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>Thursday, 9 a.m. - 12 p.m.</td>
</tr>
<tr>
<td>Activities</td>
<td>Colombo Theatre C (weeks 1-2, 7-10) Quad G031, G032, G035 (weeks 3-6, 11-12)</td>
</tr>
</tbody>
</table>

Please make sure you attend every lecture and tutorial, as all non-exam activities will be completed in class and will count toward the course mark.

Course Coordinator and Lecturer
Professor Melissa Knothe Tate, Paul Trainor Chair of Biomedical Engineering
Email: m.knothetate@unsw.edu.au
Office hours to be held in small conference room, lower ground of Samuels, Wednesdays, 1-6 p.m. If I am on travel for work, I will either set up additional office hours or be available via skype.

Demonstrators
Dan Hageman (Impairment in cardiovascular function - e.g. lymphoedema, CPD)
Email:
Anton Nathanson (Neurotrauma and Neurodegenerative Impairment)
Email:
Lucy Ngo (Musculoskeletal Trauma and Mobility Impairment)
Email:

Disabilities is an umbrella term, covering impairments, activity limitations, and participation restrictions. An impairment is a problem in body function or structure; an activity limitation is a difficulty encountered by an individual in executing a task or action; while a participation restriction is a problem experienced by an individual in involvement in life situations. Disability is thus not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives.

— World Health Organization, Disabilities

INFORMATION ABOUT THE COURSE

This course has been designed to provide students with a theoretical and practical understanding of the application of biomechanics in physical rehabilitation and to improve life quality for individuals with impairments. A combination of interactive lectures and tutorial activities enable students to learn and apply the material in an entrepreneurial context. Students will form consulting & med tech solution companies that will address complex, realistic case studies of scenarios involving individuals with impairments. These mock companies will form dossiers to present at an Angel Investors Conference at the end of term. For the conference, students themselves will become Angel Investors and prioritise where they can best invest their Angel Cash Dollars.
There is no assumed knowledge for this course. This course compliments other BIOM courses in the Biomechanics area including BIOM9510 Introductory Biomechanics, BIOM9541 Mechanics of the Human Body and BIOM9561 Mechanical Properties of Biomaterials. Alternatively this course can be taken as a stand-alone to broaden knowledge of medical assistive devices.

**HANDBOOK DESCRIPTION**

BIOM9551 Biomechanics of Physical Rehabilitation has been designed to provide students with a theoretical and practical understanding of the application of biomechanics in physical rehabilitation. Rehabilitation is a broad area of health related activity involving medicine, allied health and engineering. Rehabilitation activities include assessment of an individual's physical capacity and level of impairment, the assessment of work demands or activities of daily living, methods for improving physical capacity either through assistive devices and/or therapy, medical management, and design, evaluation and manufacture of assistive devices eg prostheses. The course with cover important areas of rehabilitation and establish the biomechanical concepts and principles that underpin rehabilitation related activities.

The course will first cover the rehabilitation setting including typical conditions and goals of rehabilitation. The course will then focus on important areas of rehabilitation including broad areas covering impairment in mobility, neuro degeneration and traumatic brain injury and cardiovascular function.

**OBJECTIVES**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Program outcome attributes</th>
<th>Assessment task</th>
</tr>
</thead>
<tbody>
<tr>
<td>To understand the relationship between multiscale biomechanics and mechanobiology and the concept that 'life is mechanobiological'</td>
<td>• An in-depth engagement with the relevant disciplinary knowledge in its inter-disciplinary context</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Capacity for analytical and critical thinking and for creative problem solving</td>
<td>• Online quizzes</td>
</tr>
<tr>
<td></td>
<td>• Ability to engage independent and reflective learning</td>
<td>• Company presentations</td>
</tr>
<tr>
<td></td>
<td>• Information literacy</td>
<td>• Company design/ solution dossier</td>
</tr>
<tr>
<td></td>
<td>• Skills for effective communication</td>
<td>• Final Exam</td>
</tr>
<tr>
<td>To develop an understanding of the concepts of impairment and disability and how biomechanics is a useful tool in physical rehabilitation.</td>
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<td></td>
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<tr>
<td>To understand the biomechanical principles that relate to assistive devices and conditions which require these devices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To contextualise the learning with practical activities including applied biomedical engineering and entrepreneurship.</td>
<td>• Skills for collaborative and multi-disciplinary work</td>
<td>• Company presentations</td>
</tr>
<tr>
<td></td>
<td>• Capacity for analytical and critical thinking and for creative problem solving</td>
<td>• Company design/ solution dossier</td>
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**TEACHING STRATEGIES**

A combination of interactive lectures with coaching from a key opinion leader in the field, and activities
led by doctoral fellows with experience in R&D 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>Assessments</th>
<th>Activities and site visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Review lecture material</td>
<td>• Find out what you must learn</td>
<td>• Demonstrate your knowledge and skills</td>
<td>• Hands-on work, to set studies in context</td>
</tr>
<tr>
<td>• Reflect on class content and assignments</td>
<td>• Follow worked examples</td>
<td>• Demonstrate higher understanding and problem solving</td>
<td></td>
</tr>
<tr>
<td>• Download materials from Moodle</td>
<td>• Hear announcements on course changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Keep up with notices and find out marks via Moodle</td>
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</table>
EXPECTED LEARNING OUTCOMES

At the conclusion of the course students will have gained:

• develop an entrepreneurial mindset and experience typical steps of the innovation & commercialisation cycle
• an understanding of the concepts of impairment and how biomechanics/mechanobiology provide a powerful tool to design multifaceted solutions
• exposure to the Biomedical Engineering profession in practice.
• the ability to discuss, develop and apply the principles of biomechanics/mechanobiology to a range of rehabilitation strategies and problem solving.
• tools for independent and curiosity driven learning.
• tools for collaborative discussion and learning.
• communication skills in scientific writing and presentation

ASSESSMENT

The assessment tasks for BIOM9551 Biomechanics of Physical Rehabilitation 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. Note: The Course Convenor reserves the right to adjust the final scores by scaling if agreed by the Head of School.

Quizzes will consist of multiple choice and short answer 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. Students who perform poorly in the online quizzes are recommended to discuss progress with the Course Convenor during the semester.

Group presentation will be a group activity and assessment during class about assistive devices.

Company Design Project will explore the design solution for a complex patient scenario requiring a biomechanics-mechanobiology based, comprehensive rehabilitation approach. This task is designed to foster team work and put the theory into action. This project involves a written report (dossier) and a group presentation.

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 formal exam scripts will not be returned. The Final Exam is worth 40% of the total course assessment.

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.

ASSIGNMENTS

1. Company Dossier Part I (5% of course assessment) due on: 15 March 2018
2. Company Dossier Part II (5% of course assessment) due on: 22 March 2018
3. Company Dossier Part III (5% of course assessment) due on: 29 March 2018
4. Company Dossier Part IV (5% of course assessment) due on: 12 April 2018
5. Quiz 1 (5% of course assessment) due on: 19 April 2018
6. Quiz 2 (5% of course assessment) due on: 10 May 2018
7. Group Design Dossier (10% of course assessment) due on: 17/22 May 2017
8. Group Design Presentation (10% of course assessment) due on: 17/22 May 2017
9. Continuous, active class participation (10% of course assessment) - continuous
10. Final exam (40% of course assessment) to be announced

Assignments must be submitted to the Course Convenor either in person or via Moodle at the start of the scheduled class time on the nominated submission day. Each submitted assignment 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 on Moodle and subsequently via the School Reception on Level 5 Samuels Building upon displaying your student ID card.
## COURSE PROGRAM  
**Semester 1, 2018**

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Location</th>
<th>Assessment Due</th>
</tr>
</thead>
</table>
| 1    | 1 March| Course Introduction  
Interactive Lecture:  
Mechanobiology/Biomechanics of Life (MKT)  
Many Facets of Disability and Impairment  
Designing multifaceted Solutions  
Introduction to Group Project | Colombo Theatre C |                                  |
| 2    | 8 March| Interactive Lecture - Example Case Study from MKT  
Introduction to Tute Leaders  
Introduction to case studies  
Formation of Companies | Colombo Theatre C |                                  |
| 3    | 15 March| Company Meeting and Work Session 1  
One group will participate in Experiment/Trial | Quad G031, G032, G035 | Dossier Part 1-3 or Exp Analysis |
| 4    | 22 March| Company Meeting and Work Session 2  
One group will participate in Experiment/Trial | Quad G031, G032, G035 | Dossier Part 1-3 or Exp Analysis |
| 5    | 29 March| Company Meeting and Work Session 3  
One group will participate in Experiment/Trial | Quad G031, G032, G035 | Dossier Part 1-3 or Exp Analysis |
|      |        | **Mid-session Break**  
5 April |                               |                   |                                  |
| 6    | 12 April| Company Meeting and Work Session 4  
One group will participate in Experiment/Trial | Quad G031, G032, G035 | Dossier Part 1-3 or Exp Analysis |
| 7    | 19 April| Interactive Lecture:  
Mechanobiology Based Physical Therapy to Potentiate Healing (MKT) | Colombo Theatre C | Quiz 1 (10%)                   |
| 8    | 26 April| Interactive Lecture:  
Connectomics of Tissue Function and Failure throughout Life - New Approaches for Rehabilitation (MKT) | Colombo Theatre C |                                  |
| 9    | 3 May  | Interactive Lecture:  
Engineering and Commercialisation of Human-Device Interfaces for Rehabilitation (MKT) | Colombo Theatre C |                                  |
<p>| 10   | 10 May | Coaching preparation for Angel Investor Conference                  | Colombo Theatre C | Quiz 2 (10%)                   |</p>
<table>
<thead>
<tr>
<th></th>
<th>Date</th>
<th>Event</th>
<th>Location</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>17 May</td>
<td>Angel Investors' Conference</td>
<td>Quad G031, G032, G035</td>
<td>Company Dossier (15%) &amp; Presentation (10%)</td>
</tr>
<tr>
<td>12</td>
<td>24 May</td>
<td>Angel Investors' Conference</td>
<td>Quad G031, G032, G035</td>
<td>Company Dossier (15%) &amp; Presentation (10%)</td>
</tr>
<tr>
<td>13</td>
<td>29 May</td>
<td>No class</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exam period</td>
<td>Final Examination (40%)</td>
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RELEVANT RESOURCES

No specific textbooks are required for this course. Readings will be provided to supplement lecture notes.

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 Course and Teaching Evaluation and Improvement (CATEI) process. Changes to the course have included revision to the course content.

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/