<u>Tutorial Participation</u>	10%	No	Every other week
<u>Fieldtrip Exercises</u>	10%	No	During fieldtrip
<u>Final Exam</u>	40%	No	Examination period

Weekly Quizzes

Due: **Friday 5 pm, weekly**

Weighting: **20%**

Each week there will be an online quiz based on the previous 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, 7, 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. *Two pages 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 online class discussions and by completing the tutorial questionnaire prior to attending class.

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.

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 field trip to the Australian Museum. The schedule is outlined below.

REQUIRED AND RECOMMENDED TEXTS AND/OR MATERIALS

Weekly required reading will be made 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. Wiley.

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	9:00	Lecture 1	Introduction (BIOL368 & scale)	Stat
		Friday	11:00	Lecture 2	Current research on scale	Stat
		Friday	12:00	Tutorial 1	The problem with scale	Stat
		Friday	14:00	Tutorial 1R	The problem with scale	Stat
2	Traits	Monday	9:00	Lecture 3	Introduction (traits)	Stat
		Monday	2:00	Practical 1A	Allometry	Stat
		Friday	11:00	Lecture 4	Life history trade-offs	Griffith
3		Monday	9:00	Lecture 5	Trait dimensions	Wright
		Friday	12:00	Tutorial 2	Traits	Stat
		Friday	14:00	Tutorial 2R	Traits	Stat
4	Populations	Monday	9:00	Lecture 6	Introduction (populations)	Stat
		Monday	14:00	Practical 1B	Allometry in R	Stat
		Friday	11:00	Lecture 7	Population regulation & viability	Stat
5		Monday	9:00	Lecture 8	Meta-populations	Stat
		Monday	14:00	Practical 2A	Population growth	Stat
6	Interactions	Friday	11:00	Lecture 9	Introduction (interactions)	Stat
7		Monday	9:00	Lecture 10	Mutualistic symbioses	Stat
		Monday	14:00	Practical 2B	Population growth in R	Stat
		Friday	11:00	Lecture 11	Trophic cascades	Stat
Break						
8		Monday	9:00	Lecture 12	Invasions & biocontrol	Leishman
		Friday	13:00	Fieldtrip	Australian Museum	Stat

9	Neutrality	Monday	9:00	Lecture 13	Neutral theories	Allen
		Friday	12:00	Tutorial 3	Holobiont & hologenomes	Stat
		Friday	14:00	Tutorial 3R	Holobiont & hologenomes	Stat
10	Biodiversity	Monday	9:00	Lecture 14	Species abundance	Alroy
		Monday	14:00	Practical 3A	Biodiversity	Stat
		Friday	11:00	Lecture 15	Deep time trends in biodiversity	Kosnik
11	Coexistence	Monday	9:00	Lecture 16	Coexistence	Stat
		Friday	12:00	Tutorial 4	Global biodiversity	Stat
		Friday	14:00	Tutorial 4R	Global biodiversity	Stat
12	Game theory	Monday	9:00	Lecture 17	Introduction (games)	Stat
		Monday	14:00	Practical 3B	Biodiversity in R	Stat
		Friday	11:00	Lecture 18	Plant strategies	Westoby
13		Monday	9:00	Lecture 19	Evolutionary games	Kemp
		Friday	11:00	Lecture 20	Review and exam overview	Stat
		Friday	12:00	Tutorial 5	Game theory	Stat
		Friday	14:00	Tutorial 5R	Game theory	Stat
Exams						

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

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)

- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](https://students.mq.edu.au/support/study/student-policy-gateway) (<https://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/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.

Supplementary Exams

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the interval between the regular exam period and the start of the next session. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. You can check the supplementary exam information page on FSE101 in *iLearn* (bit.ly/FSESupp) for dates, and approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

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