



## 1. General Course Information

### 1.1 Course Details

<b>Course Code:</b>	<b>1042SCG</b>
<b>Course Name:</b>	<b>Genetics and Evolutionary Biology</b>
<b>Trimester:</b>	<b>Trimester 2, 2024</b>
<b>Program:</b>	<b>Diploma of Science</b>
<b>Credit Points:</b>	<b>10</b>
<b>Course Coordinator:</b>	<b>Dr Ella Trembizki</b>
<b>Document modified:</b>	<b>08 May 2024</b>

### Course Description

Genetics and Evolutionary Biology is an introductory course that will provide foundational concepts in molecular genetics and evolutionary biology. Students will understand the process of inheritance and mutation, population genetics, and evolutionary theory at the molecular, organismal and population level. Students will also learn commonly used genetic analysis methods and techniques employed by scientists. Course content will be delivered through a combination of online/pre-recorded lectures, Learning experience sessions, and online material.

#### Rationale

This course will instruct students in the fundamental concepts of inheritance, genetics, evolution and basic molecular techniques that are part of the experimental toolkits for molecular biologists, environmental scientists and evolutionary biologists alike. The course builds on concepts, describing these fundamental processes at the molecular scale right through to whole organismal and population scales. The molecular genetics concepts are also applied to understand the process of evolutionary theories.

### Assumed Knowledge

It is assumed that you have the background knowledge equivalence of Australian Grade 12 biology and that you are familiar with the main concepts covered in the course 1041SCG Biological Systems. If this is not the case, you are strongly advised to review the bridging materials and resources provided on the Griffith College student portal course website and contact the Course Convenor for additional support.

## 1.2 Teaching Team

Your teacher can be contacted via the email system on the portal.

Name	Email
Ella Trembizki	<a href="mailto:Ella.Trembizki@griffithcollege.edu.au">Ella.Trembizki@griffithcollege.edu.au</a>

### 1.1 Meet with your teacher

Your teacher will be available to meet outside of normal class times by appointment. Please feel free to coordinate this via email or in person.

### 1.2 Timetable

Your timetable is available on the Griffith College Digital Campus at My Apps, Timetable.

### 1.3 Technical Specifications

All students must have access to a computer or suitable mobile device such as laptop or tablet (mobile phones are not suitable). In addition, up-to-date browser access, a reliable high-speed internet connection with enough upload and download capacity, a webcam and headset including microphone are needed.

## 2. Aims, Outcomes & Generic Skills

### 2.1 Course Aims

Defining and describing the molecular basis of inheritance and evolution, as well as the information that a gene provides to an individual, is essential to health-care practitioners, evolutionary biologists and environmental scientists.

The course deals with the molecular basis of genetics, genetic inheritance and genetic analysis. It considers chromosomal inheritance, pedigree analysis, DNA mutation and repair, definitions of the gene and recombinant DNA technology. It also applies basic statistical tools to understand the process of population genetics and the forces that can impact genetic diversity in populations and evolution.



### 2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Define cellular reproduction, the molecular nature of the gene, how genes are inherited and the evolutionary concepts and process.
2. Explain the regulation of a gene, specifically, its capacity for replication and repair, mutation and expression.
3. Apply theoretical skills in the analysis of genetic material and human disorders including genetic diseases.
4. Evaluate the principles of inheritance and genetic exchange among populations.









## 2.2 Graduate Capabilities and Employability Skills

For further details on the Graduate Capabilities and Employability Skills please refer to the [Graduate Generic Skills and Abilities policy](#).

Griffith College is committed to producing graduates who are able to demonstrate progress toward the development of a number of generic skills / capabilities that will allow them to successfully continue their studies at the tertiary level. This set of skills includes employability related skills that will ensure graduates are capable in the workplace of the future.

Studies in this course will give you opportunities to begin to develop the following skills:

Graduate Capabilities and Employability Skills			Focus within this course
Interacting with People	Teamwork		✓
	Communication		✓
	Respect for Culture and Diversity		
Readiness for the Workplace	Problem Solving		✓
	Planning and Organisation		✓
	Creativity and Future Thinking		



## 3. Learning Resources

### 3.1 Required Learning Resources

#### Textbook:

Lisa A. Urry, Noel Meyers, Michael L. Cain, Steven A. Wasserman, Peter V. Minorsky, Jane B. Reece. (2017). Campbell Biology: Australian and New Zealand edition (11th edition). Pearson.

#### Virtual labs:

Molecular cloning - <https://www.labster.com/simulations/molecular-cloning/>

Gel electrophoresis - <https://www.khanacademy.org/test-prep/mcat/chemical-processes/separations-purifications/v/gel-electrophoresis>

Southern blotting - <https://www.khanacademy.org/test-prep/mcat/biomolecules/dna-technology/v/southern-blot>

DNA sequencing - <https://www.khanacademy.org/test-prep/mcat/biomolecules/dna-technology/v/dna-sequencing>

Hardy-Weinberg - [http://www.phschool.com/science/biology\\_place/labbench/lab8/intro.html](http://www.phschool.com/science/biology_place/labbench/lab8/intro.html)

## 3.2 Recommended Learning Resources

1. Benjamin A Pierce. (2014). Genetics: A conceptual approach. New York: W.H. Freeman.
2. D. Peter Snustad; Michael J Simmons. (2015). Principles of Genetics (7th edition). Wiley.

## 3.3 College Support Services and Learning Resources

Griffith College provides many facilities and support services to assist students in their studies. Links to information about support resources that are available to students are included below for easy reference.

- [Digital Library](#) – Databases to which Griffith College students have access to through the Griffith Library Databases.
- [Study Toolbox](#) – there is a dedicated website for this course on the Griffith College Digital Campus.
- [Academic Integrity](#) - Griffith College is committed to ensuring academic integrity is understood and maintained by all staff and students. All students learn about academic integrity through engagement with Academic Integrity online modules within the Academic and Professional Studies course.
- [Services and Support](#) provides a range of services to support students throughout their studies including academic advice and assignment help from Student Learning Advisors, and personal and welfare support from Student Counsellors.
- [Jobs and Employment](#) in the Student Hub can assist students with career direction, resume and interview preparation, job search tips, and more.
- [IT Support](#) provides details of accessing support, information on s numbers and internet access and computer lab rules.

## 3.4 Other Information about your Learning

### Preparation and Participation in Learning

You need to prepare before attending your scheduled Learning Experience (In Class). Work through the Learning Content (Before Class) prepared by your teacher which is found on the course site. Make sure you complete the Learning Activities (After Class) set each week. Active participation in your learning will enhance your success. Ask questions when something is unclear or when you want to bring some issue to your teacher's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

### Attendance

You are expected to actively engage in all learning experiences which underpin the learning content in this course. Attendance will be recorded by your teacher in each learning experience to ensure you are meeting the requirements of the program you are studying and/or your visa conditions. You are expected to engage with the learning content and learning activities outside of timetabled class times. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook.

### Consultation Sessions

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class.

### Course Learning Materials

Learning materials are made available to you in the course site. The learning materials are arranged in Modules. In each Module you will find Learning Content (Before Class), Learning Experiences (In Class) and Learning Activities (After Class). **Learning Content (Before Class)** will be engaged with prior to the scheduled **Learning Experience (In Class)**. This will ensure you are prepared for the scheduled Learning Experience (In Class) by being aware of the content to be covered and therefore will be able to actively participate in the session. **Learning Activities (After Class)** are accessed after the scheduled session for purposes of review, consolidation of learning, and preparation for the Evidence of Learning Tasks (Assessments) in the course.

## Self-Directed Learning

You will be expected to learn independently. This means you must organise and engage with the course Learning Content (Before Class) even when you are not specifically asked to do so by your teacher. The weekly guide (below) will be helpful to organise your learning. This involves revising the weekly course Learning Content (Before Class) and completing the Learning Activities (After Class). It also means you will need to find additional information to evidence your learning beyond that given to you, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

## Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, students are engaged in their learning and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - [Program Progression Policy](#) - for more information].

### **International students enrolled in Language Development Modules (LDM100 / LDM200 or LDH100 / LDH200)**

Successful completion of LDM100 and LDM200 or LDH100 and LDH200 is **required** to graduate with your Diploma award and progress to your Bachelor. If you do not achieve non-graded passes for these language modules your progression to your Bachelor will be affected. Please attend all your classes and submit your assessment.






## Teacher and Course Evaluation

Your feedback is respected and valued by your teachers. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your teacher or by completing course and teacher evaluations via Griffith College's evaluation tool whenever these are available



#### 4. Weekly Guide: Learning Content, Learning Experiences and Learning Activities

The information below lays out how your learning will be organised throughout the trimester:

Week	Learning Content (Before Class)	Learning Experiences (In Class)	Learning Activities (After Class)	Evidence of Learning (Assessment)	Learning Outcome
					
<b>Module 1 - Cellular reproduction and chromosomal basis of inheritance.</b>					
1	Review of cell cycle, mitosis and meiosis. Mendelian inheritance, pedigree analysis (theory of chromosome and inheritance patterns). Mechanism of sex inheritance.	Describe cell cycle and how genes are inherited. Observe and analyse pedigree.	Learning Experience Complete diagnostic quiz at home	Case study (2%)	1
<b>Module 2: Molecular basis of Inheritance and DNA mutations</b>					
2	Central dogma. DNA & Chromosome structure. DNA Replication.	Describe DNA & Chromosome structure and how DNA replicates.	Learning Experience DNA replication video Answers to diagnostic quiz at home	Case study (2%)	2
3	DNA Transcription and translation. Basic features of mutations and phenotypic effects.	Discuss how proteins are expressed from DNA.	Learning Experience DNA transcription & translation video	Case study (2%)	2
4	Molecular basis of Mutations. DNA Recombination. DNA repair.	Observe how genes are mutated and repaired.	Learning Experience Mutation and DNA recombination video	Case study (2%)	2
<b>Module 3: Recombinant DNA Technology</b>					
5	Vectors (components of vectors and how they should be used). Cloning of DNA. Polymerase chain reaction (PCR).	Demonstrate how to clone DNA using vectors and <i>in-vitro</i> .	Learning Experience Virtual lab: molecular cloning	Case study (2%)	3
6	Molecular analysis of DNA, RNA and protein.	Describe the process of molecular analysis of DNA, RNA and protein.	Learning Experience Virtual lab: gel electrophoresis and Southern blotting	Module quiz -1 (15%)	3
7	DNA sequencing. Human genome project. Introduction to genomics	Explain how to sequence DNA using different technologies. Discuss the applications and benefits of human genome projects	Learning Experience Virtual lab: DNA sequencing	Case study (2%)	3

<b>Module 4: Microevolution/ Population Genetics</b>					
8	Modelling the Hardy Weinberg equilibrium. Introduction to the concept of evolutionary biology.	Apply molecular genetics and statistical tools to understand the process of population genetics.	Learning Experience Virtual lab: Hardy-Weinberg principle	Case study (2%)	4
9	Allelic variation and Hardy Weinberg equilibrium. Genetic diversity and evolution.	Discuss what affects allelic frequencies in a finite population.	Learning Experience Perform statistical analysis (H-W principle)	Case study (2%) Scientific report (30%)	4
10	Genetic diversity and gene flow, genetic drift, mutation and selection.	Understand what affects genetic diversities.	Learning Experience	Case study (2%)	4
11	Measuring genetic diversity at the population level. Examples.	Provide examples of how to measure genetic diversities	Learning Experience Evaluate genetic diversities using statistics	Module quiz -2 (15%)	4
12	Revision	Revision	Learning Experience	Case study (2%)	1-4



## 5. Evidence of Learning (Assessment)

### 5.1 Evidence of Learning Summary

	Evidence of Learning (Assessment)	Weighting	Learning Outcome	Due Date
1	Case studies	20%	1-4	Week 1-5, 7-10, 12
2	Module quizzes (2)	30%	1-4	Week 6 & 11
3	Scientific report	20%	2,3	Week 9
4	Final exam	30%	1-4	Final exam period

### 5.2 Evidence of Learning Task Detail

You are required to **submit your own work** for marking. All planning, notes and drafts need to be retained so they can be presented to your teacher if requested.

Tools that generate course content or extensively enhance a student's English language capability are not permitted to be used. Web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for outright assessment creation, translation, or extensive language assistance purposes. In addition, Wikipedia, Baidu, Weibo and WeTalk are not permitted to be used.

Students should follow all teacher directions about the use of Generative Artificial Intelligence (Gen-AI) tools in relation to formative and summative assessment tasks (including how to cite Gen-AI tools, if relevant). It should be noted that Turnitin provides teaching staff with a Gen-AI percentage indicator as well as an Originality Report which detects plagiarism.

### 1.Evidence of Learning Task 1: Case Studies (20%)

**Task Type:** Quiz

**Due Date:** Week 1-5, 7-10, 12

**Weight:** 20%, Marked out of 20

**Length:** N/A

**Duration:** Each case study will take approximately **15 minutes** to complete (allowed 30 mins) x 10 case studies

**Task Description:** Multiple choice questions to be answered after watching a short video

**Criteria and Marking:** Students are assessed on key concepts learnt in each module

**Submission:** Online quizzes

### 2.Evidence of Learning Task 2: Module Quizzes (30%)

**Task Type:** Quiz

**Due Date:** Week 6 & 11

**Weight:** 30%, Marked out of 30

**Length:** N/A

**Duration:** 1 hour

**Quiz type:** Closed book, invigilated

**Task Description:** 20 - 30 multiple choice questions

**Criteria and Marking:** Students are assessed on main concepts learnt in the previous modules

**Submission:** On Campus

### 3.Evidence of Learning Task 3: Scientific Report (20%)

**Task Type:** Written Assignment

**Due Date:** TBA

**Weight:** 20%, Marked out of 20

**Length:** Not Applicable

**Duration:**

**Task Description:** Research into topic from techniques used in genetics and evolutionary biology

**Criteria and Marking:** Students are assessed on structure and development of the topic, use of source materials, referencing, academic writing style, and use of diagram and illustration

**Submission:** Turnitin via the course site

### 4.Evidence of Learning Task 4: Final Exam (30%)

**Task Type:** Examination

**Due Date:** Final exam period

**Weight:** 30%, Marked out of 30

**Length:** TBA

**Duration:** 1 hr 30 mins

**Quiz type:** Closed book, invigilated

**Task Description:** Multiple choice questions and short answer questions

**Criteria and Marking:** Students are assessed on knowledge learnt throughout the entire 12 weeks.

**Submission:** On Campus

### Requirements to pass this course:

In order to pass this Course, students must:

- A. **Attend and attempt the following Evidence of Learning tasks**
  - 2 Module quizzes
  - Scientific report
  - Final exam, **And**
- B. **Achieve an overall course result (sum of all assessments) of at least 50%**

### 5.3 Late Submission

An Evidence of Learning Task submitted after the due date, without an approved extension from the teacher, will be penalised. The standard penalty is the reduction of the mark allocated to the Evidence of Learning Task by 5%



of the maximum mark applicable for the Evidence of Learning Task, for each calendar day that the task is late. Evidence of learning tasks submitted more than seven calendar days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > [Assessment Policy](#) for guidelines and penalties for late submission.

## 5.4 Other Information about Evidence of Learning

### Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the course.

### Requests for extension

To apply for an extension of time for an evidence of learning item, you must submit an [Application for Extension of Assignment](#) form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. [Griffith College Student Medical Certificate](#)]. Please refer to the Griffith College website - [Policy Library](#) - for guidelines regarding extensions and deferred assessment.

### Return of Evidence of Learning Items

1. Marks awarded for in-trimester evidence of learning items, except those being moderated externally with Griffith University, will be available on the Student Portal within fourteen [14] days of the due date. This does not apply to the final evidence of learning item in this course (marks for this item will be provided with the final course result).
2. Students will be advised of their final grade through the Student Portal. Students can review their final exam papers after student grades have been published. Review of final exam papers will not be permitted after the final date to enrol.
3. Marks for **all** evidence of learning items including the final exam (if applicable) will be recorded in the Moodle Course Site and made available to students through the Moodle Course Site.

*The sum of your marks of evidence of learning items in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.*

## 6. Policies & Guidelines

Griffith College assessment-related policies can be found in the [Griffith College Policy Library](#) which include the following policies:

[Assessment Policy](#), [Special Consideration](#), [Deferred Assessment](#), [Alternate Exam Sittings](#), [Medical Certificates](#), [Academic Integrity](#), [Finalisation of Results](#), [Review of Marks](#), [Moderation of Assessment](#), [Turn-it-in Software Use](#). These policies can be accessed within the [Policy Library](#)

**Academic Integrity** Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your teachers and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of an allegation of a breach of academic integrity being made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Griffith College website - Policy Library > [Academic Integrity Policy](#)

### **Reasonable Adjustments for Assessment – The Disability Services policy**

The [Disability Services policy](#) (accessed within the [Policy Library](#)) outlines the principles and processes that guide the College in making reasonable adjustments to assessment for students with disabilities while maintaining academic robustness of its programs.

### **Risk Assessment Statement**

There are no out of the ordinary risks associated with this course.

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