



The University of Southern Queensland

Course specification

The current and official versions of the course specifications are available on the web at <http://www.usq.edu.au/coursespecification/current>.
Please consult the web for updates that may occur during the year.

Description: Advanced Molecular Biology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
BIO	8309	91459	2, 2009	ONC	1.00	Toowoomba

Academic group:	FOSCI
Academic org:	FOS002
Student contribution band:	6
ASCED code:	010900

STAFFING

Examiner: Grant Daggard

Moderator: Guang Liu

REQUISITES

Pre-requisite: BIO2209 Co-requisite: BIO3309

RATIONALE

A knowledge of molecular biology underpins many advances in the biological sciences and the area is having an increasing impact in areas such as biotechnology and biomedical sciences. This course builds on knowledge of key concepts in molecular and cellular biology to explore more advanced areas within molecular biology including gene mapping, control of expression and gene manipulation. The potential impact of this technology on the nature of the world in which we live is also discussed.

SYNOPSIS

Biology is today in the midst of a revolution as a result of recent research into the molecular basis of life. An understanding of the theory and techniques of molecular biology are now becoming essential to many diverse areas of study in biology: from the study of biodiversity and evolutionary relationships to genetic engineering of microbes, plants and animals. This course is for students who already have a background in cell and molecular biology and wish to explore more recent advances in the field of molecular biology with a particular focus on gene organization, expression and regulation.

OBJECTIVES

On completion of this course students will be able to:

1. demonstrate an understanding of genome organization in prokaryotes and eukaryotes (Assignment 1, Exam);
2. outline recent advances in approaching gene discovery (Assignment 1, Exam);
3. explain processes involved in gene expression and regulation (Assignment 1, Exam);

4. be able to comment on a range of advanced molecular biology techniques (Assignment 1, 2, Exam);
5. be familiar with the impact of bioinformatics on molecular biology particularly in respect to recent advances in biology and medicine (Assignment 1, 2, Exam);
6. be able to design and comment upon approaches to using molecular biology to undertake gene discovery and manipulation (Assignment2, Exam).

TOPICS

	Description	Weighting (%)
1.	Review of genome organisation	10.00
2.	Gene discovery	10.00
3.	Gene expression	15.00
4.	Gene regulation	20.00
5.	Mutation, Recombination and Repair and cancer	10.00
6.	Developmental molecular biology	10.00
7.	Advanced technologies in Molecular Biology	20.00
8.	Systems Biology	5.00

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).

Watson, JD, Baker, TA, Bell, SP, Gann, A, Levine M, Losick R 2008, *Molecular Biology of the Gene*, 6th edn, Addison Wesley, Harlow.
(ISBN: 0-321-50781-9)

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.

Akam, M, et al (eds) 1994, *The evolution of Developmental Mechanisms*, The Company of Biologists, Cambridge.

Alberts, B et al 2002, *Molecular Biology of the Cell*, 4th edn, Garland Publishing Inc, New York.

Attwood, TK & Parry-Smith, DJ 1999, *Introduction to Bioinformatics*, Addison Wesley Longman Ltd, Harlow.

Brown, TA (ed) 2000, *Essential Molecular Biology: A Practical Approach*, 2nd edn, Oxford University Press, Oxford, Vol 1-2.

Brown, TA (ed) 2007, *Genomes 3*, 3rd edn, Garland Science, New York.

- Brown, TA (ed) 1991, *Molecular Biology Labfax*, BIOS Scientific Publications, Oxford.
- Freifelder, D 1987, *Molecular Biology*, 2nd edn, Jones and Bartlett Publishers, Boston.
- Karp, G 2008, *Cell and Molecular Biology: Concepts and Experiments*, 2nd edn, John Wiley, Chichester.
- Kendrew, J 1994, *The Encyclopedia of Molecular Biology*, Blackwell Science Ltd, Oxford.
- Lodish, H et al 2003, *Molecular Cell Biology*, 5th edn, W H Freeman, New York.
- Mount, DW 2004, *Bioinformatics: Sequence and Genome Analysis*, 2nd edn, Cold Spring Harbour Laboratory Press, Cold Spring Harbour.
- Nicholl, DST 2002, *An Introduction to Genetic Engineering*, Cambridge University Press, Cambridge.
- Sambrook, J, Fritsch, EF & Maniatis, T 1989, *Molecular Cloning: a laboratory manual*, Cold Spring Harbour Laboratory Press, Cold Spring Harbour.
- Voet, D & Voet, JG 1995, *Biochemistry*, 2nd edn, John Wiley and Sons, New York.
- Weaver, RF 2002, *Molecular Biology*, 2nd edn, McGraw Hill, Boston.
- Wolpert, L 1998, *Principles of Development*, Oxford University Press, New York.

STUDENT WORKLOAD REQUIREMENTS

ACTIVITY	HOURS
Examinations	2.00
Private Study	102.00
Report Writing	30.00
Tutorials	36.00

ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
ASSIGNMENT 1	20.00	20.00	24 Jul 2009 (see note 1)
ASSIGNMENT 2	20.00	20.00	24 Jul 2009 (see note 2)
2 HR RESTRICTED EXAM	60.00	60.00	END S2 (see note 3)

NOTES

1. Assessment item 1 (Assignment 1) due in week 5, Examiner will provide correct date.
2. Assessment item 2 (Assignment 2) due in week 7, Examiner will provide correct date.
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.
- 2 Requirements for students to complete each assessment item satisfactorily:
To complete each of the assessment items satisfactorily, students must obtain at least 50% of the marks available for each assessment item. (Depending upon the requirements in Statement 4 below, students may not have to satisfactorily complete each assessment item to receive a passing grade in this course).
 - 3 Penalties for late submission of required work:
If students submit assignments after the due date without (prior) approval of the examiner then a penalty of 5% of the total marks gained by the student for the assignment may apply for each working day late up to ten working days at which time a mark of zero may be recorded. No assignments will be accepted after model answers have been posted.
 - 4 Requirements for student to be awarded a passing grade in the course:
To be assured of receiving a passing grade a student must achieve at least 50% of the total weighted marks available for the course.
 - 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 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. Students whose first language is not English, may, take an appropriate unmarked non- electronic translation dictionary (but not technical dictionaries) into the examination. Dictionaries with any handwritten notes will not be permitted. Translation dictionaries 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 In order to attend laboratory classes, students must provide and wear appropriate personal protective equipment. This shall include a laboratory coat, closed in shoes, and safety glasses. Such equipment must be approved by supervising staff. Failure to provide and wear the appropriate safety equipment will result in students being excluded from classes.

10 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. If requested by the Examiner, students will be required to provide a copy of assignments submitted for assessment purposes. Such copies should be despatched to USQ within 24 hours of receipt of a request being made. The examiner of a course may grant an extension of the due date of an assignment in extenuating circumstances.