

BIOL1003: Professional Skills for Biological Sciences 1

Callaghan

Semester 2 - 2023



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description

Students are introduced to the principles of scientific investigation and initiate the development of analytical and practical skills necessary for an active career in the diverse fields of modern biology. This equips the student for further studies in both lab-based biotechnology and field based environmental biology subjects. Students will be taught practical laboratory and field skills together with experimental design, data evaluation and technical report writing within the context of a number of exciting hands on biological investigations.

Requisites

This course has similarities to BIOL1070 and BIOL1050. If you have successfully completed either of these courses you cannot enrol in this course.

Assumed Knowledge

HSC Chemistry
HSC Mathematics Advanced or HSC Mathematics Standard

Contact Hours

**Callaghan
Laboratory ***
Face to Face On Campus
3 hour(s) per Week for Full Term

Lecture
Face to Face On Campus
1 hour(s) per Week for Full Term

Tutorial
Face to Face On Campus
1 hour(s) per Week for Full Term

Unit Weighting Workload

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

COURSE OUTLINE

www.newcastle.edu.au

CRICOS Provider 00109J

CONTACTS

Course Coordinator	Callaghan Prof Brett Neilan Brett.Neilan@newcastle.edu.au 0421227477 Consultation: By appointment
Teaching Staff	A/Pr Karl Hassan Karl.Hassan@newcastle.edu.au Dr Verlaine Timms verlaine.timms@newcastle.edu.au Dr Rose Upton Rose.upton@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	Through undertaking scientific experiments in; biological chemistry, microbiology, fungi, plant & animal systems and ecology, students will be exposed to the theory and practice of: The scientific method & philosophy of science Experimental design, hypothesis testing & problem solving Health & safety for laboratory work Basic laboratory skills in biology, including microscopy, aseptic technique and informatics Use of selected analytical measurement instruments, such as spectrometry Use of Lab books to organise and document experimental details and results Data analysis, interpretation and presentation Report Writing a) Effective use of Introduction, Methods, Results, Discussion format b) Referencing c) Computer publishing skills Working in teams Ethics, Academic and personal/professional integrity.
Course Learning Outcomes	On successful completion of this course, students will be able to: <ol style="list-style-type: none">1. Demonstrate an understanding of biological terminology and concepts;2. Implement the scientific method and experimental design;3. Use basic experimental apparatus to collect, process and interpret biological information;4. Write reports and present data in the appropriate scientific format;5. Recognise hazards and minimise risks to conduct safe biological investigations;6. Effectively work in a team while maintaining ethical conduct in learning and research.
Course Materials	Recommended Reading: <ul style="list-style-type: none">– Freeman, Scott (2011): Biological Science 4th Ed. Pearson Education Henderson's Dictionary of Biology 14th Ed. Pearson Education Required Reading: <ul style="list-style-type: none">– Learning materials including the laboratory manual are provided via the course Canvas site.

COMPULSORY REQUIREMENTS

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

Contact Hour Requirements:

- Laboratory 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	Week Begins	Topic	Learning Activity	Assessment Due
1	17 Jul	Course overview & safety induction	Lab book Competence and Report Writing (NOTE: this lab session is absolutely compulsory - no exceptions!) Lecture, tutorial and lab	Safety induction session Confirm laboratory enrolment and undertake safety induction (wear long pants, covered shoes, pulled back hair) Please obtain your own course materials: Lab coat, safety glasses and lab book
2	24 Jul	Basic Skills & Light Microscope I	Calculation of molarity, dilution, SI units and solution preparation, setting up a laboratory workbook, setting up a microscope, observation and quantitation of cellular osmotic effects, and using a haemocytometer Lecture, tutorial and lab	Lab book preparation (marked in class) Calculations (4%), Microscopy competence (6%), Lab book competence (2%)
3	31 Jul	Basic Skills & Light Microscope II	Accurate and reproducible pipetting technique, standard curve preparation, microscope slide observation and interpretation Lecture, tutorial and lab	Lab book preparation (marked in class) Pipetting competence (4%), Lab book competence (2%)
4	7 Aug	Plant Development I	Analysis of plant structure and development, Application of plant hormone, GA and examine its effect on plant growth Lecture, tutorial and lab	Lab book preparation (marked in class) Lab book competence (2%)
5	14 Aug	Plant Development II	Observation and data collection, data presentation and statistical evaluation, synthesis of larger patterns from combined individual results, X-Y scatter plot, column plot with standard error Lecture, tutorial and lab	Lab book preparation (marked in class) Lab book competence (2%)
6	21 Aug	Dilution & Spectrophotometry	Spectrophotometry for measuring quantities, visually counting cell density, making solutions and dilution series, X-Y Scatter Plot. Report template and	Lab book preparation (marked in class) Lab book competence (2%)

			reference guides Lecture, tutorial and lab	
7	28 Aug	Plant Growth Report	Writing Plant Growth Report (strongly recommend attendance at interactive online tutorial) No Lecture	Plant Growth Report writing in lab
8	4 Sep	Molecular Ecology and Evolution	Retrieve DNA sequences from databases, align sequences and infer evolutionary relationships via a phylogenetic "family tree" reconstruction Lecture, tutorial and lab	Lab book preparation (marked in class) Lab book competence (2%) Plant Growth lab report due (20%) -Due via Turnitin before beginning of lab class
9	11 Sep	Aseptic Technique & Growing Microorganisms	Growing microorganisms, controlling sources of contamination, spectrophotometry for quantifying cell density, dilution series, plating and streaking Lecture, tutorial and lab	Lab book preparation (marked in class) Plate Streaking Competence (5%) Lab book competence (2%)
10	18 Sep	Isolation and Identification of Microorganisms	Gram-staining, colony counting, colony isolation from streaked plates, identification of microorganisms, plotting data Lecture, tutorial and lab	Lab book preparation (marked in class) Gram Staining Competence (5%) Lab book competence (2%)
Mid Term Break				
Mid Term Break				
11	9 Oct	Microbial Ecology Report	Writing Microbial Ecology Report (strongly recommend attendance at interactive online tutorial) No Lecture or tutorial	Microbial Ecology Report writing in lab
12	16 Oct	Final Quiz	Multiple choice quiz on theory behind safety, techniques and equipment used in Weeks 1-11 Lecture only No tutorial or lab	Quiz (during lecture time slot) Microbial Ecology lab report due (20%) - Due via Turnitin
13	23 Oct	Exam Period	NA	NA
Examination Period				
Examination Period				

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Examination: Class	Week 12	Individual	20%	1, 2, 3, 4, 5, 6
2	Laboratory Exercises	Weeks 2-11	Individual	40%	1, 2, 3, 4, 5, 6
3	Reports - Laboratory reports	Week 8 - Plant Growth Week 12 - Ecology	Individual	40%	1, 2, 4, 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 - Examination: Class

Assessment Type	In Term Test
Description	To assess knowledge, understanding of concepts and interpretive skills
Weighting	20%
Due Date	Week 12
Submission Method	In Class
Assessment Criteria	The purpose and benefit of the test is to assess students' understanding on a wide range of professional skills in biological science and to provide the students with an opportunity to reflect and consolidate their learning outcome of this course.
Return Method	Not Returned
Feedback Provided	No Feedback

Assessment 2 - Laboratory Exercises

Assessment Type	Tutorial / Laboratory Exercises
Purpose	The purpose of assessment of Lab Exercises is to enable students a continuous and hands-on studying of fundamental biological lab skills, hence providing opportunities for effective learning and improvement throughout the course.
Description	Laboratory Exercises: Lab skill tests (24%) Lab book assessment (16%) - marked during lab classes
Weighting	40%
Due Date	Weeks 2-11
Submission Method	In Class
Assessment Criteria	The purpose of assessment of Lab Exercises is to enable students a continuous and hands-on studying of fundamental biological lab skills, hence providing opportunities for effective learning and improvement throughout the course.
Return Method	In Class
Feedback Provided	In Class - Feedback provided verbally while marking lab books

Assessment 3 - Reports - Laboratory reports

Assessment Type	Report
Purpose	To develop report writing ability.
Description	Reports: 1. Plant Biology Report (20%) 2. Ecology Report (20%)
Weighting	40%
Due Date	Week 8 - Plant Growth Week 12 - Ecology
Submission Method	Online
Assessment Criteria	Report writing meets the course objectives of knowledge acquisition and demonstrated assimilation of data, upon reflection and analysis, to produce articulate and concise documents which convey evidence-based understanding of the concepts and topics.
Return Method	In Class
Feedback Provided	Online

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	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 (C)	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.

Attendance

*Skills are those identified for the purposes of assessment task(s).

Attendance/participation will be recorded in the following components:

- Laboratory (Method of recording: Class roll will be recorded and students to check-in via attendance app)

80% of lab experiment classes (not including the optional report writing sessions) need to be attended

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.
- Face to Face: Communication will be provided via face to face meetings or supervision.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students of the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

**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:

1. the assessment item is a major assessment item; or
2. 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;
3. you are requesting a change of placement; or
4. 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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