



The University of Southern Queensland

Course specification

Description: Genetics						
Subject	Cat-nbr	Class	Term	Mode	Units	Campus
BIO	2207	45169	2, 2005	ONC	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS002
Student contribution band:	2
ASCED code:	010909

STAFFING

Examiner: Grant Daggard
Moderator: John Dearnaley

REQUISITES

Pre-requisite: BIO2103 and STA2300

RATIONALE

Genetics is the study of inheritance. Not only is this study essential as a basic part of biology but an understanding of the principles of genetics is important for students whose future professions involve plant or animal breeding, genetic engineering, microbiology and related disciplines. Furthermore an understanding of genetics is necessary for an informed awareness of many human problems related to genetic dysfunction.

SYNOPSIS

The course presents the scientific basis of heredity. The principles of genetics play an increasingly important role in the modern world; in the breeding of improved crops and livestock, the conservation of endangered species and the genetic engineering of new products for agriculture or medicine. The course commences with an overview of Mendelian genetics and introduces concepts of importance to both plant and animal breeding. The theory and practice of manipulating and mapping the location of genes on chromosomes and the effects of mutations on gene expression are studied. The science of genetic engineering is briefly introduced. Changes in chromosome number and structure in plants (e.g. evolution of wheat) and animals (e.g. Downs Syndrome) are examined as are the important areas of population genetics, evolution and behavioural genetics.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate an understanding of the science of genetics and its relation to inheritance;
2. demonstrate an appreciation of the implications of inheritance in human sociology;

3. demonstrate an appreciation of the application of genetic principles to plant and animal breeding and genetic engineering;
4. solve practical problems in genetics;
5. generate and analyse genetic data in practical situations.

TOPICS

	Description	Weighting (%)
1.	Mendelian inheritance, Mitosis, Meiosis and DNA Geotype and Phenotype, Independent assortment.	10.00
2.	Heredity: dominance, co-dominance, multiple alleles, Genetic symbols and pedigree analysis.	10.00
3.	Genes and Chromosomes: Chromosome morphology and structure, The genetic basis of sex, non-disjunction.	6.00
4.	Chromosome mapping and genetic linkage, Crossing over and recombination.	14.00
5.	Variations in chromosome number, Aneuploidy, Euploidy, Prenatal diagnosis.	8.00
6.	Variations in chromosome structure, Duplications, deficiencies, inversions, translocations.	8.00
7.	Behavioural genetics - behaviours, explainable in terms of mendelian genetics.	5.00
8.	Mutation - the determination of mutation rates. Mutagens including ionizing radiation and its effect on man.	10.00
9.	Assessment of gene frequencies in populations. The Hardy-Weinberg Law. The effect of mutation, selection, genetic drift, migration and meiotic drive on gene frequencies.	12.00
10.	Examples of qualitative and quantitative inheritance - grain colour in wheat, IQ in man.	7.00
11.	Plant and animal breeding - an introduction	10.00

TEXT and MATERIALS required to be PURCHASED or ACCESSED

ALL textbooks and materials are available for purchase from USQ BOOKSHOP (unless otherwise stated). Orders may be placed via secure internet, free fax 1800642453, phone 07 46312742 (within Australia), or mail. Overseas students should fax +61 7 46311743, or phone +61 7 46312742. For costs, further details, and internet ordering, use the 'Textbook Search' facility at <http://bookshop.usq.edu.au> click 'Semester', then enter your 'Course Code' (no spaces).

Daggard, G 2005, *BIO2207 Genetics - Practical Exercises*, University of Southern Queensland, Toowoomba.

Pechenik, J A 2004, *A Short Guide to Writing about Biology*, 5th edn, Longman, Boston.

Snustad, D P and Simmons, M J 2003, *Principles of Genetics*, 3rd edn, Wiley, New York. (ISBN: 0-471-44180-5)

REFERENCE MATERIALS

Reference materials are materials that, if accessed by students, may improve their knowledge and understanding of the material in the course and enrich their learning experience.

Fairbanks, D J and Andersen, W R 1999, *Genetics: the continuity of life*, Wadsworth Publishing, Pacific Grove.

(ISBN 0 534 25279 6)

Frankham, R, Ballou, J D & Brocoe, D A 2002, *Introduction to Conservation Genetics*, Cambridge University Press, Cambridge, ISBN 0521 639859.

Griffiths, A J F, Miller, J H, Suzuki, D T, Lewantini, R C & Gelbart, W M 1999, *An Introduction to Genetic Analysis*, 7th edn, Freeman Publishers, New York.

(ISBN 0 7167 2285 2)

Korf, B R 2000, *Human Genetics: a problem-based approach*, 2nd edn, Blackwell Science Publishers, Malden, Mass.

(ISBN 0-86542-353-9)

Mange, E J and Mange, A P 1994, *Basic Human Genetics*, Sinauer Associates, Sunderland, Mass.

(ISBN 0-87893-495-2)

Stansfield, W D 1991, *Schaum's Outline of Theory and Problems of Genetics - Schaums Outline Series*, 3rd edn, McGraw-Hill Publishers, New York.

Strickberger, M W 1985, *Genetics*, 3rd edn, MacMillan, New York.

Vogel, F & Motulsky, A G 1997, *Human Genetics: problems and approaches*, 3rd edn, Springer Publishers, Berlin.

(ISBN 3-540-60290-9)

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	3.00
Laboratory or Practical Classes	30.00
Lectures	26.00
Private Study	71.00
Report Writing	30.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg(%)	Due date
1 HR RESTRICTED TEST	20.00	20.00	19 Jul 2005 (see note 1)
PRACTICAL REPORTS (2)	30.00	30.00	19 Jul 2005 (see note 2)
2 HR RESTRICTED EXAM	50.00	50.00	END S2 (see note 3)

NOTES

1. Examiner to advise the date of the 1hr restricted test for mid-semester
2. Examiner to advise of dates for the 2 practical reports
3. Examination dates will be available during the Semester. Please refer to the examination timetable when published.

IMPORTANT ASSESSMENT INFORMATION

- 1 Attendance requirements:
It is the students' responsibility to attend and participate appropriately in all activities (such as lectures, tutorials, laboratories and practical work) scheduled for them, and to study all material provided to them or required to be accessed by them to maximise their chance of meeting the objectives of the course and to be informed of course-related activities and administration. To maximize their chances of satisfying the objectives of the practical component of the course, students should attend and actively participate in the laboratory sessions in the course.
- 2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assignments satisfactorily, students must obtain at least 50% of the marks available for each assignment. To complete the examination satisfactorily, students must obtain at least 50% of the marks available for the examination.
- 3 Penalties for late submission of required work:
If students submit assignments after the due date without prior approval then a penalty of 5% of the total marks gained by the student for the assignment will apply for each working day late.
- 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must submit all of the summative assessment items, achieve at least 50% in the examination and at least 50% of the available weighted marks for the summative assessment items. Students who do not qualify for a Passing grade may, at the discretion of the Examiner, be awarded a Supplementary Examination and/or assigned additional work to demonstrate to the Examiner that they have achieved the required standard.
- 5 Method used to combine assessment results to attain final grade:
The final grades for students will be assigned on the basis of the weighted aggregate of the marks (or grades) obtained for each of the summative assessment items in the course.
- 6 Examination information:
In a Restricted Examination, candidates are allowed access to specific materials during the examination. The only materials that candidates may use in the restricted examination for this course are: writing materials (non-electronic and free from material which could give the student an unfair advantage in the examination); calculators which cannot hold

textual information (students must indicate on their examination paper the make and model of any calculator(s) they use during the examination; English translation dictionaries (but not technical dictionaries); Translation dictionary. With the Examiner's approval, candidates may, take an appropriate non- electronic translation dictionary into the examination. This will be subject to perusal and, if it is found to contain annotations or markings that could give the candidate an unfair advantage, it may be removed from the candidate's possession until the appropriate disciplinary action is completed.

- 7 Examination period when Deferred/Supplementary examinations will be held:
Any Deferred or Supplementary examinations for this course will be held during the next examination period.
- 8 University Regulations:
Students should read USQ Regulations 5.1 Definitions, 5.6. Assessment, and 5.10 Academic Misconduct for further information and to avoid actions which might contravene University Regulations. These regulations can be found at the URL <http://www.usq.edu.au/corporateservices/calendar/part5.htm> or in the current USQ Handbook.

ASSESSMENT NOTES

- 9 The due date for an assignment is the date by which a student must despatch the assignment to the USQ. The onus is on the student to provide proof of the despatch date, if requested by the Examiner. Students must retain a copy of each item submitted for assessment. this must be produced within five days if required by the Examiner.
- 10 Students who have undertaken all of the required assessments in a course but who have failed to meet some of the specified objectives of a course within the normally prescribed time may be awarded the temporary grade: IM (Incomplete - Make-up). An IM grade will only be awarded when, in the opinion of the examiner, a student will be able to achieve the remaining objectives of the course after a period of non directed personal study. Students who, for medical, family/personal, or employment-related reasons, are unable to complete an assignment or to sit for an examination at the scheduled time may apply to defer an assessment in a course. Such a request must be accompanied by appropriate supporting documentation. One of the following temporary grades may be awarded IDS (Incomplete - Deferred Examination); IDM (Incomplete Deferred Make-up); IDB (Incomplete - Both Deferred Examination and Deferred Make-up).