UNSW
THE UNIVERSITY OF NEW SOUTH WALES

FACULTY OF SCIENCE

SCHOOL OF BIOTECHNOLOGY AND
BIOMOLECULAR SCIENCES

BIOC2181

FUNDAMENTALS OF BIOCHEMISTRY

Course Outline

Term 2, 2021

1. Information about the Course

Year of Delivery	2020
Course Code	BIOC2181
Course Name	Fundamentals of Biochemistry
Academic Unit	School of Biotechnology and Biomolecular Sciences
Level of Course	Level 2
Units of Credit	6UOC
Session(s) Offered	Term 2
Assumed Knowledge, Prerequisites or Co-requisites	BABS1201 Molecules, Cells and Genes and CHEM1011 Chemistry A or CHEM1031 Higher Chemistry A or CHEM1831 Chemistry for Health, Exercise and Medical Science
Face-to-Face Hours per Week	7
Number of Weeks	10 weeks
Commencement Date	Monday 31st of May, 2021

Summary of Course Structure (for details see 'Course Schedule')

Component	HPW	Time	Day	Location
LECTURES	**4**			
Lecture 1	1	1 pm	Tuesday	**PRE-RECORDED**
Lecture 2	1	11 am	Wednesday	**SYNCHRONOUS ON TEAMS**
Lecture 3	1	12 pm	Wednesday	**PRE-RECORDED**
Lecture 4	1	1 pm	Friday	**PRE-RECORDED**
LABORATORIES	**3**			
Lab – Option 1	3	10 am - 1 pm	Thursday	**Wallace Wurth (C27) Lab 122 or 123**
Lab – Option 2	3	2 pm - 5 pm	Thursday	**Wallace Wurth (C27) Lab 122 or 123**
TOTAL	**7**			

IMPORTANT

A pass in BIOC2181 is conditional upon a satisfactory performance in the practical program AND the theory component. This means that you must satisfactorily pass the assessments related to the practical program and assessments that tests theory component.

Even if you get 50% overall in the course, if you do not pass the practical and theory components individually, you will receive an unsatisfactory fail grade in the course.

2. Staff Involved in the Course

Staff	Role	Name	Contact Details	Consultation Times
Course Convenor		Dr Nirmani Wijenayake	b.wijenayakeg@unsw.edu.au	By appointment
Additional Teaching Staff	**Other lecturers**	Dr Anne Galea A/Prof Vladimir Sytnyk Dr Rebecca LeBard A/Prof Kyle Hoehn	a.galea@unsw.edu.au v.sytnyk@unsw.edu.au r.lebard@unsw.edu.au k.hoehn@unsw.edu.au	By appointment
	Demonstrators & Tutors	See Moodle for demonstrator lists	Not Applicable	Scheduled laboratory times
	Technical & Laboratory Staff	Dr Kate Roberts Ms Zakia Begum	Not Applicable	Scheduled laboratory times

3. Course Details

Course Description	BIOC2181 Fundamentals of Biochemistry introduces modern biochemistry, fundamental aspects of the structure-function relationships of proteins and an overall coverage of intermediary metabolism. Major topics covered include: the nature and functions of enzymes; the metabolic working of cells, tissues and organs; the interrelationships between pathways of carbohydrate, lipid and amino acid metabolism; the vital roles of enzymes and hormones in catalysis and metabolic regulation; the energy-trapping mechanisms of animals and plants; and interesting variations on the central metabolic pathways in various life forms. The practical coursework complements the lectures and introduces the principles of biochemical analysis.
Course Aims	• This course aims to introduce students to modern biochemistry with an emphasis on how we, as humans, convert foods to useful energy. • This course also aims to provide a solid context for new learning material by providing clinical, medical and everyday applications that correspond to the central themes and topics. • The practicals are designed to reinforce the core biochemical concepts covered in lectures and introduce students to current laboratory techniques and biochemical assays.
Student Learning Outcomes	By the end of this course, you will be able to: 1. Describe and compare the major metabolic pathways in humans. 2. Explain the various mechanisms that control and regulate anabolic and catabolic processes simultaneously in the cells of living tissues. 3. Discuss the changes that occur in metabolic pathways during specific scenarios such as fasting, starvation, obesity and exercise and genetic diseases. 4. Perform a range of biochemical assays, analytical techniques and biochemical calculations through the application of current scientific methods in an experimental environment. 5. Design experiments to diagnose medical conditions and analyse and interpret data to confirm the diagnosis

4. Course Schedule

Week	Week Begins	LECTURE Tuesday 1pm PRE-RECORDED	LECTURE Wednesday 11am LIVE ON TEAMS	LECTURE Wednesday 12pm PRE-RECORDED	LECTURE Friday 1pm PRE-RECORDED	PRACTICAL Thursday 10am or 2pm FACE-TO-FACE
1	31 May	**LIVE INTRODUCTION** NWG	Amino Acids AG	Proteins AG	Enzymes AG	**Biochemical Calculations**
2	7 June	Enzyme Kinetics AG	**LIVE REVISION** AG	Carbohydrates VS	Glycolysis VS	**Practical 1: Spectrophotometry**
3	14 June	TCA Cycle VS	**LIVE REVISION** VS	Regulation VS	Oxidative Phosphorylation (1) NWG	**BIOCHEMICAL CALCULATIONS QUIZ** **Scientific Research and Experiment Design**
4	21 June	Oxidative Phosphorylation (2) NWG	**LIVE REVISION** NWG	Oxidative Phosphorylation (3) NWG	Glycogen Metabolism NWG	**Practical 2: Glycolysis** **Practical 3: Oxygen Electrode Simulation (Online)**
5	28 June	Gluconeogenesis NWG **LIVE OPTIONAL REVISION** NWG	**TEST 1**		Introduction to Fats NWG	**Practical 4: Glucose Tolerance**
6	5 July	**FLEXIBILITY WEEK**				
7	12 July	**DRAFT PROTOCOL DUE** Lipoproteins NWG	**LIVE REVISION** NWG	Fat oxidation NWG	Fat synthesis and Ketone bodies NWG	**Draft Protocol Feedback Session**
8	19 July	Protein Catabolism RLB	**LIVE REVISION** NWG	The Urea Cycle RLB	Hormonal Control of Metabolism RLB	**Practical 5: Separation Technique - TLC**
9	26 July	Fuel Supply in Exercise RLB	**LIVE REVISION** RLB	Metabolic Specialisation of Tissues KLH	Fuel Supply in Fasting KLH	**FINAL PROTOCOL DUE** **GROUP PRESENTATIONS**
10	2 Aug	**LIVE OPTIONAL REVISION** NWG	**TEST 2**			

NWG - Nirmani Wijenayake; AG – Anne Galea; VS - Vladimir Sytnyk; RLB – Rebecca LeBard; KLH – Kyle Hoehn

5. Assessment Tasks and Feedback

Task	Knowledge & abilities assessed	% of total mark	Date of Assessment Task	Feedback		
				WHO	WHEN	HOW
Biochemical Calculations Quiz	Ability to perform biochemical calculations	20	Week 3, Thursday 17th of June – 10 AM or 2 PM	Course Coordinator	Week 5	Through Moodle
Test 1*	Theory presented in all of AG and VS lectures and NWG's OX-PHOS lectures.	25	Week 5, Wednesday 30th of June – 11 AM	Course Coordinator	Week 7	Through Moodle
Group Project	Experimental design and understanding the relevance of biochemistry in real life through case studies. The project is divided into four assessable components: • Reflection Diary (5%) • Draft protocol (10%) • Final Protocol (5%) • Presentation (10%)	30	**Reflection:** Ongoing **Draft Protocol:** Week 7 – Tuesday 13th of July – 11.59 PM **Final Protocol:** Week 9 – Thursday 29th of July - 9 AM **Presentation:** Week 9 – Thursday 29th of July – 10 AM or 2 PM	Tutor and Course Coordinator	Week 8 and Week 11	Written and verbal feedback + Through Moodle
Test 2*	Theory presented in all the lectures after NWG's OX-PHOS lectures.	25	Week 10, Wednesday 4th of August – 11 AM	Course Coordinator	Study Break	Through Moodle
TOTAL:	-	**100**	-	-	-	-

* Please note that the format of the two Tests will be a combination of multiple choice, short answer and long response questions. Further details of each assessment task will be released on Moodle prior to each test.

6. Course Topics and Additional Class Information

Expectations from Students	**GENERAL:** • Check Moodle announcements daily. • All LIVE revision lectures will be carried out on Microsoft Teams. You will be added to TEAMS at the start of the Term, and you must check the Teams site daily. • You will also be added to a separate private chat on Teams with your assigned Team members. You must use this site for all your group communications. You are expected to check this chat daily. • Follow the Moodle timetable and keep up with the course activities. • Allocate 2-3 hours for extra online + group activities each week **PRACTICALS:** **A pass in BIOC2181 is conditional upon a satisfactory performance in the practical program. This means you must get 50% overall for the biochemical calculations quiz and the group project.** **A satisfactory performance means that:** • **100% lab ATTENDANCE** is required. • A medical certificate or other forms of evidence is required from students who are absent from the practical sessions due to illness or other misadventure. Medical certificates are to be submitted via email to the course coordinator within three days of the absence. • You use the OneNote electronic lab notebook to analyse data and answer all the discussion questions. Your demonstrators will be doing spot checks to make sure you are keeping up with the work. • You have tidied and cleaned your equipment and workspace as instructed by the demonstrators and technical staff each week. • You have completed any necessary pre-lab work. • You have contributed equally to the group project and met the deadlines set by the course coordinator and the group. If for some reason you fail the practical component, we will be looking at your OneNote lab book to see how diligent you have been with lab work throughout the Term. We may allow you to pass the practical component If we see evidence that you have been keeping up to date and tried your best. **LECTURES:** • The lectures will be delivered as recordings found on Moodle. • The revision lectures on Wednesday 11 AM are LIVE. This means your attendance in these sessions is expected. • LIVE lectures will be run through Microsoft Teams. The first hour will be a revision tutorial with your lecturers. • The second lecture on Wednesday might be used for exams or for group activities as needed. • Try to keep up with weekly lectures or it will be difficult to catch up. • **DO NOT** rely solely on lecture sides as it is not possible to get a good understanding of a topic just by reading the lecture slides. **ADDITIONAL ONLINE REVISION MATERIAL** • Online revision material should be completed independently in your own time. • There are 7 online lecture reviews with different types of practice questions and extensive feedback. • There are also some lecture review videos that you can watch. • These provide you with the opportunity to revise course content and reflect upon your own level of comprehension of the material presented in lectures and integrated with laboratory classes.

Tests	• 2 tests held during the term. • Each test is worth 25%. **You have to satisfactorily pass the tests to pass the course.** NOTE: If you experience any difficulty in writing English for academic purposes such as reports, exam short answer or written questions, or problems comprehending multiple choice questions should consult an advisor at "The Learning Centre" located in the foyer of the main library entrance to obtain relevant information or up to one hour a week of private consultation with a peer writing assistant.
Relationship to Other Courses within the Program	This course essentially covers the same material as BIOC2101 Principles of Biochemistry (Advanced), but in less detail and with more emphasis on the function of organisms and less emphasis on some of the underlying chemical mechanisms.

7. Additional Resources and Support

Text Books	**Recommended Texts:** • *Biochemistry - A Short Course* (4th edition), by Tymoczko J.L., Berg J.M. & Stryer L. (W H Freeman and Company), 2019. **OR** • *Biochemistry and Molecular Biology* (6th Edition), by Elliot W.H. & Elliot D.C. (Oxford University Press), 2018. **Additional Biochemistry Reference Texts:** • *Essential Biochemistry,* by Pratt, C.W. & Cornely, K. • *Concepts in Biochemistry* by Boyer, R. • *Biochemistry* by Berg J.M., Tymoczko J.L. & Stryer L. • *Fundamentals of Biochemistry* Voet, Voet and Pratt.
Lab Manual	The BIOC2181 lab manual will be available on **Microsoft ONENOTE through Microsoft Teams site.** You can also download the lab manual as a PDF through Moodle. **You are NOT REQUIRED to print nor buy a copy of the manual.**
Societies	ASBMB – Australian Society for Biochemistry and Molecular Biology www.asbmb.org.au

8. Administration Matters

Special Consideration	**Missed Practical Classes** Attendance in practical classes is compulsory. If you miss a practical class due to illness or some other unavoidable circumstance that can be verified via professional documentation, email your course coordinator within three days of the absence. Separate "Catch-Up" lab sessions are not conducted but if you are able to attend an alternative lab during the week of your absence, you may contact the course coordinator to ask for permission to do so. If you cannot attend an alternative lab session, then you will need to catch up on missed work by speaking to your demonstrator/tutor or class colleagues. **Missed Tests** If you missed an exam due to illness or other misadventure, you need to apply for special consideration online. You must submit the application prior to the start of the relevant exam, except where illness or misadventure prevent you from doing so. If you become unwell on the day of the exam or fall sick during an exam, you must provide evidence dated within 24 hours of the exam, with your application. You must obtain and attach Third Party documentation before submitting the application. Failure to do so may result in the application being rejected. Further information on special consideration can be found at: https://student.unsw.edu.au/specialconsideration. The applications for special consideration will be processed and students will be invited to sit a supplementary exam. **FIT-TO-SIT POLICY** If you are sick or unfit to sit the test for any other reason, DO NOT sit the test. UNSW has a fit to sit rule which means that if you sit an exam, you are declaring yourself fit to do so. This means you will not be allowed to apply for special consideration if you have already sat the exam. **Group Project** As the group project is an ongoing assessment, no extensions will be granted for the different components. Any issues you may have should be discussed with your course coordinator as they arise.
UNSW Assessment Policy[1]	**HOW TO APPLY FOR SPECIAL CONSIDERATION** The application must be made through Online Services in myUNSW (My Student Profile tab > My Student Services > Online Services > Special Consideration). **Students will be contacted via *their official university email* as to the outcome of their application. It is the responsibility of all students to regularly consult their official student email accounts and myUNSW in order to ascertain whether or not they have been granted further assessment.** **SUPPLEMENTARY EXAM** The University does not give deferred examinations. However, further assessment exams may be given to those students who were absent from Tests through illness or misadventure. Students will be notified via the online special consideration system as to the outcome of their application. **It is the responsibility of all students to regularly consult their official student email accounts and myUNSW to ascertain whether they have been granted further assessment.** Further assessment exams will only be offered once and failure to sit for the appropriate exam may result in an overall failure for the course. Further assessment will **NOT** be offered on any alternative dates.

[1] UNSW Assessment Policy

Equity and Diversity	Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.studentequity.unsw.edu.au/). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

9. UNSW Academic Honesty and Plagiarism

What is Plagiarism?

Plagiarism is the presentation of the thoughts or work of another as one's own.

*Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person's assignment without appropriate acknowledgement;
- paraphrasing another person's work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†
- resubmitting work you already submitted for another course at UNSW or another institute.

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.

The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does *not* amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

http://www.lc.unsw.edu.au/academic-integrity-plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne