

BIOM9420

Clinical Laboratory Science

Term 2, 2023

Course Details

Units of Credit 6

Summary of the Course

BIOM9420 explores the science behind clinical diagnostics covering areas such as haematology, immunology, imaging and clinical biomechanics as well as medical systems. In each of the areas the underlying principles in the measurement of physiological parameters will be covered and how they have been used to engineer diagnostic devices.

Course Aims

Course Objectives

BIOM9420 Clinical Laboratory Science has been designed to provide students with some of the many different aspects of clinical medicine where Biomedical Engineering plays a role.

- Identify the underlying scientific and engineering principles of a diagnostic systems

The Online Mid-term Quiz is designed to reflect on the learning of the review of the course content up to the mid-term flexible week. It will consist of questions and how these are run on Moodle in preparation for the final exam.

Assessment 3: Rapid antigen test strip design report

Due date: Friday, Week 8

Rapid antigen test strip design report (10%) is a group task designed to explore relevant topics and apply the knowledge in timely clinical and diagnostic settings.

Assessment 4: Major Group Report

Due date: Friday, Week 10

Major Group Report is completed as a group-based literature review task providing an opportunity for team-work and independent literature searching on different topics relevant to the non-invasive diagnostics in a clinical setting.

Assessment 5: Group video presentation

Due date: Sunday, Week 9

Group video presentation is a group-based activity designed to consolidate learning from lectures and tutorials and bring it all together in a team environment to produce a video presentation.

Assessment 6: Final Exam

The Final Exam includes two parts- (1) Final Online Quiz (similar to the mid-term quiz) and (2) written exam (limited, open-book, long-answer questions (requires Moodle upload, 25% of total mark).

Course Schedule

Week	Date	Live Event Lecture	Online Resources	Tutorial Workshop	Assessment Due
1	29 May	Diagnostic Engineering 1	1. MATLAB introduction	Workshop 1	Append MATLAB Course Completion Certificate to the Enzyme activity report in week 5
		Course introduction	1. Background to group major report - Glucose Biosensors	Complete MATLAB Onramp course	
		Biomedical Engineering and Diagnostics	1. Cell & DNA background for week 3	Workshop 2	
2	5 Jun	Diagnostic Engineering 2			
		Blood Diagnostics	1. Cell cycle video	Group discussion on sources of scientific literature. Compare reviews, journals & scientific reports	
		Antibody-based Diagnostics	1. Exercise on cell cycle	Write an abstract	
			1. Review Enzyme Kinetics Activity Risk Assessment		

& Quiz
2. Introduction to diagnostics - enzymes
1. PCR
virtual lab

3

12 Jun

Diagnostic Engineering 3

(Public Holiday, Chromosomal disorders)
no F2F lecture

DNA, Genetics & PCR Diagnostics
Single gene Inheritance

1.

			1. Diagnostic of type 2 diabetes	Group discussion on how to write a literature review	
6		Flexible Work	Group video and major report Q&A		
7	10 Jul	Diagnostic Engineering 7	1. Gait video practice	Quiz 1 on (open book)	Quiz 1 Due at end of tutorial time
		Clinical Gait Analysis (online module, no F2F lecture)			
8	17 Jul	Diagnostic Engineering 8	1. Imaging tutorial questions	Workshop 8	Rapid antigen test strip design report
		Imaging Modalities		Group discussion & presentation on imaging tutorial question	Due on Friday Week
				Group video and major report Q&A	
9	24 Jul				

Resources

Recommended Resources

RELEVANT RESOURCES Useful Books

- Introduction to Biomedical Engineering (3rd edition) by John Enders
Publisher: Elsevier/Academic Press, 2011, ISBN: 9780123749796

Digital available at <https://unswbookshop.vitalsource.com/products/-v97800809>

- An Introduction to Clinical Laboratory Science by Connie Mahon, Burns. Publisher: Elsevier Health Sciences, 1988, ISBN10 072164

Course Evaluation and Development

Student feedback has helped to shape and develop this course, including online evaluations as part of UNSW's myExperience process. Changes to the course content by refocusing on the lecture content and sciences and maths. This course is now designed to run on-line in discrete

Submission of Assessment Tasks

Laboratory reports and major assignments [Non-Plagiarism Declaration Cover Sheet](#)

Assignments should be submitted on time. A daily penalty of 5% of the assignment will apply for work received after the due date. Any assignment will not be accepted. The only exemption will be when prior permission for late submission is granted by the Course coordinator. Extensions will be granted only on medical or other extreme circumstances.

Academic Honesty and Plagiarism

PLAGIARISM

Academic Information

COURSE EVALUATION AND DEVELOPMENT

Student feedback has helped to shape and develop this course, including on-line evaluations as part of UNSW's myExperience platform. We encourage you to complete such an on-line evaluation toward the end of the semester. Your feedback provided will be important in improving the course for future students.

DATES TO NOTE

Refer to MyUNSW for Important Dates, available at:
<https://my.unsw.edu.au/student/resources/KeyDates.html>

ACADEMIC ADVICE

For information about:

- " Notes on assessments and plagiarism,
- " Special Considerations,
- " School Student Ethics Officer, and
- " BESS

refer to the School website available at
<http://www.engineering.unsw.edu.au/biomedical-engineering/>

Supplementary Examinations:

Supplementary Examinations for Term 2 2023 will be held on (TBC) shortly after the end of the semester.

This course outline sets out description of classes at the date the Course Outline was published. The nature of classes may change during the Term after the Course Outline is published. Please consult for the up to date class descriptions. If there is any inconsistency between the University timetable and the Course Outline (as published), the description in the Course Outline/Moodle applies.

Image Credit

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CRICOS

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Acknowledgement of Country

We acknowledge the Bedegal people who are the traditional custodians of the Kensington campus is located.