COURSE OUTLINE

MBT254 Biotechnology: Research to Product

School: School of Science, Technology and Engineering

2024 | Semester 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 usc.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

Biotechnology is the use of biologically-derived knowledge (from tissues, cells, DNA, RNA, proteins, metabolites) to create useful products. You will follow the pathway from biotechnology research to product development, incl. drug discovery and how genetic material and proteins can be manipulated and produced, how metabolites can be utilised, and explore case studies in drug design and screening. The course includes aspects of intellectual property, commercialisation, and basic enterprise management and the ethical and social aspects of biotechnology, as well as legal and regulatory affairs.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Online pre-recorded learning materials	2hrs	Week 1	13 times
Tutorial/Workshop 1 – Tutorials, engaging with guest lectures and students' presentations.	2hrs	Week 1	13 times

1.3. Course Topics

1. What is biotechnology?
2. Methods of drug discovery
3. Bioinformatics approaches
4. Medical applications of biotechnology
5. Medical diagnostics
6. Plant biotechnology case studies (anti-cancer drugs)
7. Marine biotechnology (novel molecules)
8. Reproductive biotechnologies in aquaculture
9. Marine biotechnology (aquaculture)
10. State of the art in big pharmaceutical companies – internship
11. Intellectual property and regulation in drug development

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	Demonstrate and apply knowledge about 1) Drug screening, design and testing 2) Developing and commercialising a biotechnology product	Knowledgeable
2	Demonstrate and apply knowledge about ethics and legislation of drug development.	Ethical
3	Analyse, create and present an innovative approach for drug development.	Knowledgeable 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

(SCI105 and LFS100) OR (SCI105 and LFS103 or LFS100 and enrolled in Program SC355 or 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)

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

A formative exam (as detailed in Assessment Task 1).

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	1	Examination - not Centrally Scheduled	Individual	0%	30 minutes	Week 4	Online Submission
All	2	Written Piece	Individual	30%	Submit report (up to 1,000 words; Tables, Figure Captions and references not included in word count).	Week 12	In Class
All	3	Oral	Individual	30%	15 minutes	Refer to Format	In Class
All	4	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1: Formative Exam (0%)

GOAL:	You will demonstrate and apply knowledge about biotechnology research and development
PRODUCT:	Examination - not Centrally Scheduled
FORMAT:	A 30 minutes exam, consisting of multiple choice questions. The questions will be based mainly on the material covered in the theory component of the course (i.e. learning material), supplemented with material presented during the laboratory and tutorials
CRITERIA:	**No.** — **Learning Outcome assessed** 1 You will be assessed on your ability to: Demonstrate knowledge of methods in biotechnology, particularly drug design and testing — 1 2 2 Demonstrate knowledge of biotechnology, particularly drug development and commercialisation — 1
GENERIC SKILLS:	Problem solving, Information literacy

All - Assessment Task 2: Written Assignment (30%)

GOAL:	You will demonstrate and apply knowledge about biotechnology research and development
PRODUCT:	Written Piece
FORMAT:	The students pick a product and briefly describe the key elements in its commercialization all the way through from research, to development and marketing, considering legislation and ethics issues relevant.

CRITERIA:

No.		Learning Outcome assessed
1	Demonstrate knowledge of methodologies in biotechnology, particularly drug design and testing	1
2	Demonstrate knowledge of biotechnology, particularly drug development and commercialisation	2

GENERIC SKILLS:	Communication, Organisation, Information literacy

All - Assessment Task 3: Oral Presentation (30%)

GOAL:	You will present to the class a case study of drug design and development, implementing the knowledge base of drug design and development into a product, considering all aspects learnt in class and during the tutorials, including ethics and legality.
PRODUCT:	Oral
FORMAT:	The student will present the topic to the class, taking a case study of a developed drug and showcasing the process from the idea to development, including commercialisation, ethics and legal aspects. To be scheduled for weeks 10-13 of semester.

CRITERIA:

No.		Learning Outcome assessed
1	You will be assessed on your ability to: Communicate effectively the case study in a clear and cohesive oral format	1
2	Select a topic with impact and significance in drug design and development	1 2
3	Present critical and creative approaches for drug delivery	1 3
4	Synthesise and convey key concepts covered in the course	1 3
5	Demonstrate knowledge about ethics and legislation of drug development	2

GENERIC SKILLS:	Communication, Organisation, Information literacy

All - Assessment Task 4: Final Exam (40%)

GOAL:	You will demonstrate and apply knowledge about biotechnology research and development
PRODUCT:	Examination - Centrally Scheduled
FORMAT:	A two (2) hour written exam, consisting of multiple choice and short-answer questions. The questions will be based mainly on the material covered in the theory component of the course (i.e. learning material), supplemented with material presented during the laboratory and tutorials
CRITERIA:	

No.		Learning Outcome assessed
1	You will be assessed on your ability to: Demonstrate knowledge of methodologies in biotechnology, particularly drug design and testing	1
2	Demonstrate knowledge of biotechnology, particularly drug development and commercialisation	1 3
3	Demonstrate knowledge of ethics and legislation	2

GENERIC SKILLS:	Problem solving, Organisation, Information literacy

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
1	What is Biotechnology?
2	Methods of drug discovery
3	Bioinformatics approach
4	Medical applications of biotechnology
5	Medical diagnostics
6	Plant Biotechnology case studies (anti-cancer drugs)
7	Marine Biotechnology (novel molecules)
8	Reproductive Biotechnologies in Aquaculture
9	Marine Biotechnology (aquaculture)
10	State of the art in big pharmaceutical companies
11	Intellectual Property and regulations in drug development
12	Students Seminars
13	Exam revision session (and Seminars)

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

> There are no required/recommended resources for this course.

8.2. Specific requirements

NA

9. How are risks managed in this course?

Health and safety risks for this course have been assessed as low. It is your responsibility to review course material, search online, discuss with lecturers and peers and understand the health and safety 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

Your eligibility for supplementary assessment in a course is dependent of the following conditions applying:

The final mark is in the percentage range 47% to 49.4%
The course is graded using the Standard Grading scale
You have not failed an assessment task in the course due to academic misconduct

10.3. Assessment: Submission penalties

Late submission of assessment tasks may be penalised at the following maximum rate (the rates are cumulative):
- 5% (of the assessment task's identified value) per day for the first two days from the date identified as the due date for the assessment task.
- 10% (of the assessment task's identified value) for the third day
- 20% (of the assessment task's identified value) for the fourth day and subsequent days up to and including seven days from the date identified as the due date for the assessment task.
- A result of zero is awarded for an assessment task submitted after seven days from the date identified as the due date for the assessment task.

Weekdays and weekends are included in the calculation of days late.
To request an extension you must contact your course coordinator to negotiate an outcome.

10.4. SafeUniSC

UniSC is committed to a culture of respect and providing a safe and supportive environment for all members of our community. For immediate assistance on campus contact SafeUniSC by phone: 07 5430 1168 or using the SafeZone app. For general enquires contact the SafeUniSC team by phone 07 5456 3864 or email safe@usc.edu.au.

The SafeUniSC Specialist Service is a Student Wellbeing service that provides free and confidential support to students who may have experienced or observed behaviour that could cause fear, offence or trauma. To contact the service call 07 5430 1226 or email studentwellbeing@usc.edu.au.

10.5. Study help

For help with course-specific advice, for example what information to include in your assessment, you should first contact your tutor, then your course coordinator, if needed.

If you require additional assistance, the Learning Advisers are trained professionals who are ready to help you develop a wide range of academic skills. Visit the Learning Advisers web page for more information, or contact Student Central for further assistance: +61 7 5430 2890 or studentcentral@usc.edu.au.

10.6. Wellbeing Services

Student Wellbeing provide free and confidential counselling on a wide range of personal, academic, social and psychological matters, to foster positive mental health and wellbeing for your academic success.

To book a confidential appointment go to Student Hub, email studentwellbeing@usc.edu.au or call 07 5430 1226.

10.7. AccessAbility Services

Ability Advisers ensure equal access to all aspects of university life. If your studies are affected by a disability, learning disorder mental health issue, injury or illness, or you are a primary carer for someone with a disability or who is considered frail and aged, AccessAbility Services can provide access to appropriate reasonable adjustments and practical advice about the support and facilities available to you throughout the University.

To book a confidential appointment go to Student Hub, email AccessAbility@usc.edu.au or call 07 5430 2890.

10.8. 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

10.9. 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.

10.10. General Enquiries

In person:

- **UniSC Sunshine Coast** - Student Central, Ground Floor, Building C, 90 Sippy Downs Drive, Sippy Downs
- **UniSC Moreton Bay** - Service Centre, Ground Floor, Foundation Building, Gympie Road, Petrie
- **UniSC SouthBank** - Student Central, Building A4 (SW1), 52 Merivale Street, South Brisbane
- **UniSC Gympie** - Student Central, 71 Cartwright Road, Gympie
- **UniSC Fraser Coast** - Student Central, Student Central, Building A, 161 Old Maryborough Rd, Hervey Bay
- **UniSC Caboolture** - Student Central, Level 1 Building J, Cnr Manley and Tallon Street, Caboolture

Tel: +61 7 5430 2890

Email: studentcentral@usc.edu.au