620-232 Mathematical Methods

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 2, - Taught on campus. Lectures and practice classes.
Time Commitment:	Contact Hours: 36 one-hour lectures (three per week), 11 one-hour practice classes (one per week) Total Time Commitment: 120 hours total time commitment.
Prerequisites:	One of # 620-122 (prior to 2008) # 620-142 (prior to 2009) # *Linear Algebra* # *Accelerated Mathematics 1* (620-157 Mathematics 1 prior to 2009) # 620-192 (prior to 2006) # 620-194 (prior to 2006) # 620-211 (prior to 2008) and one of # 620-113 (prior to 2008) # 620-123 (prior to 2008) # 620-143 (prior to 2009) # 620-193 (prior to 2006)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may gain credit for only one of *Mathematical Methods* and 620-234 (prior to 2009). 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:	Assoc Prof Antoinette 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.
Objectives:	.
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 potentially can be taken as a breadth subject component for the following courses: # **Bachelor of Arts (https://handbook.unimelb.edu.au/view/2009/D09)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2009/F04)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2009/A04)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2009/M05)** You should visit **learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)** and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.
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 Majors/Minors/ Specialisations:	Mathematics & Statistics Major