COURSE DETAILS

<table>
<thead>
<tr>
<th>Units of Credit</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hours</td>
<td>3 hours per week</td>
</tr>
<tr>
<td>Lecture</td>
<td>Monday, 3:00 – 6:00 pm</td>
</tr>
<tr>
<td>Activity Rooms</td>
<td>Monday, 3:00 – 6:00 pm</td>
</tr>
<tr>
<td>Laboratory Rooms</td>
<td>Monday, 3:00 – 4:30 pm, 4:30 – 6:00 pm</td>
</tr>
</tbody>
</table>

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Staff are available by appointment. Please contact the relevant staff member by phone or email to arrange an appointment.

INFORMATION ABOUT THE COURSE

This course outlines the fundamental science that underlies diagnostic tests. Students are will explore how Biomedical Engineers have used these fundamentals to develop diagnostic equipment for the laboratory and clinical environment.

There is no assumed knowledge for this course. This course compliotes other BIOM courses and certain thesis topics.
HANDBOOK DESCRIPTION

This course outlines the technologies, tests and operation of a variety of clinical laboratory testing systems (biochemistry, haematology and immunology) and how they apply to a particular organ or system. The students will also be exposed to the underlying principles involved in the measurement of certain physiological parameters from some of the complex organ systems including the urinary, cardiac and musculoskeletal systems. An important component of the course is two practical sessions. The first focuses on the fundamentals of enzyme biochemistry and how this might be useful in generating a test for a particular disease and the second will build upon this knowledge to design, fabricate and test a diagnostic test strip for glucose.

OBJECTIVES

<table>
<thead>
<tr>
<th>Objective</th>
<th>Program outcome attributes</th>
<th>Assessment task</th>
</tr>
</thead>
</table>
| To enable students to experience different aspects of engineering in clinical laboratory testing systems relevant to biomedical engineers. | • An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context  
• Capacity for analytical and critical thinking and for creative problem solving  
• Ability to engage independent and reflective learning  
• Information literacy - the skills to appropriately locate, evaluate and use relevant information.  
• Skills required for collaborative and multidisciplinary work.  
• An appreciation of and responsiveness to change  
• Respect for ethical practice and social responsibility  
• Skills for effective communication | • Quizzes  
• Major Project  
• Final Exam |
| To develop problem solving skills for the medical field.                 | • Skills involved in scholarly enquiry.  
• Capacity for analytical and critical thinking and for creative problem solving  
• The capacity for enterprise, initiative and creativity.  
• Skills required for collaborative and multidisciplinary work.  
• Skills for effective communication | • Quizzes  
• Major project  
• Final Exam |
| To contextualise the learning with an emphasis on the importance of clinical aspects to Biomedical Engineers. | • Skills for collaborative and multi-disciplinary work  
• Skills for effective communication.  
• An appreciation of and respect for diversity.  
• A capacity to contribute to and work within the international community. | • Lab reports |
TEACHING STRATEGIES

A combination of lectures, tutorials and laboratory classes are used in this course to expose students to a range of teaching modes. These modes encompass a range of teaching styles, including passive and active participation.

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

<table>
<thead>
<tr>
<th>Private Study</th>
<th>Lectures</th>
<th>Problem Solving Sessions</th>
<th>Assessments</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Review lecture material and textbook</td>
<td>• Find out what you must learn</td>
<td>• Be guided by demonstrators</td>
<td>• Demonstrate your knowledge and skills</td>
</tr>
<tr>
<td>• Do set problems and assignments</td>
<td>• See methods that are not in the textbook</td>
<td>• Practice solving set problems</td>
<td>• Demonstrate higher understanding and problem solving</td>
</tr>
<tr>
<td>• Join Moodle discussions of problems</td>
<td>• Follow worked examples</td>
<td>• Ask questions</td>
<td></td>
</tr>
<tr>
<td>• Reflect on class problems and assignments</td>
<td>• Hear announcements on course changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Download materials from Moodle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Keep up with notices and find out marks via Moodle</td>
<td></td>
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Laboratory work and practical activities

• Hands-on work, to set studies in context

EXPECTED LEARNING OUTCOMES

At the conclusion of the course students will have gained:
- an understanding of the underlying principles of a variety of clinical testing systems.
- problem solving skills in the medical field.
- teamwork skills and an understanding of an individual’s strengths in a team environment.
- tools for independent and curiosity driven learning.
- communication skills in scientific writing.

ASSESSMENT

The assessment tasks for BIOM9420 Clinical Laboratory Science have been designed to measure your achievement of the learning outcomes.

The final grade for this course will normally be based on the sum of the scores from each of the assessment tasks. The Final Examination is worth 60% of the total course assessment. The formal exam scripts will not be returned. Note: The Course Convenor reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Students who perform poorly in the online quizzes and problem solving sets are recommended to discuss progress with the Course Convenor during the semester.

Quizzes will consist of multiple choice questions and are designed to encourage learning throughout the semester and prepare students for the types of questions in the final exam. These quizzes are available on Moodle.

Enzyme Activity Report is an individual task to teach students how to write scientific reports.

The Clinical Trial Protocol is a document prepared during class in week 9 in groups to prepare for the Clinical Trial in week 11. A Clinical Trial Report is a group report designed to consolidate learning in the practical activity as well as independent literature search.

The Final Exam will be a closed book exam with a combination of multiple choice and short answer questions. The final exam will be held during the formal exam period. Materials allowed: University approved calculator.
The marks assigned and dates of submission of each assessment task are set out below. Details of each assessment component, the marks assigned to it, the criteria by which marks will be assigned, and the dates of submission are provided in detail on Moodle.

<table>
<thead>
<tr>
<th>ASSIGNMENTS</th>
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<tbody>
<tr>
<td>1. Quiz 1 (2% of course assessment)</td>
<td>due on: 8 August 2016</td>
</tr>
<tr>
<td>2. Risk Assessment Quiz (1% of course assessment)</td>
<td>due on: 15 August 2016</td>
</tr>
<tr>
<td>3. Enzyme Activity Report (10% of course assessment)</td>
<td>due on: 22 August 2016</td>
</tr>
<tr>
<td>4. Quiz 2 (2% of course assessment)</td>
<td>due on: 12 September 2016</td>
</tr>
<tr>
<td>5. Clinical Trial Protocol (1% of course assessment)</td>
<td>due on: 19 September 2016</td>
</tr>
<tr>
<td>6. Quiz 3 (3% of course assessment)</td>
<td>due on: 3 October 2016</td>
</tr>
<tr>
<td>7. Risk Assessment Quiz (1% of course assessment)</td>
<td>due on: 10 October 2016</td>
</tr>
<tr>
<td>8. Clinical Trial Report (20% of course assessment)</td>
<td>due on: 24 October 2016</td>
</tr>
</tbody>
</table>

Assignments 1 and 8 must contain a Non Plagiarism Declaration Cover Sheet. Late submissions will be penalised 10% of the mark for each calendar day late. If you foresee a problem in meeting the nominated submission date please contact the Course Convenor to make an appointment to discuss your situation as soon as possible.

Assessment marks will be available on Moodle as soon as they have been marked, which will usually be within 2 weeks of submission. Assessment documents will be available in the class following assessment mark release and subsequently via the School Reception on Level 5 Samuels Building upon displaying your student ID card.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Location</th>
<th>Assessment</th>
</tr>
</thead>
</table>
| 1    | 25 July | Course Introduction  
Diagnostic Engineering (ML)                                      | CLB8           |                                                   |
| 2    | 1 Aug   | Chemical I. Haematology (JW)  
Activity: Clinical Trial Workshop I                                    | CLB8 Activity Rooms |                                                   |
| 3    | 8 Aug   | Chemical II. Renal (ML)  
Problem Solving Session I                                                 | CLB8 Activity Rooms | Quiz 1 (2%)                                       |
| 4    | 15 Aug  | Clinical III. Biochemistry (ML)  
Enzyme Laboratory                                                           | CLB8 Activity Rooms | Risk Assessment Quiz (1%)                         |
| 5    | 22 Aug  | Chemical IV. Genetic Testing (JRK)  
Problem Solving Session II                                                 | CLB8 Activity Rooms | Enzyme Laboratory Report (10%)                    |
| 6    | 29 Aug  | Mechanical I. Pulmonary Function (ML)  
Problem Solving Session III                                               | CLB8 Activity Rooms |                                                   |
| 7    | 5 Sept  | Mechanical II. Clinical Gait Analysis (LK)  
Problem Solving Session IV                                                | CLB8 Activity Rooms |                                                   |
| 8    | 12 Sept | Electrical I. Cardiac Monitoring (MS)                                   | CLB8           | Quiz 2 (2%)                                       |
| 9    | 19 Sept | Clinical Trial Workshop II                                              | Activity Rooms  | Clinical Trial Experimental Protocol (1%)          |
|      |         | **Mid-session break**                                                  |                |                                                   |
| 10   | 3 Oct   | Public holiday  
Problem Solving Session V (on moodle)                               |                | Quiz 3 (3%)                                       |
| 11   | 10 Oct  | Clinical Trial Laboratory  
(3 - 4:30 pm or 4:30 – 6 pm)                                             | Bioscience 107D/449 | Risk Assessment Quiz (1%)                         |
| 12   | 17 Oct  | Imaging I. Histology (BF)  
Imaging II. CT, MRI and X-ray (ML)                                        | CLB8           |                                                   |
| 13   | 24 Oct  | No class                                                               |                | Clinical Trial Report (20%)                       |
|      |         | **Exam period**                                                        |                | Final Examination (60%)                           |
RELEVANT RESOURCES

- Introduction to Biomedical Engineering (3rd edition) by John Enderle and Joseph Bronzino
- Additional materials provided on Moodle.
- Internet sites recommended during lectures

COURSE EVALUATION AND DEVELOPMENT

Student feedback has helped to develop this course, including feedback obtained from on-line evaluations as part of UNSW’s Course and Teaching Evaluation and Improvement (CATEI) process. Changes to the course since 2015 have included revision to the course content and incorporation of additional practical activities.

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 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/