COURSE DETAILS

Units of Credit 6

Contact hours 2 hours per week lecture, 2 hours per week tutorial/laboratory most weeks (see timetable in the Moodle portal at http://moodle.telt.unsw.edu.au)

Lecture Tuesdays, 11:00 – 13:00 CLB 8

Tutorial/Laboratory

- Tuesday 14:00 – 16:00 Samuels 518
- Wednesday 15:00-17:00 Samuels 518
- Thursday 09:00-11:00 Samuels 518
- Thursday 12:00-14:00 Samuels 518
- Friday 10:00-12:00 Samuels 518
- Friday 13:00-15:00 Samuels 518

Course Coordinator Penny Martens
Room 511, Samuels Building
email: p.martens@unsw.edu.au
phone: 9385 3902

Demonstrators

- Mr. Grant Kelly, UNSW
  email: z5044943@zmail.unsw.edu.au
- Ms Lucy Armitage, UNSW
  email: l.armitage@unsw.edu.au
- Mr. Zachary Artist, UNSW
  email: z3375257@zmail.unsw.edu.au

INFORMATION ABOUT THE COURSE

This course introduces the 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 biological systems, the engineering approach to biological systems and the application of basic engineering concepts to solving biomedical problems, with examples from cutting edge technologies including the artificial heart, bionic eye and tissue engineering.

How the course fits into your program:

This is an introductory course. It prepares 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).

Handbook description:


For each hour of contact it is expected that you will put in at least 1.5 hours of private study.

The primary contact method is via the university e-mail system. It is essential that students use their university e-mail address for all correspondence.
EXPECTED LEARNING OUTCOMES

Learning outcomes:
1. The student has an understanding of several applications of engineering and technology in medicine.
2. The student can apply problem-solving skills involving basic mathematics, physics and engineering methods to solve problems of a biomedical nature (e.g., biomechanics, blood flow and renal function).
3. The student has developed analytical and information finding skills such that, given a problem involving an application of technology in medicine / biology, the student 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.

Graduate attributes:
- scholarly enquiry
- engagement with the relevant disciplinary knowledge
- critical thinking and creative problem solving
- information literacy
- collaborative work
- effective communication

ASSESSMENT

Before detailing the assessment items in this course, it is prudent to describe the philosophy of assessment that will be applied.

First, deadlines are strictly adhered to. Thus, the student is required to hand-in all assessment items on-time in order to obtain credit for them. There are cases where legitimate and serious circumstances preclude one from accomplishing something by a particular time, but these are rare and obvious, and can be dealt with on a case-by-case basis. Please ensure that all work is submitted by the due date and time as late submissions will require evidence of the aforementioned 'rare and obvious' circumstances. Extensions will be given only in these extraordinary cases.

Second, keeping up in this course is crucial. There is a great deal of material to cover, and a limited time in which to cover it. For this reason, assessment will require that the student stays on top of course material at all times throughout the semester. If a lecture is missed, ensure that notes are obtained by other means. Slides for most lectures will be made available and, importantly, as in most circumstances this is not a competitive course (i.e. you will be assessed individually and not relative to others in the course) sharing of notes and open discussion of course material is encouraged. However, unless otherwise stated, all work submitted for assessment must be your own, unique and original work. Failure to comply can result in a zero mark for the assessment task and further action according to the UNSW Sydney plagiarism policy.

Quizzes are typically NOT returned to the students although the solutions will be worked through in the lecture (time permitting).

A comprehensive project on a topic relating to biomedical engineering will form an integral requirement of the course. The details of this major assignment will be provided in the first weeks of the course.

At the end of the semester, there will be a final examination consisting of both qualitative and quantitative multiple choice, and/or short- and long-answer questions.
The following criteria will be applied in assessing your work:

- evidence of critical understanding of the concepts developed in the course
- ability to apply these concepts to a range of problems pertaining to implantable bionics
- clarity of description, explanation and attention to the focus of the assessment task
- degree to which the material submitted for assessment addresses the specified requirements

**ASSIGNMENTS**

<table>
<thead>
<tr>
<th>Assessment Task</th>
<th>Contribution to Mark</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>15%</td>
<td>There will be a quiz at weeks six and 11. Each quiz will be comprised of short answer questions and/or multiple choice questions. The aims of this assessment are to encourage the students to revise, on a regular basis throughout the course, encourage preparation in tutorials/laboratories, and to allow students to gauge their progress in different topics and receive feedback on that progress before the final examination.</td>
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<tr>
<td>Tutorial / Laboratory participation</td>
<td>10%</td>
<td>Engaging in discussions and participating in activities are essential components of this course. Accordingly, your participation in tutorial and laboratory activities will be assessed in various ways throughout the semester.</td>
</tr>
<tr>
<td>Major Report</td>
<td>35%</td>
<td>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 on Week 12 on a specific date to be specified. Given that this is a group effort, assessments will be made in consideration of individual.</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
<td>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.</td>
</tr>
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</table>
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](http://moodle.telt.unsw.edu.au).

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture</th>
<th>Tutorial/Lab</th>
<th>Lecturer</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25/7/17</td>
<td>Intro to course and Bio-synthetic Polymers</td>
<td>No Tutorial</td>
<td>Penny</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1/8/17</td>
<td>Wound healing and infections</td>
<td>Graphing</td>
<td>Brooke</td>
<td>Group &amp; Topics</td>
</tr>
<tr>
<td>3</td>
<td>8/8/17</td>
<td>Musculoskeletal modelling in physical rehabilitation</td>
<td>Simulation-based design of injury prevention devices</td>
<td>Lauren</td>
<td></td>
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<tr>
<td>4</td>
<td>15/8/17</td>
<td>Image Processing for Physiological Measurement</td>
<td>Image Processing</td>
<td>Heba</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>22/8/17</td>
<td>Ethics in Biomedical Engineering</td>
<td>Ethics</td>
<td>John</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>29/8/17</td>
<td>“Mending Broken Hearts”: An Introduction to Bionic Hearts</td>
<td>Bionic hearts and referencing</td>
<td>Michael</td>
<td>Quiz Draft Report</td>
</tr>
<tr>
<td>7</td>
<td>5/9/17</td>
<td>Biomaterials &amp; Tissue Engineering</td>
<td>Biomaterials</td>
<td>Jelena</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>12/9/17</td>
<td>Implantable and Wearable Bionics</td>
<td>Implantable and Wearable Bionics</td>
<td>Nigel</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>19/9/17</td>
<td>Up, down, turn around: Monitoring human movement using wearable sensors</td>
<td>Monitoring human movement</td>
<td>Stephen</td>
<td>Detailed Outline and Annotated Bibliography</td>
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<tr>
<td></td>
<td>26/9/17</td>
<td>No class</td>
<td>No class</td>
<td></td>
<td>No Class</td>
</tr>
<tr>
<td>10</td>
<td>3/10/17</td>
<td>Computational Simulations in Bioengineering</td>
<td>Computational Simulations</td>
<td>Socrates</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10/10/17</td>
<td>Sensory neural prostheses and transcutaneous energy</td>
<td>Sensory neural prostheses</td>
<td>Gregg</td>
<td>Quiz Video Presentation</td>
</tr>
<tr>
<td>12</td>
<td>17/10/17</td>
<td>Presentations</td>
<td>No Tutorial</td>
<td>Penny</td>
<td></td>
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</tbody>
</table>
RELEVANT RESOURCES

UNSW Moodle will be used as the primary source of information and communication of marks and obligatory material that is required in order to comply with UNSW directives. This resource can be found here: http://telt.unsw.edu.au/


Note: This is a colouring book, but it is nevertheless an excellent introductory physiology text. You are encouraged to colour the relevant pages. (At least some of them.) It helps to fix the material in memory.

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 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 School website available at: http://www.engineering.unsw.edu.au/biomedical-engineering/