School of Environmental and Life Sciences

BIOL2002: Laboratory Skills in Biological Systems

Callaghan Semester 2 - 2023



OVERVIEW

Course Description This course is designed to provide students with extensive training in the laboratory practices associated with biological research. The course is divided into three modules, the focus areas include microbial systems, plant biology systems and animal biology systems. Students completing this course will be able to demonstrate intermediate-level training in experimental design and development which will enable progression to advanced training in these skill sets in 3000-level courses.

Requisites

Students must have successfully completed BIOL2001.

Assumed Knowledge	Successful completion of level 1000 Biology including BIOL1003 and successful completion of BIOL2001
Contact Hours	Callaghan Lecture Face to Face On Campus 2 hour(s) per Week for Full Term
	Practical * Face to Face On Campus 48 hour(s) per Term Full Term

* This contact type has a compulsory requirement.
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 Workload
 Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.



www.newcastle.edu.au CRICOS Provider 00109J



CONTACTS

Course Coordinator	Callaghan Dr Joseph Pegler Joseph.Pegler@newcastle.edu.au (02) 4921 6129 Consultation: By email. If urgent by phone or office (Biology Building B112).
Teaching Staff	Animal Biology Module: Dr Zamira Gibb Zamira.Gibb@newcastle.edu.au Microbiology Module: Associate Professor Karl Hassan Karl.Hassan@newcastle.edu.au
School Office	School of Environmental and Life Sciences Room C228 Chemistry Building Callaghan Science-SELS@newcastle.edu.au +61 2 4921 5080 9am-5pm (Mon-Fri)

SYLLABUS

Course Content

This course provides additional laboratory techniques required of a Biotechnology or Biology graduate. Through undertaking scientific experiments on model biological organisms, students will be exposed to the theory and practice of:

- 1. Experimental techniques:
 - The growth, analysis and manipulation of microorganisms.
 - Physiological and molecular analysis of animal and plant model systems.
 - Fundamentals of aseptic technique.
 - Use of appropriate microscopy instrumentation to investigate biological systems.
- 2. Communication skills Use of Lab books to organise and document experimental details and results, data analysis and report writing.
- 3. Health and Safety Awareness of hazards and other safety issues in the laboratory and effective responses to safety incidents.

Course Learning Outcomes

On successful completion of this course, students will be able to:

- 1. Use biological terminology to display an understanding of biological experimentation and demonstrate a working knowledge of the scientific method and philosophy;
- 2. Explain experimental design and show the skills required to collect, process and interpret biological information;
- 3. Display ethical conduct in learning and research;
- 4. Recognise hazards and implement hazard minimisation strategies to conduct safe biological investigations;
- 5. Apply scientific writing and data presentation skills to demonstrate competence in scientific communication.

Course Materials

Recommended Text:

Textbooks - suggested but not requred for this course:

- Animal Biology: Molecular Biology of the Cell (Alberts et al) 4th Edition <u>http://www.ncbi.nlm.nih.gov/books/NBK21054/</u>
- Plant Biology: Taiz, L. and Zeiger, E. (2022). Plant Physiology and Development. Seventh Edition, Sinauer Associates Inc., Massachusetts, USA.
- Microbiology: Prescott's Microbiology 12th Edition; Eds. Willey, Sherwood & Woolverton (2022); Publisher: McGraw-Hill Several copies are available in library including Short Loans. Earlier editions also useful.



COMPULSORY REQUIREMENTS

In order to pass this course, each student must complete ALL of the following compulsory requirements:

Contact Hour Requirements:

- Practical There is a compulsory attendance requirement in this course. Laboratory Attendance Students are required to attend a minimum of 80% of all lab sessions to attain required competency.
- Practical Induction Requirement Students must attend and pass the induction requirements before attending these sessions. In order to participate in this course students must complete a compulsory safety induction.

SCHEDULE

Week	ek Week Begins Topic		Learning Activity	Assessment Due
1	17 Jul	Animal Biology Module	Lecture and Laboratory Dr. Gibb	
2	24 Jul	Animal Biology Module	Lecture and Laboratory Dr. Gibb	
3	31 Jul	Animal Biology Module	Lecture and Laboratory Dr. Gibb	
4	7 Aug	Animal Biology Module	Lecture and Laboratory Dr. Gibb	
5	5 14 Aug Microbiology Module		Lecture and Laboratory Associate Prof. Hassan	Animal Biology Module Lab report - 5 pm - Friday 18th August Module Competency assessment- 5 pm - Friday 18th August
6	21 Aug	Microbiology Module	Lecture and Laboratory Associate Prof. Hassan	
7	28 Aug	Microbiology Module	Lecture and Laboratory Associate Prof. Hassan	
8	4 Sep	Microbiology Module	Lecture and Laboratory Associate Prof. Hassan	
9	11 Sep	Plant Biology Module	Lecture and Laboratory Dr. Pegler	Microbiology Module Lab report - 5 pm - Friday 15th September Module Competency assessment- 5 pm - Friday 15th September
10	10 18 Sep Plant Biology Module L		Lecture and Laboratory	
		Mid Terr	m Break	
		Mid Terr	m Break	
11	9 Oct	Plant Biology Module	Lecture and Laboratory Dr. Pegler	
12	16 Oct	Plant Biology Module	Lecture and Laboratory Dr. Pegler	
13	23 Oct	Fur-units and		Plant Biology Module Lab report - 5 pm - Friday 27th October Module Competency assessment- 5 pm - Friday 27th October
		Examinati		



ASSESSMENTS

This course has 2 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Module Competency assessment	Animal Module - by completion of Module - 18th August 2023 Plant Module - by completion of Module -15th September 2023 Microbiology Module - by completion of Module - 27th October 2023	Individual	40%	2, 3, 4
2	3 Written Reports	Animal Module - by completion of Animal Module: 18th August 2023 Plant Module - by completion of Plant Module: 15th September 2023 Microbiology Module - by completion of Microbiology Module: 27th October 2023	Individual	60%	1, 2, 3, 5

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Module Competency assessment

Assessment Type Purpose	Practical Demonstration Engagement, participation and competency will be assessed throughout each lab session. This assessment may include completion of online guizzes as specified for each module.
Description	
Weighting	40%
Due Date	Animal Module - by completion of Module - 18th August 2023
	Plant Module - by completion of Module -15th September 2023
	Microbiology Module - by completion of Module - 27th October 2023
Submission Method	In Class
Assessment Criteria	Competency to complete experimental tasks; understanding of safety issues and laboratory procedures.
Return Method	Not Returned
Feedback Provided	In Class

Assessment 2 - 3 Written Reports

Assessment Type Purpose Description Weighting Due Date	Report To assess ability to scientifically describe the research project undertaken THREE (3) Written Reports, each covering one of the three Laboratory Modules 60% Animal Module - by completion of Animal Module: 18th August 2023 Plant Module - by completion of Plant Module: 15th September 2023 Microbiology Module - by completion of Microbiology Module: 27th October 2023
Submission Method	Online Online via Turnitin on Canvas site.
Assessment Criteria	Clarity of report and detailed understanding of the experimental and intellectual background. Detailed rubrics will be provided on Canvas.
Return Method Feedback Provided	Online Online



ADDITIONAL INFORMATION

Grading Scheme

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-	This course i	is graded as fo	ollows:
	Range of Marks	Grade	Description
	85-100 High Distinction (HD) Outstanding standa and understanding c an outstanding leve skills*; and achiever		Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
	75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
	65-74 Credit Good s (C) understa high lev		Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
	50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
	0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.
	*Skills are th	ose identified	for the purposes of assessment task(s).
Attendance	Attendance/r - Practi	participation w ical (Method o	ill be recorded in the following components: f recording: Recorded against class list)
Communication Methods	 Communication methods used in this course include: Canvas Course Site: Students will receive communications via the posting of c or announcements on the Canvas course site. 		
	- Email - Face	: Students will to Face: Com	I receive communications via their student email account. munication will be provided via face to face meetings or supervision.
Course Evaluation	Each year fe in the Univ improvemen	edback is sou rersity for the t.	ght from students and other stakeholders about the courses offered e purposes of identifying areas of excellence and potential
Oral Interviews (Vivas)	As part of the (viva) may b the material conducted in In cases whe own work the	e evaluation p e conducted. submitted in accordance v ere the oral ex e case will be	rocess of any assessment item in this course an oral examination The purpose of the oral examination is to verify the authorship of response to the assessment task. The oral examination will be with the principles set out in the <u>Oral Examination (viva) Procedure</u> . comination reveals the assessment item may not be the student's dealt with under the <u>Student Conduct Rule</u> .
Academic Misconduct	All students standards re Academic In all locatio https://policie	are required t sinforce the in tegrity policies ns. For es.newcastle.e	o meet the academic integrity standards of the University. These nportance of integrity and honesty in an academic environment. apply to all students of the University in all modes of study and in the Student Academic Integrity Policy, refer to edu.au/document/view-current.php?id=35.

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Adverse Circumstances	The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:				
	 the assessment item is a major assessment item; or the assessment item is a minor assessment item and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system; you are requesting a change of placement; or the course has a compulsory attendance requirement. 				
	Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at: https://policies.newcastle.edu.au/document/view-current.php?id=236				
Important Policy Information	The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at https://www.newcastle.edu.au/current-students/no-room-for/policies-and-procedures that support a safe and respectful environment at the University.				

This course outline was approved by the Head of School. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

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