

MAST20030 Differential Equations

Credit Points:	12.50																								
Level:	2 (Undergraduate)																								
Dates & Locations:	This subject is not offered in 2014. Lectures and practice classes																								
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 120 hours																								
Prerequisites:	<table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20009 Vector Calculus</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p>plus one of</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST10007 Linear Algebra</td> <td>Summer Term, Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST10008 Accelerated Mathematics 1</td> <td>Semester 1</td> <td>12.50</td> </tr> </tbody> </table> <p>MAST10013 UMEP Maths for High Achieving Students</p> <p>plus one of</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST10006 Calculus 2</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST10009 Accelerated Mathematics 2</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	MAST20009 Vector Calculus	Semester 1, Semester 2	12.50	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	Subject	Study Period Commencement:	Credit Points:	MAST10006 Calculus 2	Semester 1, Semester 2	12.50	MAST10009 Accelerated Mathematics 2	Semester 2	12.50
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Corequisites:	None																								
Recommended Background Knowledge:	None																								
Non Allowed Subjects:	<p>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).</p> <p>Students may only gain credit for one of MAST20030 Differential Equations and MAST20029 Engineering Mathematics.</p>																								
Core Participation Requirements:	<p>For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Students Experiencing Academic Disadvantage Policy, academic requirements for this subject are articulated in the Subject Description, Subject Objectives, Generic Skills and Assessment Requirements of this entry. The University is dedicated to provide support to those with special requirements. Further details on the disability support scheme can be found at the Disability Liaison Unit website: http://www.services.unimelb.edu.au/disability/</p>																								
Contact:	barrydh@unimelb.edu.au (mailto:barrydh@unimelb.edu.au)																								
Subject Overview:	<p>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</p>																								

	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 <ul style="list-style-type: none"> # 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: <ul style="list-style-type: none"> # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2014/B-ARTS) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2014/B-COM) # Bachelor of Environments (https://handbook.unimelb.edu.au/view/2014/B-ENVS) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2014/B-MUS) <p>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.</p>
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 <ul style="list-style-type: none"> # 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 Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED