# ELEN90009 Transmission Systems

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| **Credit Points:** | 12.50 |
| **Level:** | 9 (Graduate/Postgraduate) |
| **Dates & Locations:** | 2010, Parkville<br>This subject commences in the following study period/s:<br>Semester 2, Parkville - Taught on campus. |
| **Time Commitment:** | Contact Hours: One 3 hours lecture per week; Total Time Commitment: Estimated total time commitment 120 hours |
| **Prerequisites:** | 4-yearElectrical Engineering degreeorequivalent. |
| **Corequisites:** | None |
| **Recommended Background Knowledge:** | Knowledge of communications systems at final year undergraduate level |
| **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 Maxim Gitlits |
| **Contact:** | Melbourne School of Engineering Office<br>Building 173, Grattan Street<br>The University of Melbourne<br>VIC 3010 Australia<br>General telephone enquiries<br>+ 61 3 8344 6703<br>+ 61 3 8344 6507<br>Facsimiles<br>+ 61 3 9349 2182<br>+ 61 3 8344 7707<br>Email<br>**eng-info@unimelb.edu.au (mailto:eng-info@unimelb.edu.au)** |
| **Subject Overview:** | This subject covers the basic areas of physical and MAC layers in modern wireline and wireless communications. In particular, it includes the following topics:<br>• Structures of analog and digital transmission systems.<br>• Advanced principles of multiplexing and multiple accesses.<br>• Mathematical tools for analysis of transmission signals and circuits.<br>• Signal processing in digital and analog transmissions.<br>• Digital representation of analog signals<br>• Voice encoding in mobile technologies.<br>• VoIP transmission.<br>• Modulation techniques.<br>• Error handling techniques. |
| **Objectives:** | On completion of this subject, the students will develop skills and knowledge required to understand the fundamentals of transmission systems and to be able to solve technical problems in the following areas:<br>• Mathematical description of deterministic and random signals and circuits.<br>• Deterministic and random signals transmission over linear circuits.<br>• Signals impairments in transmission over noisy channels. |

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| | • Channel capacity in noisy and bandwidth limited environments.<br>• Digital encoding of analog signals, including voice encoding.<br>• Baseband and pass-band analog and digital modulation.<br>• Error detection and error correction techniques.<br><br>The students should be able to assess performance of transmission systems, interpret the results and to propose solutions for performance enhancements. They should have the ability to utilise a system approach to design and performance evaluation of telecommunication systems, Furthermore, they should be able to evaluate the applicability of different performance enhancement methods to wireless and wireline communication systems and to assess the gain that can be achieved. |
| **Assessment:** | • Formally supervised written examination - 3 hours 70% (end of semester). This final exam is a hurdle. A student must pass the exam to pass the subject. • Written class test – 1 hour 30% (mid semester); |
| **Prescribed Texts:** | Leon W.Couch. Digital and Analog Communication Systems. Prentice-Hall Int. 2001. |
| **Recommended Texts:** | Additional Reading:<br>• Simon Haykin. Communication Systems. John Wiley&Sons, Inc 2001<br>• John G. Proakis. Digital Communications. McGraw-Hill. 2001.<br>• Bernard Sklar. Digital Communications. Prentice-Hall International. 2001. |
| **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:** | On completion of this subject, the students should have developed:<br><br>• Problem solving and analytical skills,<br>• Critical and creative thinking, with an aptitude for continued self-directed learning;<br>• Sense of intellectual curiosity;<br>• Ability to interpret data and research results;<br>• Ability to learn in a range of ways, including through information and communication technologies;<br>• Capacity to confront unfamiliar problems;<br>• Ability to evaluate and synthesise the research and professional literature;<br>• Ability to develop models of practical applications and evaluate their performance by rigorous analytical means; |
| **Related Course(s):** | Master of Telecommunications Engineering<br>Master of Telecommunications Engineering<br>Postgraduate Certificate in Engineering |