



Faculty of Engineering
Graduate School of Biomedical Engineering

Session 2, 2018 **BIOM1010 Engineering in Medicine and Biology**

COURSE DETAILS

Units of Credit	6	
Contact hours	4 hours per week, consisting of 2 hours lecture and 2 hours tutorial	
Lecture	Tuesday, 16:00 – 18:00	Central Lecture Block 8 (CLB 8) (E19)
Tutorial/ Laboratory	Monday, 16:00 – 18:00	Room 518, Level 5, Samuels Bldg (F25)
	Tuesday, 9:00 – 11:00	Room 518, Level 5, Samuels Bldg (F25)
	Tuesday, 11:00 – 13:00	Room 518, Level 5, Samuels Bldg (F25)
	Tuesday, 13:00 – 15:00	Room 518, Level 5, Samuels Bldg (F25)
	Wednesday, 13:00 – 15:00	Room 518, Level 5, Samuels Bldg (F25)
	Thursday, 16:00 – 18:00	Room 518, Level 5, Samuels Bldg (F25)
Course Coordinator	A/Prof Socrates Dokos email: s.dokos@unsw.edu.au office: Room 506, Samuels Bldg phone: 9385 9406	
Demonstrators	Ms Lucy Armitage email: l.armitage@unsw.edu.au Mr Kieran Lau email: kieran.lau@unsw.edu.au Mr Luke Sy email: l.sy@unsw.edu.au	

INFORMATION ABOUT THE COURSE

Welcome to BIOM1010: Engineering in Medicine and Biology. This course introduces the vast field of biomedical engineering, where the principles of engineering are used to solve problems in medicine and biology. Topics covered include a basic introduction to physiological systems, the engineering approach to biology and the application of basic engineering concepts to solving medical problems, with examples from cutting edge technologies including the artificial heart, bionic eye and tissue engineering.

This is an introductory course, preparing students in the dual degree biomedical engineering programs for subsequent biomedical engineering and physiology courses. As an introductory course, it is also a suitable first-year elective for all engineering students and for interested non-engineering students with some technical background (mathematics and physics).

Lecture notes will be available on-line from Moodle, along with a comprehensive set of additional online resources and activities developed to enhance your learning and appreciation of the enormous breadth of biomedical engineering. Weekly on-line quizzes given during the tutorial sessions are assessable. Along with the lectures and other tutorial activities, these will serve as the basis for the final exam. Finally, students will also be required to submit a comprehensive group report and video presentation on their chosen medical device or technology.

Weekly tutorials will be given in the Biomedical Engineering Computer Laboratory (Room 518, Samuels Building). This room will be accessible using a swipe card system based on your student card (the same system that will give you access to the building and the lifts).

We hope you find this course useful and enjoyable, serving as a stimulus for further exploration and study in the important, fascinating and immense field of biomedical engineering!

HANDBOOK DESCRIPTION

See link to virtual handbook:

<http://www.handbook.unsw.edu.au/undergraduate/courses/current/BIOM1010.html>

EXPECTED LEARNING OUTCOMES

By the end of this course, students will

1. be familiar with several applications of engineering and technology applied to medicine.
2. apply basic mathematics, physics and engineering methods to solve various biomedical problems (e.g., biomechanics, blood flow and renal function).
3. have developed analytical and information finding skills such that, given a problem involving an application of technology in medicine/biology, they can:
 - research the relevant anatomy, physiology and pathology
 - research the given technology
 - analyse the problem and arrive at a solution
 - write a concise and professional report detailing the analysis and solution, using effectively the languages of engineering and medicine/biology.

For each hour of contact, it is expected that you will put in at least 1.5 hours of private study. You will need to spend substantial time each week before and after class to work through the various online resources and activities in Moodle, study for the weekly quizzes, as well as working in groups to complete the major assignment report.

ASSESSMENT

The assessment scheme for the course will be:

Weekly Quizzes	15%
Participation in tutorial and online activities	10%
Major Report & Presentation	35%
Final Exam	40%

Details of each assessment component are set out below:

ASSIGNMENTS, ON-LINE QUIZZES AND MAJOR REPORT

Assessment Task	Contribution to Mark	Comment
Weekly Quizzes	15%	There will be weekly quizzes given during the tutorial classes from weeks 2-12. Each quiz will be comprised of multiple choice questions and/or short answer questions/calculations. Only quizzes from weeks 3 onwards are assessable: the week 2 quiz is a trial. The aims of these quizzes are to encourage you to revise on a regular basis throughout the course, facilitate your preparation in tutorials/laboratories and online activities, allow you to gauge your progress in different topics and receive feedback on that progress before the final examination.
Tutorial/ Online Activity Participation	10%	Participation in the various tutorial and online activities is a vital component of this course. Your participation in these activities will be assessed in various ways throughout the session.
Major Report	35%	Each student will be assigned to a group. Each group will be required to submit a MAJOR REPORT and a PRESENTATION on a topic relating to biomedical engineering. Details will be provided in the first weeks of the course. The Major Report will be due in Week 12 on a specific date to be specified. Given that this is a group effort, assessments will be made in consideration of individual participation.
Final Exam	40%	The final exam may be made up of any of the following: true/false, multiple choice, matching, short answer and essay questions. The aims of this assessment are to encourage students to review the entire course - including laboratory/tutorial work and to allow students to apply all the knowledge disseminated to solve problems. This assessment is a direct test of the degree to which the knowledge based learning outcomes listed above have been achieved

COURSE PROGRAM

A detailed course program is provided at the top of the BIOM1010 Moodle portal to which all students have access via <http://moodle.telt.unsw.edu.au/>

SESSION 2, 2018

Week	Date	Lecture (Tuesday 4-6 pm, CLB 8)	Tutorial (Various Days, Samuels 518)	Assessment
1	24-7-2018	Introduction to Biomedical Engineering	No Tutorial	
2	31-7-2018	Musculoskeletal modelling in physical rehabilitation	Simulation-based design of injury prevention devices	
3	7-8-2018	Wound healing and infections	Graphing	– Quiz 1 – Group and Topics
4	14-8-2018	Image Processing for Physiological Measurement	Image Processing	Quiz 2
5	21-8-2018	Ethics in Biomedical Engineering	Ethics	Quiz 3
6	28-8-2018	Bionic Hearts	Bionic Hearts Citing & Referencing	– Quiz 4 – Draft Report
7	4-9-2018	Implantable and Wearable Bionics	Implantable and Wearable Bionics	Quiz 5
8	11-9-2018	Monitoring human movement using wearable sensors	Monitoring human movement	Quiz 6
9	18-9-2018	Biomaterials & Tissue Engineering	Biomaterials	– Quiz 7 – Detailed Report Outline and Annotated Bibliography
Break				
10	2-10-2018	Computational Modelling in Bioengineering	Introduction to Matlab	Quiz 8
11	9-10-2018	Sensory neural prostheses and transcutaneous energy	Sensory neural prostheses	– Quiz 9 – Video Presentation
12	16-10-2018	Presentations	No tutorial	– Quiz 10 – Final Report

RELEVANT RESOURCES

UNSW Moodle will be used as the primary source of information and communication of marks and obligatory material required to comply with UNSW directives. This resource can be found here:

<http://telt.unsw.edu.au/>

Recommended Textbook: Joseph D Bronzino, Introduction to Biomedical Engineering. 3rd Edition. Elsevier Inc. 2012. (Available in the library)

COURSE EVALUATION AND DEVELOPMENT

Student feedback has helped to shape and develop this course, including feedback obtained from on-line evaluations as part of UNSW's myExperience process. You are highly encouraged to complete such an on-line evaluation toward the end of Session. Feedback and suggestions provided will be important in improving the course for future students. Changes to the course from previous comments received have included more hands-on model examples in lectures and in the laboratories.

DATES TO NOTE

Refer to MyUNSW for Important Dates, available at:

<https://my.unsw.edu.au/student/resources/KeyDates.html>

PLAGIARISM

Beware! An assignment that includes plagiarised material will receive a 0% Fail, and students who plagiarise may fail the course. Students who plagiarise will have their names entered on a plagiarism register and will be liable to disciplinary action, including exclusion from enrolment.

It is expected that all students must at all times submit their own work for assessment. Submitting the work or ideas of someone else without clearly acknowledging the source of borrowed material or ideas is plagiarism.

All assessments which you hand in **must** have a [Non Plagiarism Declaration Cover Sheet](#). This is for both individual and group work. Attach it to your assignment before submitting it to the Course Coordinator or at the School Office.

Plagiarism is the use of another person's work or ideas as if they were your own. When it is necessary or desirable to use other people's material you should adequately acknowledge whose words or ideas they are and where you found them (giving the complete reference details, including page number(s)). The Learning Centre provides further information on what constitutes Plagiarism at:

<https://student.unsw.edu.au/plagiarism>

ACADEMIC ADVICE

For information about:

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

refer to the Graduate School of Biomedical Engineering website available at

<http://www.engineering.unsw.edu.au/biomedical-engineering/>