



Course Outline

BIOS1301

Ecology, Sustainability and Environmental Science

School of BEES

Faculty of Science

T1, 2022

1. Staff

Position	Name	Email & contact details	Consultation times and locations
Course Convenors	Professor Richard Kingsford	BIOS1301@unsw.edu.au	By appointment
	Dr Hayley Bates	BIOS1301@unsw.edu.au Level 1, Samuels Building Room 132	By appointment h.bates@unsw.edu.au
Guest Lecturers	There are many guest lectures in this course. All guest lecturers are active in research. Some guest lecturers are from the University of New South Wales, others conduct research for other institutions or government agencies. For example, Dr Tanya Mason will be giving a guest lecture on <i>Invasive Plant Species</i> . Tanya is from the Department of Primary Industry and Environment (DPIE, NSW Government) and is an invasive plant specialist. The guest lecturers bring real life experience to the course. This is deliberately done to expose students to a wide range of practitioners working in environmental sciences.		
Technical & laboratory staff	Vivian Sim	Biological Sciences Building (D26) and Teaching Lab 6, (E26)	On site

2. Course information

Units of credit: 6UOC

Pre-requisite(s): None

Teaching times and locations:

Component	HPW	Time	Day	Location
Lectures	3			
Lecture 1	1	Online lectures will be released at the start of each week.		Online (via Moodle)
Lecture 2	1			
Lecture 3	1			
Laboratory	3	The delivery of practicals is face to face in class @UNSW (or fieldtrips), except for a select group of international students who are studying online		
Tuesday AM	3	10am-1pm	Tuesday	Varies each week, (see schedule)
Tuesday PM	3	2-5pm	Tuesday	Varies each week, (see schedule)
Wednesday AM	3	10am-1pm	Wednesday	Varies each week, (see schedule)
Wednesday PM	3	2-5pm	Wednesday	Varies each week, (see schedule)
Thursday AM	3	10am-1pm	Thursday	Varies each week, (see schedule)
Thursday PM	3	2-5pm	Thursday	Varies each week, (see schedule)
Revision sessions	1	TBC		Online

2.1 Course summary

This course is designed to introduce students to the topics of ecology, sustainability and environmental science.

- The course develops student skills in critically assessing scientific information, routinely debated by the public and decision-makers. It provides a strong grounding in today's and tomorrow's environmental problems and the role of science in providing solutions.
- You may decide to specialise as an environmental scientist, environmental engineer, ecologist, marine biologist or a river scientist and this course will provide a fundamental base. Even if you are enrolled in a completely different degree (e.g. law, commerce, engineering, art), you will find this course a useful elective. There are few professions today that can ignore the effects of environmental issues. Of course, your everyday life will also be informed by what you learn.
- This course will give you a good background in the full range of environmental issues affecting the world today and their effects on biodiversity and sustainability.

2.2 Course aims

The course develops student skills in critically assessing scientific information, routinely debated by the public and decision-makers. It provides a strong grounding in today's and tomorrow's environmental problems and outlines the role that science plays in providing solutions.

Environmental problems are increasingly a challenge for today's society. There is a rising concern about the effects of climate change, degradation of rivers, clearing of native vegetation, overharvesting of fishing resources and pollution on our world. The issues are often complex, involve major decisions by Governments and communities but are fundamental if we are to deliver a sustainable planet for future generations. Environmental science is a discipline that can address these problems and also provide potential solutions for management and policy decisions.

This course aims to give you a broad understanding of the major environmental problems of the world, encourage critical thought, provide experience in biological observation and measurement and teach you how to make careful and critical observations. Environmental Science is a rigorous discipline that requires logic and critical thinking, in this course you will learn how this is done.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Describe how environmental science is used to: identify, monitor, address and manage ecological problems such as key threatening processes
2. Conduct basic scientific field observations and monitoring techniques (such as, species identification and counts, water quality testing, inputs and outputs and mark recapture)
3. Collect, analyse (spatially and statistically) and interpret results from field and laboratory data
4. Develop skills in written and oral scientific communication
5. Work collaboratively to engage in creative problem solving

3. Strategies and approaches to learning

3.1 Learning and teaching activities

There are five major components to this course. The various streams re-enforce but do not duplicate each other:

- 1) Lectures which outline the main elements of the environment, problems of sustainability and ways of addressing these problems with environmental science. Lectures are primarily given by academics from the School of Biological, Earth and Environmental Sciences. However, to expand students' understanding and provide real world examples, guest lecturers (specialist scientists) from Government agencies and outside organizations (are invited in the second half of the course), to give lectures in their areas of expertise. Sometimes lectures will not be sequential as consideration has to be made for some of the guest lecturers who have busy schedules. Always refer to the module to see where lectures fit.
- 2) Practical classes which provide "hands on" experience teaching the basic skills of environmental monitoring and data collection. There are 6 set practicals (1-6) in weeks 1-7 and an additional self-guided practical to Taronga zoo. The self-guided practical incurs an entry fee. You can do this practical at any time, including the designated practical time for which it is designed for in week 8.
- 3) Assessments which are designed to enhance skills such as data collection, analysis, report writing, problem solving and scientific communication.
- 4) Revision sessions which are offered as an optional resource and support for students. The aim of the revision sessions is to reinforce themes learnt throughout the lectures, to encourage deep learning and discussion; and help stage 1 students prepare for the final exam. These sessions will give you an opportunity as a student to discuss many of the issues raised during the lectures.
- 5) Final exam which tests the students' understanding of the course (lecture) content.

3.2 Expectations of students

Lectures

Three lectures will be released each week, online via the course BIOS1301 T1 Moodle page. It is up to the student to make time to watch each lecture and prepare their own study notes. Staying on top of the lecture content will help students in their understanding of assessment material and will also help students stay engaged with the course. The content from lectures is examined in the final exam as well as overlapping with assessment material. Revision sessions are offered towards the end of the term to help students prepare for their final exams.

Practicals

The practical aspect of ecology is so important that participation in practical classes is a fundamental requirement for the award of a pass. During each practical class, time is spent working on assignments for the course. If you miss a practical class, you may miss out on valuable information (data collection, analysis, groupwork) required for the completion of your assignments. You can only attend the lab in which you are enrolled. Should you be unable to attend your practical class for any reason, you should contact Hayley Bates (BIOS1301@unsw.edu.au) to arrange an alternate time in the same week as the missed class. All make-up labs have to be approved. For unavoidable absences from practical classes that cannot be made up at an alternate time, you must apply for special consideration- please refer to Moodle for details on how to do this. Any student who misses more than one practical class and does not provide a medical certificate to cover any such absence may be awarded an unsatisfactory failure (UF) grade for having failed to complete essential elements of their assignments for the subject.

The location of practical classes changes each week. Please pay attention to the course schedule and the weekly course announcements made on Moodle.

For practical classes held in the lab you must bring:

- BIOS 1301 Ecology and Sustainability Lab Manual (now E-Book). Read the instructions in advance.
- A laboratory coat and closed shoes (not sandals). This is required by Workplace Health and Safety (WHS) regulations, and you will not be permitted to participate in practicals if you are inappropriately clothed.
- Material for recording your observations and findings appropriate for each class. These items include: a pencil, pen, eraser and ruler.

For practical classes held in the field (Centennial Park and Randwick Environment Park) you must bring:

- BIOS 1301 Ecology and Sustainability Lab Manual. Read the instructions in advance for each practical.
- Material for recording your observations and findings appropriate for each class. These items include: a pencil, pen eraser and ruler.
- Hat, sunscreen, sunglasses, water bottle and wet weather gear (raincoat, umbrella)
- You must wear appropriate clothing and footwear for field work.
- You are required to make your own way to and from these field sites (both locations are approximately a 20-minute walk from the university).

4. Course schedule and structure

There are four major modules (themes) for the lectures in this course:

Module 1- Introduction to Ecology, Sustainability and Environmental Science:

- Course Introduction (Professor Richard Kingsford)
- Sustainability Issues (Professor Richard Kingsford)
- Definitions of Sustainability (Professor Richard Kingsford)
- Environmental Science (Professor Richard Kingsford)

Module 2 – Biodiversity and Landscape Processes:

- Biodiversity in Australia (Dr Hayley Bates)
- Distribution and Abundance of Organisms (Dr Hayley Bates)
- Carbon and Hydrogen Cycles (Professor Richard Kingsford)
- Water, Rivers and River Regulation (Professor Richard Kingsford)
- Land Degradation in Australia (Dr Alan Kwok)

Module 3 -Disturbance Ecology and impacts of threats:

- Disturbance Ecology (Professor Richard Kingsford)
- Exotic Animal Species (Professor Richard Kingsford)
- Invasive Plant Species (Dr Tanya Mason)
- Fire and Ecosystems (Dr Mark Ooi)
- Climate Change and Australian Ecosystems (Dr Hayley Bates)

Module 4- Management of Ecosystems within the context of Ecologically Sustainable Development:

- Future of Australian Terrestrial Ecosystems (Professor Mike Archer)
- Role of Zoos in Conservation (Dr Kate Brandis, Taronga Conservation Society)
- Wildlife Harvesting (Professor Richard Kingsford)
- Pollution in Marine Ecosystems (Dr Graeme Clarke)
- Biodiversity Management (Dr Hayley Bates)
- Fisheries Management (Professor Iain Suthers)
- Conservation Policy and Management (Professor Richard Kingsford)
- Protected Area Management (Professor Richard Kingsford)

Course Schedule:

BIOS1301 schedule for T1, 2022

Week Date	Lecture 1 Async	Lecture 2 Async	Lecture 3 Async	Online Content	Lab 3h	Assessment
Week 1 Feb 14th- 20th	Lecture 1. Introduction to Ecology and Sustainability R. Kingsford	Lecture 2. Sustainability Issues R. Kingsford	Lecture 3. Definitions of Sustainability R. Kingsford		Practical 1 Ice Breaker	
Week 2 Feb 21st-27th	Lecture 4. Environmental Science R. Kingsford	Lecture 5. Distribution and Abundance of organisms H. Bates	Lecture 6. Biodiversity in Australia H. Bates			
Week 3 Feb 28th March 6th	Lecture 7. Carbon, Water and Nitrogen R. Kingsford	Lecture 8. Waters, Rivers and Rivers Regulation R. Kingsford	Lecture 9. Land Degradation in Australia A. Kwok	Online Q and A	Practical 2 Centennial Park	
Week 4 March 7th-13th	Lecture 10. Disturbance Ecology R. Kingsford	Lecture 11. Exotic Animal Species R. Kingsford	Lecture 12. Invasive Plant Species Tanya Mason		Practical 3 Randwick Environment Park	Mid-term test Due- Sunday 13th
Week 5 March 14- 20th	Lecture 13. Fire and Ecosystems M. Ooi	Lecture 14. Trade in Biodiversity D. Robinson	Lecture 15. Climate Change in Australia H. Bates	Online Q and A	Practical 4 Biodiversity Measurement (Leaf litter lab)	Report: Introduction (section) Due - Sunday 20th
Week 6 March 21st-27th	Flexibility week 21st-27th March				NO LAB	
Week 7 March 28th- April 3rd	Lecture 16. Bio signals K. Brandis	Lecture 17. Pollution in Marine Ecosystems G. Clarke	Lecture 18. Future of Australian Terrestrial Ecosystems M. Archer	Online Q and A	Practical 5 Landscape Investigations Computer lab	Report: Methods and Results (sections) Due- Sunday 3rd

BIOS1301 schedule for T1, 2022 continued

Week Date	Lecture 1 Async	Lecture 2 Async	Lecture 3 Async	Online Content	Lab 3h	Assessment
Week 8 April 4th-10th	Lecture 19. Biodiversity Management H. Bates	Lecture 20. Fisheries Management I. Suthers	EASTER Weeks 8 and 9 15th-18th April		Practical 7 Presentation prep	Report: Discussion, Abstract and Reference (sections) Due Sunday 10th
Week 9 April 11th-17th	Lecture 21. Wildlife Harvesting R. Kingsford	Lecture 22. Conservation Policy and Management R. Kingsford	Lecture 23. Protected Area Management R. Kingsford	Online Q and A	Practical 8 Group Presentations	Group Presentations Due in class
Week 10 April 18th-24th	No lectures	No Lectures	No Lectures	Q and A Session with Industry	Practical 6 Measurement Techniques	Report: Final changes due Monday 18 th

5. Assessment

5.1 Assessment tasks and feedback

See Moodle for full details of all assessments, including instructions and marking rubrics

Assessment task	Knowledge and abilities assessed	Assessment criteria	% of total mark	Due date	Feedback
Assessment 1: Threats to global diversity presentation	Knowledge of research topic. Creativity, science communication skills, research skills, ability to work as a member of a group, presentations, and communications skills.	Quality and presentation of information conveyed. Creativity, ability to work as a member of a team, presentation and communication skills.	15%	Week 9 – in class	Week 9 – marks and comments, via Moodle
Assessment 2: Biodiversity Report- <ul style="list-style-type: none"> • Introduction 10% • Methods and Results 10% • Discussion, abstract and References 20% • Final Edits 5% 	Research skills, group work, data analysis, report writing skills.	Written presentation, analysis, framework for scientific report, references, accuracy of answers and overall conclusions. Ability to implement feedback to show improvement and skill development (learning development).	45%	Week 5- Introduction Due Sunday 20th March Online via Moodle Week 7- Methods and Results Due Sunday 3rd April Online via Moodle Week 8- Discussion Due Sunday 10th April Online via Moodle Week 10- Final Due Monday 18th Online via Moodle	Week 7- Introduction Online via Moodle and in class Week 8- Methods and Results Online via Moodle and in class Week 9- Discussion Online via Moodle and in class Week 10- Final Online via Moodle
Assessment 3: Mid test (multiple choice lecture quizzes)	Understanding of lecture content	Ability to answer questions correctly	15%	Week 4 – by Sunday 13th March	Week 5 via Moodle
Assessment 4: Final exam (short answer response)	Understanding of lecture content	Ability to answer questions correctly and provide examples (case studies) where appropriate	25%	Exam period, TBA	Final grade

Further information: UNSW grading system: student.unsw.edu.au/grades UNSW assessment policy: student.unsw.edu.au/assessment

5.3 Submission of assessment tasks

Please see Moodle for detailed instructions for assessment submission. Generally, all written assessments are to be submitted electronically via Moodle. Videos are to be submitted via YouTube link via the course email – see Moodle for detailed instructions closer to submission date.

If, due to sickness or some equally compelling reason, you must miss a practical the first thing you should do is contact Hayley Bates via the course email in the same week as the missed day in order to see if it is possible to slot you in with another class. One day of sickness does not grant an automatic one-week extension. If your absence is on the day of a test or examination, a zero mark will be recorded unless a medical certificate covering that day is submitted via special consideration. If your certified absence is from a test or examination, you must be prepared to do an equivalent assessment in subsequent weeks. Like all rules, these may not fit every situation. If you have a problem that is not covered, please ask Hayley Bates or e-mail Bios1301@unsw.edu.au. Most problems are easily solved with timely notice.

Assignments submitted after the due date will be penalised at the rate of 5% per day unless accompanied by a medical certificate and special consideration application. All outstanding assignments must be handed in by the end of Week 10. Work will only be accepted after this date if accompanied by a special consideration application. (**This is School 'policy'.**)

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect, responsibility and courage.¹ At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site student.unsw.edu.au/plagiarism, and
- The *ELISE* training site subjectguides.library.unsw.edu.au/elise

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: student.unsw.edu.au/conduct.

¹ International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

7. Readings and resources

Course manual

BIOS 1301 Ecology and Sustainability. Available on the Moodle course page.

Textbooks

No textbook is specified for this class but there is a list of suggestions of textbooks that will be held in the library for use throughout the semester by students:

Attiwill, P. & Wilson, B. (2003). Ecology: an Australian perspective. Oxford University Press, Melbourne.

Botkin, D.B. & Keller, E.A. (2011). Environmental Science: Earth as a Living Planet (8th Edition). John Wiley and Sons

Campbell, N. A. & Reece, J. A. (2011). Biology, 9th Edition. Benjamin/Cummings, San Francisco, and Augee, M.L. & Fox, M. (1999). Biology of Australia and New Zealand. Benjamin Cummings, Redwood City (a supplement to Campbell *et al.*)

Keith, D. (2004). Ocean shores to desert dunes. The native vegetation of NSW and the ACT. NSW Department of Environment and Conservation, Sydney.

As well, you will have access to particular scientific papers suggested by individual lecturers.

A biological dictionary can be very useful. The campus book shop usually has several different dictionaries. Highly recommended is "Henderson's Dictionary of Biology 14th edition (2008) Pearson: Benjamin Cummings".

Other materials

Other useful materials, including additional readings, recommended internet sites, and societies, will be provided via the Moodle page

8. Administrative matters

Academic matters

The first contact for help with course work is a demonstrator (i.e. the person who is present at one of the practical sessions). Consult the demonstrator if you have any difficulty with the subject material. In some cases, your demonstrator will also be the laboratory supervisor, or alternatively a demonstrator may refer you to the supervisor or the course convenor (H. Bates). Outside of class time all BIOS1301 enquires should be directed to **BIOS1301@unsw.edu.au**

School information	<p>For support with administrative matters:</p> <p>Current student please consult: unsw.to/webforms Future student please consult: https://www.futurestudents.unsw.edu.au/ask-question</p> <p>Alternatively you can contact Hayley Bates via the course email BIOS1301@unsw.edu.au</p> <p>There is also a wealth of information for students on the School's web site http://www.bees.unsw.edu.au/. Depending on your interest, you can find out</p>
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	<p>about courses, future postgraduate opportunities and even the research areas of your lecturers</p>
<p>Occupational Health and Safety</p>	<p>UNSW takes matters of Work Health and Safety policies very seriously. You should be aware of your responsibilities (http://www.safety.unsw.edu.au/).</p> <p>General conduct</p> <p>A laboratory is for serious work not horseplay. Eating, drinking or smoking in laboratories is not allowed. Further- no food should be brought into a laboratory. Students must read the instructions to their laboratories carefully beforehand and be aware of all possible hazards.</p> <p>No undergraduate students will be allowed to work in the laboratories outside class hours without permission and some supervision.</p> <p>All accidents and injuries must be reported to the lecturer or demonstrator in charge of the practical class for treatment if necessary. A 'Hazard/Incident' report should be filled in if an accident or incident occurs without causing an injury. With injury, an additional 'Injury/Loss of Time' report is also required.</p> <p>Never dispose of broken glass or other dangerous rubbish in waste paper baskets. Put broken glass into bins marked 'broken glass' and other sharp objects labelled 'sharps' or 'contaminated sharps'.</p> <p>Laboratory and protective clothing</p> <p>Clothes should protect your body and not be highly inflammable. Laboratory coats are essential in all laboratories. You will be asked to leave if a supervisor feels your attire puts you at risk. Where necessary, safety equipment will be provided and should be used as directed.</p> <p>Closed-in shoes are compulsory so they can give adequate protection against corrosive liquids and cuts. Persons wearing thongs or arriving in bare feet will not be allowed into practical classes.</p> <p>YOU MUST WEAR APPROPRIATE ENCLOSED TOE SHOES (NOT OPEN SANDALS) & A LABORATORY COAT WHILST IN THE LABORATORIES.</p>
<p>Equity and Diversity</p>	<p>Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.studentequity.unsw.edu.au/).</p> <p>Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.</p> <p>Language Difficulties</p> <p>Biology deals with many concepts which have to be explained in words. This requires careful and accurate use of English. In addition, biology, as with any disciplines, has its own specialist language which you will need to learn. In some cases particular words have a specialised use in biology which is different from their everyday meaning.</p> <p>The textbook contains an extensive glossary, and most terms are explained when first introduced. In addition lecturers and demonstrating staff will explain</p>

	<p>new terms. We don't expect you to pick up this new vocabulary instantly, but eventually it will become second nature.</p> <p>If you do not have a good command of English you may find the course difficult. UNSW provides a range of opportunities for you to improve your language skills - if you are having difficulty please contact the Learning Centre</p> <p>Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.studentequity.unsw.edu.au/).</p> <p>Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.</p>		
Student complaint procedure	<p>In all cases you should first try to resolve any issues with the course convenor.</p> <p>If this is unsatisfactory, you should contact the School Student Ethics Officer (A/Prof Stephen Bonser, s.bonser@unsw.edu.au) or the Deputy Head of School (A/Prof Scott Mooney s.mooney@unsw.edu.au) who is the School's Grievance Officer and Designated Officer under the UNSW Plagiarism Procedure.</p> <p>UNSW has formal policies about the resolution of complaints that are available online for review (see https://student.unsw.edu.au/complaints).</p>		
	School contact	Faculty Contact	University contact
	<p>Dr S Mooney Deputy Head of School (Undergraduate Programs) s.mooney@unsw.edu.au Tel: 9385 8063</p> <p>Dr Stephen Bonser Director of Teaching (BEES) s.bonser@unsw.edu.au</p>	<p>Dr Chris Tisdell Associate Dean (Education) cct@unsw.edu.au Tel: 9385 6792</p> <p>or</p> <p>Dr S Mooney Associate Dean (Undergraduate Programs) s.mooney@unsw.edu.au Tel: 9385 8063</p>	<p>Student Administration in the Office of the Pro-ViceChancellor (Students). clare.jones@unsw.edu.au Tel: 9385 3087</p> <p>University Counselling and Psychological Services3 Tel: 9385 5418 counselling@unsw.edu.au</p>

9. Additional support for students

- The *Current Students Gateway*: student.unsw.edu.au
- Academic Skills and Support: student.unsw.edu.au/skills
- Student Wellbeing, Health and Safety: student.unsw.edu.au/wellbeing
- Disability Support Services: student.unsw.edu.au/disability
- UNSW IT Service Centre: www.it.unsw.edu.au/students