431-335 Signal Processing 1 (Fundamentals)

Credit Points:	12.50
Level:	3 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: Thirty-six hours of lectures, 12 hours tutorials, 12 hours of laboratory work Total Time Commitment: Not available
Prerequisites:	431-221 Fundamentals of Signals and Systems
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Assoc Prof Erik Weyer
Subject Overview:	On completion of this subject students should have a good understanding of fundamental digital signal processing operations, digital filter design and frequency domain properties of discrete time signals and systems. Topics include motivation for signal processing with examples. Revision of deterministic signals and systems. Sampling of analog signals. Frequency domain properties: Discret time Fourier transform and Discret Fourier transform and their properties, Fast Fourier transform. Application of Fourier transform in spectral analysis and filter design. Digital filter design: filter types (lowpass, highpass, stopband, all pass, notch), phase, group delay, implications of causality, design of FIR and IIR filters. Multi-rate signal processing: upsampling, downsampling, signal rate conversion. Applications of digital signal processing.
Objectives:	On completing this subject the student should be able to: 1. Apply fundamental mathematical tools, in particular frequency-domain techniques, in the analysis and design of signal processing systems; 2. Design, implement and test simple digital filters according to given specifications. 3. Use software packages such as MATLAB for analysis and design of signal processing systems 4. Use DSP based prototyping platforms and associated software development tools to implement signal processing algorithms.
Assessment:	Formally supervised written examination 3 hours 60% (end of semester); project/laboratory reports 40% (four projects/labs throughout the semester). The written examination is a hurdle requirement: in order to receive a pass mark for the subject, students must perform at a passing standard on the written examination.
Prescribed Texts:	None

Recommended Texts:	Information Not Available
Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Generic Skills:	# ability to apply knowledge of basic science and engineering fundamentals # ability to communicate effectively, not only with engineers but also with the community at large # ability to undertake problem identification, formulation and solution # ability to utilise a systems approach to design and operational performance # understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development # capacity for independent critical thought, rational inquiry and self-directed learning # intellectual curiosity and creativity, including understanding of the philosophical and methodological bases of research activity # openness to new ideas and unconventional critiques of received wisdom # profound respect for truth and intellectual integrity, and for the ethics of scholarship
Related Course(s):	Bachelor of Engineering (Biomedical)Biosignals Bachelor of Engineering (Electrical Engineering)