

ELEN90052 Advanced Signal Processing

| Credit Points: | 12.5 | | | | | | |
|--|--|----------------|----------------------------|----------------|-------------------------------|------------------|-------|
| Level: | 9 (Graduate/Postgraduate) | | | | | | |
| Dates & Locations: | 2015, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. | | | | | | |
| Time Commitment: | Contact Hours: 36 hours of lectures (3 x one hour lectures per week) and up to 24 hours of workshops Total Time Commitment: 200 hours | | | | | | |
| Prerequisites: | Prerequisites for this subject are: ELEN90058 Signal Processing (../view/current/ELEN90058) (prior to 2011, ELEN30008 Signal Processing 1) AND ELEN90054 Probability and Random Models (../view/current/ELEN90054) (prior to 2011, ELEN30002 Stochastic Signals and Systems) | | | | | | |
| Corequisites: | None | | | | | | |
| Recommended Background Knowledge: | None | | | | | | |
| Non Allowed Subjects: | Anti-requisite for this subject is: <table border="1" data-bbox="389 1010 1485 1155"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ELEN40004 Signal Processing 2</td> <td>Not offered 2015</td> <td>12.50</td> </tr> </tbody> </table> | Subject | Study Period Commencement: | Credit Points: | ELEN40004 Signal Processing 2 | Not offered 2015 | 12.50 |
| Subject | Study Period Commencement: | Credit Points: | | | | | |
| ELEN40004 Signal Processing 2 | Not offered 2015 | 12.50 | | | | | |
| Core Participation Requirements: | <p><p>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.</p> <p>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</p> </p> | | | | | | |
| Coordinator: | Prof Jonathan Manton | | | | | | |
| Contact: | Prof Jonathan Manton Email: jmanton@unimelb.edu.au (mailto:jmanton@unimelb.edu.au) | | | | | | |
| Subject Overview: | <p>AIMS</p> <p>This subject provides an in-depth introduction to statistical signal processing.</p> <p>INDICATIVE CONTENT</p> <p>Students will study topics including:</p> <ul style="list-style-type: none"> # Applications of statistical signal processing # A review of stochastic signals and systems fundamentals – random processes, white noise, stationarity, auto- and cross-correlation functions, spectral- and cross-spectral densities, properties of linear time-invariant systems excited by white noise # Parameter estimation - least squares and its properties, recursive least squares and least mean squares, optimisation-based methods, maximum likelihood methods | | | | | | |

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| | <ul style="list-style-type: none"> # Kalman filtering and selected topics from spectral estimation, Wiener and Markov filtering # Power spectrum estimation. <p>This material will be complemented with the use of software tools (e.g. MATLAB) for computation and a DSP (Digital Signal Processor) based development platform for the implementation of signal processing algorithms in the laboratory.</p> |
| Learning Outcomes: | <p>INTENDED LEARNING OUTCOMES (ILO)</p> <p>On completing this subject the student should be able to:</p> <ol style="list-style-type: none"> 1 Apply fundamental mathematical tools, in particular stochastic techniques, in the analysis and design of signal processing systems 2 Recognise estimation problems and design, implement and analyses algorithms for solving them 3 Use software packages such as MATLAB for the analysis and design of signal processing systems 4 Implement signal processing systems with DSP based development platforms. |
| Assessment: | <p>One written examination, not exceeding three hours at the end of semester, worth 60% A one-hour mid-semester test, worth 10% Two laboratory projects (approximately 40-45 hours of work per student), each worth 15%. Hurdle requirement: Students must pass the written exam to pass the subject. Intended Learning Outcomes (ILOs) 1 and 2 are assessed in the final written examination, the mid-semester test, and submitted reports for two projects. ILOs 3 and 4 are assessed as part of submitted project work and workshops.</p> |
| Prescribed Texts: | TBA |
| 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: | <ul style="list-style-type: none"> # Ability to apply knowledge of basic science and engineering fundamentals # 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 # Capacity for independent critical thought, rational inquiry and self-directed learning # Ability to communicate effectively, with the engineering team and with the community at large |
| Notes: | <p>Credit may not be obtained for both ELEN40004(431-461) Signal processing 2 and ELEN90052 Advanced Signal Processing</p> <p>LEARNING AND TEACHING METHODS</p> <p>The subject is delivered through lectures and workshop classes that combine both tutorial and hands-on laboratory activities.</p> <p>INDICATIVE KEY LEARNING RESOURCES</p> <p>Students are provided with lecture slides, tutorial questions and solutions, project specifications, and reference text lists.</p> <p>CAREERS / INDUSTRY LINKS</p> <p>Exposure to industry standard DSP design tools through laboratory activities.</p> |
| Related Course(s): | Bachelor of Engineering (Biomedical)Biosignals |
| Related Majors/Minors/Specialisations: | <p>Master of Engineering (Electrical with Business)</p> <p>Master of Engineering (Electrical)</p> |