



BIOL121

Marine Biology and Ecosystems

S1 Day 2014

Dept of Biological Sciences

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General Information

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At sea until 18th March, after 9-5pm

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Guest Lecturer

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Credit points

3

Prerequisites

Corequisites

Co-badged status

Unit description

This unit provides students with a background to marine sciences focusing primarily on the ocean environment, its habitats, ecosystems and organisms characterising our blue planet. The unit develops basic knowledge of the chemical, physical and biological disciplines that are interwoven in the study of the marine environment and its organisms. The unit is a first step for those considering a career in this field. The unit focuses on the basic but very important physical and chemical properties of the oceans that constrain life, habitats and the dispersion of biological. It then develops into consecutive sections of the unit that are concerned with the variety of life forms and the major marine habitats and ecosystems. Three practicals will be held off campus and will involve additional entry fee costs (eg, Taronga Zoo).

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:

Explain how chemistry and oceanography constrains life in marine environments.

Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.

Identify, summarise and critically evaluate primary (journal articles) and secondary

(books and reports) literature pertaining to marine topics.

Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.

Work effectively in a team to research and communicate marine science.

Make clear, accurate descriptions of field and laboratory observations.

Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Assessment Tasks

Name	Weighting	Due
<u>Weekly Quiz</u>	10%	Weekly
<u>Writing Task</u>	2%	14th March 2014
<u>Fact Sheet Assignment</u>	13%	28th March, 2014
<u>Animal Behaviour Assignment</u>	10%	7th April 2014
<u>Plankton Practical</u>	5%	11th April 2014
<u>Harbour excursion report</u>	15%	12th May 2014
<u>Fish Taxonomy Practical</u>	5%	23rd May 2014
<u>Exam</u>	40%	Semester 1 Exam Period

Weekly Quiz

Due: **Weekly**

Weighting: **10%**

Students have a series of multi-choice, short answer or diagrammatic questions to answer each week based on lecture content and/or associated reading. The quizzes will be posted on-line through iLearn at the end of the week's second lecture and are accessible for assessment for one week only. Quizzes can be accessed as basic review material for the final exam. Grades from the quiz will contribute up to 10% of a student's final grade.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Make clear, accurate descriptions of field and laboratory observations.

- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Writing Task

Due: **14th March 2014**

Weighting: **2%**

This is an early assessment writing task for each individual student to hand in a 200 word maximum summary on their Factsheet topic and a list of three primary references relevant to the topic.

Note: That although you will work as a pair to produce the Factsheet, this quick written task should be undertaken individually and separately. Students should write in their own word and should NOT have the same references or text.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.

Fact Sheet Assignment

Due: **28th March, 2014**

Weighting: **13%**

In collaboration with the Sydney Institute of Marine Science (SIMS) students will produce public-oriented fact sheets, based on the Sydney Harbour marine environment or its inhabitants. Working in pairs, students will be assigned a random marine topic to produce a two-page fact sheet. The five best fact sheets will go in the running for selection to be printed into real fact sheets by the Sydney Institute of Marine Science (SIMS) for public dispersion. The fact sheets are uploaded to iLearn and are assessed against a set criteria provided to students and by TURNITIN (anti-plagiarism software). All images must be either owned by the student or Creative Commons attributed (i.e. they can not be copied or manipulated from the web). One mandatory tutorial (with an associated pre-tute task) is associated with this activity where library search skills specific to marine science are explained and put into practice. Students have two weeks to complete the task as a team in their own time. Word length: maximum 1000 words.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.

- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Work effectively in a team to research and communicate marine science.

Animal Behaviour Assignment

Due: **7th April 2014**

Weighting: **10%**

This practical is preceded by a tutorial (Week 3) detailing the practical expectations. In the tutorial students will be exposed to field notebook styles and advice on data collection. Students will be allocated marine organisms found at the Taronga Zoo to observe key behaviours undertaken and then to study over a set time period the time spent on those behaviours. Students will be assessed on their field notebook and the data that they collect, collate, summarise and present in an appropriate graph form.

Students have 3 weeks to visit the zoo in their own time to undertake their observations and submit their fieldbook and graphs before the deadline.

Please note: Full-time enrolled students will incur a **\$31.50 entry fee charge** to Taronga Zoo on presentation of their current student card and any additional transport and/or parking charges to/from the Zoo. Failure to present a current Full-time student card on entry will mean you are charged at the Full Adult entry fee of \$44.00. There are no discounts for part-time enrolled students.

On successful completion you will be able to:

- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Plankton Practical

Due: **11th April 2014**

Weighting: **5%**

In week 6 students will examine and identify major plankton groups under a dissecting microscope. This plankton will be sourced from Sydney Harbour and be a basis for identification for the Field Trip. Microscopy skills will be demonstrated. An identification skill test will be the basis for assessment.

On successful completion you will be able to:

- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.

- Work effectively in a team to research and communicate marine science.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Harbour excursion report

Due: **12th May 2014**

Weighting: **15%**

We take to the Harbour in Week 7 (the first week back after mid-semester break) to expose students to boat-based sampling of the physical environment and its biological micro-organisms. Students will be expected to take detailed notes in their field notebook, document parameters and observations while on the water and then try their hand at identifying the micro-organisms they have just sampled. Students will be assessed on their field book and a detailed methodological-based report and graph. Word limitation for report: 1500 words.

The Field Trip is **COMPULSORY** and students will spend 1/2 day undertaking the experience. Arrangements for external commitments should be arranged well in advance.

Dates: Friday 2-May 2014 (am and pm groups), Saturday 3-May 2014 (am and pm groups).

Please Note: Buses from Macquarie University will be organised to transport students to/from SIMS (Chowder Bay) relevant to a student's practical session. Alternatively, students can make their own way there by public transport (Bus 244 from near Wynyard Station - pre-paid tickets required, 1 bus per hour generally). Car parking at, or near, SIMS is possible but not recommended due to the fact that it is metered, expensive and very well patrolled by parking inspectors who give out hefty fines.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Fish Taxonomy Practical

Due: **23rd May 2014**

Weighting: **5%**

This practical in Week 10, is hands-on and laboratory-based. Students will be guided through fish anatomical features that aid in the identification of New South Wales fish through an on-line taxonomic guide. You will be challenged on your abilities to identify mystery fish from your new taxonomic skills.

Please note: Closed-in footwear is mandatory, and students are strongly-advised to bring a lab coat to protect their clothing.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Work effectively in a team to research and communicate marine science.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Exam

Due: **Semester 1 Exam Period**

Weighting: **40%**

Students will be assessed on their understanding of basic concepts covered in the unit by means of multichoice questions. Additional short answer questions that test their understanding of the marine environment and ecosystems will also be included.

On successful completion you will be able to:

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Delivery and Resources

CHANGES TO THIS UNIT IN 2014

This is the second year that this unit has been offered. Changes from the 2013 offering are described below.

1. There is a new text book used as the basic reference for the unit - this can be either purchased as a hard-copy from the Co-Op book shop, as an on-line e-book or borrowed/accessed through the open/reserve section of the University library.
2. We have introduced an individual, early-feedback and low grading (2%) assesement task in the second week of the semester related to the teamwork Factsheet assessment task due in Week 4. This has been integrated so that all students receive individual feedback, understand University expectations and start the year with good study practices (i.e. don't assume an assignment can be completed a day before hand up).
3. The Factsheet assessment has been increased 3% in weight (new total 13% of final

assessment grade) to account for the work undertaken.

4. We have introduced a 5% Plankton identification practical prior to the Field Trip to assist students familiarity with the organisms they will find during their field work experience.

5. The Fieldwork report and notebook assessment task has been decreased to 15% and equally the report is now focused on providing a detailed introduction, methodological procedure and graph.

DELIVERY

This unit has two lectures per week, five practicals sessions (2hrs) and one 1/2 day compulsory field trip to the Sydney Institute of Marine Science at Chowder Bay. One of the practicals is external and needs to be completed at your own convenience during a three week window. All dates and times of lectures and practicals are provided in the Unit Schedule and are provided/ updated on the iLearn portal for BIOL121. All assessments have detailed instructions and marking criteria provided in advance through iLearn.

PRACTICALS

Students will need to select a single practical stream that they will attend through the semester. Swapping of practical streams is not permitted due to laboratory seating, resource and staffing allocations. Practical are compulsory and impart skills that are relevant to assignments, external practicals and the field trip.

For all tutorials and practicals closed in footwear is mandatory. Students will be excluded from the laboratory or practical if they do not have appropriate shoes on.

The Taronga Zoo Animal Behaviour Observation Practical is undertaken relevant to a student's personal timetable prior to the assessment submission deadline. No extensions or alternative timings are provided for this off-campus practical.

The Chowder Bay, Sydney Institute of Marine Science, Field Trip is compulsory and students are advised to **plan in advance and request 1/2 day leave on Friday the 2nd May particularly if you have signed up into a Friday practical stream.** Preference for the Saturday Field trip will be given to students enrolled in the Monday practical stream. Placements will be allotted dependent on final student enrolment numbers.

If you fail to attend or complete associated external tasks/field notebooks your grades will be affected.

TECHNOLOGY USED

Audio recordings ONLY (**no visual recording**) of the lecture presentation are normally provided via ECHO-360. This can be accessed via direct links through iLearn on BIOL121's homepage on iLearn. These recordings are not a substitute for attendance, and should only be considered as a starting point for revision. There is a very clear association between students that attend and

participate in lectures and their doing well in a unit.

We use Microsoft EXCEL™ as a basic statistical package during practicals. However, you can use the Macquarie supported, free-access, to Minitab. The latest version of Minitab (Minitab 16) can be downloaded from the **myMQ**portal website (<https://my.mq.edu.au/>) by selecting the drop-down menu "online Tools" and then "Software Downloads".

During practicals you may wish to access the free web stats sites: vassarstats

USE OF ANTI-PLAGIARISM TECHNOLOGY

Macquarie University treats plagiarism very seriously with harsh penalties for students that consider this an option in their education. Plagiarism is not tolerated at any level or in any manner. **Ensure that your work is written in your own words and is not shared with others.** Student work assessed in BIOL121 will be scrutinised by TURNITIN and tutor assessments. Aside from failing a set task, all instances of plagiarism will be reported directly to the Faculty Discipline Panel and kept on record for the entirety of your degree. If you are doing a double-degree/major that includes Law be aware that a recording of University plagiarism will end your career before it starts.

TEXT BOOK

We HIGHLY RECOMMEND (or in the words of an anonymous student from last year's feedback - "you need a text book!") that students, particularly those interested in pursuing Marine Science, purchase their own e-book alone or the Mind-Tap version, which includes the e-book (via the BIOL121 iLearn page or Co-Op bookshop) or a hardcopy (from the Co-Op Bookshop on campus) of the following as we can not guarantee a copy will be available for you to use from the library:

[Introduction to Marine Biology, 4th Edition by Karleskint, Turner and Small. Publisher Brooks/Cole Cengage learning.](#)

Two copies of this text can be found in the RESERVE collection of the library.

Other Marine Science textbooks can be found in the general section of the library and can be used as alternative sources for the same material we cover.

If you need assistance with [writing reports](#) for Biological Sciences we highly recommend the following as a very useful guide for the next three years of your degree:

J.A. Pechenik: *A short guide to writing about biology*. 7th or 8th Edition (Available in the co-op bookshop or second hand or many copies in the library).

Unit Schedule

DRAFT 2014 TIMETABLE (Posted 11 DEC 2013).

WEEK #	Date	Lecture/ Tute/ Prac	Topic	Lecturer	What is due?
1	3-Mar-2014	Prac 1 Group A	Lab induction and Fact Sheet Outline	Super Tutor	Weekly Quizzes (10%)
	4-Mar-2014	Lecture 1	Course Introduction	Dr Leanne Armand and Super Tutor	
	6-Mar-2014	Lecture 2	Start-up skills for BIOL121	Super Tutor	
	7-Mar-2014	Prac 1 Group B	Lab induction and Fact Sheet Outline	Super Tutor	
		Prac 1 Group C	Lab induction and Fact Sheet Outline	Super Tutor	
		Prac 1 Group D	Lab induction and Fact Sheet Outline	Super Tutor	
2	10-Mar-2014		No Lab - Personal Study Time		
	11-Mar-2014	Lecture 3	Ocean as Habitat - Properties	Dr Moninya Roughan	
	13-Mar-2014	Lecture 4	Ocean as Habitat - Motion	Dr Moninya Roughan	
	14-Mar-2014		No Lab - Personal Study Time		14th March 12noon Outline of Fact sheet due (2%, no extensions)
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		
3	17-Mar-2014	Prac 1 Group A	Taronga Zoo practical outline	Super Tutor	
	18-Mar-2014	Lecture 5	Modern marine ecosystems, habitats and communities	Dr Andrés Rigual- Hernández	
	20-Mar-2014	Lecture 6	Ecosystems 1 Polar	Dr Leanne Armand	
	22-Mar-2014	Prac 1 Group B	Taronga Zoo practical outline	Super Tutor	
		Prac 1 Group C	Taronga Zoo practical outline	Super Tutor	

		Prac 1 Group D	Taronga Zoo practical outline	Super Tutor	
4	24-Mar-2014		No Lab - Personal Study Time		
	25-Mar-2014	Lecture 7	Ecosystems 2 Coasts - Temperate	Dr Melanie Bishop or Dr L. Armand	
	27-Mar-2014	Lecture 8	Ecosystems 3 Coasts -Tropical	Dr Leanne Armand	
	28-Mar-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		Fact sheet due 28th March 2014 (13%)
5	31-Mar-2014		No Lab - Personal Study Time		CENSUS DATE TODAY
	1-Apr-2014	Lecture 9	Ecosystems 4 Deep Sea	Dr Leanne Armand	
	3-Apr-2014	Lecture 10	Ecocsystems 5 Open Ocean	Dr Leanne Armand	
	4-Apr-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		
6	7-Apr-2014	Prac 1 Group A	Plankton Taxonomy & ID	Super Tutor	Taronga Zoo Prac and Lab Book (10%)Due 7th April 2014
	8-Apr-2014	Lecture 11	Bacteria and Viruses	Dr Martin Ostrowski	
	10-Apr-2014	Lecture 12	Primary Production & Phytoplankton	Dr Leanne Armand	
	11-Apr-2014	Prac 1 Group B	Plankton Taxonomy & ID	Super Tutor	5% Prac Activity
		Prac 1 Group C	Plankton Taxonomy & ID	Super Tutor	
		Prac 1 Group D	Plankton Taxonomy & ID	Super Tutor	

Session Break	12-Apr-2014 to the 27-Apr-2014		Includes Easter and Anzac day Holidays		
7	28-Apr-2014		No prac on Monday		
	29-Apr-2014	Lecture 13	Marine Plants	Dr Leanne Armand	
	1-May-2014	Lecture 14	Marine Zooplankton	Dr Leanne Armand	
Compulsory attendance at one session	2-May-2014	All Prac groups	SIMS Field Trip (1/2 day, am and pm sessions)	Super Tutor	
	3-May-2014	All Prac Groups	SIMS Field Trip (1/2 day am and pm sessions)	Super Tutor	
	4-May-2014	All Prac Groups	SIMS Field Trip (Back-up day)	Super Tutor	
8	5-May-2014		No Lab - Personal Study Time		
	6-May-2014	Lecture 15	Marine life adaptations	Dr Leanne Armand	
	8-May-2014	Lecture 16	Lower Invertebrates	Dr Leanne Armand	
	9-May-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		
9	12-May-2014		No Lab - Personal Study Time		Field Trip Report Due 12th May 2014 (15%)
	13-May-2014	Lecture 17	Higher Invertebrates	Dr Leanne Armand	
	15-May-2014	Lecture 18	Marine Fish	Dr Leanne Armand	
	16-May-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		

			No Lab - Personal Study Time		
10	19-May-2014	Prac 1 Group A	Fish Prac	Assoc. Prof. Culum Brown	5% Prac activity
	20-May-2014	Lecture 19	Fish Behaviour	Assoc. Prof. Culum Brown	
	22-May-2014	Lecture 20	Marine reptiles and birds	Leanne Armand ??	
	23-May-2014	Prac 1 Group B	Fish Prac	Culum Brown & Super Tutor	
		Prac 1 Group C	Fish Prac	Super Tutor	
		Prac 1 Group D	Fish Prac	Super Tutor	
11	26-May-2014		No Lab - Personal Study Time		
	27-May-2014	Lecture 21	Marine Mammals	Mr Andrew Irvine	
	29-May-2014	Lecture 22	Marine Trophic Relationships	Dr Leanne Armand	
	30-May-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		
12	2-Jun-2014		No Lab - Personal Study Time		
	3-Jun-2014	Lecture 23	Human Impacts in the Marine Environment	Dr Leanne Armand	
	5-Jun-2014	Lecture 24	Indigenous Marine History	Dr Leanne Armand	
	6-Jun-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		

13	9-Jun-2014		QUEENS BIRTHDAY HOLIDAY		
	10-Jun-2014	Lecture 25	Marine Staff at MQ	Dr Leanne Armand	
	12-Jun-2014	Lecture 26	Unit Summary	Dr Leanne Armand	
	13-Jun-2014		No Lab - Personal Study Time		
			No Lab - Personal Study Time		
			No Lab - Personal Study Time		
Exam Period	16 June to 4 July 2014			Exam (40%)	

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use Policy](#). The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcomes

- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Work effectively in a team to research and communicate marine science.

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Work effectively in a team to research and communicate marine science.
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- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Explain how chemistry and oceanography constrains life in marine environments.
- Describe the main forms of life in the oceans, their discriminating characteristics, habitats and methods of dispersal.
- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Work effectively in a team to research and communicate marine science.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data,

and draw these graphs using a widely available graphing software package.

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Identify, summarise and critically evaluate primary (journal articles) and secondary (books and reports) literature pertaining to marine topics.
- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Work effectively in a team to research and communicate marine science.
- Make clear, accurate descriptions of field and laboratory observations.
- Identify the most appropriate type of graph for summarising different types of basic data, and draw these graphs using a widely available graphing software package.

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcomes

- Effectively communicate aspects of marine biology, of interest to the general public, using visually effective and appropriately worded summary sheets.
- Work effectively in a team to research and communicate marine science.

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Work effectively in a team to research and communicate marine science.