Course Code:	1042SCG
Course Name:	Genetics & Evolutionary Biology
Semester:	Trimester 2, 2019
Program:	Diploma of Science
Credit Points:	10
Course Coordinator:	Claire Wang
Document modified:	14 June 2019

Teaching Team

Your lecturer/tutor can be contacted via the email system on the portal.

Name	Email
Claire Wang	claire.wang@staff.griffithcollege.edu.au

Staff Consultation

Your lecturer/tutor is available each week for consultation outside of normal class times. Times that your lecturer/tutor will be available for consultation will be given in the first week of lectures. A list of times and rooms will be published on the Griffith College Portal under the “myTimetable” link.

Prerequisites

There are no prerequisites for this course

Brief 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 lectures, tutorials, and online material. Incompatible: Functional Molecular Genetics 1006BPS

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.

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.

Learning Outcomes

Upon successful completion of this course students will be able to...

1. Describe what a gene is, and the molecular nature of the gene.
2. Understand how it is inherited, and the evolutionary process.
3. Define and describe the regulation of a gene, specifically, its capacity for replication and repair, mutation and expression.

4. Describe how to analyse genetic material.
5. Gain theoretical skills used in the analysis of human disorders including genetic diseases.
6. Describe the process and concepts of evolution.
7. Understand the Principles of inheritance and genetic exchange among populations.

Texts and Supporting Materials

Required text:

1. 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.

Supplementary text:

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.

Organisation and Teaching Strategies

The course will be taught using 1 x three hour lecture per week and 1 x two hour tutorial per week over the 12 week semester.

The lectures will provide the basic introduction to each module, and introduce relevant reading or web-based resources.

The tutorials will provide students with an opportunity to develop knowledge gained during the lectures with the help of a tutor.

Attendance at lectures and tutorials is COMPULSORY.

Class Contact Summary

Attendance

You will greatly advance your chances of success in the course by fully using the contact time you have available with your lecturers and tutors. The contact time provided in lectures,

tutorials, workshops and consultation is for your benefit; it is your opportunity to have any questions about course content or requirements clarified.

Participation in Class

You are expected to actively participate in classes each week.

Consultant Times

Attendance during consultation times is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Materials

Lecture notes will be made available to you on the Learning@Griffith College site on the student portal and you are advised to print these out and bring them to each class so that extra notes can be added.

Independent Learning

You are expected to reinforce your learning gained during contact time by undertaking sufficient independent study. For this 10 CP course, you will need to spend at least 10 hours per week engaged in activities that will help your learning and fulfil the course objectives. Thus, provided you have well used the 4 hours per week of formal contact, you would then complete at least 6 hours per week of independent study.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, and that GPA is maintained at equal to or greater than 3.5 with passing grades achieved in more than 50% of courses in any semester [please see Griffith College Policy Library - Program Progression Policy - for more information].

Content Schedule

Weekly Teaching Schedule

Week	Topic	Activity	Readings
1	Module 1: Cellular reproduction and chromosomal basis of inheritance Review of cell cycle, mitosis and meiosis. Mendelian inheritance, pedigree analysis (theory of chromosome and inheritance patterns). Mechanism of sex	Lecture	Textbook : Ch.6, 12, 14 & 15

	determination and variation in chromosome number.		
	Introduction to course and assessment	Tutorial	Review: basic molecular/cell biology
2	Module 2: Molecular basis of Inheritance and DNA mutations part 1- Central dogma. DNA & Chromosome structure. DNA Replication	Lecture	Textbook : Ch.16 & 17
		Tutorial	Review module 1
3	Module 2: Molecular basis of Inheritance and DNA mutations part 2a – DNA Transcription and translation, basic features of mutations and phenotypic effects.	Lecture	Textbook : Ch. 16 &17
		Tutorial	Review module 2 part 1
4	Module 2: Molecular basis of Inheritance and DNA mutations part 2b – Molecular basis of Mutations and DNA Recombination and DNA repair.	Lecture	Textbook : Ch. 16 & 17
	In Class Quiz 1- 10%	Lecture	Review module 1-2 (part 2a)
		Tutorial	Review Module 2 part 2a
5	Module 3: Recombinant DNA Technology part 1 – Vectors (components of vectors and how they should be used). Cloning of DNA. Polymerase chain reaction (PCR).	Lecture	Textbook : Ch. 20
		Tutorial	Review module 2 part 2b
6	Module 3: Recombinant DNA Technology part 2: Molecular analysis of DNA, RNA and protein. DNA sequencing. Human genome project. Introduction to genomics	Lecture	Textbook: Ch. 20
		Tutorial	Review module 3 part 1

7	Review: module 1-3	Lecture	Review module 1-3
	Mid trimester exam (20%)	Tutorial	Module 1-3 (part 1)
8	Module 4: Microevolution/ Population Genetics – Modelling the Hardy Weinberg equilibrium, introduction to the concept of evolutionary biology	Lecture	Textbook: Ch. 22 & 23
		Tutorial	Review: module 3 part 2
9	Module 4: Microevolution/ Population Genetics - Allelic variation and Hardy Weinberg equilibrium Genetic diversity and evolution	Lecture	Textbook: Ch 23.
		Tutorial	Review: module 4 (week 8)
	Scientific report (10%) due		Submission via portal
10	Module 4: Microevolution/Population Genetics – Genetic diversity and gene flow, genetic drift, mutation and selection.	Lecture	Textbook: Ch 23
		Tutorial	Review: module 4 (week 9)
11	Module 4: Microevolution/Population genetics – Measuring genetic diversity at the population level. Examples.	Lecture	Textbook: Ch 23
	In-Class Quiz 2 (10%)	Tutorial	Review module 4 (week 10)
12	Revision	Lecture	Review: module 3 & 4
		Lecture	Review: module 3 & 4
		Tutorial	Review: module 1-4
13	Final Examination	Examination	40%
14	Final Examination	Examination	40%

Assessment

This section sets out the assessment requirements for this course.

Summary of Assessment

Item	Assessment Task	Weighting	Relevant Learning Outcomes	Due Date
1	Diagnostic quiz	0%	1,2,3	Weeks 1/2
2	Online assessment	10%	1, 2, 3, 4, 5, 6, 7	Week 3-11
3	In-Class Quizzes [x2]	20%	1, 2, 3, 4, 5, 6, 7	Week 4 & 11
4	Scientific report	10%	3, 4, 5, 6	Week 9
5	Mid Trimester Exam	20%	1,2,3,4,5	week 7
6	Final Examination	40%	1,2,3,4,5,6,7	Week 13/14

Assessment Details

Diagnostic quiz (0%)

During week 1-2, a short multiple choice quiz (10 questions) will be available on student portal. The quiz will cover general and assumed knowledge essential for successful completion of this course. Students are required to complete the short quiz by the end of week 2 and answers to the quiz will be posted by week 3. The item has 0% weighing and is designed to help students to identify the knowledge and skills they need to improve. After the quiz, students can seek assistance during the scheduled tutorials with lecturer or tutor.

Online assessment (10%)

A self-paced online assignment task will be completed between weeks 3 and 11. The assignment will use a common theme/example to explore various aspects of the material delivered throughout the course. The assignment will help students understand concepts discussed in Module 1 through to 4. The assessment will be completed online via link on student portal

In-class quizzes (2 x 10%)
These quizzes will be conducted during class time and will be comprised of a combination of multiple choice and problem solving questions. These quizzes will focus on assessment of fundamental knowledge and skills in genetics and evolutionary biology. They will also provide opportunity for students to measure their progress and prepare for the final examination questions.

Scientific report (10%)

Scientific report is a written assignment where students will have the opportunity to perform online research in scientific literature. On week 1, students will select a topic related to molecular techniques applied in genetics and evolutionary biology. Students can explore the various process and applications in the technique and construct a summarised report. The assessment aims to help students to learn how the knowledge and skills acquired in this course are applied in the industry. It also provides students the opportunity to practice academic writing with appropriate citation and references.

Mid-trimester Exam (20%)
Students will complete a mid-semester exam that will be comprised of multiple choice, short answer and extended problem solving questions. This exam will assess knowledge and skills developed across Weeks 1 to 6. The exam will be approximately one and a half hours in duration.

Final exam (40%)
The three hour exam at the end of the semester will examine the full content of this course, with more emphasis being given to the modules taught after mid-semester exams.

Submission and Return of Assessment Items

Normally you will be able to collect your assignments in class within fourteen [14] days of the due date for submission of the assignment.

Results for In-class Quizzes will be available on the student portal within 14 days of the due date for the quizzes.

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.

Extensions

To apply for an extension of time for an assignment, 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 Medical Certificate]. Please refer to the Griffith College website - Policy Library - for guidelines regarding extensions and deferred assessment.

Assessment Feedback

Marks awarded for assessment items will also be available on the on-line grades system on the Student Website within fourteen [14] days of the due date.

Generic Skills

Griffith College aims to develop graduates who have an open and critical approach to learning and a capacity for lifelong learning. Through engagement in their studies, students are provided with opportunities to begin the development of these and other generic skills.

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

Generic Skills	Taught	Practised	Assessed
Written Communication	Yes	Yes	Yes
Oral Communication	Yes	Yes	
Information Literacy	Yes	Yes	Yes
Secondary Research	Yes	Yes	Yes
Critical and Innovative Thinking	Yes	Yes	
Academic Integrity	Yes	Yes	Yes
Self Directed Learning	Yes	Yes	Yes
Team Work	Yes	Yes	Yes
Cultural Intelligence	Yes		
English Language Proficiency	Yes	Yes	

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 lecturers, tutors 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 any allegation of academic misconduct 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 Academic Integrity Policy on the Griffith College website – Policy Library.

Risk Assessment Statement

There are not out of the ordinary risks associated with this course.

Note: For all Diploma level programs, Griffith College acknowledges content derived from Griffith University.