



BIOL6610

Biological Data Analysis

Session 1, Online-scheduled-weekday 2025

School of Natural Sciences

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General Information

Unit convenor and teaching staff

Drew Allen

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Credit points

10

Prerequisites

Corequisites

Co-badged status

BIOL2610 BIOX2610

Unit description

Biological organisms are inherently variable, which means that practicing biologists need a solid grasp of how to design and implement experiments, perform statistical analyses on the resulting data, and correctly interpret the results of statistical tests. This unit provides a foundation in the principles of experimental design and data analysis for biology. The unit is taught by biology staff and draws on research carried out in the School of Natural Sciences. Students also learn the overall process of asking and answering questions in biology. Students learn a range of common data analysis techniques, and how to interpret the outcomes of these analyses. There is a strong emphasis on critically evaluating biological studies and identifying sound conclusions and not-so-sound conclusions. This unit is strongly recommended for students planning a career in biology or environmental science.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals ([UNSDGs](#)) Industry, Innovation and Infrastructure

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:

ULO1: Develop testable hypotheses from general scientific questions

ULO2: Design an unconfounded experiment to test a given scientific hypothesis

ULO3: Choose an appropriate statistical test to analyse experimental data

ULO4: Carry out and correctly interpret a range of commonly used statistical tests using the computer package R

ULO5: Clearly present outcomes of statistical analyses using figures, tables and text

ULO6: Critically evaluate other studies with respect to experimental design and the application and interpretation of statistics

General Assessment Information

Late Assessment Submission Penalty Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is 11:55 pm. A 1-hour grace period will be provided to students who experience a technical concern. For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration.

Special Consideration The Special Consideration Policy aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through <https://connect.mq.edu.au>.

Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Practice-based task</u>	0%	Yes	Weekly
<u>Mid-semester Exam</u>	15%	No	Week 8
<u>Final Exam</u>	45%	No	Final Exam Period
<u>Experiment Report</u>	20%	No	June 1 11:59pm
<u>Exam of Basic Stats Knowledge</u>	5%	Yes	Week 3
<u>Weekly Quiz</u>	15%	No	Weekly

Practice-based task

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 0 hours

Due: **Weekly**

Weighting: **0%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

These assessments, which will be undertaken during weekly practicals, will allow you to demonstrate your knowledge of how to perform, interpret and report statistical analyses.

On successful completion you will be able to:

- Carry out and correctly interpret a range of commonly used statistical tests using the computer package R

Mid-semester Exam

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Week 8**

Weighting: **15%**

You will be tested on your knowledge of lecture and practical material that was covered during the first half of the semester.

On successful completion you will be able to:

- Choose an appropriate statistical test to analyse experimental data
- Carry out and correctly interpret a range of commonly used statistical tests using the computer package R
- Critically evaluate other studies with respect to experimental design and the application and interpretation of statistics

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 2 hours

Due: **Final Exam Period**

Weighting: **45%**

The final exam will be held during the final exam period.

On successful completion you will be able to:

- Choose an appropriate statistical test to analyse experimental data
- Carry out and correctly interpret a range of commonly used statistical tests using the computer package R
- Critically evaluate other studies with respect to experimental design and the application and interpretation of statistics

Experiment Report

Assessment Type ¹: Report

Indicative Time on Task ²: 30 hours

Due: **June 1 11:59pm**

Weighting: **20%**

You will design and conduct an experiment of your own. You will need to pick a question, design and carry out an experiment addressing that question, then write up the results in the form of a scientific paper.

On successful completion you will be able to:

- Develop testable hypotheses from general scientific questions
- Design an unconfounded experiment to test a given scientific hypothesis
- Choose an appropriate statistical test to analyse experimental data
- Carry out and correctly interpret a range of commonly used statistical tests using the computer package R
- Clearly present outcomes of statistical analyses using figures, tables and text
- Critically evaluate other studies with respect to experimental design and the application and interpretation of statistics

Exam of Basic Stats Knowledge

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 1 hours

Due: **Week 3**

Weighting: **5%**

This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)

You will be tested on your knowledge of basic statistical concepts and skills taught in the

statistics prerequisite for this unit. The test will be delivered as an online quiz through iLearn.

On successful completion you will be able to:

- Choose an appropriate statistical test to analyse experimental data

Weekly Quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 26 hours

Due: **Weekly**

Weighting: **15%**

Every week there will be an online quiz with problems for you to complete. These problems will allow you to independently undertake statistical analyses in order to apply the concepts and methods you learned during lectures and practicals.

On successful completion you will be able to:

- Choose an appropriate statistical test to analyse experimental data
- Carry out and correctly interpret a range of commonly used statistical tests using the computer package R
- Clearly present outcomes of statistical analyses using figures, tables and text

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Lectures

There are two live one-hour lectures per week that are conducted online. You are encouraged to attend these live online sessions to ask questions, but recordings will also be made available on iLearn. All students are expected to listen to the lectures prior to the practical for that week.

Practicals

Practicals last 2 hours each and are conducted on campus and online. You are expected to attend and participate in practical sessions, as they are a hurdle requirement of the unit. Failure to attend and complete at least 8 of the practicals will result in a failing grade.

iLearn

The primary means of communication for this unit is via iLearn, which can be accessed by most web browsers from inside or outside the University. You are expected to use iLearn for:

- Doing the Weekly Quizzes
- Regularly checking announcements
- Discussing the unit and its content with staff and other students
- Downloading Lecture and Practical materials
- Downloading reference materials

Logging in to iLearn

- The iLearn login page is: <https://ilearn.mq.edu.au/>
- Username: your student number
- Problems? Please contact Student IT Help
- Need extra help due to a disability/health condition? Please visit the Student Services Website : <https://students.mq.edu.au/support/wellbeing>

Missed Practicals

If you know you will miss a practical, or if you have already missed one, please email the convenor at biol2610@mq.edu.au. There may be alternative practical slots, including the internal sessions, available for you to catch up.

Overall grades

The University grading is: fail (F <50%), pass (P 50%-64%), credit (CR 65%-74%), distinction (D 75%-84%) and high distinction (HD 85%-100%).

Exam Special Consideration

If you apply for Special Consideration for your final examination, you must make yourself available for the alternative examination period. If you are not available at that time, there is no guarantee an additional examination time will be offered. Specific examination dates and times will be determined at a later date.

Assignment submission, Turnitin and Plagiarism

This is a paperless unit, so no paper submission will be required for your written report, which will be submitted through iLearn via a Turnitin link. Your written assignment will be checked for plagiarism using Turnitin. Plagiarism will not be tolerated. Do not under any circumstances lend your work to another student. If that student plagiarises your work, you too may be liable. The penalties imposed by the University for plagiarism are serious and may include expulsion from the University. A full outline of the Universities policy on plagiarism is found at http://www.mq.edu.au/policy/doc s/academic_honesty/policy.html.

RESOURCES and SUPPORT

How to find the answers

1. Please read the unit outline.
2. Consult iLearn - often your question has already been asked and answered by another student.
3. If the answer to a question will benefit others, please post it on iLearn.
4. Ask a question by emailing biol2610@mq.edu.au.
4. Unexpected adjustments made during the unit will announced via announcements, so make sure you check iLearn regularly.

EMAIL PROTOCOL

1. Always submit questions to biol2610@mq.edu.au.
2. Please be courteous and patient - we will endeavour to reply to your email within 24 hours, excluding weekends. Responses will be delayed during weekends.

Text Book

There are no required textbooks for the unit, but two recommended textbooks: "Statistics Explained : An Introductory Guide for Life Scientists" and "The Analysis of Biological Data".

OTHER HELP

The Numeracy Centre offers drop-in sessions to students with statistical questions. It is located at 14 Sir Christopher Ondaatje Avenue, Room 188. For questions and scheduling, please visit the iLearn page.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to

Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies](https://students.mq.edu.au/support/study/policies) (<https://students.mq.edu.au/support/study/policies>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central](https://policies.mq.edu.au) (<https://policies.mq.edu.au>) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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 connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

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

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

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.

Unit information based on version 2025.05 of the [Handbook](#)