620-637 Computational Differential Equations

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus. On-campus
Time Commitment:	Contact Hours: 36 hours comprising 1 one-hour computer lab and 1 two-hour computer lab per week. Total Time Commitment: 3 contact hours and 7 private study hours per week.
Prerequisites:	Students should be able to progam in one of: C, Matlab, Mathematica, Perl, Fortran, Python etc
Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed a third year subject in partial differential equations (equivalent to 620-331 [2008] Applied Partial Differential Equations).
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 participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Dr Steven Lyle Carnie
Subject Overview:	Understanding the behaviour of the mathematical problem and the numerical algorithm gives insight into the pitfalls for the unwary in using canned packages inappropriately or uncritically. Topics will include boundary value problems for ordinary differential equations and the solution of parabolic, hyperbolic and elliptic partial differential equations.
Objectives:	After completing this subject, students should: - appreciate how and why numerical methods are developed to solve differential equations commonly arising in finance, science and engineering; - understand the chief factors to be considered in choosing an appropriate algorithm for a given class of problem; - acquire high level numerical tools and knowledge that can be used to solve a range of problems in science and engineering; - gain the ability to pursue further studies in this and related areas.
Assessment:	Up to 80 pages of written assignments (80%: four assignments worth 20% each due early, mid, late, and at the end of semester), and a 15 minute oral presentation on a project (20%) due towards the end of semester.
Prescribed Texts:	TBA
Recommended Texts:	R.J.Leveque, "Finite difference methods for ordinary and partial differential equations. Steady-state and time-dependent problem", SIAM, 2007.
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:	Upon completion of this subject, students should gain the following generic skills: - Problem-solving skills including the ability to engage with unfamiliar problems and identify relevant solution strategies

	- Analytical skills through the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis - Through interactions with other students, the ability to work in a team - Time management skills, the ability to meet regular deadlines while balancing competing commitments
Related Majors/Minors/ Specialisations:	R05 RM Master of Science - Mathematics and Statistics