ELEN90051 Advanced Communication Systems

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 and up to 24 hours of workshops Total Time Commitment: 200 hours
Prerequisites:	The prerequisite for this subject is: {{TABLE1}} (prior to 2011, ELEN30003 Communication Systems) Master of Telecommunications Engineering (MTE) students may be eligible on the basis of subject(s) equivalent to ELEN90057, subject to approval.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Anti-requisite for this subject is: {{TABLE2}}
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:	Assoc Prof Margreta Kuijper
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Subject Overview:	**AIMS** The aim of this subject is to develop a thorough understanding of the main concepts, techniques and performance criteria used in the analysis and design of digital communication systems. Such systems lie at the heart of the information and communication technologies (ICT) that underpin modern society. Digital communications have become the preferred option for many communication devices, replacing analogue systems, due to their robustness to noise, ease of standardisation and increased scale of integration. **INDICATIVE CONTENT** This subject provides an in-depth treatment of the main concepts and techniques used in the analysis and design of digital communication systems.

Table 1 (Prerequisites):

Subject	Study Period Commencement:	Credit Points:
ELEN90057 Communication Systems	Semester 2	12.50

Table 2 (Non Allowed Subjects):

Subject	Study Period Commencement:	Credit Points:
ELEN40003 Digital Communications	Not offered 2015	12.50

Topics include:

Source coding; data compression; entropy
Digital modulation and demodulation, with and without bandwidth constraints; signal constellations in signal vector space; M-ary signalling and probability of error calculations for AWGN channels; Nyquist's criterion, pulse shaping and equalisation; sequence detection; Viterbi's algorithm
Mutual information and channel capacity; BSC and erasure channels; Shannon bounds; channel coding; erasure coding; block codes; convolutional / trellis codes; error-correction; and decoding methods.

This material is complemented by examples such as JPEG, the compact disc, satellite communication systems, and mobile communication systems.

Learning Outcomes:	**INTENDED LEARNING OUTCOMES (ILO)** Having completed this subject the student is expected to: 1 Understand the various blocks that constitute a digital communication system and understand how they interrelate 2 Be able to qualitatively and quantitatively analyse and evaluate digital communication systems 3 Recognise the broad applicability of digital communication systems in society 4 Use software tools to analyse, design and evaluate digital communication systems
Assessment:	One written examination, not exceeding three hours at the end of semester, worth 60% Continuous assessment of submitted project work, not exceeding 30 pages over the semester (approximately 40-45 hours of work per student), worth 30% Up to two progress tests over the semester, in total worth 10%. Hurdle requirement: Students must pass the written exam to pass the subject. Intended Learning Outcomes (ILOs) 1 to 3 are assessed in the final written examination, progress tests, and workshop project reports. ILO 4 is assessed as part of the workshop project reports
Prescribed Texts:	TBA
Recommended 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 # 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:	Credit may not be obtained for both ELEN40003 (431-460) Digital Communication Systems and ELEN90051 Advanced Communication Systems **LEARNING AND TEACHING METHODS** The subject is delivered through lectures and workshop classes that combine theoretical tutorial, MATLAB programming and hands-on laboratory activities. **INDICATIVE KEY LEARNING RESOURCES** Students are provided with lecture notes, a workshop manual and reference text lists. **CAREERS / INDUSTRY LINKS**

	Exposure to industry applications via guest lecturers
Related Course(s):	Master of Telecommunications Engineering
Related Majors/Minors/ Specialisations:	Master of Engineering (Electrical with Business) Master of Engineering (Electrical)