UNSW Course Outline

# BABS2264 Genetics (Advanced Level) - 2024

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## General Course Information

**Course Code :** BABS2264
**Year :** 2024
**Term :** Term 3
**Teaching Period :** T3
**Is a multi-term course? :** No
**Faculty :** Faculty of Science
**Academic Unit :** School of Biotechnology and Biomolecular Sciences
**Delivery Mode :** Multimodal
**Delivery Format :** Standard
**Delivery Location :** Kensington
**Campus :** Sydney
**Study Level :** Undergraduate
**Units of Credit :** 6

**Useful Links**

Handbook Class Timetable

## Course Details & Outcomes

### Course Description

Genetics is the study of inheritance and is an exciting and rapidly expanding discipline with applications in medicine, biotechnology, agriculture, and many other fields. This course provides an overview of the key concepts in genetics including gene structure and transmission, genetic

variation and evolution, and regulation of gene expression. Laboratory experiments and a research project are used to demonstrate genetic theory and its application and introduce students to real-world genomics research. The course includes self-directed experiments and extended presentations on scientific literature, and is designed for high-achieving students interested in a research career.

This advanced version of the BABS2204 course includes an individual research project carried out throughout the term in addition to the laboratory classes. This course is designed to suit students who plan to pursue research careers in genomics or related disciplines.

Assumed knowledge: BABS1201/DPST1051: Molecules, cells, and genes.

## Course Aims

This course will introduce students to theoretical concepts in genetics and genomics as well as different societal applications. The practical component of the course is designed to reinforce the core genetics concepts covered in lectures and provide students with hands-on experience in some of the current experimental techniques and methods routinely used in the field. The individual project allows students to develop and carry out an independent project providing an opportunity to experience authentic genomics research.

# Course Learning Outcomes

| Course Learning Outcomes |
|---|
| CLO1 : Describe ideas in genetics and genomics using contemporary concepts, principles and procedures. |
| CLO2 : Critically interpret and evaluate scientific literature on genetic and genomic topics. |
| CLO3 : Derive hypotheses and design experiments following the scientific method. |
| CLO4 : Perform experimental techniques and methods routinely used in genetics and genomics safely and effectively. |
| CLO5 : Analyse and interpret experimental results. |
| CLO6 : Communicate key findings from genetic and genomic experiments to an educated audience. |

| Course Learning Outcomes | Assessment Item |
|---|---|
| CLO1 : Describe ideas in genetics and genomics using contemporary concepts, principles and procedures. | • Final Exam<br>• Fortnightly Quizzes |
| CLO2 : Critically interpret and evaluate scientific literature on genetic and genomic topics. | • Course Project |
| CLO3 : Derive hypotheses and design experiments following the scientific method. | • Final Exam<br>• Course Project<br>• Fortnightly Quizzes |
| CLO4 : Perform experimental techniques and methods routinely used in genetics and genomics safely and effectively. | • Course Project |
| CLO5 : Analyse and interpret experimental results. | • Final Exam<br>• Fortnightly Quizzes<br>• Course Project |
| CLO6 : Communicate key findings from genetic and genomic experiments to an educated audience. | • Course Project |

# Learning and Teaching Technologies

Moodle - Learning Management System

# Assessments

## Assessment Structure

| Assessment Item | Weight | Relevant Dates |
|---|---|---|
| Final Exam<br>Assessment Format: Individual | 40% | |
| Course Project<br>Assessment Format: Individual<br>Short Extension: Yes (2 days) | 30% | |
| Fortnightly Quizzes<br>Assessment Format: Individual | 30% | |

## Assessment Details

### Final Exam

**Assessment Overview**

This examination typically consists of multiple-choice and short-answer questions that will assess knowledge obtained in lectures and practical classes throughout the term. The exam will be two hours long and will be scheduled during the formal examination period. Mark/grade will be released to students on the official results release date. Feedback is available through inquiry with the convenor.

**Course Learning Outcomes**

- CLO1 : Describe ideas in genetics and genomics using contemporary concepts, principles and procedures.
- CLO3 : Derive hypotheses and design experiments following the scientific method.
- CLO5 : Analyse and interpret experimental results.

**Generative AI Permission Level**

**No Assistance**

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

### Course Project

**Assessment Overview**

This assessment task is unique to BABS2264 students and is designed to provide you with an

opportunity to apply theoretical and practical skills covered in the course to solve an authentic genomics research question.
The assessment task has two components and is worth 30% of your course total.

1. You will need to submit a one-page flow chart with a 200-word rationale of the proposed experimental plan. This is due at the end of Week 5 and is worth 30% of the assessment total. Written feedback will be provided at the beginning of Week 7.

2. The final research report of 750 words is due in Week 9. You may use information from the primary literature to have an AI-generated report aimed at an educated audience. In MS Word you will need to make track changes to make sure that the references are correct and fix any mistakes the AI has made. This component is worth 70% of the assessment total.

Additional information and feedback will be provided throughout the term during the tutorials dedicated to this assessment task. Marks and feedback will be provided within 10 working days from the due date via Moodle.

**Course Learning Outcomes**

- CLO2 : Critically interpret and evaluate scientific literature on genetic and genomic topics.
- CLO3 : Derive hypotheses and design experiments following the scientific method.
- CLO4 : Perform experimental techniques and methods routinely used in genetics and genomics safely and effectively.
- CLO5 : Analyse and interpret experimental results.
- CLO6 : Communicate key findings from genetic and genomic experiments to an educated audience.

**Assignment submission Turnitin type**

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

**Generative AI Permission Level**

**Generative AI Software-based Assessments**

This assessment is designed for you to use generative AI as part of the assessed learning outcomes. Please refer to the assessment instructions for more details.
For more information on Generative AI and permitted use please see here.

## Fortnightly Quizzes

**Assessment Overview**

There will be a short quiz held every two weeks at the start of the practical class, starting in

Week 3. There will be three quizzes in total during the term (in Weeks 3, 5, and 8). This assessment task is designed to provide you with feedback on how you are progressing in the course regularly. These quizzes may contain multiple-choice and short-answer questions based on the material covered during lectures and practical classes. You will have 20 min to complete the quiz and each quiz is worth 10% of the final course total. Feedback will be released online once the quiz has closed. Additional general feedback will also be provided during Q&A sessions. Additional information on quizzes will be provided in the course.

**Course Learning Outcomes**

- CLO1 : Describe ideas in genetics and genomics using contemporary concepts, principles and procedures.
- CLO3 : Derive hypotheses and design experiments following the scientific method.
- CLO5 : Analyse and interpret experimental results.

**Assignment submission Turnitin type**

Not Applicable

**Generative AI Permission Level**

**No Assistance**

This assessment is designed for you to complete without the use of any generative AI. You are not permitted to use any generative AI tools, software or service to search for or generate information or answers.
For more information on Generative AI and permitted use please see here.

# General Assessment Information

**Grading Basis**

Standard

# Course Schedule

| Teaching Week/Module | Activity Type | Content |
|---|---|---|
| Week 1 : 9 September - 15 September | Lecture | Lecture A: Course introduction, The genetics revolution - Paul Waters<br>Lecture B: Genomics: New questions - Paul Waters<br>Lecture C: Large scale genetic change - Paul Waters |
| | Laboratory | (1) Introduction to informatics tools<br>(2) Introduction to the assignment |
| | Tutorial | Revision |
| Week 2 : 16 September - 22 September | Lecture | Lecture A: Review of inheritance - Paul Waters<br>Lecture B: Model species - Paul Waters<br>Lecture C: Q&A + Quiz 1 review - Paul Waters |
| | Laboratory | (1) Epigenetics 1<br>(2) Hypothesis testing |
| | Tutorial | Revision |
| Week 3 : 23 September - 29 September | Lecture | Lecture A: Gene interactions 1 - Paul Waters<br>Lecture B: Gene interactions 2 - Paul Waters<br>Lecture C: Regulation of gene expression - Paul Waters |
| | Laboratory | (1) Epigenetics 2<br>(2) Recombination and gene mapping 1 |
| | Tutorial | Revision |
| Week 4 : 30 September - 6 October | Lecture | A: Public holiday<br>Lecture B: Complex traits 1 - Mark Tanaka<br>Lecture C: Q&A + Quiz 2 review - Paul Waters |
| | Laboratory | (1) Epigenetics 3<br>(2) Recombination and gene mapping 2 |
| | Tutorial | Revision |
| Week 5 : 7 October - 13 October | Lecture | Lecture A: Complex traits 2 - Mark Tanaka<br>Lecture B: PCR techniques - Dhanushi Abeygunawardena, Joel Brame<br>Lecture C: Genomes and genomics 1 - Dhanushi Abeygunawardena, Joel Brame |
| | Laboratory | (1) Fingerprinting<br>(2) Using microsatellites to identify parentage |
| | Tutorial | Revision |
| Week 7 : 21 October - 27 October | Lecture | Lecture A: Genomes and genomics 2 - Dhanushi Abeygunawardena, Joel Brame<br>Lecture B: Genomes and genomics 3 - Dhanushi Abeygunawardena, Joel Brame<br>Lecture C: Q&A + Quiz 3 review - Paul Waters |
| | Laboratory | Identification of plant material 1 |
| | Tutorial | Revision |
| Week 8 : 28 October - 3 November | Lecture | Lecture A: Human genetics - Emily Oates<br>Lecture B: Population genetics 1 - Mark Tanaka<br>Lecture C: Population genetics 2 - Mark Tanaka |
| | Laboratory | (1) Identification of plant material 2<br>(2) Collect class data for allele frequencies |
| | Tutorial | Revision |
| Week 9 : 4 November - 10 November | Lecture | Lecture A: Evolution of genes and traits 1 - Paul Waters<br>Lecture B: Evolution of genes and traits 2 - Paul Waters<br>Lecture C: Q&A - Paul Waters |
| | Laboratory | (1) Identification of plant material 3<br>(2) Allele frequencies in the class |
| | Tutorial | Revision |
| Week 10 : 11 November - 17 November | Lecture | Lecture A: Evolution of genes and traits 3 - Paul Waters<br>Lecture B: Evolution of genes and traits 4 - Paul Waters<br>Lecture C: Final lecture - Paul Waters |
| | Laboratory | Bioinformatics |
| | Tutorial | Revision |

## Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

# Staff Details

| Position | Name | Email | Location | Phone | Availability | Equitable Learning Services Contact | Primary Contact |
|---|---|---|---|---|---|---|---|
| Convenor | Paul Waters | | | | Lectures and pracs | Yes | Yes |
| | Joel Brame | | | | Lectures and pracs | Yes | No |

# Other Useful Information

## Academic Information

Upon your enrolment at UNSW, you share responsibility with us for maintaining a safe, harmonious and tolerant University environment.

You are required to:

- Comply with the University's conditions of enrolment.
- Act responsibly, ethically, safely and with integrity.
- Observe standards of equity and respect in dealing with every member of the UNSW community.
- Engage in lawful behaviour.
- Use and care for University resources in a responsible and appropriate manner.
- Maintain the University's reputation and good standing.

For more information, visit the UNSW Student Code of Conduct Website.

## Academic Honesty and Plagarism

**Referencing** is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.
Further information about referencing styles can be located at https://student.unsw.edu.au/referencing

**Academic integrity** is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits: honesty, trust, fairness, respect,

responsibility and courage. At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.
Further information about academic integrity, plagiarism and the use of AI in assessments can be located at:

- The Current Students site,
- The ELISE training site, and
- The Use of AI for assessments site.

The Student Conduct and Integrity Unit provides further resources to assist you to understand your conduct obligations as a student: https://student.unsw.edu.au/conduct

## Submission of Assessment Tasks

### Penalty for Late Submissions

UNSW has a standard late submission penalty of:

- 5% per day,
- for all assessments where a penalty applies,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

***Any variations to the above will be explicitly stated in the Course Outline for a given course or assessment task.***

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

### Special Consideration

If circumstances prevent you from attending/completing an assessment task, you must officially apply for special consideration, usually within 3 days of the sitting date/due date. You can apply by logging onto myUNSW and following the link in the My Student Profile Tab. Medical documentation or other documentation explaining your absence must be submitted with your application. Once your application has been assessed, you will be contacted via your student email address to be advised of the official outcome and any actions that need to be taken from there. For more information about special consideration, please visit: https://student.unsw.edu.au/special-consideration

**Important note**: UNSW has a “fit to sit/submit” rule, which means that if you sit an exam or submit a piece of assessment, you are declaring yourself fit to do so and cannot later apply for Special Consideration. This is to ensure that if you feel unwell or are faced with significant circumstances beyond your control that affect your ability to study, you do not sit an examination or submit an assessment that does not reflect your best performance. Instead, you should apply for Special Consideration as soon as you realise you are not well enough or are otherwise unable to sit or submit an assessment.

## Faculty-specific Information

### Additional support for students

- The Current Students Gateway
- Student Support
- Academic Skills and Support
- Student Wellbeing, Health and Safety
- Equitable Learning Services
- UNSW IT Service Centre
- Science EDI Student Initiatives, Offerings and Guidelines