BMEN30006 Fundamentals of Biosignals

Credit Points: 12.50

Level: 3 (Undergraduate)

Dates & Locations:

2011, Parkville

This subject commences in the following study period/s:
Semester 1, Parkville - Taught on campus.

Time Commitment: Contact Hours: 36 hours of lectures; 12 hours of tutorials; 12 hours of workshops Total Time Commitment: 120 hours

Prerequisites:

The prerequisites for this subject are:

Subject	Study Period Commencement:	Credit Points:
ENGR10004 Engineering Systems Design 1	Semester 1, Semester 2	12.50

OR

Subject	Study Period Commencement:	Credit Points:
ENGR10003 Engineering Systems Design 2	Not offered 2011	12.50

The following subjects may be taken concurrently

Subject	Study Period Commencement:	Credit Points:
COMP20005 Engineering Computation	Not offered 2011	12.50
MAST20029 Engineering Mathematics	Summer Term, Semester 1, Semester 2	12.50

Corequisites: None

Recommended Background Knowledge: None

Non Allowed Subjects:

Anti- requisites for this subject are:

Subject	Study Period Commencement:	Credit Points:
431-221 Fundamentals of Signals and Systems	Not offered 2010	
ELEN30012 Signals and Systems	Semester 2	12.50

Core Participation Requirements: For the purposes of considering applications for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005) and Students Experiencing Academic Disadvantage Policy, this subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the Subject Coordinator and the Disability Liaison Unit. http://www.services.unimelb.edu.au/disability/

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Subject Overview:	This subject introduces students to the fundamental principles of signals measurement and analysis in a biosignals context. This subject takes the perspective of conservation of charge to examine basic principles of charge, current, Coulomb's law, electric fields and electrical energy. Analysis techniques are introduced with Krichhoff's current law, Kirchhoff's voltage law and frequency domain models for signals and frequency response for systems, covering topics such as Fourier representations of periodic signals, continuous-time and discrete-time Fourier transforms, frequency response, filtering, transfer functions, Z-transforms, Laplace transforms, poles and zeros, Bode plots, and the relationship to state-space representations. In addition to the fundamental concepts, topics to be covered include an introduction to various types of sensors and the basic physical phenomena underpining their operation as well as the basic statistics required to analyse measurements, calibrate sensors and evaluate measurement system performance. In the laboratories, students will learn about laboratory safety, team work and measurement safety in an integrated way. Students will learn how to measure a range of variables to monitor various biosignals, such as electrocardiogram (ECG), electromyogram (EMG), and electrocencephalogram (EEG) signals.
Objectives:	On completing this subject the student should have the ability to: # Analyse signals in a biosignals context; # Design a solution to a particular sensing problem; # Explain the fundamentals of the operation of sensors and transducers for the measurement of biosignals; # Use a range of laboratory equipment to measure these quantities;
Assessment:	Four laboratory reports of 1,000 words each spread from week 5 to week 12 (40%).One mid-semester test of one hour duration (10%).One excamination of two hours duration at the end of the semester (50%).
Prescribed Texts:	To be advised
Breadth Options:	This subject potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2011/B-ARTS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/B-MUS)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	On completion of this subject, students should have developed their: # Ability to apply knowledge of science and engineering fundamentals. # Ability to undertake problem identification, formulation and solution. # Ability to utilise a systems approach to complex problems and to design and operational performance. # Proficiency in engineering design. # Ability to communicate effectively, with the engineering team and with the community at large. # Capacity for creativity and innovation. # Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member. # Capacity for lifelong learning and professional development.
Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	Bioengineering Systems Master of Engineering (Biomedical)