



FACULTY OF SCIENCE

SCHOOL OF BEES

BIOS 2011

Evolutionary and Physiological Ecology

SESSION 1, 2022

Faculty of Science - Course Outline

1. Information about the Course

Year of Delivery	2022			
Course Code	BIOS 2011			
Course Name	Evolutionary and Physiological Ecology			
Academic Unit	School of Biological, Earth and Environmental Sciences			
Level of Course	Second year			
Units of Credit	6 UOC			
Session(s) Offered	Session 1			
Assumed Knowledge, Prerequisites or Co-requisites	BIOS 1101			
Hours per Week	7 HPW			
Number of Weeks	10			
Commencement Date	February 14			
Summary of Course Structure (for details see 'Course Schedule')				
Component	HPW	Time	Day	Location
Lectures	2			
<i>Lecture 1</i>	1	4-5pm	Wednesday	Online
<i>Lecture 2</i>	1	1-2pm	Thursday	Online
Laboratory	4			
<i>Laboratory 1</i>	2	12-2pm	Friday	E26 Lab 6
<i>Laboratory 2</i>	2	3-5pm	Friday	E26 Lab 6
TOTAL	6			

2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
Course Convener		Michael Kasumovic	Room 5105, E26 m.kasumovic@unsw.edu.au	By appointment
Additional Teaching Staff	Additional Lecturers and practical teaching	Suhelen Egan	Level 4, E26	By appointment
	Additional Lecturers	Terry Ord	Level 5, E26	By appointment
	Additional Lecturers	Will Cornwell	Level 5, E26	By appointment
	Technical & Laboratory Staff	Bernadette Phu	Room LG015, E26	By appointment

3. Course Details

Course Description (Handbook Entry)	Introduction to functional relationships between living organisms and the environments in which they live. Emphasis on interactions within and between populations, ecological energetics, ecophysiology, and the theory of evolution by natural selection. Plants, animals and microbes are covered. Also serves as an introduction to the process of scientific enquiry. Assumed knowledge: BIOS1101.
Course Aims	<ul style="list-style-type: none">• To illustrate how organisms relate to and interact with their environment, including other organisms.• To consider the adaptive challenges that individuals face and the ways in which evolution by natural selection shapes species to meet those challenges.• To explore how biological <i>processes</i> result in the observable and measurable <i>patterns</i> that we see in the living world.• To demonstrate the relationships between three primary levels of biological organisation; the individual organism, populations of individuals, and communities of species.
Student Learning Outcomes	At the end of this course students should be able to: <ul style="list-style-type: none">• Demonstrate an understanding of key ecological and evolutionary concepts• Undertake biological research, including the design experiments and the analysis, interpretation and presentation of their results and collaboration.• Communicate their understanding of the scope of fundamental knowledge of ecology and evolution and its importance and usefulness to society.• Collaborate with team members to explore the relevance of ecology and evolution to contemporary issues in society.• Understanding how science relates to entrepreneurship• Improve understanding and discussion around primary literature

Graduate Attributes Developed in this Course		
Science Graduate Attributes	Select the level of FOCUS 0 = NO FOCUS 1 = MINIMAL 2 = MINOR 3 = MAJOR	Activities / Assessment
Research, inquiry and analytical thinking abilities	3	Through multi-stage experiments, which develop through several practicals, we build your research skills. Your work will culminate in written reports for each of these research projects. Your reports are to be handed in during session or included as part of your <i>Laboratory Manual</i> which will be assessed at the end of session. Through the experiments you will develop your ability to analyse and interpret data, as well as communicate scientific findings. Prior to submission you will have the opportunity to improve your work through peer-feedback and feedback from demonstrators and lectures.
Ethical, social and professional understanding	2	Emphasise on the societal impact of key ecological and evolutionary concepts are a key part of the <i>Science entrepreneurship Project</i> . You will approach this project as a team. It is assessed in 3 parts including a business plan, grant application, and a verbal presentation.
Communication	3	You will develop skills in writing and reporting to a 'scientific' audience through the reports in your <i>Laboratory Manual</i> as well as writing and presenting to a professional 'industry' and 'community' audience through your group <i>Science entrepreneurship</i> project.
Teamwork, collaborative and management skills	3	We will assist you in developing skills in teamwork and collaboration through several devices in the <i>Science entrepreneurship</i> project. You will be formally assessed on your and your group-mates involvement in the project.
Information literacy	2	Lecture material will be assessed by a final exam at the end of the session.

Major Topics (Syllabus Outline)	<ul style="list-style-type: none"> • Adaptation and speciation • The evolution of life histories • Population dynamics. • Predator/prey and herbivore/plant interactions • Animal behaviour • Competition • Community ecology
Relationship to Other Courses within the Program	EPE is a key introductory course to all upper year biology courses. Course content, experimental design, data interpretation, and science communication skills developed in EPE are all required for advanced courses in biology, and biology honours students.

4. Rationale and Strategies Underpinning the Course

Teaching Strategies	<p>Strategies:</p> <ul style="list-style-type: none">• A series of lectures in which major concepts and principles in ecology and evolution are presented, illustrated and discussed.• Weekly laboratory classes, in which you design, conduct, analyse and interpret experiments. There will be a major assessable report as your Laboratory Manual• A collaborative learning program on how ecological and evolutionary knowledge is applied to practical problems and an exploration of the scope for science to help resolve important and controversial social issues – <i>Science entrepreneurship</i> project: a group project exploring contemporary issues in ecology and evolution.
Rationale for learning and teaching in this course, i.e., How this course is taught?	<ul style="list-style-type: none">• Science is about research and continual improvement in knowledge, not a collection of facts. To this end we will deliberately strive to create an atmosphere of intellectual excitement and to relate what we teach to excellent scientific research.• EPE is a demanding course, and we expect a lot of our students. In order to benefit from it you will need to be extremely proactive in class work, group work and your independent study. You are now part of a learning community that includes your group mates, your demonstrator and your lecturers. Be an active member.• We suggest you take full advantage of the program and attend all lectures to follow the full development, explanation and linkage of concepts. Outlines of or slides from each lecture will be posted on the Moodle site, but we do not provide “lecture notes” on the web or in any other form. The outlines we provide are to act as a record of the content covered, and are in no way a substitute for lecture attendance.• Additional reading material consisting of pertinent scientific research articles are also provided on the Moodle site for those students who would like to extend their engagement.

5. Course Schedule

	Date	L	Lectures*	P	Practical	P	Practical	Assessment schedule	
Week 1	Feb-14	1	Decomposition 1	0	DECOMPOSITION 1- Lab introduction & experimental planning	1	<i>DECOMPOSITION 2 - Design experiment, review materials prepare plan for submission</i>	Decomposition - Experimental Design (5%)	
		2	Decomposition 2						
Week 2	Feb-21	3	Plant adaptations - Physiology	2	<i>DECOMPOSITION 3 finalise experimental plans. Make bags</i>	3	DECOMPOSITION 4 - Make and fill bags and bury		
		4	Animal adaptations - Physiology						
Week 3	Feb-28	5	Food webs & energy flow	4	<i>STUDENT PAPER DISCUSSION 1 - Presentation group 1</i>	5	ENTREPRENEURSHIP: Problem-solution fit canvas	Discussion Paper Reflection (7.5%)	
		6	Trophic cascades & community ecology						
Week 4	Mar-07	7	How communities are formed	6	STUDENT PAPER DISCUSSION 2 - Presentation group 2	7	ENTREPRENEURSHIP: Lean Canvas	Discussion Paper Reflection (7.5%) Lean Canvas (5%)	
		8	Interspecific competition						
Week 5	Mar-14	9	Host-parasite interactions	8	<i>Exploring our DECOMPOSITION Data</i>	9	DECOMPOSITION 5 - Revise decomp samples activities for next lab. Review basic lab skills, begin preparation of serial dilutions	Entrepreneurship grant (10%)	
		10	Data Analysis Refresher						
Week 6	Mar-21	No classes							
Week 7	Mar-28	11	Biodiversity	10	<i>DECOMPOSITION 6 - (i) Retrieve and wash bags, (ii) sort and bag inverts, (iii) serial dilutions and plate bacteria.</i>		DECOMPOSITION 7 - (i) sort and bag inverts, (ii) serial dilutions and plate bacteria.	Decomposition - Intro and Methods (10%)	
		12	Ecology vs. Evolution						
Week 8	Apr-4	13	Natural Selection		DECOMPOSITION 8 - (i) Weigh dried bags, (ii) analyse bagged inverts, (iii) conduct gram stains. (discuss feedback from intro and methods for report)	11	<i>DECOMPOSITION 9 - (i) Weigh dried bags, (ii) analyse bagged inverts, (iii) conduct gram stains/ data analysis</i>		
		14	Sexual Selection						
Week 9	Apr-11	15	Life-history trade-offs	12	NO CLASS PUBLIC HOLIDAY GOOD FRIDAY	13	NO CLASS PUBLIC HOLIDAY GOOD FRIDAY		
		16	Speciation						

Week 10	Apr-18	17	Radiation	14	<i>Final class- groups to work on data analysis and interpretation for Decomp and/or other aspects of course</i>	15	Final class- groups to work on data analysis and interpretation for Decomp and/or other aspects of course	Full Decomposition Report (25%) due May 3rd
		18	Recap					

*All lectures are online

6. Assessment Tasks and Feedback

See lab manual for full details of all assessments

Task		Knowledge/skills assessed	% of total mark	Date of		Feedback		
				Release	Submission	WHO	WHEN	HOW
Laboratory Projects	Project Outline	Skills for understanding and undertaking biological research - including the design of experiments and the analysis, interpretation and presentation of their results. Analysis, interpretation and scientific report writing	5	Week 1	Week 1	TurnItIn	Week 2	Online
	Draft Introduction and Methods		10		Week 7		Week 9	
	Final report		25		Week 11		Week 12	
Science Paper Discussions	Reflection x 2	Lead discussions about scientific papers and explore what makes a scientific study good or bad. You will learn how to critique science papers and how papers vary in how they present information.	15 (7.5 each)	Week 2	Week 3	TurnItIn	Week 5	Online
				Week 4	TurnItIn			
Biological start-up	Lean Canvas	Explore scientific entrepreneurship by developing a scientific start-up linking concepts in ecology and evolution to government and industry. You will be assessed on creativity, the scientific and practical basis of the ideas.	5	Week 2	Week 4	TurnItIn	Week 5	Posted on Moodle, marks and comments
	Grant writing		10		Week 5	TurnItIn	Week 7	
Lecture (theory) quizzes	Fundamental knowledge of ecology and evolution and importance and use to society	Short answer and essay style answers quality of answers (strength of ideas, etc). This will test your understanding of fundamental ecological and evolutionary concepts	30	Each week		Online	At the end of each week	Posted on Moodle, marks and comments

Note: If your assignment is handed in late, you will lose 5% per day past the due date at a limit of 5 days unless you have authorised special consideration.

7. Additional Resources and Support

Text Books	<p>There are no required textbooks, but these are available:</p> <p>Cain.M.L., Bowman,W.D. & Hacker S.D. 2008. <i>Ecology</i>. Sinauer Associates, Inc. Massachusetts.</p> <p>Kardong, K.V. 2005. An introduction to Biological Evolution. McGraw Hill. New York.</p> <p>OPEN RESERVE BOOK LIST</p> <ol style="list-style-type: none"> 1) Begon, M., Harper, J. L. and Townsend, C. R. (1996) <i>Ecology :Individuals, Populations and Communities</i>. 3rd Edition. (Blackwell : Oxford) 2) Stiling, P. (1992). <i>Introductory Ecology</i>. Prentice Hall, NJ. 3) Ridley, M. <i>Evolution</i>
	A course manual will be made available to the students in print and/ or online
Additional Readings	Your lecturers will attach relevant scientific articles on Moodle along with each of the lectures as pdfs.
Societies	Australasian Evolution Society (http://www.evolutionau.org); Ecological Society of Australia (www.ecolsoc.org.au); Ecological Society of America (www.esa.org)
Computer Laboratories or Study Spaces	Computer rooms are available for student use. Laboratory spaces are available during practical hours only.

8. Required Equipment, Training and Enabling Skills

Equipment Required	You will be required to wear a lab coat and closed toed shoes in the practicals
Enabling Skills - training which maybe required to complete this course	Students are required to observe OHS regulations during the practicals.

9. Course Evaluation and Development

Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible. This course outline conveys how feedback has helped to shape and develop this course.

Mechanisms of Review	Last Review Date	Comments or Changes Resulting from Reviews
Major Course Review	2020	EPE underwent a major revision of assessment to increase interactive and hands-on student learning.
CATEI	2020	Course CATEI reviewed in 2020. Your comments on the course are critical in this process.

10. Administration Matters

Expectations of Students	<ul style="list-style-type: none"> EPE is a demanding course, and we expect a lot of our students. In order to benefit from it you will need to be extremely proactive in class work, group work and your independent study. You are now part of a learning community that includes your group mates, your demonstrator and your lecturers. Be an active member. To get the most out of the lecture content, you will need to complete the weekly online modules before attending the lectures. These are designed to introduce the weekly course content You need to attend all lectures to follow the full development, explanation and linkage of concepts. Outlines of or slides from each lecture will be posted on the Moodle site, but we do not provide "lecture notes" on the web or in any other form. The outlines we provide are to act as a record of the content covered, and are in no way a substitute for lecture attendance. Science is about research and continual improvement in knowledge, not a collection of facts. We aim to create an atmosphere of intellectual excitement and to relate what we teach to excellent scientific research.
Assignment Submissions	<p>Assessments will be submitted or presented in the Practicals; see the Tables 'Assessment Tasks and Feedback' and 'Course Schedule' for the dates and locations.</p> <p>The final examination will be scheduled by the examinations branch. Students should be available for examination throughout the entire UNSW end of year examination period.</p> <p>Supplementary examinations will only be granted to students who miss the final examination due to illness or other unexpected reasons outside their control.</p>

	<p>A student who wishes to apply for a supplementary examination should contact one of the course convenors as soon as the problem becomes apparent.</p> <p>If a supplementary examination is granted, it will be held before the beginning of the next session. Until then, you should maintain a current address with SIS, and be available for contact and assessment.</p>		
Occupational Health and Safety	<p>Information on relevant Work Health and Safety policies and can be found on the following websites https://safety.unsw.edu.au/ http://www.bees.unsw.edu.au/health-and-safety</p>		
Equity and Diversity	<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 convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit: https://student.unsw.edu.au/disability or phone 9385 4734</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. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: https://www.adcet.edu.au/inclusive-teaching/</p>		
Grievance Policy	School Contact	Faculty Contact	University Contact
	<p>Arrange an appointment via the school of BEES undergraduate office</p>	<p>Associate Dean (Education) or Associate Dean (Undergraduate Programs) Vacant at time of printing</p>	<p>Student Central studentcentral@unsw.edu.au Tel: 9385 8500</p> <p>University Counselling Services Tel: 9385 5418</p>

10. UNSW Academic Honesty and Plagiarism

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.

*Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

<https://student.unsw.edu.au/plagiarism>

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle

† Adapted with kind permission from the University of Melbourne.