640-251 Instrumentation for Scientists

Credit Points:	12.500
Level:	Undergraduate
Dates & Locations:	2008, This subject commences in the following study period/s: Semester 1, - Taught on campus.
Time Commitment:	Contact Hours: 24 lectures and seminars (two per week) and 48 hours of laboratory (a 1-hour and a 3-hour lab per week) Total Time Commitment: 120 hours.
Prerequisites:	Any two semesters of first-year physics: physics (640-121 and 640-122) or (640-141 and 640-142) or (640-151 and 640-152) or (640-161 and 640-162). Mathematics: one of 620-121, 620-140, 620-141, 620-151, 620-161 or equivalent.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	It is University policy to take all reasonable steps to minimise the impact of disability upon academic study and reasonable steps will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact upon their active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.
Coordinator:	Dr R Rassool
Subject Overview:	This subject presents the basic principles and modern techniques of instrumentation and data acquisition and presentation that are now commonly used by experimental scientists. The lectures are supported by a highly integrated laboratory program in which students develop skills in designing and computer-interfacing experiments. Students are able to suit the laboratory program to their own needs by drawing on those particular laboratory exercises of relevance to their field, such as the physical, biomedical or environmental sciences. In the subject, elementary DC theory will be revised and extended to AC. The operational amplifier, which plays a key role in instrumentation, will be introduced together with its control by negative and positive feedback. Students completing this subject will be able to: # demonstrate an understanding of elementary DC and AC theory and explain the principles of sensors, transducers and actuators; # demonstrate an understanding of and be able to implement techniques for noise reduction and signal processing; # design and implement computer interfaces to simple experiments; and # analyse and interpret data. In addition students will enhance their ability to: # participate effectively as part of a group in tutorials and in a laboratory environment; and # plan effective work schedules and manage their time to meet the deadlines for submission of assessable work and prepare for tests and examinations.
Assessment:	Ongoing assessment of practical work during the semester, consisting of laboratory participation, and record keeping up to a total of 3000 words (25%); design and execution of an experimental project, accompanied by a written report up to a total of 3000 words due during the semester (25%); a 2-hour written examination in the examination period (50%).

Prescribed Texts:	None
Breadth Options:	This subject is a level 2 or level 3 subject and is not available to new generation degree students as a breadth option in 2008. This subject or an equivalent will be available as breadth in the future. Breadth subjects are currently being developed and these existing subject details can be used as guide to the type of options that might be available. 2009 subjects to be offered as breadth will be finalised before re-enrolment for 2009 starts in early October.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Notes:	This subject is available for science credit to students enrolled in the BSc (pre-2008 degree only), BASc or a combined BSc course.
Related Course(s):	Bachelor of Engineering (Mechanical &Manufacturing)& Bachelor of Science