620-232 Mathematical Methods

Credit Points:	12.500
Level:	Undergraduate
Dates & Locations:	2008, This subject commences in the following study period/s: Semester 2, - Taught on campus.
Time Commitment:	Contact Hours: 36 lectures (three per week) and 11 1-hour tutorials (one per week) Total Time Commitment: 120 hours
Prerequisites:	One of [07]620-122, [08]620-142, 620-156, 620-157, [05]620-192, [05]620-194, [07]620-211; and one of [07]620-113, [07]620-123, [08]620-143, [05]620-193.
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may gain credit for only one of 620-232 and 620-234. Students in the combined degree BE/BSc should note that credit exclusions exist between this subject and Engineering mathematics subjects. Refer to entries for 431-201 Engineering Analysis A and 431-202 Engineering Analysis B for details.
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:	A/Prof A Tordesillas
Subject Overview:	Many phenomena in the biological and physical sciences as well as engineering and modern finance are described by differential equations. Examples include tissue engineering, contaminant transport, epidemic models, electrical circuits, dynamical systems and quantum mechanics. This subject describes analytical methods to solve linear ordinary and partial differential equations, as well as qualitative methods for linear and nonlinear systems of differential equations. Transform methods for ordinary differential equations are introduced via the Laplace transform. The most common partial differential equations - Laplace's equation, the wave equation and the heat equation - are introduced and solved in simple geometries by separation of variables. This requires the development of Fourier series to represent functions and leads to an introduction to Fourier transforms. Linear systems of ordinary differential equations are solved by matrix methods and the phase plane is defined. Qualitative ideas such as stability and phase portraits are extended to nonlinear systems of differential equations. Applications include topics such as population models and normal modes.
Assessment:	Two 45-minute written class tests held during semester (20%); a 3-hour written examination in the examination period (80%).
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 Engineering (Chemical) and Bachelor of Science Bachelor of Engineering (Civil) and Bachelor of Science Bachelor of Engineering (Environmental) and Bachelor of Science Bachelor of Engineering (Mechanical &Manufacturing)& Bachelor of Science Bachelor of Engineering(Biochemical Engineering)and Bachelor of Science