

# MAST20029 Engineering Mathematics

<b>Credit Points:</b>	12.50																		
<b>Level:</b>	2 (Undergraduate)																		
<b>Dates &amp; Locations:</b>	2011, Parkville This subject commences in the following study period/s: Summer Term, Parkville - Taught on campus. Semester 1, Parkville - Taught on campus. Semester 2, Parkville - Taught on campus. Lectures and practice classes.																		
<b>Time Commitment:</b>	Contact Hours: Summer semester: 6 x 1 hours lectures per week, 2 x one hour practice classes per week. Semester 1 and 2: 3 x one hour lectures per week, 1 x one hour practice class per week Total Time Commitment: Estimated total time commitment of 120 hours																		
<b>Prerequisites:</b>	<p>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> <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 (620-190) UMEP Maths for High Achieving Students</p> <p>Or</p> <p># 431-201 Engineering Analysis A (prior to 2010)</p>	Subject	Study Period Commencement:	Credit Points:	MAST10006 Calculus 2	Semester 1, Semester 2	12.50	MAST10009 Accelerated Mathematics 2	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																	
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																	
<b>Corequisites:</b>	None																		
<b>Recommended Background Knowledge:</b>	None																		
<b>Non Allowed Subjects:</b>	<p>Students may only gain credit for one of</p> <ul style="list-style-type: none"> <li># MAST20029 Engineering Mathematics</li> <li># 620-232 Mathematical Methods (prior to 2010)</li> <li># 620-234 Mathematical Methods Advanced (prior to 2009)</li> <li># 431-202 Engineering Analysis B (prior to 2009)</li> <li># MAST30023 Differential Equations for Engineers</li> </ul> <p>Students who have gained credit for MAST20009 Vector Calculus may not enrol in MAST20029 Engineering Mathematics.</p>																		
<b>Core Participation Requirements:</b>	<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: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a></p>																		

<b>Coordinator:</b>	Assoc Prof Marcus Brazil, Dr Christine Mangelsdorf, Prof Omar Foda
<b>Contact:</b>	Second Year Coordinator <b>Email: <a href="mailto:sycoord@ms.unimelb.edu.au">sycoord@ms.unimelb.edu.au</a> (mailto:sycoord@ms.unimelb.edu.au)</b>
<b>Subject Overview:</b>	<p>This subject introduces important mathematical methods required in engineering such as manipulating vector differential operators, computing multiple integrals and using integral theorems. A range of ordinary and partial differential equations are solved by a variety of methods and their solution behaviour is interpreted. The subject also introduces sequences and series including the concepts of convergence and divergence.</p> <p>Topics include: Vector calculus, including Gauss' and Stokes' Theorems; sequences and series; Fourier series, Laplace transforms; systems of homogeneous ordinary differential equations, including phase plane and linearization for nonlinear systems; second order partial differential equations and separation of variables.</p>
<b>Objectives:</b>	<p>At the completion of this subject, students should be able to</p> <ul style="list-style-type: none"> <li># manipulate vector differential operators</li> <li># determine convergence and divergence of sequences and series</li> <li># solve ordinary differential equations using Laplace transforms</li> <li># sketch phase plane portraits for linear and nonlinear systems of ordinary differential equations</li> <li># represent suitable functions using Fourier series</li> <li># solve second order partial differential equations using separation of variables</li> <li># use MATLAB to perform simple numerical and symbolic calculations</li> </ul>
<b>Assessment:</b>	Two or three written assignments due at regular intervals during semester amounting to a total of up to 40 pages (15%), a 45 minute written test held mid-semester and a 3-hour written examination in the examination period (75%).
<b>Prescribed Texts:</b>	None
<b>Recommended Texts:</b>	E Kreysig, <i>Advanced Engineering Mathematics</i> , Ninth Edition, Wiley, 2006.
<b>Breadth Options:</b>	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-ARTS">https://handbook.unimelb.edu.au/view/2011/B-ARTS</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-COM">https://handbook.unimelb.edu.au/view/2011/B-COM</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-ENVS">https://handbook.unimelb.edu.au/view/2011/B-ENVS</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-MUS">https://handbook.unimelb.edu.au/view/2011/B-MUS</a>)</li> </ul> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<p>In addition to learning specific mathematical skills, students will have the opportunity to develop generic skills that will assist them in any career path. These include:</p> <ul style="list-style-type: none"> <li># problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies;</li> <li># 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;</li> <li># collaborative skills: the ability to work in a team;</li> <li># time-management skills: the ability to meet regular deadlines while balancing competing tasks;</li> <li># computer skills: the ability to use mathematical computing packages.</li> </ul>

<p><b>Notes:</b></p>	<p>Students enrolled in the BSc (new degree only) will receive science credit for the completion of this subject.</p> <p>Note for BSc (new degree) students: This subject is intended only for students pursuing an Engineering Systems major, who do not wish to take any further study in Mathematics and Statistics or Physics. Other students, including those wanting to supplement their Engineering Systems major with further study in Mathematics and Statistics or Physics, should seek advice.</p> <p>Students undertaking this subject are required to regularly use computers with MATLAB installed.</p> <p>Students who have completed MAST20009 Vector Calculus and need to satisfy prerequisites for Engineering Systems majors, should enrol in MAST30023 Differential Equations for Engineers instead of MAST20029 Engineering Mathematics.</p> <p>Please note that Dr Steven Carnie coordinates this subject in Summer Semester and all queries should be directed to him during the Summer Semester.</p>
<p><b>Related Course(s):</b></p>	<p>Bachelor of Science</p>
<p><b>Related Majors/Minors/ Specialisations:</b></p>	<p>B-ENG Chemical Engineering stream                  B-ENG Chemical and Biomolecular Engineering stream                  B-ENG Civil Engineering stream                  B-ENG Electrical Engineering stream                  B-ENG Mechanical Engineering stream                  Civil (Engineering) Systems                  Master of Engineering (Biomedical)                  Master of Engineering (Biomolecular)                  Master of Engineering (Chemical)                  Master of Engineering (Civil)                  Master of Engineering (Electrical)                  Master of Engineering (Environmental)                  Master of Engineering (Mechanical)                  Master of Engineering (Mechatronics)                  Master of Engineering (Structural)                  Physical (Environmental Engineering) Systems                  Science credit subjects* for pre-2008 BSc, BAsC and combined degree science courses</p>