

# Course Outline

## BIOS1301 Ecology and Sustainability

### 1. Information about the Course

NB: Some of this information is available on the [UNSW Virtual Handbook](#)<sup>1</sup>

<b>Year of Delivery</b>	20165
<b>Course Code</b>	BIOS 1301
<b>Course Name</b>	Ecology, Sustainability and Environmental Science
<b>Academic Unit</b>	School of Biological, Earth and Environmental Sciences
<b>Level of Course</b>	Level 1
<b>Units of Credit</b>	6 units of credit
<b>Session(s) Offered</b>	Session 1
<b>Assumed Knowledge, Prerequisites or Co-requisites</b>	None
<b>Hours per Week</b>	3 Lectures; 3 hours practical, however in some weeks the practical will run as an optional 1 hour discussion session for revision of material.
<b>Number of Weeks</b>	12 weeks
<b>Commencement Date</b>	7/03/2016

### Summary of Course Structure (for details see 'Timetable-Course Schedule')

Component	HPW	Day	Time	Location
<b>Lectures</b>	3			
Lecture 1		Monday	1pm – 2pm	Mathews Theatre B
Lecture 2		Thursday	5pm– 6pm	Mathews Theatre B
Lecture 3		Friday	2pm – 3pm	Mathews Theatre B
<b>Laboratory</b>	3 (but only 5 labs)			
Lab – Option 1		Tuesday	10 am -1 pm	Varies (see p. 7-9)
Lab – Option 2		Tuesday	2 pm -5 pm	Varies (see p. 7-9)
Lab – Option 3		Thursday	10 am -1 pm	Varies (see p. 7-9)
Lab – Option 4		Thursday	2pm-5 pm	Varies (see p. 7-9)

#### Library Tutorial - online

**Total hours:** 35 Lectures; 15 hours Practical; 5 hours In Lab Tutorial (optional); 1 hour Online Library Tutorial

### 2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
<b>Course Coordinator</b>		<b>Professor Richard Kingsford</b>	(room 567, Biological Science Bldg); bios1301@unsw.edu.au	To be organised via email
<b>Additional Teaching Staff</b>	Guest Lecturers	You will also have other lecturers from the University and from others working in conservation and environmental science. These people will give you different perspectives as well as bring real life experience to your course. This is deliberately done to expose you to a wide range of practitioners working in environmental science so that you can think about the applications of your study. Many of the visiting lecturers are practicing environmental scientists dealing with environmental problems in non-government organizations and within government (e.g. NSW Office of Environment and Heritage).		
	Assistant Coordinator	<b>Hayley Bates</b>		
	Lead Demonstrators	<b>Tegan Gale</b>		
	Technical & Laboratory Staff	Rosa Ascencio and Hayley Bates		

<sup>1</sup> UNSW Virtual Handbook: <http://www.handbook.unsw.edu.au/2012/index.html>

### 3. Course Details

<p><b><u>Course Description</u></b><sup>2</sup> (Handbook Entry)</p>	<p>This course provides an introduction to ecology, sustainability and environmental science, introducing a range of biological topics and how scientists approach these topics to solve problems.</p> <p>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.</p>
<p><b><u>Course Aims</u></b><sup>3</sup></p>	<p>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.</p> <p>Environmental science is a discipline that can address these problems and also provide potential solutions for management and policy decisions.</p> <p>This course will give you a good background in the full range of environmental issues and their effects on biodiversity and sustainability.</p> <p>There are five components in the Ecology, Sustainability and Environmental Science course:</p> <ol style="list-style-type: none"> <li>1) lectures which outline the main elements of the environment, problems of sustainability and ways of addressing these with environmental science;</li> <li>2) practical classes which provide "hands on" experience;</li> <li>3) a library tutorial for understanding how to access scientific information;</li> <li>4) various textbooks, which cover basic issues of environmental science; and</li> <li>5) assessment tasks, including an exam.</li> </ol>
<p><b><u>Student Learning Outcomes</u></b><sup>4</sup></p>	<p>You will learn about biodiversity (animals, plants and smaller organisms, ecosystems), the supporting ecological and biogeochemical processes and the major environmental issues in Australia and around the world. The environment also supports us through ecosystem services. Think about the key environmental issues (climate change, clearing of native vegetation, river degradation, salinity, forest management, harvesting of marine resources, effects of exotic species, overharvesting, too much fire) and you will meet them in this course. You will also learn something about how human population and consumption is affecting the environment.</p> <p>Finally, Environmental Science is a rigorous discipline that requires logic and critical thinking and you will learn how this is done. We also cover the potential solutions for sustainable management. The 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.</p> <p>You may decide to specialise as an environmental scientist, 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), 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.</p> <p>UNSW strives for excellence in teaching. Our focus is student learning and how best to create an environment that interests, challenges, and enthuses students. We also want our teaching to be relevant and engaging to prepare you for the future. As a research-led university, we want to approach teaching in a scholarly way: this means</p>

<sup>2</sup> UNSW Handbook: <http://www.handbook.unsw.edu.au>

<sup>3</sup> [Learning and Teaching Unit: Course Outlines](#)

<sup>4</sup> [Learning and Teaching Unit: Learning Outcomes](#)

taking into account research on student learning, drawing upon established good practice in teaching, and encouraging critical reflection on practice. With these principles in mind, the Academic Board has agreed on a set of *Guidelines on Learning that Inform Teaching at UNSW*. This course is designed to challenge your thinking about the role of humans and their interaction with the environment and how this can be informed by environmental science. We will be presenting everyday real world problems and possible solutions. You will have lectures, a tutorial and laboratory classes that will integrate to increase your understanding of ecology, sustainability and environmental science.

The course has three streams: lectures, practicals and tutorials. The various streams re-enforce but do not duplicate each other. The practicals are designed to give you experience in hands-on work. Some of the practicals relate to specific lectures, others stand alone. Practical are not run every week so you need to check your timetable. In the weeks in which practical are not held a 1 hour tutorial will run. These tutorials will give you an opportunity as a student to discuss many of the issues raised during the lectures.

The lectures, practicals and tutorials are underpinned by a range of other resources:

- Various reference books (held on reserve in the Biomedical Library). You are encouraged to explore the textbooks to reinforce what you have learnt in lectures.
- Moodle - this contains material related to the lectures and tutorials

While we provide guidance to the links between the various components we expect that you will discover them yourself. One of the differences between school and university is that you have much more responsibility for developing an understanding of the course.

### Graduate Attributes Developed in this Course<sup>5</sup>

#### Science Graduate Attributes<sup>5</sup>

#### Select the level of FOCUS

0 = NO FOCUS  
1 = MINIMAL  
2 = MINOR  
3 = MAJOR

#### Activities / Assessment

Research, inquiry and analytical thinking abilities

**3**

Technical competence and discipline specific knowledge. Ability to construct new concepts or create new understanding through the process of enquiry, critical analysis, problem solving, research and inquiry.

Capability and motivation for intellectual development

**3**

Capacity for creativity, critical evaluation and entrepreneurship. Ability to take responsibility for and demonstrate commitment to their own learning, motivated by curiosity and an appreciation of the value of learning.

Ethical, social and professional understanding

**2**

Ability to critically reflect upon broad ethical principles and codes of conduct in order to behave consistently with a personal respect and commitment to ethical practice and social responsibility. Understanding of responsibility to contribute to the community. Respect and value social, multicultural, cultural and personal diversity.

Communication

**2**

Effective and appropriate communication in both professional (intra and inter disciplinary) and social (local and international) contexts.

Teamwork, collaborative and management skills

**2**

Ability to recognise opportunities and contribute positively to collaborative scientific research, and to perceive the potential value of ideas towards practical applications. Demonstrate a capacity for self-management, teamwork, leadership and decision making based on open-mindedness, objectivity and reasoned analysis in order to achieve common goals and further the learning of themselves and others.

Information literacy

**3**

Ability to make appropriate and effective use of information and information technology relevant to your discipline.

<sup>5</sup> Contextualised Science Graduate Attributes: <http://www2.science.unsw.edu.au/guide/slatig/sciga.html>

**Major Topics  
(Syllabus Outline)**

This is the structure of the course and lets you know what you are to learn. The lectures will be given primarily by academics from) the School of Biological, Earth and Environmental Sciences but we will also bring in specialist scientists from Government Agencies, the University and other organisations to give you some idea of environmental scientists with jobs and the world's environmental problems and solutions. Always refer to this module to see where lectures fit. Sometimes they will not be sequential as consideration has to be made for some of the outside lecturers who have busy schedules.

There are five modules with different numbers of lectures in each. Not all lectures will be sequential. You will see from this presentation that this is the framework of the course. Unless specified, lectures will be from Associate Lecturer Hayley Bates.

**Module 1 - Introductory**

- Introduction
- Sustainability Issues
- Definitions of Sustainability
- Environmental Science 1
- Environmental Science 2
- Scientific Literature

**Module 2 – Life's fundamental processes**

- Evolution (Dr Gilad Bino)
- Carbon Cycle
- Nitrogen Cycle
- Hydrological Cycle
- Environmental Microbiology (Dr Suhelen Egan)

**Module 3 – Biodiversity and landscape processes**

- Land Cover Change- global and Australian environment (Professor Andy Pitman)
- Native Vegetation Conservation & Management (Professor David Keith)
- Distribution and Abundance of Organisms (Hayley Bates)
- Water and Rivers
- Biodiversity in Australia (Hayley Bates)
- Land Degradation in Australia (Dr Alan Kwok)

**Module 4- Disturbance Ecology and impacts of threats**

- Disturbance Ecology
- River Regulation
- Water Quality - cyanobacteria (Professor Brett Nielan)
- Climate Change and Australian Ecosystems (Professor Lesley Hughes)
- Exotic Animal Species
- Pollution in Marine Ecosystems (Dr Graeme Clarke)
- Invasive Plant Species: a threat to conservation (Dr Tanya Mason)
- Fire and Ecosystems (Dr Mike Letnic)
- Harvesting Wildlife

**Module 5– Management of ecosystems within the context of ecologically sustainable development**

- Trade in Biodiversity – (Dr Dan Robinson)
- Future of Australian Terrestrial Ecosystems (Professor Mike Archer)
- Role of Zoos in Conservation (Dr David Slip, Taronga Conservation Society)
- Non-Government Conservation Organisations (Dr Jacinta Green)
- Conservation Policy and Management )
- Challenges in Managing Antarctica – (Assoc. Prof. Tracey Rogers)
- Fisheries Management (Dr James Smith)
- Protected Area management

**Relationship to Other Courses within the Program**

This course is a six unit credit course in Semester 1 in Stage 1 of your degree. It will equip you for a number of different courses in Environmental Science and other courses in the University.

#### 4. Rationale and Strategies Underpinning the Course

**Teaching Strategies****Lectures**

There are three lectures a week. Lectures cover a lot of ground on global environmental problems as well as basic ecology. Lecturers are usually active in research and have well-established reputations in the fields in which they teach. At UNSW the people who teach you biology have made significant contributions to your area of study.

Some lectures will be given by guest lecturers from outside of UNSW. This means their information will give you a different perspective that is usually from someone working in conservation biology. It is also examinable like the rest of the material presented in lectures.

We do not take the roll at lectures but you would be surprised how much a lecturer notices from the front. It is up to you to attend and learn. There is also a positive relationship between attendance at lectures and final results. We need to make sure that we cater in our lecturing for the range of differences in background knowledge of first year students. So, the lectures will aim to encourage students with little or no background in biology. That means you **do not** treat lectures as a time to catch up on your social life. There are plenty of other times and places for this. It is also rude to your fellow students who want to follow the lecture and the lecturer. Disruption of lectures by talking, or other inappropriate behaviour, constitutes academic misconduct and we have to deal with those of you who continue to cause problems. Material in lectures may not be covered anywhere else, so you are strongly encouraged to attend lectures. **Don't forget to turn your mobile phones off during lectures, practicals and tutorials.**

### Practicals - general information

More specific information for each of the practicals can be found in the later sections devoted to these practicals. All practical sessions are for three hours. There is a mixture of self-guided and set practical sessions.

Set practical sessions of three hours occur on one of Tuesday 10am-1pm, 2pm-5pm, Thursday 10am-1pm, or 2pm-5pm. You must attend one of these sessions when there is a set practical class. There are four set practicals in weeks 3, 4, 5 and 6. The fifth practical is self-guided and you can do at any time, including the practical times. It is designed primarily for weeks 7-9. It is a self-guided practical that goes to the zoo and incurs the cost of entry (\$36.00 for concession). At other times, there is a library tutorial that you will be able to do on Moodle. Make sure you do this as it counts towards your assessment.

You need to check and enrol in the practical sessions. There are limited places in each practical time slot. You have to pick a time for your laboratory and stick to that time. Numbers may be limited for some and so spots will be allocated on a first in first serve basis. With limited places in the laboratories for students, you may not get your first choice of laboratory times. Read the instructions in advance for each practical set out in the Practical section of this guide. Practical will not be held every week but you must attend when they occur. The roll will be marked. For each of practicals 1 to 4 there will be a short four-question pre-lab quiz released one week in advance to be completed before each practical via Moodle.

The practical aspect of biology is so important that participation in practical classes is a fundamental requirement for the award of a pass. Should you be unable to attend your practical class for any reason, you should contact the BEES Student Office to arrange an alternate time **in the same week**. For unavoidable absences from practical classes that cannot be made up at an alternate time, you **must** contact the office and provide a medical certificate. 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 an essential element of the subject.

This practical course is designed to explore just some of the many different ways of investigating ecology and sustainability as an environmental scientist. It is divided into five different practicals that will be linked to the lecture course.

Each practical comes with an outline in this course book. You will have tutors to help you. There are a series of questions and exercises that you will need to answer for each of the practicals.

For practical classes held in the lab you must bring:

- BIOS 1301 Ecology and Sustainability Manual. Read the instructions in advance for each practical as there will be pre-lab quizzes.
- 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 HD pencil, eraser and ruler.

### Rationale for learning and teaching in this course<sup>6</sup>,

Presentation of contemporary topics in lectures by leading researchers and practitioners is intended to build enthusiasm and learning in students. Case studies are discussed. Students are taught to be critical about information. In addition the practical course is intended to introduce students to the environment and ways in which different aspects of the environment and biodiversity can be measured.

<sup>6</sup>Reflecting on your teaching

[http://learningandteaching.unsw.edu.au/content/LT/course\\_prog\\_support/guidelines.cfm?ss=2](http://learningandteaching.unsw.edu.au/content/LT/course_prog_support/guidelines.cfm?ss=2)

