BIOL2410

Ecology

Session 2, Weekday attendance, North Ryde 2020

Department of Biological Sciences

Contents

Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and ot her small group learning activities on campus for the second half-year, while keeping an online ver sion available for those students unable to return or those who choose to continue their studies onli ne.

To check the availability of face-to-face and onlin e activities for your unit, please go to timetable vi ewer. To check detailed information on unit asses sments visit your unit's iLearn space or consult yo ur unit convenor.

General Information

Unit convenor and teaching staff
Linda Beaumont
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Monday 11-12pm, Thursday 12-1pm

Tech Manager
Josh Griffiths
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Lecturer
Laura Fernandez
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Credit points
10

Prerequisites
(50cp including [20cp from ((BIOL1310 or BIOL114) or (BIOL1110 or BIOL115) or BIOL121)] or [10cp from ((BIOL1310 or BIOL114) or (BIOL1110 or BIOL115) or BIOL121) and 10cp from (ENVE117 or (ENVS1017 or ENVS117) or GEOS117)] and [10cp from ((STAT1170 or STAT170) or (STAT1371 or STAT171) or FOSE1015)])

Corequisites

Co-badged status
BIOL6410

Unit description
Ecology is the study of the distribution and abundance of organisms and of the processes that generate these patterns. This unit covers basic ecological concepts at the level of organisms, populations, communities, and ecosystems. We study how interactions among organisms - and between organisms and their physical environment - shape the natural world. This unit also addresses how ecological concepts can be applied to current issues such as climate change, conservation, fisheries and agriculture. A first year Statistics unit is a prerequisite for this unit because we use both descriptive statistics and statistical tests to investigate community structure, population dynamics and how organisms interact with the environment. Many students find that the skills they gain taking BIOL2610 and or BIOL235 complements the skills needed in this Ecology unit.

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:

ULO1: Describe and analyse how interactions between organisms, and between organisms and the environment, influence population, community and ecosystem patterns

ULO2: Critically evaluate and compare ecological concepts and principles, and apply these to find solutions to contemporary environmental issues

ULO3: Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities

ULO4: Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these

ULO5: Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work

ULO6: Develop a scientific report to communicate a study you have undertaken, demonstrating appropriate linkages to scientific literature and ecological theory

General Assessment Information

Assessment Task Descriptions

Participation (5%): Remaining on top of the workload of a unit is vital for success, and to aid with a deep understanding of the subject matter. Having a mark for class participation helps to motivate students to develop a pattern of preparing for class, attending lectures and undertaking the background reading. To achieve this mark, students will be required to respond to 1-2 questions posed for each lecture. To receive full marks, students need to address both lectures for 10 of 13 weeks.

Pre-prac quizzes: For the four face-to-face practicals, short quizzes need to be undertaken **prior** to commencing the practical class. Although there are no marks associated with these quizzes, they are required to ensure that you have gone through the reading material, considered hypotheses and experimental designs, and are sufficiently prepared for lab or fieldwork. As these classes begin in the Ecology Reserve, your prior preparation is absolutely not-negotiable. Fieldwork always carries risks, and as professionals you would be required to be adequately prepared before embarking on any trip. Expect to spend ~ 1 hour going through material for each of these classes.

Two online, open-book quizzes (20%): Two quizzes will be held in Weeks 5 and 10. For internal students, these will run during your normal practical class, while for externals the quizzes will be

open on the Wednesday evening of each week. The quizzes will be based on lecture material AND recommended readings from Weeks 1-4 for Quiz 1 and Weeks 5-9 for Quiz 2. The tests will be multiple choice and will include numerical exercises similar to those taught in lectures. Questions will be randomly allocated to students. Both tests will be timed, running for 60 minutes. Note that if you are unwell and cannot undertake the test during your scheduled time, a special consideration will need to be submitted to organise a new time to sit the test.

Practical Report – Ecology Reserve (20%)

You will be required to write up one of the studies based upon a fieldwork practical, conducted in the Ecology Reserve. The report is to be in the style of a scientific paper submitted to the journal *Austral Ecology*. The length should be 1000-1200 words, **excluding Abstract, Acknowledgements and References**. A marking rubric will be provided on iLearn. This task is designed to assess your understanding of ecological concepts, limitations associated with fieldwork, how to source and utilise appropriate scientific literature to craft an argument, and scientific communication conventions.

Essay (25%): This year, in place of a second report based upon a practical, students will be required to write an essay on one of six topics surrounding Ecology in the Anthropocene. The purpose of this is to demonstrate your understanding of how ecological concepts can be applied to understand and solve real-world problems, and your ability to communicate scientific issues to a lay audience. The essay will be in the style of an essay in BioScience, which is a prestigious journal that is written for broad range of people from school teachers and environmental educators, to those who work in government or for ecological consultancies, and researchers. It should be ~1500 words (excluding **Acknowledgements and References**). A marking rubric will be provided on iLearn.

Examination (30%): The final exam (worth 35% of your mark) will be held during the Semester 2 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. You will be permitted to take a non-programmable calculator and/or English language dictionary into the exam. Notes will not be permitted. The exam will focus on material from Weeks 7-13, but short answer questions may also require knowledge of subject matter from Weeks 1-6.

Assessment Tasks

Name	Weighting	Hurdle	Due
Lecture participation	5%	No	Continuous
Quiz	20%	No	Weeks 5 and 10
Practical Report	20%	No	Internals: 27 Sept. (Recess); Externals: 4 Oct (Week 8)
Ecology in the Anthropocene	25%	No	1 November (Week 12)

Name	Weighting	Hurdle	Due
Final Exam	30%	Yes	Formal Examination Period

Lecture participation

Assessment Type [1]: Participatory task
Indicative Time on Task [2]: 0 hours
Due: **Continuous**
Weighting: **5%**

All students are expected to actively participate in the lectures each week. Active participation, for this unit, is defined as viewing the lectures within the week of their delivery, for at least nine of the 12 lecture weeks *and* answering the questions related to each lecture posted on iLearn by the convenor.

On successful completion you will be able to:

- Describe and analyse how interactions between organisms, and between organisms and the environment, influence population, community and ecosystem patterns
- Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities
- Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work

Quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 15 hours
Due: **Weeks 5 and 10**
Weighting: **20%**

There will be two open-book online quizzes. The questions may be based on lectures, reading materials and practicals. Each quiz is worth 10% and will test your knowledge of ecological concepts and your understanding of equations used in different subfields of ecology.

On successful completion you will be able to:

- Describe and analyse how interactions between organisms, and between organisms and the environment, influence population, community and ecosystem patterns

- Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities
- Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work

Practical Report

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 14 hours
Due: **Internals: 27 Sept. (Recess); Externals: 4 Oct (Week 8)**
Weighting: **20%**

You will write a scientific report, in the format of a paper for the journal Austral Ecology, describing one of the practical experiments, and discussing principles of fieldwork. The report will be uploaded to Turnitin.

On successful completion you will be able to:

- Describe and analyse how interactions between organisms, and between organisms and the environment, influence population, community and ecosystem patterns
- Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities
- Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these
- Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work
- Develop a scientific report to communicate a study you have undertaken, demonstrating appropriate linkages to scientific literature and ecological theory

Ecology in the Anthropocene

Assessment Type [1]: Essay
Indicative Time on Task [2]: 15 hours
Due: **1 November (Week 12)**
Weighting: **25%**

You will select one of five contemporary environmental issues and develop an essay synthesising scientific consensus of the issue, discussing how ecological concepts can be used to find solutions to your selected issue, and comparing and prioritising uncertainties and knowledge gaps.

On successful completion you will be able to:

- Critically evaluate and compare ecological concepts and principles, and apply these to find solutions to contemporary environmental issues
- Develop a scientific report to communicate a study you have undertaken, demonstrating appropriate linkages to scientific literature and ecological theory

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 25 hours
Due: **Formal Examination Period**
Weighting: **30%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The final exam will be held during the Semester 2 Exam Period. Please consult the University Handbook to determine the commencement and finishing dates of the compulsory exam period. This exam will assess your understanding and interpretation of ecological patterns, processes and concepts, and your ability to use these to suggest solutions to contemporary environmental issues

On successful completion you will be able to:

- Describe and analyse how interactions between organisms, and between organisms and the environment, influence population, community and ecosystem patterns
- Critically evaluate and compare ecological concepts and principles, and apply these to find solutions to contemporary environmental issues
- Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities
- Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these
- Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work
- Develop a scientific report to communicate a study you have undertaken, demonstrating appropriate linkages to scientific literature and ecological theory

[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

About this unit: Ecology is the study of the distribution and abundance of organisms and of the processes that generate these patterns. This unit will cover basic ecological concepts at the level of organisms, populations, communities, and ecosystems. We will study how interactions among organisms and between organisms and their physical environment shape the natural world. This unit will also address how ecological concepts can be applied to current issues like conservation and fisheries and agriculture.

- Successful completion of this unit will earn you 10 credit points.
- The unit may be completed internally (D2) or externally (X2).

Classes: The unit consists of 2 lectures per week (to be delivered via Zoom) and a 2 to 3-hour practical per week (weeks 2-11 only). Six of the practicals will be online and four will be conducted face-to-face (i.e. you need to come to campus). If you are an internal student, these will be in Weeks 6, 7, 8, and 9. If you are external, you will attend campus on 17-18 September.

Teaching and learning strategy: Ecology is an evolving science, with theories constantly being developed, tested and refined. This knowledge and practical skills can be used to understand and help solve some of the most pressing environmental issues of our era. That makes Ecology a very useful subject. Consequently, we aim to teaching you theory and practical skills, and how you can apply these to improve the state of the environment and biodiversity, better manage natural resources, help modified environments (agriculture and urban regions) to reduce their ecological footprint, and even contribute to solving medical problems. In the lectures you will be introduced to theoretical concepts and some of the tools that you will need for this problem solving. This knowledge will be reinforced through unit readings or supplementary videos. In the practicals you will be required to integrate theory and skills, to understand natural phenomena. Throughout the unit, you will also be exposed to the scientific process, whereby observations can be used to craft hypotheses, and how to develop research methodologies to test these hypotheses. The assessments have been designed to strengthen your understanding of theory and practice, as well as science communication and your ability to source scientifically-valid information.

We will endeavour to make the unit as interactive as possible. We encourage you to interact with the material and participate actively, as this will maximise your learning. To this end, you are expected to attend zoom sessions each week.

Unit Schedule

Week	Date	Lecture	Topic	Practical	Assessments
1	28-Jul	1	Ecology		
		2	Time to get ahead…literally		
2	4-Aug	3	It's a niche concept: Conditions, resources and niches	Niches and ALA Online	
		6	Moving through space and time: Distributions		
3	11-Aug	7	Not all is equal: Global patterns of productivity	Population growth Online	
		8	Me and Mine: Life history		
4	18-Aug	9	Population growth and intraspecific competition	Interspecific interactions Online	
		10	The leading edge: Interspecific competition		
5	25-Aug	11	Every predator is somebody else's prey: Predation	Quiz 1	Quiz 1 (Weeks 1-4)
		12	What takes but never gives? A Parasite		
6	1-Sep	13	Helping hands: Facilitation	Sampling and Plant ID On Campus	
		14	Ecological Techniques, aka How to do things		
7	8-Sep	15	Ecology, Big Data, and Molecular Ecology, aka How to do really cool things	Species Richness and Community Composition On Campus	
		16	Hanging out: Describing community structure		
MID SEMESTER BREAK				Externals: Block session 17-18 September	Internals: Prac Report 27 Sept
8	29-Sep	17	The more the merrier: Why biodiversity matters	Invasive Species On Campus	
		18	When patterns are broken, new worlds emerge: Disturbance and succession		Externals: Prac Report 4 Oct
9	6-Oct	4	My island home: island biogeography	Carbon Accounting On Campus	
		5	The flux of energy through ecosystems i		
10	13-Oct	19	The flux of energy through ecosystems ii	Quiz 2	
		24	Greed or need? Human alteration of biogeochemicals		
11	20-Oct	20	It's getting hot in here! Global climate change	Impacts of Climate Change Online	
		21	Spatial subsidies: another time, another place		
12	27-Oct	22	Fixed! Ecological impact assessment and Restoration Ecology		Essay: 1 November

		23	Not your friendly neighbour: Invasive species and their management		
13	3-Nov	25	Managed ecosystems: agriculture, fisheries and forestry		
		26	Absolutely vital information for the Exam!		

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). 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.)*

Students seeking more policy resources can visit the 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 (https://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 published on platform other than eStudent, (eg. iLearn, Coursera etc.) 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Honesty – please read, as this is very important

Presenting the work of another person as one's own is a serious breach of the University's rules

and carries significant penalties. The University's Academic Honesty Policy can be found at http://www.mq.edu.au/policy/docs/academic_honesty/policy.html

In this unit, we will be checking written work for plagiarism using TURNITIN. Penalties for plagiarism may include a zero mark for the assignment or in more extreme cases, failure of the unit. Plagiarism WILL be noted on your academic record. Full details of penalties can be found at http://www.mq.edu.au/policy/docs/academic_honesty/schedule_penalties.html

Extensions, penalties and disruptions to studies

Late assignments will attract a penalty of **10%** of the total marks allocated to the exercise per day.

You may hand in your work after the due date and escape penalty only if you have an acceptable reason (usually a medical certificate). Discuss your problem with the Lecturer as early as possible before the due date.

Information about the Disruptions to Studies policy and procedure is online at Policy Central: http://www.mq.edu.au/policy/docs/disruption_studies/procedure.html.

Information on managing your Disruptions to Studies:

http://students.mq.edu.au/student_admin/manage_your_study_program/disruption_to_studies/

All Disruptions to Studies notifications should be submitted using the online form: 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 help you improve your marks and take control of your study.

- Getting help with your assignment
- Workshops
- StudyWise
- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides
- Ask a Librarian

Pastoral Care: Convenors are here to help you succeed with your units. Please, if you are having difficulties with the workload, contact the convenor to discuss options.

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

If you are a Global MBA student contact globalmba.support@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.

This unit will require access to Microsoft Excel. If you do not already have this, or have an old version, please go to iLab: https://students.mq.edu.au/support/technology/software-downloads

Changes from Previous Offering

Due to Covid-19 there will be no overnight fieldtrip this year. This is because we cannot meet requirements for social distancing whilst on this fieldtrip.

There will be two quizzes (Week 5 and 10), which will be open-book, online tests. This are designed to encourage problem-solving skills, reinforce lecture material and ensure students remain up-to-date.

Fieldwork

Please read these rules about practicals:

1. Attendance at all practicals, whether online or on campus, is **compulsory**.

2. For all practicals scheduled for On Campus (i.e. Internals: Weeks 6, 7, 8, 9; Externals: 17-18 September), you must be wearing covered shoes to be allowed entry to the labs. There is strictly no eating or drinking in the labs. These practicals will all start in the Ecology Reserve. After sampling has taken place, the class will be back to campus labs. Therefore, ensure your shoes are comfortable to walk in.

3. Fieldwork risks assessments must be completed by the due dates specified below. Failure to do so will mean you **cannot undertake the practical.**

Fieldwork Risks

All fieldwork carries some amount of risk. For Ecology, this is minimal as this year we will only be sampling in the Ecology Reserve which adjoins Lane Cove National Park. However, just with any

workplace, students must sign a fieldwork risk form **by Friday 28 August**. We will discuss these forms in the first online practicals in Week 2, and links to them will be posted on iLearn.

Note that these practicals will go ahead regardless of weather. Please ensure that you wear appropriate clothing. This includes a hat and long pants. **Shorts and skirts are not allowed**. A long-sleeved top is preferable and wet-weather gear if appropriate (no umbrellas – these cannot open in closed canopy and your hands will be full with equipment).