COURSE OUTLINE

LFS251 Biochemistry

School: School of Health and Behavioural Sciences

2022 | Semester 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 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

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	13 times
Tutorial/Workshop 1 – Online workshop via zoom	2hrs	Week 2	6 times
Laboratory 1 – On campus, in person lab classes	3hrs	Week 3	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 Completing these tasks successfully will contribute to you becoming...
1	Demonstrate and apply knowledge of the basic principles & concepts of biochemistry to familiar and unfamiliar metabolic pathways.	Knowledgeable
2	Analyse the relationship between metabolic pathways using the "metabolic road map".	Creative and critical thinker
3	Solve problems by using evidence-based reasoning, and where appropriate, mathematical calculations.	Creative and critical thinker
4	Conduct experiments safely using fundamental biochemical techniques, and process and present the findings.	Creative and critical thinker Empowered
5	Communicate scientifically in the form of a problem set and practical report, with reference to the literature.	Empowered

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)

5.2. Co-requisites

Not applicable

5.3. Anti-requisites

MBT251

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

Students will complete a Problem Set and submit this to Canvas Turnitin by 4.00 pm Monday Week 4. The task will consolidate learning activities on biomolecules included within Weeks 1-4 learning materials and readings from the prescribed text (Garrett and Grisham, Biochemistry, 6th Ed. The assignment is worth 20% of the overall grade. Feedback will be provided to students within 2 weeks of the submission date.

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	Artefact - Technical and Scientific	Individual	20%	500 words	Week 4	Online Assignment Submission with plagiarism check
All	2	Artefact - Technical and Scientific	Individual	30%	1000 words +/- 10%	Week 6	Online Assignment Submission with plagiarism check
All	3a	Examination - not Centrally Scheduled	Individual	0%	90 min	Week 9	Online Submission
All	3b	Examination - Centrally Scheduled	Individual	50%	2 hours	Exam Period	Online Submission

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:	Artefact - Technical and Scientific
FORMAT:	Answers, with working, to 10 problems on a worksheet

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

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:	Full report
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

All - Assessment Task 3a: Mid-Semester 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

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, problem solving, calculations based on material from learning materials, tutorials and laboratory activities
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

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
Module 13	Revision

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

Please note that you need to have regular access to the resource(s) listed below. Resources may be required or recommended.

REQUIRED?	AUTHOR	YEAR	TITLE	EDITION	PUBLISHER
Required	Reginald H. Garrett,Charles M. Grisham	2017	Biochemistry	6th ed.	Cengage Learning

8.2. Specific requirements

Laboratory coat, safety glasses, closed in footwear, Calculator

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%
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 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