COURSE OUTLINE

LFS251 Biochemistry

School: School of Health - Biomedicine

2026 | Trimester 1

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

Biochemistry, the chemistry of life, is fundamental to the biomedical sciences, biotechnology, sports science, nutrition and dietetics, amongst others. This course focuses on principles and concepts relating to metabolic pathways. You gain understanding of the main biomolecules that are important to cellular structure and function. You learn how to analyse and interpret fundamental metabolic pathways, and apply your understanding to unfamiliar situations, using real world examples of biochemistry.

1.2. How will this course be delivered?

ACTIVITY	HOURS	BEGINNING WEEK	FREQUENCY
BLENDED LEARNING			
Learning materials – Recorded, narrated powerpoints with embedded H5P quiz questions.	1.5hrs	Week 1	12 times
Tutorial/Workshop 1 – On campus, in person tutorials	2hrs	Week 2	6 times
Laboratory 1 – On campus, in person lab classes	3hrs	Week 1	6 times

1.3. Course Topics

Introduction; Water; Electon configuration; Hydrogen bonds

Acid-base; Henderson-Hasselbalch equation; Ionization

Nucleic Acids; Carbohydrates; Proteins; Lipids

Proteins; Levels of protein strucutre; Hydrophobicity; Introduction to enzymes

Introduction and overview of metaoblism

Glycolysis; Aerobic fate of pyruvate; Gluconeogenesis

Regulation of metabolism

Hormonal regulation of metabolism; G-proteins; Nuclear receptors

Metabolism of hexoses other than glucose; Non-glucose sugars; Glycogen; Pentose phosphate pathway

The mitochondrion; TCA cycle; Electron transport; Oxidative phosphorylation; Control of ATP production; Physiological implications of aerobic metabolism

Fatty acid oxidation (beta-oxidation; Keton bodies; fatty acid synthesis

Nitrogen metabolism; amino acid metabolism; Urea cycle

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 MAPPING Completing these tasks successfully will contribute to you becoming...	PROFESSIONAL STANDARD MAPPING * Australian Institute of Medical and Clinical Scientists
1 Demonstrate and apply knowledge of the basic principles & concepts of biochemistry to familiar and unfamiliar metabolic pathways.	Knowledgeable	2.1.1, 2.1.2, 2.2.1, 2.3.1, 3.2.7, 3.3.1, 3.3.2
2 Analyse the relationship between metabolic pathways using the "metabolic road map".	Creative and critical thinker	2.1
3 Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations.	Creative and critical thinker	1.6.3, 1.6.6, 1.6.8, 2.1, 2.2, 3.3
4 Conduct experiments safely using fundamental biochemical techniques, and process and present the findings.	Creative and critical thinker Empowered	1.5.4, 1.6.1, 1.6.3, 1.2, 1.3, 2.1.1, 3.4.1, 3.1, 6.2.4, 7.1.2
5 Communicate scientifically in the form of a problem set and practical report, with reference to the literature.	Empowered	2.1, 6.2.4, 9.1.1, 10.4

* Competencies by Professional Body

CODE	COMPETENCY
AUSTRALIAN INSTITUTE OF MEDICAL AND CLINICAL SCIENTISTS	

CODE	COMPETENCY
1.6.3	Read and validate results - Equipment based testing: Results are calculated from data outputs according to documented procedures.
1.6.6	Read and validate results - Observation based testing: Available clinical information is reviewed.
1.6.8	Read and validate results - Observation based testing: Observations and evaluations are summarised, using the appropriate knowledge base, and summary is recorded according to regulatory protocols.
1.5.4	Process specimen utilising appropriate techniques: Processes are performed in accordance with prescribed methods, quality procedures and accepted safe working practices.
1.6.1	Read and validate results - Equipment based testing: Laboratory instrumentation is operated within established procedures (including quality control, troubleshooting instrument problems and performing preventative and corrective maintenance).
1.2	Collection, preparation and analysis of clinical material: Ensure the appropriateness of specimen reception procedures
1.3	Collection, preparation and analysis of clinical material: Evaluate specimen suitability prior to analysis
2.1.1	Assess validity of data/results against possible range of outcomes: Initial observation and limited interpretation for significance of the raw data/results is undertaken.
2.1.2	Assess validity of data/results against possible range of outcomes: Implausible results, results inconsistent with clinical information or expected outcomes based on other test results or those outside defined criteria are investigated further using defined troubleshooting strategies.
2.2.1	Validation of results: Possible causes for implausible or inconsistent results or outcomes are determined.
2.3.1	Make decisions about reporting results, repeating procedures, consulting senior staff and carrying out further tests within established guidelines: Appropriate decisions about repeating procedures, carrying out further tests within established guidelines, rejection or reporting of results are made. Senior staff are appropriately consulted.
2.1	Correlation and validation of results of investigations using knowledge of method(s) including analytical principles and clinical information: Assess validity of data/results against possible range of outcomes
2.2	Correlation and validation of results of investigations using knowledge of method(s) including analytical principles and clinical information: Validation of results
3.2.7	Use the administrative systems in place to communicate the results: Relevant reference intervals and, if appropriate, clinical decision limits are included in reports as per established protocols.
3.3.1	Ensure that results with important diagnostic or treatment implications are communicated as per established protocols: Significant results, as defined by the laboratory, are identified
3.3.2	Ensure that results with important diagnostic or treatment implications are communicated as per established protocols: Results are interpreted in the light of clinical information provided and knowledge of the test(s) and limitations.
3.4.1	Ensure appropriate storage and disposal of data and reports: All results are recorded and retained according to current regulations and guidelines.
3.1	Interpretation, reporting and issuing of laboratory results: Verify report(s) with sample identification
3.3	Interpretation, reporting and issuing of laboratory results: Ensure that results with important diagnostic or treatment implications are communicated as per established protocols
6.2.4	Maintain and update scientific/technical knowledge and skills: Opportunities to enhance learning from investigation of unusual clinical cases and/or results are pursued.
7.1.2	Accepts responsibility for own actions/omissions: Tasks are checked to ensure they are completed.
9.1.1	Research, prepare and deliver appropriate presentations: Educational topics are researched, prepared and presented to health workers and others.
10.4	Contribute to planning and design of research and development projects: Prepare and deliver report

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 LFS103 or SCI100)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MBT251

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

Not applicable

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 complete problem sets with feedback in tutorial classes scheduled for week 4, consolidating learning activities from weeks 1-3. Formative revision activities are scaffolded throughout the course.

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	Activity Participation	Individual	30%	400 words	Refer to Format	Online Assignment Submission with plagiarism check
All	2	Artefact - Technical and Scientific	Individual	30%	800 words +/- 10%	Week 9	Online Assignment Submission with plagiarism check
All	3a	Examination - not Centrally Scheduled	Individual	0%	70 min	Week 9	Online Submission
All	3b	Examination - Centrally Scheduled	Individual	40%	2 hours	Exam Period	Exam Venue

All - Assessment Task 1: Problem Set

GOAL:	You will demonstrate understanding and solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations in regards to biomolecules.
PRODUCT:	Activity Participation
FORMAT:	Answers, with working, to problems on a worksheet. Students will complete two problem sets. The first will be in the Week 4 tutorial and the second will be in the Week 8 tutorial. Each problem set is weighted at 15% (combined total of 30%).
CRITERIA:	

No.		Learning Outcome assessed
1	Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations.	1 3 5
2	Communicate scientifically in the form of a problem set, referring to literature.	2 5

GENERIC SKILLS:	Problem solving, Information literacy

All - Assessment Task 2: Practical Report

GOAL:	You will conduct an experiment safely using fundamental biochemical techniques, and processes and present the findings in an individual report.
PRODUCT:	Artefact - Technical and Scientific
FORMAT:	Introduction, Results and Discussion sections, with references.
CRITERIA:	

No.		Learning Outcome assessed
1	Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations	1 4 5
2	Conduct experiments safely using fundamental biochemical techniques, and process and present the findings.	4
3	Communicate scientifically in the form of a practical report, with reference to the literature.	5

GENERIC SKILLS:	Communication, Problem solving, Organisation, Applying technologies, Information literacy

All - Assessment Task 3a: Mid-Trimester Exam

GOAL:	You will demonstrate and apply knowledge, analyse relationships, and solve problems in biochemistry.
PRODUCT:	Examination - not Centrally Scheduled
FORMAT:	Multiple choice and short answer questions, problem solving, calculations based on material from learning materials, tutorials and laboratory activities up to and including week 8.
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstrate and apply knowledge of the basic principles and concepts of biochemistry to familiar and unfamiliar metabolic pathways.	1
2	Analyse the relationship between metabolic pathways using the “metabolic road map”.	2
3	Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations.	3

GENERIC SKILLS:	Communication, Problem solving, Information literacy

All - Assessment Task 3b: Final Examination

GOAL:	Demonstrate and apply knowledge, analyse relationships, and solve problems in biochemistry.
PRODUCT:	Examination - Centrally Scheduled
FORMAT:	Multiple choice questions, short answer questions, problem solving, calculations based on material from learning materials, tutorials and laboratory activities from Weeks 1 to 12.
CRITERIA:	

No.		Learning Outcome assessed
1	Demonstrate and apply knowledge of the basic principles and concepts of biochemistry to familiar and unfamiliar metabolic pathways.	1
2	Analyse the relationship between metabolic pathways using the “metabolic road map”.	2
3	Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations.	3

GENERIC SKILLS:	Problem solving, Organisation, Applying technologies, 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
Modules 1-4: Overview of key biomolecules	Learning materials on acid/base, proteins, nucleic acids, carbohydrates and lipids.
Modules 5-8: Metabolism and its regulation	Learning materials on glycolysis, gluconeogenesis, hormonal regulation of metabolism
Modules 9-12: Metabolism	Learning materials on the TCA cycle, oxidative phosphorylation, beta oxidation, nitrogen metabolism

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	Reginald H. Garrett, Charles M. Grisham	2024	Biochemistry	7th ed.	Cengage

8.2. Specific requirements

Laboratory coat, safety glasses, closed in footwear, calculator.
To successfully complete the UB001 Bachelor of Medical Laboratory Science (Pathology) and meet accreditation requirements of AIMS, UB001 students enrolled in LFS251 are expected to attend and participate in laboratory practical classes, and attendance will be recorded.

9. How are risks managed in this course?

Risk assessments have been performed for all laboratory classes and a moderate level of health and safety risk exists. Moderate risks are those associated with laboratory work such as working with chemicals and hazardous substances. You will be required to undertake laboratory induction training and it is also 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

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

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% b. The course is graded using the Standard Grading scale c. You have not failed an assessment task in the course due to academic misconduct

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