COURSE DETAILS

Units of Credit 6

Contact hours 3 hours per week

Lecture Monday, 2 – 5 pm  
Civil Engineering G1
Mathews Room 104, Mathews Room 105, Samuels Room 513,

Activities

Course Coordinator  
Dr Brooke Farrugia
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Office: Level 4, 434, Samuels Building
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Lecturers  
Dr Lauren Kark
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Guest Lecturers  
Dr Che Fornusek
Email: che.fornusek@sydney.edu.au

Professor Stephen Lord
Email: s.lord@unsw.edu.au

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. A combination of lectures, guest speakers, activities and a site visit are included in this course.

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 basic biomechanical capabilities and limitations for normal movement will be broadly covered. The course will then focus on important areas of rehabilitation including amputees, assistive devices, clinical gait analysis and functional electrical stimulation for a range of impairments.
OBJECTIVES

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<tr>
<th>Objective</th>
<th>Program outcome attributes</th>
<th>Assessment task</th>
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| To develop an understanding of the concepts of impairment and disability and how biomechanics is a useful tool in physical rehabilitation. | • 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  
• Skills for effective communication | • Online quizzes  
• Group design project  
• Final Exam |
| To understand the biomechanical principles that relate to assistive devices and conditions which require these devices. |                                                                                             | • Group presentation  
• Group design project |
| To contextualise the learning with practical activities. | • Skills for collaborative and multi-disciplinary work  
• Capacity for analytical and critical thinking and for creative problem solving |                                                                                             |

TEACHING STRATEGIES
A combination of lectures, guest speakers and activities 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.

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<tr>
<th>Private Study</th>
<th>Lectures</th>
<th>Assessments</th>
<th>Activities and site visit</th>
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</table>
| • Review lecture material  
• Do assignments  
• Join Moodle discussions of problems  
• Reflect on class content and assignments  
• Download materials from Moodle  
• Keep up with notices and find out marks via Moodle | • Find out what you must learn  
• Follow worked examples  
• Hear announcements on course changes | • Demonstrate your knowledge and skills  
• Demonstrate higher understanding and problem solving | • 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 concepts of impairment and disability and how biomechanics is a useful tool in physical rehabilitation.
- an understanding of the biomechanical principles that relate to assistive devices and conditions which require these devices.
- exposure to the Biomedical Engineering profession in practice.
- the ability to discuss, develop and apply the principles of biomechanics 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.

Design thinking reflection is an individual activity to articulate the thought processes involved in the design of the limb assistive device for the Group Design Project.

Group Design Project will explore the design and manufacture of a limb assistive device. This task is designed to foster team work and put the theory into action. This project involves a written report 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 60% 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. Design thinking reflection (5% of course assessment) due on: 20 March 2017
2. Group presentation (5% of course assessment) due on: 27 March 2017
3. Quiz 1 (5% of course assessment) due on: 10 April 2017
4. Quiz 2 (5% of course assessment) due on: 8 May 2017
5. Group Design Project (20% of course assessment) due on: 22 May 2017

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

<table>
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<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Location</th>
<th>Assessment Due</th>
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| 1    | 27 February | Course Introduction  
Lecture: Introduction to Rehabilitation (BF) | Civil Engineering G1  |                          |
| 2    | 6 March | Lecture: Biomechanics of normal movement and methods of assessment (LK)  
Group Project Introduction | Civil Engineering G1  |                          |
| 3    | 13 March | Design Thinking (2-2:30pm)                                            | Civil Engineering G1  |                          |
|      |        | Group 1: Clinical Gait Analysis (2:30-5pm)  
Group 2: Design (2:30-4:30pm) | MAT104 / MAT105 / Sam513 | Reflection (5%)          |
| 4    | 20 March | Group 2: Clinical Gait Analysis (2-4:30pm)  
Group 1: Design (2-4pm) | MAT104 / MAT105 / Sam513 | Presentation (5%)       |
| 5    | 27 March | Activity: Physical Rehabilitation Assistive Devices and group presentations | MAT104 / MAT105 / Sam513 |                        |
| 6    | 3 April | Instrumented Gait and Exercise Rehabilitation for Falls  
Group 1 (2:30-5pm) and 2 (3:30-5pm) | NeuRA                 |                          |
| 7    | 10 April | Amputees & Prosthetics (LK)                                           | Civil Engineering G1  | Quiz 1 (5%)              |
|      |        | Mid-session Break                                                     |                       |                          |
| 8    | 24 April | Functional Electrical Stimulation (CF)                                | Civil Engineering G1  |                          |
| 9    | 1 May  | Stem Cells (BF)                                                       | Civil Engineering G1  |                          |
| 10   | 8 May  | Cerebral Palsy and Parkinsons (CF)                                    | Civil Engineering G1  | Quiz 2 (5%)              |
| 11   | 15 May | Activity: Clinical Trial of Group Project                             | MAT104 / MAT105 / Sam513 |                      |
| 12   | 22 May | Activity: Presentations of Group projects                             | MAT104 / MAT105 / Sam513 | Group Report  
(15%) & Presentation (5%) |
| 13   | 29 May | No class                                                              |                       |                          |
|      |        | Exam period                                                           | Final Examination (60%) |                          |
RELEVANT RESOURCES

No specific textbooks are required for this course. Lecturers may provide a list of additional reading at the end of their lecture. The following reference books may assist in certain areas of the course:

- Introduction to Biomedical Engineering MB 610.28/235
- Fundamentals of Biomechanics MB 612.76/169
- Additional materials provided on Moodle.
- Recommended internet sites.

COURSE EVALUATION AND DEVELOPMENT

Student feedback has helped to shape and develop this course, including feedback obtained from online evaluations as part of UNSW’s myExperience 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 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 School website available at http://www.engineering.unsw.edu.au/biomedical-engineering/