ELEN40004 Signal Processing 2

Credit Points:	12.50
Level:	4 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: Thirty-six hours of lectures, 12 hours of tutorials and 12 hours of laboratory experiment or project work Total Time Commitment: 120 hours
Prerequisites:	431-325 Stochastic Signals and Systems, 431-335 Signal Processing 1 (Fundamentals)
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 Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/
Coordinator:	Prof Robin Evans
Contact:	Melbourne School of Engineering Office Building 173, Grattan Street The University of Melbourne VIC 3010 Australia General telephone enquiries + 61 3 8344 6703 + 61 3 8344 6507 Facsimiles + 61 3 9349 2182 + 61 3 8344 7707 Email **eng-info@unimelb.edu.au (mailto:eng-info@unimelb.edu.au)**
Subject Overview:	On completion of this subject students should have a good understanding of signal processing methods for parameter estimation, and signal estimation and be able to design, analyse and implement such algorithms. Topics include: Motivation for parameter estimation and filtering with examples. Parameter estimation: least squares and its properties, recursive least squares and least mean squares, optimisation-based methods, maximum likihood methods. Spectral estimation: periodogram, Barlett method, Welch method and Blackman-Tukey method. Optimal filters for signal estimation: Wiener filter, Kalman filter and Hidden Markov Model filter. Examples illustrating the wide application area of signal processing algorithms. Project: Design, implementation and testing of signal processing algorithms. Implementation and testing of real time signal processing algorithms on a DSP board.
Objectives:	On completing this subject the student should be able to: # Apply fundamental mathematical tools, in particular stochastic techniques, in the analysis and design of signal processing systems; # Recognize estimation problems and design, implement and analyse algorithms for solving them;

	# Use software packages such as MATLAB for the analysis and design of signal processing systems; # Prototype signal processing systems with DSP based hardware.
Assessment:	Formally supervised written examination 3 hours: 70% (end of semester); Project reports (not exceeding 20 pages each): 30% (two projects, one in the first half of the semester and one in the second half of the semester).
Prescribed Texts:	None
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 # In-depth technical competence in at least one engineering discipline # Ability to undertake problem identification, formulation and solution # Ability to utilise a systems approach to design and operational performance # Ability to function effectively as an individual and in multi-disciplinary and multi-cultural teams, with the capacity to be a leader or manager as well as an effective team member # Understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development # Expectation of the need to undertake lifelong learning, capacity to do so # 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 (Computer Engineering) Bachelor of Engineering (Electrical Engineering) Bachelor of Engineering (Electrical) and Bachelor of Arts Bachelor of Engineering (Electrical) and Bachelor of Commerce Bachelor of Engineering (Electrical) and Bachelor of Laws Bachelor of Engineering (Electrical) and Bachelor of Science Bachelor of Engineering (EngineeringManagement) Electrical Bachelor of Engineering (IT) Computer Engineering Bachelor of Engineering (IT) Electrical Engineering Bachelor of Engineering (Software Engineering) Postgraduate Certificate in Engineering