620-331 Applied Partial Differential Equations

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: 36 lectures (three per week) and up to 12 practice classes (one per week) Total Time Commitment: 120 hours
Prerequisites:	Either 620-231 or 620-233; and either 620-232 or 620-234.
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:	Prof K Landman
Subject Overview:	This subject illustrates how partial differential equations (PDEs) of first and second order arise in mathematical modelling of the real world. It introduces basic techniques for solving these PDEs such as eigenfunction expansions, Green's functions, similarity solutions, method of images, and addresses general features of the solutions. The subject also covers certain topics in ordinary differential equations (ODEs). Topics covered include: # First-order non-linear PDEs: characteristics, fans, shocks and applications; # Classification of linear second order PDE' in two variables, canonical forms, initial and boundary conditions; # The wave equation, d'Alembert's solution; # Laplace's equation, Poisson's equation, harmonic functions, maximum and minimum principles; # The heat equation, convective diffusion equation, Burgers' equation and the Hopf-Cole transformation; # Sturm-Liouville equation, properties of eigenfunctions and eigenvalues; and # Series solutions of ODEs, ordinary points, regular singular points, Bessel and Legendre functions.
Assessment:	A 45-minute written test held mid-semester (either 0% or 20%); a 3-hour written examination in the examination period (80% or 100%). The relative weighting of the examination and the mid-semester test will be chosen so as to maximise the student's final mark.
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 Arts Bachelor of Arts and Bachelor of Science Bachelor of Arts and Sciences Bachelor of Engineering (Mechanical &Manufacturing)& Bachelor of Science Bachelor of Science