UNSW SYDNEY

Faculty of Science
School of Biological, Earth and Environmental Sciences

BIOS3091 | MSCI9001
Marine & Aquatic Ecology

Term 3 2020


Photo: Adriana Vergés

Contributions from:
A/ Prof Adriana Vergés, Prof Alistair Poore,
Prof Peter Steinberg, Prof Emma Johnston

BIOS3091 | MSCI9001

Marine and aquatic ecology

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Course information

Year of Delivery	2020		
Course Code	BIOS3091 & MSCI9001		
Course Name	Marine and Aquatic Ecology		
Academic Unit	School of Biological, Earth and Environmental Sciences		
Level of Course	3rd year, undergraduate		
Units of Credit	6 UOC		
Session(s) Offered	T3		
Assumed Knowledge, Prerequisites or Co-requisites	MSCI2001 or BEES2041		
Hours per Week	6		
Number of Weeks	10		
Commencement Date	Tuesday 14th September, 2020		
Summary of Course Structure (for details see 'Course Schedule')			
Component	**HPW**	**Time & Day**	**Location**
Lectures, seminars and debates	3	Monday 11am Tuesday 12pm Wednesday 1pm	Online – please note some sessions are recorded and others are 'live' and interactive, where student participation is required
Fieldwork and/ or laboratory practicals	4	Tuesday 2-6pm	LABS 3-4 E26 and in the field
TOTAL	7		

NB: Some of this information is available on the UNSW Virtual Handbook:
http://www.handbook.unsw.edu.au/undergraduate/courses/2018/BIOS3091.html

Staff Involved in the course

Staff	Role	Name	Contact Details
Course Convenor		A/Prof Adriana Vergés	a.verges@unsw.edu.au Ph: 9385 2110
Additional Teaching Staff	Lecturers & Facilitators	Prof Peter Steinberg A/Prof Alistair Poore Prof Paul Gribben Dr Steph Gardner A/Prof Suhelen Egan Dr Torsten Thomas Prof Tracey Rogers Prof Richard Kingsford Dr Laura Parker	p.steinberg@unsw.edu.au a.poore@unsw.edu.au p.gribben@unsw.edu.au s.gardner@unsw.edu.au s.egan@unsw.edu.au t.thomas@unsw.edu.au tracey.rogers@unsw.edu.au richard.kingsford@unsw.edu.au l.parker@unsw.edu.au
	Tutors & Demonstrators	n/a	n/a
	Technical & Laboratory Staff	Suzy Evans	s.evans@unsw.edu.au
	Other Support Staff		

Course details

Course Description (Handbook Entry)	Ecology of marine and freshwater systems, emphasising benthic communities. Population and community dynamics of these systems. Evolution of life histories in the light of constraints of aquatic systems. Emphasis on experimental approaches to aquatic ecology. Special topics considered include chemical ecology, plant/herbivore ecology, and applied aspects of the topic such as mariculture. A section on the biology and taxonomy of marine algae (seaweeds) is included. Fieldwork is an important component of the course.
Course Aims	The course is aimed to provide an understanding of the processes that govern the ecology of aquatic habitats with a major emphasis on the ecology of marine coastal systems, and particularly the experimental analysis of benthic communities. Marine systems are then compared to streams and both freshwater and saline lakes.
Student Learning Outcomes	At the end of the course, students should be able to discuss the relative importance of the major ecological processes structuring marine and freshwater communities. They will have experience in each of the steps involved in the ecological research that has given rise to such knowledge. These are: 1) the careful formulation of hypotheses, 2) the design of field experiments and sampling, 3) collection of data, 4) data analysis, and interpretation, and 5) communication of results via scientific reports. Students should be familiar with the application of ecological data to applied problems in marine and freshwater habitats (pollution, habitat loss, overfishing, flow regulation, marine reserves).

Graduate Attributes Developed in this Course

Science Graduate Attributes	**The level of FOCUS** *0 = NO FOCUS* *1 = MINIMAL* *2 = MINOR* *3 = MAJOR*	**Activities / Assessment**
Research, inquiry and analytical thinking abilities	3	Class research projects, Independent research projects (all assessed)
Capability and motivation for intellectual development	3	Students design their own research project (assessed). Links in course materials to current research activities at UNSW
Ethical, social and professional understanding	3	Links in course material to applied problems in marine and aquatic habitats. Recognition that a diverse range of views are held on ecological issues.
Communication	3	Written reports (for scientific audiences), Oral presentations
Teamwork, collaborative and management skills	3	Independent group research project & oral presentations (assessed as report)
Information literacy	0	

Major Topics (Syllabus Outline)	Major topics to be covered include: • experimental marine ecology of rocky shores, kelp forests, soft sediment communities, coral reefs and seagrass beds • ecology of streams and lakes • life histories of marine invertebrates and algae • marine chemical ecology • marine microbiology • applied aspects of marine and freshwater ecology (pollution, disturbance, overfishing, biotechnology and biofouling, marine reserves and flow regulation). • marine conservation biology
Relationship to Other Courses within the Program	BIOS3091 shares its lectures and some assessments with MSCI9001 Conservation in aquatic ecosystems BIOS3091 is intended to complement BIOS3081 Ocean to Estuarine Ecosystems as third year offerings in marine biology. Study of ecological processes and field experimentation also form part of BIOS3601 Advanced Field Biology, BIOS3671 Conservation Biology and Biodiversity, BIOS2011 Evolutionary & Physiological Ecology, and BEES2041 Data Analysis for Life and Earth Sciences. Many honours and postgraduate projects conducted within the school involve research in marine ecology.

Rationale and strategies underpinning the course

Teaching Strategies	The **lectures** are organised around key ecological processes that shape different marine and aquatic habitats (rocky shores, kelp forests, coral reefs, etc) and also focus on current marine conservation issues. Lectures provide the key theoretical concepts and examples of experiments conducted to test hypotheses about the functioning of aquatic habitats. The **practical sessions** and **field trips** provide an opportunity to gain experience in the design, conduct and communication of ecological experiments in the field. The class will conduct one experiment that has already been designed, and groups of students will design their own sampling programs in independent research projects.
Rationale for learning and teaching in this course	The focus on experimental ecology in the lecture and practical material was chosen as it this approach that has been particularly powerful in advancing our understanding of marine and aquatic ecology. The ability to design and conduct rigorous experiments, analyse the resultant data, and communicate the results in written and oral form are skills essential for graduates seeking employment in this field.

Course schedule 2020: Sessions in **blue** are online and recorded (you can watch in your own time) | Sessions in **yellow** are online and 'live' (i.e. interactive – please log on at the appropriate time) | Sessions in **green** are practicals that will take place in the field

Week	Day & date		Lecturer	Topic	PRACTICAL SESSION (Tuesdays 2-6 pm) Lab 3-4 E26
1	Monday 11am	14/9/20	Adriana Vergés & class	Introduction to the course	
	Tuesday 12pm	15/9/20	Adriana Vergés	Species interactions: Herbivory & Predation	Opinions in Ecology debates & Independent Field Projects
	Wednesday 1pm	16/9/20	Paul Gribben	Species interactions: Competition & Facilitation	
2	Monday 11am	21/9/20	Tracey Rogers	Conservation of marine megafauna	
	Tuesday 12pm	22/9/20	Paul Gribben	Marine invaders: Establishment to impact	Whalewatching (Depart from Circular Quay at 1pm)
	Wednesday 1pm	23/9/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 1	
3	Monday 11am	28/9/20	Peter Steinberg	Larval & supply ecology 1	
	Tuesday 12pm	29/9/20	Peter Steinberg	Larval & supply ecology 2	Independent field projects: preparation
	Wednesday 1pm	30/9/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 2	
4	Monday 11am	5/10/20	Peter Steinberg	Kelp forests	
	Tuesday 12pm	6/10/20	Adriana Vergés	Rocky Shores	Independent field projects: fieldwork training
	Wednesday 1pm	7/10/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 3	
5	Monday 11am	12/10/20	Adriana Vergés	Seagrass meadows	
	Tuesday 12pm	13/10/20	Steph Gardner	Coral reefs	Independent field projects: data collection
	Wednesday 1pm	14/10/20	CMSI postgraduates	Research Bites + Q&A	
6	*Monday 11am* *Tuesday 12pm* *Wednesday 1pm*	*19/10/20* *20/10/20* *21/10/20*	*BREAK*		*[Independent field projects: data collection]*
7	Monday 11am	26/10/20	Torsten Thomas	Microbial diversity	
	Tuesday 12pm	27/10/20	Suhelen Egan	Marine holobionts	Marine microbiology
	Wednesday 1pm	28/10/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 4	
8	Monday 11am	2/11/20	Richard Kingsford	Desert Rivers	
	Tuesday 12pm	3/11/20	Richard Kingsford	Freshwater management: problems	Marine microbiology
	Wednesday 1pm	4/11/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 5	
9	Monday 11am	9/11/20	Richard Kingsford	Freshwater management: solutions	
	Tuesday 12pm	10/11/20	Adriana Vergés	Threats to marine populations	Independent field projects: oral presentations
	Wednesday 1pm	11/11/20	Adriana Vergés & class	Opinions in marine ecology DEBATE 6	
10	Monday 11am	16/11/20	Laura Parker	Impacts of climate change on marine ecosystems	
	Tuesday 12pm	17/11/20	Alistair Poore	Algal diversity	Algal diversity
	Wednesday 1pm	18/11/20	CMSI postgraduates & class	Research Bites + Q&A	

BIOS3091/ MSCI9001 | Assessment 2020

Task	Knowledge & abilities assessed	Assessment Criteria	% of total mark	Date of		Feedback		
				Release	Submission	WHO	WHEN	HOW
Opinions in ecology	Ability to read ecological literature critically. Ability to write and present a persuasive argument orally.	Extent of research. Effective written communication of scientific controversy to a wide audience, in writing and orally.	11%	14th Sept	Written article. *On day of assigned debate (9 am)*	A/Prof Adriana Vergés	Two weeks after submission	Marks & written/ oral comments
		Extent of research. Effective persuasive oral communication of scientific controversy to a wide audience	6.5%		Debate. *On day and time of assigned oral debate*			
Independent field project report	Ability to design a sampling program to test specific hypotheses. Ability to plan and conduct ecological research in the field. Ability to write a scientific report and prepare a scientific presentation.	Effective planning of research, including experimental design.	15%	6th Oct	Proposal **12th October** *(5 pm)*			
		Completion of field and/ or lab tasks, correct analysis and presentation of results. Effective communication of results as a scientific paper.	20%		Report **2nd November** *(5 pm)*			
		Effective communication of research and results to a scientific audience.	7.5%		Oral presentation **10th November**			
Final exam*	Knowledge of the ecological processes structuring marine and freshwater habitats. Ability to contrast functioning of ecosystems across habitats studied.	Comprehension of all material covered in lectures, seminars and practical classes	40%	Date set by exam office				

*Attendance at exams is expected. T3 exams have been scheduled for the period 27 Nov - 10 Dec.

Resources for students

Text Books	Connell, SD and BM Gillanders (eds) (2007) *Marine ecology*. Oxford University Press Availability: UNSW bookshop, UNSW library, Open Reserve
Course Manual	You are reading it! (available as pdf from Moodle)
Required Readings	Lecture notes for each section of the course will suggest recommended readings from the text and other sources of information. Reference to studies in the primary literature (i.e. original studies in journal articles rather than textbooks) will form an important part of the course. The following list includes the most important general ecology journals and the major journals that are devoted entirely, or in large part, to marine ecology, freshwater ecology, or marine botany: *Aquaculture, Annual Review of Ecology and Systematics, Aquatic Botany, Botanica Marina, Coral Reefs, Ecological Monographs, Ecology, Ecology Letters, European Journal of Phycology, Freshwater Biology, Hydrobiologia, Journal of Experimental Marine Biology and Ecology, Journal of the Marine Biological Association of the UK, Journal of Marine Research, Journal of Phycology, Limnology and Oceanography, Marine Biology, Marine Ecology Progress Series, Marine and Freshwater Research, Nature, Nature Climate Change, Oceanography and Marine Biology, Annual Review, Oecologia, Oikos, Phycologia, Phycological Research, PNAS, Science, Trends in Ecology and Evolution* (This list is by no means exhaustive, and of course articles are scattered throughout the biological literature).
Additional Readings	Bertness, MD., JF Bruno, BR Silliman, and JJ Stachowicz (eds) (2014). *Marine Community Ecology and Conservation*. Sinauer Associates, Sunderland. Scientific articles and other primary references provided during lectures.
Recommended Internet Sites	**Course web page (Moodle)** Lecture outlines, data sets from practicals, instructions for assessment and other useful resources will be posted throughout the session on the BIOS3091/ MSCI9001 web page. You will need to log on (using your student number and zPass) to Moodle: http://moodle.telt.unsw.edu.au/

Required Equipment, Training and Enabling Skills

Equipment Required	All required equipment will be provided during practicals/ lab sessions.
Enabling Skills Training Required to Complete this Course	**Students are required to observe WHS regulations during the fieldtrip and practicals. Safety should be your top priority during fieldtrips and lab classes.** If you are unsure of any procedures, please consult with staff. All lectures, practicals and seminars/ debates will take place in a laboratory setting, **where wearing covered shoes is compulsory**. During the Microbiology practical sessions held in the laboratory **it is**

	compulsory to wear laboratory coats and covered shoes. Students cannot be admitted to these classes without these items. Additional safety requirements will be announced at the start of each practical. During field trips, it is essential to wear non-slip covered shoes that you are prepared to get wet. Students also need to wear appropriate clothing for the weather e.g. rain jackets if raining or hats and sunscreen if sunny. Extra care must be taken on the rocky shore due to wave action.

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	2019 2010 2008 2006	Changes associated with moving from 12 weeks to 10 weeks under UNSW's T3 has resulted in a change in schedule, with all lectures/ labs and fieldwork concentrated on a single day. Flipped activities and new fieldwork practicals were introduced. Revision of lecture material with greater focus on marine conservation issues (given lecture material is shared with MSCI9001 Conservation in aquatic ecosystems) The change from 14 week to 12 week sessions involved the removal of one of the written reports with assessment of practical exercise being moved to the final exam. Course revised to add independent group research projects and replace oral debates with written Opinions in Ecology essays.
MyExperience		The course is periodically evaluated. The current approach to obtain feedback from students is via MyExperience. While the responses are generally overwhelmingly positive, several changes resulting from these evaluations have been implemented through time, including a reduction in the number of written reports, more fieldwork, more time allocated to the independent research projects, more help to be available on the preparation of written reports, and a reduced value for the final exam.

Administration matters

Expectations of Students	**Attendance at all sessions is expected.**
Assignment Submissions	**School policy for late report submission** For reports submitted up to seven (7) days late, **a 10% per day penalty applies. Reports submitted more than seven (7) days late** will not be marked. If medical grounds preclude submission of a report by the due date, contact should be made with the course convenor as quickly as possible. A medical certificate will be required for Special Consideration and late submissions based on medical grounds and must be appropriate for extension period. **Assignment extensions will not be considered under any other circumstances.**

Health and Safety[1]	Information on relevant Health and Safety policies and expectations at UNSW can be accessed online http://www.safety.unsw.edu.au/staff-student-resources/students Please note that to ensure your safety at UNSW during the COVID-19 pandemic, you must complete the COVID-19 Module on Moodle before the start of term. Please refer to this information at any time during term as needed.
Assessment Procedures	The final examination will be scheduled by the Examinations Office. Students should be available for examination throughout the entire UNSW end-of-session examination period. Supplementary examinations will only be granted to students who miss the final examination due to illness or other unexpected reasons outside their control. A student who wishes to apply for a supplementary examination should contact the course coordinator as soon as the problem becomes apparent, and should apply for special consideration. Special consideration cannot be given for students who have planned or wish to plan any holiday trips or return flights home before the end of the examination period. If a supplementary examination is granted, it will normally 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. For information on examinations see https://my.unsw.edu.au/student/academiclife/assessment/examinations/examinations.html). If illness or misadventure intervenes to prevent a student meeting an assessment deadline or class meeting then he/she should contact the lecturer in charge of the assessment. The conditions for special consideration are given at https://student.unsw.edu.au/special-consideration.
Equity, Diversity & Inclusion	Inclusion is when "a diversity of people (e.g. of different ages, cultural backgrounds, genders) feel valued and respected, have access to opportunities and resources, and can contribute their perspectives and talents to improve their organisation" (Diversity Council Australia, 2019). We aim to create an inclusive classroom environment that enables students to feel supported and a strong sense of belonging, regardless of identity or background. UNSW has numerous resources to assist with this, including: UNSW Ally, Counselling and Psychological Services, Disability Services, International Student Support, Student Support Advisors, The Learning Centre, Nura Gili, Pregnancy and Parenting Support, Diversity Champions. 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 coordinator (A/ Prof Adriana Vergés prior to, or at the commencement of, their course, and with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.studentequity.unsw.edu.au/). UNSW Science also has an Academic Disability Advisor, John Wilson (J.E.Wilson@unsw.edu.au). 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.

[1] UNSW Occupational Health and Safety: www.riskman.unsw.edu.au/ohs/ohs.shtml

Resources

<table>
<tr><td>Student Complaint Procedure[2]</td><td colspan="3">In all cases you should first try to resolve any issues with the course convenor (A/Prof Adriana Vergés).

If this is unsatisfactory, you should contact the Director of Teaching (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.

UNSW has formal policies about the resolution of complaints that are available online for review (see https://student.unsw.edu.au/complaints).</td></tr>
<tr><td></td><td>School Contact</td><td>Faculty Contact</td><td>University Contact</td></tr>
<tr><td></td><td>A/Prof Scott Mooney
Deputy Head of School (Undergraduate Programs)
s.mooney@unsw.edu.au
Tel: 9385 8063</td><td>Prof Simon Killcross
Acting Deputy Dean (Education)
s.killcross@unsw.edu.au
Tel: 9385 3034
or

A/Prof Scott Mooney
Associate Dean (Undergraduate Programs)
s.mooney@unsw.edu.au
Tel: 9385 8063</td><td>Head of Student Lifecycle
clare.jones@unsw.edu.au
Tel: 9385 3087

University Counselling and Psychological Services[3]
Tel: 9385 5418
counselling@unsw.edu.au</td></tr>
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[2] UNSW Complaints Procedure: https://student.unsw.edu.au/complaints
[3] University Counselling and Psychological Services https://student.unsw.edu.au/counselling

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:

www.lc.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