



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: Molecular Biology

Subject	Cat-nbr	Class	Term	Mode	Units	Campus
BIO	3309	90180	2, 2009	ONC	1.00	Toowoomba

<b>Academic group:</b>	FOSCI
<b>Academic org:</b>	FOS002
<b>Student contribution band:</b>	6
<b>ASCED code:</b>	010901

### STAFFING

Examiner: Grant Daggard  
Moderator: Robert Learmonth

### REQUISITES

Pre-requisite: BIO2209 Co-requisite: BIO2205

### RATIONALE

A revolution in biology has occurred as a result of recent advances in the field of molecular biology and genetic engineering. An appreciation of the potential applications of molecular biology is of growing importance in many areas of biological and medical research. This course serves to develop an understanding of many fundamental principles and current techniques in molecular biology. 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 have a background in cell biology. Drawing on this knowledge base, the course addresses the nature of gene organisation, replication and expression in both prokaryotic and eukaryotic systems. Practicals involve an introduction to techniques required for the isolation, study and manipulation of genes as well as an introduction to basic tools in bioinformatics. Potential applications of recombinant DNA technology and bioinformatics in biotechnology and medicine are also discussed.

### OBJECTIVES

On the successful completion of this course, the student will be able to:

1. demonstrate an understanding of the current concepts of DNA structure, maintenance and repair (Problem Sets; Test; Exam);
2. explain the processes involved in gene organisation, replication and expression in both prokaryotic and eukaryotic systems (Problem Sets; Test; Exam);
3. demonstrate an understanding of the tools used in recombinant DNA technology including: enzymes, host-vector systems and techniques for gene isolation, cloning and characterization (All assessments);
4. use of a range of molecular biological laboratory techniques (Practical Reports);
5. comment on the applications of molecular biology and bioinformatics to recent advances in biology and medicine (Practical Reports);
6. comment on the various debate positions presented by both critics of and advocates of the use of recombinant DNA technology (Practical Reports);
7. demonstrate skills and knowledge required to perform laboratory experiments safely with appropriate equipment (Practical Reports).

## TOPICS

	Description	Weighting (%)
1.	Genome organisation and Genomics	20.00
2.	Genome packaging	10.00
3.	Prokaryotic gene expression and development	5.00
4.	Eukaryotic gene expression and development	30.00
5.	Genome Recombination and Repair	10.00
6.	Molecular Databases (Bioinformatics)	5.00
7.	DNA cloning and manipulation	20.00

## 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).

Brown, TA 2007, *Genomes 3*, Garland Science, New York.

## 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.

All Books on 3 Hour Loan Basis

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, IRL Press, Oxford, Vol 1-2.
- 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 1999, *Cell and Molecular Biology: Concepts and Experiments*, 2nd edn, John Wiley, New York.
- Kendrew, J 1994, *The Encyclopedia of Molecular Biology*, Blackwell Science Ltd, Oxford.
- Lodish, H et al 1995, *Molecular Cell Biology*, 3rd edn, Scientific American Books, 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	3.00
Laboratory or Practical Classes	32.00
Lectures	24.00
Private Study	74.00
Report Writing	32.00

## ASSESSMENT DETAILS

Description	Marks out of	Wtg (%)	Due date
PROBLEM SET 1	5.00	5.00	24 Jul 2009 (see note 1)
PRACTICAL REPORT 1	10.00	10.00	24 Jul 2009 (see note 2)
1HR MID-SEM RES TEST	20.00	20.00	24 Jul 2009 (see note 3)
PROBLEM SET 2	5.00	5.00	24 Jul 2009 (see note 4)
PRACTICAL REPORT 2	10.00	10.00	24 Jul 2009 (see note 5)
2 HR RESTRICTED EXAM	50.00	50.00	END S2 (see note 6)

### NOTES

1. Assessment item 1 (Problem Set 1) due in week 5, Examiner will provide correct date.
2. Assessment item 2 (Practical Report 1) due in week 7, Examiner will provide correct date.
3. Assessment item 3 (Mid-semester test) due in week 8, Examiner will provide correct date.
4. Assessment item 4 (Problem Set 2) due in week 11, Examiner will provide correct date.
5. Assessment item 5 (Practical Report 2) due in week 12, Examiner will provide correct date.
6. 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.
- 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:  
Candidates are allowed access only to specific materials during a Restricted 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 nonelectronic translation dictionary (but not technical dictionary) into the examination. Dictionaries with any handwritten notes will not be permitted. Translation dictionaries will be subject to perusal and may be removed from the candidate's possession until appropriate disciplinary action is completed if found to contain material that could give the candidate an unfair advantage.
- 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 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).
- 11 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. The Faculty will normally only accept assessments that have been written, typed or printed on paper-based media. The Faculty will NOT accept submission of assignments by facsimile. Students who do not have regular access to postal services or who are otherwise disadvantaged by these regulations may be given special consideration. They should contact the examiner of the course to negotiate such special arrangements. In the event that a due date for an assignment

falls on a local public holiday in their area, such as a Show holiday, the due date for the assignment will be the next day. Students are to note on the assignment cover the date of the public holiday for the Examiner's convenience.