COURSE OUTLINE

LFS252 Molecular Biology

School: School of Science, Technology and Engineering

2026 | Trimester 2

UniSC Sunshine Coast
UniSC Moreton Bay

BLENDED LEARNING

Most of your course is on campus but you may be able to do some components of this course online.

Please go to unisc.edu.au for up to date information on the teaching sessions and campuses where this course is usually offered.

1. What is this course about?

1.1. Description

You will study the basic principles of molecular biology by discovering the interplay of molecules that underpin life and enable genetic engineering, biotechnology and bioinformatics and synthetic biology fields. You will understand concepts relating to DNA structure, the genetic code, replication, and repair; and how RNA is transcribed, regulated, and functions within cells. You will also understand how proteins are translated, folded, and their myriad functions and perform key molecular techniques including PCR, cloning, sequencing, and protein production.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – asynchronous learning materials	1hr	Week 1	12 times
Tutorial/Workshop 1 – on campus tutorial/workshop	2hrs	Week 1	6 times
Tutorial/Workshop 2 – Online workshop	1hr	Week 1	2 times
Laboratory 1 – wet lab	3hrs	Week 2	6 times

1.3. Course Topics

Central dogma and DNA structure

The genetic code, DNA replication and PCR

DNA replication and repair

Transcription and regulation of gene expression – prokaryote and eukaryote

Noncoding RNAs

Proteins

Omics: Genomic, transcriptomic and proteomic

2. What level is this course?

200 Level (Developing)

Building on and expanding the scope of introductory knowledge and skills, developing breadth or depth and applying knowledge and skills in a new context. May require pre-requisites where discipline specific introductory knowledge or skills is necessary. Normally, undertaken in the second or third full-time year of an undergraduate programs.

3. What is the unit value of this course?

12 units

4. How does this course contribute to my learning?

COURSE LEARNING OUTCOMES On successful completion of this course, you should be able to...		GRADUATE QUALITIES Completing these tasks successfully will contribute to you becoming...
1	Describe the processes of nucleic acid replication, RNA transcription, protein translation and their regulation.	Knowledgeable
2	Understand the relevance and justify use of molecular biology in relation to current applications.	Ethical
3	Perform and understand basic laboratory techniques in recombinant DNA technology minipreps, gel electrophoresis and restriction digestion and mapping, PCR, DNA sequencing and cloning, and record in a standard laboratory report structure.	Empowered
4	Solve basic exercises in molecular biology processes and recombinant DNA manipulation, as listed in the learning materials and laboratory notes.	Creative and critical thinker

5. Am I eligible to enrol in this course?

Refer to the UniSC Glossary of terms for definitions of “pre-requisites, co-requisites and anti-requisites”.

5.1. Pre-requisites

(SCI100 or LFS100) or (LFS103 and enrolled in Program SE303, AE304, SC355, SC357 or SC354)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

Not applicable

5.4. Specific assumed prior knowledge and skills (where applicable)

Basic understanding of cell biology.

5.5. Microcredential Information

Not applicable

6. How am I going to be assessed?

6.1. Grading Scale

Standard Grading (GRD)

High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL).

6.2. Details of early feedback on progress

Students perform formative laboratory quizzes based on the lab content, and automatically receive their results the following week in Grade Centre. In addition, tutorials are provided every two weeks (beginning week 3), where students work through written exam-like questions and are provided face-to-face feedback on their answers in a group discussion.

6.3. Assessment tasks

DELIVERY MODE	TASK NO.	ASSESSMENT PRODUCT	INDIVIDUAL OR GROUP	WEIGHTING %	WHAT IS THE DURATION / LENGTH?	WHEN SHOULD I SUBMIT?	WHERE SHOULD I SUBMIT IT?
All	1a	Quiz/zes	Individual	15%	5 minutes	Throughout teaching period (refer to Format)	In Class
All	1b	Quiz/zes	Individual	15%	8-10 Short answer questions (worth a total of 10 marks each time) in 1 hour	Refer to Format	Online Test (Quiz)
All	2	Examination - not Centrally Scheduled	Individual	30%	90 minutes	Week 7	Online Test (Quiz)
All	3	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1a: Lab skills quiz

GOAL:	You will answer multiple choice and/or short-answer questions that will assess your knowledge of what was done in each laboratory session.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Individual. On paper. You will complete quiz from each laboratory.
CRITERIA:	**No.** **Learning Outcome assessed**
GENERIC SKILLS:	Collaboration, Problem solving, Applying technologies

All - Assessment Task 1b: Laboratory Questions and Summary

GOAL:	You will answer simple multiple choice and short-answer questions that will help you summarise what was done in each laboratory session and why it was done in relation to the overall goal of the laboratory sessions. You will carry out experimental work as described in your laboratory manual and under the direction of your demonstrator.
PRODUCT:	Quiz/zes
AUTHORSHIP STATEMENT:	
FORMAT:	Individual. You will complete online quizzes from each laboratory
CRITERIA:	**No.** **Learning Outcome assessed** 1 Correct answers to questions 1 2 4
GENERIC SKILLS:	Problem solving, Information literacy

All - Assessment Task 2: Mid-Trimester Exam

GOAL:	You will demonstrate and apply knowledge, analyse relationships, and solve problems in basic principles in molecular biology.
PRODUCT:	Examination - not Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	Multiple choice and short answer format based on material covered in Weeks 1-6 (learning materials, tutorials and laboratories)
CRITERIA:	

No.		Learning Outcome assessed
1	Describe the central dogma of molecular biology, processes of nucleic acid replication, recombination and repair, the genetic code, mobile genetic elements, genetic engineering, and recombinant DNA technology.	2 4
2	As well as practical techniques such as DNA extractions and PCR.	3

GENERIC SKILLS:	

All - Assessment Task 3: Final exam

GOAL:	Demonstrate knowledge and apply knowledge, analyse relationships, and solve problems in the basic principles of molecular biology.
PRODUCT:	Examination - Centrally Scheduled
AUTHORSHIP STATEMENT:	
FORMAT:	Multiple choice and short answer questions from weeks 7-12 learning materials, tutorials and laboratories, of a type similar to those given in the on-line formative quizzes and end of chapter questions as listed in the learning materials PowerPoint slides, as well as questions given in the laboratories and tutorials.
CRITERIA:	

No.		Learning Outcome assessed
1	Describe the processes of nucleic acid replication, transcription, translation and their regulation. Relate these processes to everyday examples and ethical situations.	1
2	Solve basic exercises in nucleic acid processes and recombinant DNA manipulation, as listed in the learning materials and laboratory notes.	3

GENERIC SKILLS:	

7. Directed study hours

A 12-unit course will have total of 150 learning hours which will include directed study hours (including online if required), self-directed learning and completion of assessable tasks. Student workload is calculated at 12.5 learning hours per one unit.

7.1. Schedule

PERIOD AND TOPIC	ACTIVITIES
Week 1	Content: Molecular biology an overview, Central Dogma and DNA structure, Inspiring examples of the usefulness of Molecular biology Tutorial: Questions related to Week 1
Week 2	Content: DNA: The Genetic code, DNA replication & PCR Laboratory: Basic skills, genomic DNA extraction, PCR, amplicon purification
Week 3	Content: Eukaryotic DNA replication, DNA repair and recombination Tutorial: Questions related to Weeks 2-3
Week 4	Content: Mobile genetic elements, recombinant DNA technology, Applications and ethics of genetic engineering and biotechnology Laboratory: TA cloning/BW
Week 5	Content: Transcription and regulation prokaryotes Tutorial: Questions related to Weeks 4-5
Week 6	Content: Transcription and regulation of gene expression – Eukaryotes Laboratory: Cloning into TA expression vectors. Theory of Blue-white selection
Week 7	Content: Mid-trimester exam Tutorial: Questions related to Weeks 6-7
Week 8	Content: Introduction to noncoding RNAs (RNAi, short RNAs), Functional RNAs Laboratory: Sequencing
Week 9	Content: Proteins: mechanisms of translation and synthesis Tutorial: Questions related to Weeks 8-9
Week 10	Content: Proteins: understanding structure and function Laboratory: Proteins: PAGE
Week 11	Content: Omics I and II: Genomic, bioinformatics and proteomics Tutorial: Questions related to Weeks 10-11
Week 12	Content: Revision and summary Laboratory: Proteins: WB

8. What resources do I need to undertake this course?

Please note: Course information, including specific information of recommended readings, learning activities, resources, weekly readings, etc. are available on the course Canvas site– Please log in as soon as possible.

8.1. Prescribed text(s) or course reader

You need regular access to the resource(s) below. Many texts are available as ebooks through the Library at no additional cost.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Required	Lodish et al.	0	Molecular Cell Biology, 9e (IE)	9th edition	n/a

8.2. Specific requirements

Laboratory coat, safety glasses, closed in footwear in laboratories.

9. How are risks managed in this course?

Risk assessments have been performed for all studio and laboratory classes and a low level of health and safety risk exists. Some risk concerns may include equipment, instruments, and tools; as well as manual handling items within the laboratory. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the risks associated with your specific course of study and to familiarise yourself with the University's general health and safety principles by reviewing the online induction training for students, and following the instructions of the University staff.

10. What administrative information is relevant to this course?

10.1. Assessment: Academic Integrity

Academic integrity is the ethical standard of university participation. It ensures that students graduate as a result of proving they are competent in their discipline. This is integral in maintaining the value of academic qualifications. Each industry has expectations and standards of the skills and knowledge within that discipline and these are reflected in assessment.

Academic integrity means that you do not engage in any activity that is considered to be academic fraud; including plagiarism, collusion or outsourcing any part of any assessment item to any other person. You are expected to be honest and ethical by completing all work yourself and indicating in your work which ideas and information were developed by you and which were taken from others. You cannot provide your assessment work to others. You are also expected to provide evidence of wide and critical reading, usually by using appropriate academic references.

In order to minimise incidents of academic fraud, this course may require that some of its assessment tasks, when submitted to Canvas, are electronically checked through Turnitin. This software allows for text comparisons to be made between your submitted assessment item and all other work to which Turnitin has access.

10.2. Assessment: Additional Requirements

Eligibility for Supplementary Assessment

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:
(a) The final mark is in the percentage range 47% to 49.4%; and
(b) The course is graded using the Standard Grading scale

10.3. Assessment: Submission penalties

Late submissions may be penalised up to and including the following maximum percentage of the assessment task's identified value, with weekdays and weekends included in the calculation of days late:
(a) One day: deduct 5%;
(b) Two days: deduct 10%;
(c) Three days: deduct 20%;
(d) Four days: deduct 40%;
(e) Five days: deduct 60%;
(f) Six days: deduct 80%;
(g) Seven days: A result of zero is awarded for the assessment task.

The following penalties will apply for a late submission for an online examination:
Less than 15 minutes: No penalty
From 15 minutes to 30 minutes: 20% penalty
More than 30 minutes: 100% penalty

10.4. Links to relevant University policy and procedures

For more information on Academic Learning & Teaching categories including:

- Assessment: Courses and Coursework Programs
- Review of Assessment and Final Grades
- Supplementary Assessment
- Central Examinations
- Deferred Examinations
- Student Conduct
- Students with a Disability

For more information, visit https://www.usc.edu.au/explore/policies-and-procedures#academic-learning-and-teaching

10.5. Student Charter

UniSC is committed to excellence in teaching, research and engagement in an environment that is inclusive, inspiring, safe and respectful. The Student Charter sets out what students can expect from the University, and what in turn is expected of students, to achieve these outcomes.

10.6. General Enquiries

For course-specific questions, contact your teaching staff or Course Coordinator.

For other enquiries or to access support, please contact Student Central:

- UniSC Student Central
- UniSC Adelaide Student Central