BIOL6410

Ecology

Session 2, In person-scheduled-infrequent, North Ryde 2023

School of Natural Sciences

Contents

General Information

Unit convenor and teaching staff
Unit Convenor, and Professor of Marine Ecology
Melanie Bishop
melanie.bishop@mq.edu.au
Contact via 9850 4075
14 EaR 205
Please email for an appointment (Mon-Thurs); note I do not work Fridays

Credit points
10

Prerequisites
Admission to MConsBiol or GradDipConsBiol or GradCertConsBiol or MSc or MScInnovationBioConsMgmt or MScInnovationEnvSc or MScInnovationGeologyGeophys or MEnv or GradDipEnv or GradCertEnv or MSusDev

Corequisites

Co-badged status
biol2410

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. An understanding of basic statistics is assumed knowledge, and students will be required to 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/ 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
ULO4: Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these
ULO3: Carry out and correctly interpret a range of equations and statistical tests to measure characteristics of populations and communities
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

NB: This unit cannot be completed online. All students must attend some face-to-face classes.

To pass this unit you must

- Attempt all assessments,
- Achieve a total mark equal to or greater than 50%,
- Achieve at least 40% in the final examination,
- Attend the Stanwell Tops Fieldtrip (or in the case of illness or misadventure an approved make-up activity)

Students scoring a final exam mark of <40% but that would otherwise meet all unit requirements will be offered a supplementary exam.

Hurdle Assessments

Final exam (minimum mark - 40%): The final exam assesses the students' attainment of Unit Learning Outcomes (ULOs) 1-4. Although some of these ULOs are also assessed elsewhere, a mark of 40% is considered the minimum benchmark for demonstrating their adequate attainment. Students who do not attain this mark, but have attended the exam and met all other unit requirements will be given the opportunity to resit the exam in the supplemental period.

Assignment submission

The Powerpoint slides for the oral presentation are to be uploaded to iLearn via the assignment submission box and the Practical Report via the TURNITIN link by 11:55 pm on the due date. TURNITIN is a powerful online tool for the detection of plagiarism. It works by comparing the text of a submitted document (i.e., your assignment) with the work of your current classmates, past students in Ecology and other courses at Macquarie, as well as published material in books,

journals and on the web.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration.

Special Consideration

The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Assessment descriptions

Presentation (15%)

You will prepare a 6 minute presentation on a topic of your choosing, related to the application of ecology to real-world issues. 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. **You can choose a topic from the list provided in ilearn, or come up with your own based on the guidelines provided above the list.** You will deliver your presentation in the week 4 and 5 labs (or, if you have enrolled in the infrequent attendance offering, the on-campus session). All students must upload Powerpoint slides to ilearn by **11:55 pm Fri 11 Aug**. Late submission of slides without approved Special Consideration will attract a penalty as per the assessment policy. **A marking rubric is provided on iLearn.** Please consult this when developing your presentation.

Mid-semester test (25%)

There will be a mid-semester test held in Week 7. This will be 50 minutes in length, and will be an open book, online quiz (that can be completed on or off campus) that may cover all work from Weeks 1-7, including lectures, practicals and reading material. For weekday attendance students, this will run during the scheduled lecture session on Wed 6 Sept. For infrequent attendance students, the test will be open on the evening of Wed 6 Sept, from 7-9 pm (your 50 min will count down from the time you start the test). Students who cannot make this time are required to the convenor at email biol2410@mq.edu.au to make alternative arrangements. The tests will be multiple choice and will include numerical exercises similar to those taught in lectures. Questions will be randomly allocated to students. 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. Some example questions will be provided in ilearn in the weeks prior to the assessment.

Fieldtrip Practical Report (25%)

At the Stanwell Tops fieldtrip, you will undertake a group-based project. Students will individually write this up in the style of a scientific paper for the journal Austral Ecology. 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. The word limit for this report is 1500 words (excluding Abstract, Acknowledgement and References). Any text beyond 1500 words will not be read by the markers; shorter submissions are acceptable. Further details can be found in the Field Trip practical notes (on iLearn). **A marking rubric is provided on iLearn, as well as a template for completing your report and examples of previous studies.** Please consult these when preparing your report.

Examination (35%)

The final exam will be held during the Semester 2 Exam Period and will be 2 hr (plus 10 min reading time). This will be an in-person, invigilated exam. 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. While most of the material will focus on Weeks 8-13, some questions will also require knowledge of subject matter from Weeks 1-7.

The exam questions have been carefully written to test understanding, not rote learning:

- You will NOT be required to regurgitate definitions or the details of case studies we have discussed in class;
- You WILL need to be able to apply ecological principles to solve real-world problems.

Specifically, the exam (out of 70) will be comprised of three sections, and it is recommended you spend ~40 min on each:

(A) a multiple choice section where you will be asked to interpret figures and tables and synthesise information (20 questions, 1 mark each; to give 20 possible marks);

(B) a short answer section where you will be asked to solve problems by integrating ecological concepts you have learnt during the course (6 questions, 5 marks each, to give 30 possible marks);

(C) longer response questions where you will use your ecological knowledge to address an applied (conservation or management) problem (2 questions, 10 marks each, to give 20 possible marks)

Assessment Tasks

Name	Weighting	Hurdle	Due
Oral-based presentation	15%	No	Slides: Fri 11 August, Presentation: 12-13 August
Mid-semester quiz	25%	Yes	Wed 6 September
Practical Report	25%	No	Sun 15 October
Final Exam	35%	Yes	Semester 2 exam period

Oral-based presentation

Assessment Type [1]: Presentation
Indicative Time on Task [2]: 10 hours
Due: **Slides: Fri 11 August, Presentation: 12-13 August**
Weighting: **15%**

You will give a short presentation on a key topic in 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
- Critically evaluate and compare ecological concepts and principles, and apply these to find solutions to contemporary environmental issues

Mid-semester quiz

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 13 hours
Due: **Wed 6 September**
Weighting: **25%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

There will be an online quiz. The questions may be based on lectures, reading materials and practicals 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]: 13 hours
Due: **Sun 15 October**
Weighting: **25%**

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. It 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
- Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these
- 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
- 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]: 23 hours
Due: **Semester 2 exam period**
Weighting: **35%**

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
- Develop testable hypotheses to assess ecological patterns and processes, and design comparative experiments to test these
- 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
- Develop a scientific report to communicate a study you have undertaken, demonstrating appropriate linkages to scientific literature and ecological theory

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[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

The unit consists of:

- 2 lectures per week: Mon 0900 (23WW T1) AND Wed 1100 (23WW T2) (recorded and available via echo360)
- a compulsory on-campus session, 0900-1700 Sat 12 - Sun 13 August (14EaR labs and

field) in which all on-campus pracs will be completed

- a **compulsory** field trip to Stanwell Tops in the September mid-semester break that **all** students enrolled in this unit must attend: **A:** 18-20 September OR **B:** 20-22 September. **Students who cannot attend the fieldtrip should NOT enrol in this unit.**

Week 1 classes: LECTURES commence in **week 1**

Required and recommended texts and/or materials

There is no prescribed text book for this course. Instead, I have compiled a collection of materials (papers, videos, websites) that directly complement the lectures. These are available via the iLearn site for this unit. It is expected that you review these materials before coming to each lecture.

If you would also like to consult a textbook (this is not compulsory), I suggest:

Begon M, Howarth RW, Townsend CR (2014) Essentials of Ecology. 4th edition. Blackwell Scientific Publications, Cambridge. The 3rd (2008) edition is also acceptable, if you can come by it second hand.

Unit web page

PowerPoint slides, lecture recordings, unit readings, copies of all unit hand-outs and helpful resources for completion of assessments will be available through iLearn. Consequently, it is strongly recommended that you interact with the BIOL2410/6410 online unit regularly. **To access the online unit, go to https://iLearn.mq.edu.au/login/MQ/ and type in your Macquarie OneID Username and password.**

New to iLearn? You can find out more at: https://students.mq.edu.au/support/technology/systems/ilearn

Experiencing difficulties? contact the IT Service Desk at help@mq.edu.au.

Methods of Communication

We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email (biol6410@mq.edu.au) on iLearn.

COVID Information

For the latest information on the University's response to COVID-19, please refer to the Coronavirus infection page on the Macquarie website: https://www.mq.edu.au/about/coronavirus-faqs. Remember to check this page regularly in case the information and requirements change during semester. If there are any changes to this unit in relation to COVID, these will be communicated via iLearn.

Unit Schedule

Lecture timetable

Part 1. Organisms and their environment

WEEK 1

24th July 1. An introduction to ecology

26th July 2. Conditions, resources and the niche concept

WEEK 2

30th July 3. Distributions

2nd August 4. Global patterns of productivity

WEEK 3

7th August 5. Ecological strategies and their evolution

9th August 6. Population growth and intraspecific competition

Part 2. Interactions among species

WEEK 4

14th August 7. Interspecific competition

16h August 8. Predation and herbivory

WEEK 5

21st August 9. Parasitism and disease

23d August 10. Facilitation and mutualisms

Part 4. Communities and ecosystems

WEEK 6

28th August 11. Community structure

30th August 12. Community function

WEEK 7

4th September 13. Preparing for the field trip

6th September MID SEMESTER TEST

MID SEMESTER BREAK

WEEK 8

25th September 14. Disturbance and succession

27th September 15. Island biogeography

WEEK 9

2nd October PUBLIC HOLIDAY – NO LECTURE

3rd October 16. The flux of energy through food webs

WEEK 10

9th October 17. The flux of matter through food webs

11th October 18. Spatial subsidies

5. Applied ecological issues

WEEK 11

16th October 19. Microbial ecology and one health

18th October 20. Invasive species and their management

WEK 12

23rd October 21. Global change biology

25th October 22. Ecological impacts and their assessment

WEEK 13

30th October 23. Restoration and reconciliation ecology

1st November 24. Managed ecosystems: fisheries and forestry

Practical and Fieldwork Risks

All fieldwork carries some amount of risk. For Ecology, this is minimal as we will only be sampling in the Ecology Reserve which adjoins Lane Cove National Park, and at Stanwell Tops during the 2.5-day fieldtrip. However, just as with any workplace that requires staff to work in the field, there are safety protocols that must be followed, and fieldwork risk assessments that must be completed.

Please read these rules about fieldwork:

1. Attendance at all practicals, whether on campus, or at the fieldtrip, is compulsory.
2. For all face-to-face practicals, whether on-campus or on the fieldtrip, you must be wearing covered shoes that are comfortable to walk reasonable distances in (i.e. several kilometres).
3. Please note that the following items of clothing are not acceptable during fieldwork: tops showing mid-riffs, singlets, skirts, shorts or pants showing the ankles. This isn't because we are trying to annoy you or that we don't understand fashion, it is because wearing these clothes increases the risk of ticks, leeches, sunburn, and cuts and scratches that come from bush-bashing (i.e. crawling through dense vegetation). Further, long skirts present an entanglement risk out in the field. One of the learning outcomes of this unit is

"Demonstrate knowledge of professional responsibility and safe working practices whilst undertaking field work". Therefore, you are required to wear field-safe clothing and shoes.

4. All pracs in the Ecology Reserve and the Stanwell Tops fieldtrip require that fieldwork risk assessments must be completed well in advance. Failure to do so by the due date will mean you cannot undertake the practical or attend the fieldtrip. If you do not attend the fieldtrip, you must withdraw from the unit. We will discuss these forms in the first practical in Week 2, and links to them will be posted on iLearn.

The pracs will go ahead **regardless of the weather**, so bring rain gear if the weather looks doubtful (no umbrellas – these cannot open in closed canopy and your hands will be full with equipment).

Field trip (mid-semester break, September)

All students are required to attend a field trip at Stanwell Tops. You may attend one of two sessions: **A: 18-20 September** OR **B: 20-22 September**. Students who have genuine clashes (e.g. other field trips, work or carer responsibilities) will be given first preference of fieldtrip. Others are invited to indicate their preferred trip, with remaining places filled on a first-come first-served basis (it is important that we have equal numbers of students on each). Places on specific fieldtrips are not confirmed until full payment has been made. Sign-ups for field-trips will be done electronically via Google docs. The web link for sign-up will be made available on iLearn from **Mon 30 July**. Please sign up by the end of week 4 (**Fri 18 August**).

Highlights

- Nocturnal mammal spotlighting
- Early morning bird watching
- Native plant identification
- Getting to know your fellow students and many of the Natural Sciences staff

Cost

The cost of the fieldtrip will be approximately $220 (to be confirmed). This amount will be due by **5pm Friday 18 August** (end of Week 4). Instructions on how to pay will be placed on iLearn. Once you have paid, you will need to register your receipt number electronically in the Fieldtrip receipt database and confirm your attendance. If you have not done this by 5pm Friday 18 August, it will be assumed that you are not attending the fieldtrip and are therefore withdrawing from the unit.

Transport and Address: You will need to make your own way to the field site (The Tops Conference Centre). The address is:

The Tops Conference Centre 51 Bendena Garden Stanwell Tops

You can plan your trip on public transport using "Trip planner" https://transportnsw.info/trip#/ There is plenty of parking and you are welcome to bring your own car (please make sure it is

roadworthy and appropriately insured) to drive to the site. We will help to facilitate lifts for those who don't have a vehicle. The drive takes 1.5-2 hr from Macquarie University (regardless of what google maps predicts)

Program

You will spend a half day prac studying each of five different ecological communities: fish, birds, plants, aquatic invertebrates, and terrestrial invertebrates. One the last day you will be working in small groups to compare the distribution and abundance of organisms between two habitats of your choice. This project will form the basis of the second Practical Report (due Sun 15 Oct, all students). A detailed program will be provide 1-2 weeks before the fieldtrip.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://policies.mq.edu.au). 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
- Assessment Procedure
- Complaints Resolution Procedure for Students and Members of the Public
- Special Consideration Policy

Students seeking more policy resources can visit Student Policies (https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit Policy Central (https://policies.mq.edu.au) and use the search tool.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/admin/other-resources/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 Integrity

At Macquarie, we believe academic integrity – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free online writing and maths support, academic skills development and wellbeing consultations.

Student Support

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

The Writing Centre

The Writing Centre provides resources to develop your English language proficiency, academic writing, and communication skills.

- Workshops
- Chat with a WriteWISE peer writing leader
- Access StudyWISE
- Upload an assignment to Studiosity
- Complete the 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

Student Services and Support

Macquarie University offers a range of Student Support Services including:

- IT Support
- Accessibility and disability support with study
- Mental health support
- Safety support to respond to bullying, harassment, sexual harassment and sexual assault
- Social support including information about finances, tenancy and legal issues
- Student Advocacy provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via AskMQ, or contact Service Connect.

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.

Changes from Previous Offering

We value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Student feedback from the previous offering of this unit was very positive overall, with students pleased with the clarity around assessment requirements and the level of support from teaching staff. To better accomodate the interests Medical Science students, a lecture on microbial ecology and one health has been added. Lectures will make greater use of infectious disease and health examples in illustrating key points.