MAST20030 Differential Equations

Credit Points:	12.5
Level:	2 (Undergraduate)
Dates & Locations:	2016, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 36 one-hour lectures (three per week), 12 one-hour practice classes (one per week) Total Time Commitment: Estimated total time commitment of 170 hours
Prerequisites:	

Subject	Study Period Commencement:	Credit Points:
MAST20009 Vector Calculus	Semester 1, Semester 2	12.50

plus one of

Subject	Study Period Commencement:	Credit Points:
MAST10007 Linear Algebra	Summer Term, Semester 1, Semester 2	12.50
MAST10008 Accelerated Mathematics 1	Semester 1	12.50

MAST10013 UMEP Maths for High Achieving Students

plus one of

Subject	Study Period Commencement:	Credit Points:
MAST10006 Calculus 2	Semester 1, Semester 2	12.50
MAST10009 Accelerated Mathematics 2	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of MAST20030 Differential Equations, MAST30029 Partial Differential Equations (prior to 2014) and MAST30023 Differential Equations for Engineers (prior to 2012). Students may only gain credit for one of MAST20030 Differential Equations and MAST20029 Engineering Mathematics.
Core Participation Requirements:	For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: http://services.unimelb.edu.au/disability
Coordinator:	Dr David Ridout

Contact:	**david.ridout@unimelb.edu.au (mailto:david.ridout@unimelb.edu.au)**
Subject Overview:	Differential equations arise as common models in the physical, mathematical, biological and engineering sciences. This subject covers linear differential equations, both ordinary and partial, using concepts from linear algebra to provide the general structure of solutions for ordinary differential equations and linear systems. The differences between initial value problems and boundary value problems are discussed and eigenvalue problems arising from common classes of partial differential equations are introduced. Laplace transform methods are used to solve dynamical models with discontinuous inputs and the separation of variables method is applied to simple second order partial differential equations. Fourier series are derived and used to represent the solutions of the heat and wave equation and Fourier transforms are introduced. The subject balances basic theory with concrete applications.
Learning Outcomes:	At the completion of this subject, students should be able to # understand the solution structure of linear ordinary differential equations; # appreciate how partial differential equations arise in physical applications; # be able to find exact solutions of simple first and second-order partial differential equations in two variables; # know how eigenfunction and transform methods arise naturally and can be applied in differential equation problems.
Assessment:	Three written assignments due at regular intervals during semester amounting to a total of up to 50 pages (30%), and a 3-hour written examination in the examination period (70%).
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/2016/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2016/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2016/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2016/B-MUS)** 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
Generic Skills:	In addition to learning specific skills that will assist students in their future careers in science, engineering, commerce, education or elsewhere, they will have the opportunity to develop generic skills that will assist them in any future career path. These include # problem-solving skills: the ability to engage with unfamiliar problems and identify relevant strategies; # analytical skills: the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis.
Related Majors/Minors/ Specialisations:	Applied Mathematics Applied Mathematics Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED