

# ELEN90057 Communication Systems

<b>Credit Points:</b>	12.50																		
<b>Level:</b>	9 (Graduate/Postgraduate)																		
<b>Dates &amp; Locations:</b>	This subject is not offered in 2014.																		
<b>Time Commitment:</b>	Contact Hours: 3 x one hour lectures; up to 12 hours of tutorials; and up to 18 hours of workshops Total Time Commitment: 200 hours																		
<b>Prerequisites:</b>	<p>Prerequisites for this subject are:</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ELEN30012 Signals and Systems</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p>AND</p> <p>One of the following subjects</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ELEN90054 Probability and Random Models</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>MAST30020 Probability and Statistical Inference</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>MAST30001 Stochastic Modelling</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	ELEN30012 Signals and Systems	Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	ELEN90054 Probability and Random Models	Semester 1	12.50	MAST30020 Probability and Statistical Inference	Semester 1	12.50	MAST30001 Stochastic Modelling	Semester 2	12.50
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<b>Corequisites:</b>	None																		
<b>Recommended Background Knowledge:</b>	None																		
<b>Non Allowed Subjects:</b>	<p>Anti-requisite for this subject is:</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>ELEN30003 Communication Systems</td> <td>Not offered 2014</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	ELEN30003 Communication Systems	Not offered 2014	12.50												
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<b>Core Participation Requirements:</b>	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: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a>																		
<b>Contact:</b>	Email: <a href="mailto:elen-subjectenquiry@unimelb.edu.au">elen-subjectenquiry@unimelb.edu.au</a> (mailto:elen-subjectenquiry@unimelb.edu.au)																		
<b>Subject Overview:</b>	<p><b>AIMS</b></p> <p>This subject provides an introduction to the analysis and design of telecommunication signals and systems, in the presence of uncertainty. The emphasis is on understanding the basic concepts that underpin both analog and digital formats. The material covered is crucial to understanding how modern wired and wireless communication systems work at the physical layer. This is a core subject for the Master of Engineering (Electrical) course.</p> <p><b>INDICATIVE CONTENT</b></p> <p>Topics to be covered include:</p>																		

	<ul style="list-style-type: none"> <li># Transmission through linear time-invariant channels; magnitude and phase distortion; basic equalisation; low-pass representations of band-pass signals and systems; group and phase delays</li> <li># Time- and frequency-domain analysis of analog modulation and demodulation schemes, including conventional amplitude modulation (AM), double sideband suppressed carrier (DSBSC), single sideband, and frequency modulation (FM); threshold effects in AM and FM</li> <li># Random processes in frequency domain; signal-to-noise ratios (SNR's) in DSBSC, AM and FM;</li> <li># Nyquist's sampling theorem; quantisation and signal-to-quantisation noise ratios</li> <li># Digital modulation schemes including baseband pulse amplitude modulation, amplitude-shift keying and frequency-shift keying, synchronisation, matched filter receivers for additive white Gaussian noise channels, bit-error rate analysis;</li> <li># Comparisons of analog and digital schemes in terms of spectral efficiency, transmission power, demodulated SNR and complexity.</li> </ul>
<b>Learning Outcomes:</b>	<p><b>INTENDED LEARNING OUTCOMES (ILO)</b></p> <p>Having completed this subject it is expected that the student be able to:</p> <ol style="list-style-type: none"> <li>1 Qualitatively describe the basic functional blocks of a telecommunication system and their attributes</li> <li>2 Quantitatively analyse the overall performance of analog and digital communication schemes, in terms of signal-to-noise ratios, transmission bandwidth</li> <li>3 Assess the relative merits of different modulation and demodulation techniques, and make design choices on this basis</li> <li>4 Use software and hardware simulation tools to understand the properties and performance of simple communication systems</li> </ol>
<b>Assessment:</b>	<p>One written examination, not exceeding three hours at the end of semester, worth 70%; Continuous assessment of submitted workshop reports, not exceeding 20 pages over the semester, worth 20%; A one-hour mid-semester test, worth 10%. Hurdle requirement: Students must pass the written exam to pass the subject. Intended Learning Outcomes (ILOs) 1 to 3 are assessed via the mid-semester test and final examination. ILO 4 is assessed through the workshop reports.</p>
<b>Prescribed Texts:</b>	TBA
<b>Breadth Options:</b>	This subject is not available as a breadth subject.
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<ul style="list-style-type: none"> <li># Ability to apply knowledge of basic science and engineering fundamentals</li> <li># In-depth technical competence in at least one engineering discipline</li> <li># Ability to undertake problem identification, formulation and solution</li> <li># Ability to utilise a systems approach to design and operational performance</li> <li># Capacity for independent critical thought, rational inquiry and self-directed learning</li> <li># Ability to communicate effectively, with the engineering team and with the community at large</li> </ul>
<b>Notes:</b>	<p><b>LEARNING AND TEACHING METHODS</b></p> <p>The subject is delivered through lectures, tutorials and workshop classes.</p> <p><b>INDICATIVE KEY LEARNING RESOURCES</b></p> <p>The subject is delivered through lectures, tutorials and workshop classes.</p> <p><b>CAREERS / INDUSTRY LINKS</b></p> <p>Exposure to simulation and measurement tools and teamwork through the five workshops.</p>
<b>Related Majors/Minors/ Specialisations:</b>	<p>B-ENG Electrical Engineering stream</p> <p>Master of Engineering (Electrical with Business)</p> <p>Master of Engineering (Electrical)</p>