BIOL116

Biology in Practice

S1 External 2016

Dept of Biological Sciences

Contents

General Information

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Credit points
3

Prerequisites

Corequisites

Co-badged status

Unit description
Biology in Practice is a skills based unit that aims to ensure you have the required laboratory, safety, field and practical skills essential to studying biology required as a basis for all units offered in the Dept of Biological Sciences. The unit will consists of a mixture of lectorials, tutorials and practicals. You will acquire hands-on skills for working in the field and the laboratory, including the use of microscopes, data collection, analysis and graphing, aseptic techniques, skills for microbiological and molecular work as well as accessing and interpreting scientific literature. We will discuss broader topics about the scientific working environment, ethics and career pathways.

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:

Articulate and practice the importance of health and safety in biological sciences (lab and field).

Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.

Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).

Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.

Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.

Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.

Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).

Develop competency in working individually or as a team in tutorials, in the field and the laboratory.

Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

General Assessment Information

External students must **undertake and submit** all required elements, and **attend all on-campus sessions (OCS)** to pass the unit.

Externally enrolled students should pay particular care of activity and assessment deadlines, which vary from deadlines set for internal (Day) enrolled students undertaking the unit. Extensions will not be granted if External students confuse deadlines.

A "Skills Achieved" portfolio certificate will be provided through iLearn as External students achieve skills during the unit. A student's skills portfolio certificate can be used in support of CV building in 3rd year Capstone Units.

Assessment Tasks

Name	Weighting	Due
Australian Scientist Summary	2%	5pm Friday 11th March (Week 2)
Lab/Tute Prep Activities	10%	1 day prior to OCS
Practical Book Maintenance	10%	13th April OCS 3 & TBA
Consultant Scientific Report	16%	5pm, 30th May 2016
Mid-term Exam	20%	13th April 2016, OCS 3
Final Exam	30%	TBA, Semester 1 Exam period
Skills Tests	12%	12/3, 12/4, 13/4, 21/5 2016

Australian Scientist Summary

Due: **5pm Friday 11th March (Week 2)**
Weighting: **2%**

Using information from the Australian Academy of Science's *Interviews with Australian Scientists*, students must summarise in their own words the contribution that their chosen scientist has made to Australian or International science, and why this is inspiring to the student. Minimum limitation 200 words - Maximum limitation 300 words. Students must submit their paragraph on-line to Turnitin (for plagiarism assessment).

On successful completion you will be able to:

- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).

- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.

Lab/Tute Prep Activities

Due: **1 day prior to OCS**
Weighting: **10%**

Pre-class activities will be set prior to specific on-campus sessions and on-line tutorials. Students are referred to the ***External Students Activity Submission Timetable*** in the Unit Guide or on the BIOL116 iLearn website.

External Students must complete relevant set activities the day prior to attending the one of the four on-campus sessions for a grade to be awarded. Each activity will be assigned 1% of your final grade. Most pre-class activities will require reading (e.g. articles, risk assessments, prac notes), accessing material (e.g. videos and other media) and answering questions on-line, or the advance preparation of presentation slides or text for a tutorial.

On successful completion you will be able to:

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Practical Book Maintenance

Due: **13th April OCS 3 & TBA**
Weighting: **10%**

External students will maintain an e-prac book during their on-campus sessions (OCS). During the OCS mid-term (13th April) and OCS final exams (TBA during the University Semester 1 Exam Week, 13-27 June), the e-prac book will be assessed against set criteria that cover

the completeness of activities and adherence to expected lab prac book conventions.
The assessment of the e-prac book is worth 5% mid-term and 5% at the end of the semester.

On successful completion you will be able to:

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.

Consultant Scientific Report

Due: **5pm, 30th May 2016**
Weighting: **16%**

External students must use a standard scientific report structure (outlines are provided) to convey the experimental method and results of their field work survey undertaken on campus during their on-campus session. Minimum limitation 1000 words - Maximum limitation 2000 words. Students must submit their report to Turnitin (for plagiarism assessment).

On successful completion you will be able to:

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific

information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Mid-term Exam

Due: **13th April 2016, OCS 3**
Weighting: **20%**

External students will be examined on the skills they have experienced during the first two on-campus sessions (OCS 1 & 2) of the semester. Skills tested during the exam will include activities taken from material covered in lectures, OCS-delivered practicals and on-line tutorial sessions. The mid-term exam will occur on the morning of the 13th April during the OCS.

On successful completion you will be able to:

- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Final Exam

Due: **TBA, Semester 1 Exam period**
Weighting: **30%**

External students will be examined on the skills they have experienced within all four on-campus sessions (OCS 1- 4) of the semester. Skills tested during the exam will include activities taken from material covered in lectures, OCS-delivered practicals and on-line tutorial sessions. The final exam date for External students is yet to be set and maybe scheduled within the University Examinations Week (13 - 27th June, 2016). External students will be advised early in the second

half of the semester of the examination date and time.

On successful completion you will be able to:

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Skills Tests

Due: **12/3, 12/4, 13/4, 21/5 2016**
Weighting: **12%**

External students will undertake four in-class skill assessment tasks during their on-campus sessions throughout the semester. Each test is worth 3%, thus contributing to a total of 12% of the final grade.

On-campus session 1 (12th March 2016): Microscopy and digital imagery assessment task. Students will need to show competence in using a dissecting microscope and Motic (TM) image software to capture appropriate images of insect anatomy.

On-campus session 2 (12 April 2016): Journal article search task. Students will be required to search for a series of journal articles using the library multi-search interface.

On-campus session 3 (13th April 2016): Data collation, basic statistical analyses and representation by appropriate graphs. Students will use the data collected in Week 9 practicals on salinity impacts on Eucalyptus species to visually represent data and statistically test for differences.

On-campus session 4 (21st May 2016): Micro-pipette handling skill. Students will be required to show competence in micro-pipetting techniques and calculating concentrations by generating a standard curve using spectrophotometers and Excel (TM).

On successful completion you will be able to:

- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Delivery and Resources

Lectorials.

External students should keep up with weekly lectorials that are placed on-line within hours of the presentation being made. All BIOL116 students have access to the weekly 1-hour lectorial through two on-line media:

1. Automated recordings of the Tuesday presented lectorial, registered in ECHO-360. ECHO-360 recordings are available from a direct link on the BIOL116 iLearn website.
2. *"Lecture Tool"* presentations. All lectorial presentation slides are available after each weekly (Tuesday or Wednesday) delivery, accessible through a direct link on the BIOL116 iLearn portal. *Lecture Tools* is an interactive presentation format when delivered to internal students who use have electronic devices available to them in the lecture theatre. External students can still access the presentation and quiz questions/ class results, take notes on the slides, print both slides and notes, and signal slides that need additional follow up, *but can not* vote nor respond to interactive in-class delivered quiz/questions.

Tutorials.

External students will be allocated to "external on-line tutorial groups" in Week 1, with an on-line 1 hour Tutorial Tutor contact on either Wednesday or Thursday evenings (provisionally

envisioned for 7 - 8pm). We aim to have most tutorial activities on-line or delivered during on-campus sessions (OCS). Tutorials are formulated around both independent and team activities that focus on problem solving and development of resource inquiry and writing skills. Access to the internet and the use of spreadsheet software (e.g. Excel (TM)) is assumed. External students should refer to the ***External Students Activity Submission Timetable*** below to ensure that they undertake tutorial activities by the correct due date.

On-campus sessions (practicals).

External students have **FOUR COMPULSORY** on-campus sessions to attend. OCS are an intense and stimulating blend of tutorial, practical and field work activities and will also include assessments such as skill tests, student presentations and formal examinations. As the unit is focused on a student's handling of basic equipment in the lab/field, and development of technical and analytical skills, students will be expected to maintain an e-prac book during their OCS sessions. During the mid-term and the final exams the e-prac book will be assessed against set criteria that cover the completeness of activities and adherence to expected conventions described in class. The e-prac book will be assessed after students have undertaken their mid-term and final practical exams.

The table below outlines the provisional OCS activities that are planned for each session.

Provisional On-Campus Session Activities (Version: Dec 2015)

Time	Saturday 12th March	Tuesday 12 April	Wednesday 13th April	Saturday 21st May	Final Exam
9am Start	1. OCS Intro Lecture 2. Working in a Team Environment Tute	1. Skills Test 2 2. Hot and Hoppy Crickets prac	1. Mid Term Prac Exam	1. Pipetting & Standard Curves Practical. 2. " *0.1% germs" practical. 3. Skills Test 4	Date and times to be advised within the University Exam Period (13 - 27th June, 2017).
Tea break	30 mins	30 mins	30 mins	30 mins	
	3. Microscopy basics: compound microscopes (Pollen in honey)	3. Field Techniques (insect-flower interactions) 4. Report question discussion.	2. Salinity stress on Eucalyptus seedlings practical. 3. Skills Test 3.	4.Risk Assessment Group Presentations	
Lunch	30 mins	30 mins	30 mins	30 mins	

Time	Saturday 12th March	Tuesday 12 April	Wednesday 13th April	Saturday 21st May	Final Exam
	4. Microscopy basics: dissecting microscopes (Backyard mosquitoes) 5. Skills Test 1 6. Finish Library challenge	5. The "99.9%* germ free" practical. 6. Field collection planning and risk assessment introduction.	4. Field Work Data Collection practical	4. The answer is "R"	
Anticipated End	4.30pm	4.30pm	4.30pm	4.30pm	

External students should also take due note of the following:

• External students MUST WEAR ENCLOSED FOOTWARE to all practical sessions.

• Lab coats are not compulsory but are encouraged. In the event a lab coat is required for any activity external students will be informed in advance and have the opportunity to purchase a disposable lab apron (~$2) in class should they not have a lab coat.

• All other personal protection such as gloves and safety glasses will be supplied as required by our approved risk assessment procedures.

• There are no dissections of animals in BIOL116, however, we do handle insects and take the ethical handling of all organisms very seriously.

• Students that have a medically-assessed allergy to gloves (latex, plastics, nitrile), pollen or crustaceans, or have a disability should make staff aware in advance so that alternative equipment and activities for certain practicals can be prepared in advance to ensure completion of the unit. Contact: biol116@mq.edu.au and in the subject line use the flag: *Confidential Prac Allergy Notification - External*.

• Failure to attend set OCS will result in automatic failure of the unit, as alternative on-campus catch-up sessions are not possible. Externally-enrolled students cannot attend Internal (Day) offered practical classes due to the lack of class space and University Workplace Health and Safety regulations.

Exams.

External students have two practical exams. The first on the morning of the third on-campus session and the second in the official exam period of semester 1. Practical exams will cover the following:

• **OCS 3 (Wednesday 13th April, 2016).** The mid-term practical exam will cover Lectorial, Tutorial, Pre-prac activities and Practical experiences or material covered up to an inclusive of the first 2 OCS. External students will be tested on equipment use or will need to answer

technique or analytical questions at ~6 stations.

• **Semester 1 Exam Session (TBA between 13 - 27th June, 2016).** The final practical exam will cover Lectorial, Tutorial, Pre-prac activities, and Practical material or experiences across the whole semester. External students will be tested on equipment use or will need to answer technique or analytical questions at ~8 stations.

• At the end of the exam stations for both the mid-term and final practical exams, students will show their on-line e-prac book to a separate marker for grading against 5 criteria that cover the completeness of class activities and adherence to expected lab note book conventions.

Unit Schedule

Provisional External Unit Schedule (Version Dec 2015)

Uni Week	Lectorial	Assignments or Activities (upload to Turnitin or Forum)	Lab/Tute prep Activity	Practical Book Assessment	Skill Tests	Practical Exams
1 (29 Feb - 4 Mar)	Course Introduction (How to succeed in BIOL116)		On-line Safety quiz (1%)(due 5pm 11th March before 12th March, on-campus session 1 (OCS 1) - recommended as completed in Week 1)			
2 (7 - 11 Mar)	"*Observe Nature not (Face) Books!*"	Australian Scientist Summary (2%) (due 5pm 11th March, to Turnitin)	Pollen pre-prac activity (1%)(due 5pm 11th March before 12th March, OCS 1)			
3 (14-18 Mar)	Originality in a sea of ideas.		Mosquito pre-prac activity (1%) (due 5pm 11th March before 12th March OCS 1)		Skills test 1: Microscopy and digital imagery (3%) (12th March, OCS 1)	
4 (21- 25 Mar)	The Scientific Method		On-line literature search quiz (1%) (**due 9am Tuesday 29th March, 2016**)			
5 (28 Mar - 1 Apr)	Which graph when?		Crickets pre-prac activity (1%)(due 5pm 11th April, before 12th April, OCS 2)		Skills test 2. Journal Article search task (3%) (12th April, OCS 2)	

Uni Week	Lectorial	Assignments or Activities (upload to Turnitin or Forum)	Lab/Tute prep Activity	Practical Book Assessment	Skill Tests	Practical Exams
6 (4 - 8 Apr)	Statistics and why you need 'em!					
On-campus sessions 2 and 3 (Semester Break 11-22 Apr)			Pipette pre-prac activity (1%) (due 5pm 11th April before 12th April, OCS 2) Eucalyptus pre-prac activity (1%) (due 5pm 12th April before 13th April, OCS 3)	E-prac books will be assessed after your mid-term exam (5%) (13th April, OCS 3)	Skills test 3: Data collation, basic statistical analyses and representation by appropriate graphs (3%) (13th April, OCS 3)	Mid term Exam (20%) (13th April, OCS 3)
7 (25 - 29 Apr)	Out of the Lab and into Field					
8 (2 - 6 May)	Aseptic laboratory techniques	Methods section written and uploaded to on-line tutorial group forum (1%) (**by 10pm Wednesday 4th May**)				
9 (9 - 13 May)	Hitting the bullseye - Precision and Accuracy					
10 (16 - 20 May)	To "R" or not to "R" that is the question?	Two-slide power-point, five minute field-work reflection presentation (1%) (due 5pm 20th May before 21st May, OCS 4)	Standard Curve pre-prac activity (1%) (due 5pm 20th May before 21st May, OCS 4)		Skills test 4: Micropippette handling skills (3%) (21st May, OCS 4)	
11 (23 - 27 May)	Roots and Keys					
12 (30 May - 3 Jun)	The Price is Right!	Consultant Scientific Report (16%) (due 5pm, 30th May, to Turnitin)				

Uni Week	Lectorial	Assignments or Activities (upload to Turnitin or Forum)	Lab/Tute prep Activity	Practical Book Assessment	Skill Tests	Practical Exams
13 (6 - 10 Jun)	Where to from here? Unit Summary.			E-prac books will be assessed after your final exam (5%) (TBA In S1 Exam period 13-27 June, 2016)		Final Exam (30%) (TBA In S1 Exam period 13-27 June, 2016)

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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy prior to Session 2 2016 http://mq.edu.au/policy/docs/grading/policy.html

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

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.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/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

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://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

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

- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Describe and practice scientific methods from generating hypotheses and predictions

through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).

Assessment tasks

- Australian Scientist Summary
- Lab/Tute Prep Activities
- Practical Book Maintenance
- Consultant Scientific Report

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

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Assessment tasks

- Australian Scientist Summary
- Lab/Tute Prep Activities
- Practical Book Maintenance
- Consultant Scientific Report
- Mid-term Exam
- Final Exam
- Skills Tests

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 outcomes

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Assessment tasks

- Lab/Tute Prep Activities
- Practical Book Maintenance
- Mid-term Exam
- Final Exam

- Skills Tests

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

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).

Assessment tasks

- Australian Scientist Summary
- Practical Book Maintenance
- Consultant Scientific Report
- Mid-term Exam
- Final Exam
- Skills Tests

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

- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).

Assessment tasks

- Australian Scientist Summary
- Lab/Tute Prep Activities
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- Final Exam
- Skills Tests

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

- Develop and demonstrate competencies in set up, operation and shutting down/clean-up of standard laboratory and field equipment.
- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.

Assessment tasks

- Australian Scientist Summary
- Lab/Tute Prep Activities
- Practical Book Maintenance
- Consultant Scientific Report
- Mid-term Exam
- Final Exam
- Skills Tests

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

- Articulate and practice the importance of health and safety in biological sciences (lab and field).

- Develop and demonstrate competencies in standard laboratory techniques (e.g. dilutions, aseptic plating, imagery and measurement, labelling).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Demonstrate competency in data collation, basic statistical analyses and representation by appropriate graphs in reports.
- Describe and practice scientific methods from generating hypotheses and predictions through to following experimental procedures, and undertaking data collection.
- Locate, synthesize, appropriately reference (Harvard style) and communicate scientific information, concepts and your own data through oral, visual and written formats (e.g. class tutorials, report, practical exam).
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Assessment tasks

- Australian Scientist Summary
- Lab/Tute Prep Activities
- Practical Book Maintenance
- Consultant Scientific Report
- Mid-term Exam
- Final Exam
- Skills Tests

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

- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Develop competency in working individually or as a team in tutorials, in the field and the

laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Assessment tasks

- Australian Scientist Summary
- Consultant Scientific Report

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 outcomes

- Articulate and practice the importance of health and safety in biological sciences (lab and field).
- Maintain an experimental notebook (field and lab); includes field observations with information related to environmental parameters and conditions.
- Develop competency in working individually or as a team in tutorials, in the field and the laboratory.
- Demonstrate professional behaviour in conduct with colleagues and staff, and the ethical handling of organisms.

Assessment task

- Consultant Scientific Report

Changes from Previous Offering

2015: This is the first year that BIOL116 has been offered both Internally (Day) and Externally.