

MAST20029 Engineering Mathematics

Credit Points:	12.50																		
Level:	2 (Undergraduate)																		
Dates & Locations:	This subject is not offered in 2014. Lectures and practice classes.																		
Time Commitment:	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																		
Prerequisites:	<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 UMEP Maths for High Achieving Students</p> <p>Or</p> <p># 431-201 Engineering Analysis A (prior to 2010)</p> <p>Or</p> <p>Enrolment in the Master of Engineering.</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																	
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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																	
Corequisites:	None																		
Recommended Background Knowledge:	None																		
Non Allowed Subjects:	<p>Students may only gain credit for one of</p> <ul style="list-style-type: none"> # MAST20029 Engineering Mathematics # MAST20030 Differential Equations # 620-232 Mathematical Methods (prior to 2010) # MAST30023 Differential Equations for Engineers (prior to 2012) <p>Students who have completed MAST20009 Vector Calculus may not enrol in MAST20029 Engineering Mathematics for credit.</p> <p>Concurrent enrolment in both MAST20029 Engineering Mathematics and MAST20009 Vector Calculus is not permitted.</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:	Second Year Coordinator Email: sycoord@ms.unimelb.edu.au (mailto:sycoord@ms.unimelb.edu.au)
Subject Overview:	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. 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.
Learning Outcomes:	At the completion of this subject, students should be able to <ul style="list-style-type: none"> # manipulate vector differential operators # determine convergence and divergence of sequences and series # solve ordinary differential equations using Laplace transforms # sketch phase plane portraits for linear and nonlinear systems of ordinary differential equations # represent suitable functions using Fourier series # solve second order partial differential equations using separation of variables # use MATLAB to perform simple numerical and symbolic calculations
Assessment:	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 (15%), and a 3-hour written examination in the examination period (70%). Students must pass the assessment during semester to pass the subject. That is, students must obtain a mark of at least 15% out of 30% for the combined assignment and mid semester test mark to pass the subject.
Prescribed Texts:	None
Recommended Texts:	E Kreysig, <i>Advanced Engineering Mathematics</i> , 10th Edition, Wiley, USA 2011.
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 mathematical skills, students will have the opportunity to develop generic skills that will assist them in any career path. These include: <ul style="list-style-type: none"> # problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution 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; # collaborative skills: the ability to work in a team; # time-management skills: the ability to meet regular deadlines while balancing competing tasks; # computer skills: the ability to use mathematical computing packages.

<p>Notes:</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>Related Majors/Minors/ Specialisations:</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 major Environmental Engineering Systems major Environments Discipline subjects Master of Engineering (Biochemical) Master of Engineering (Biomedical) Master of Engineering (Chemical with Business) Master of Engineering (Chemical) Master of Engineering (Civil with Business) Master of Engineering (Civil) Master of Engineering (Electrical with Business) Master of Engineering (Electrical) Master of Engineering (Environmental) Master of Engineering (Mechanical with Business) Master of Engineering (Mechanical) Master of Engineering (Mechatronics) Master of Engineering (Structural) Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED</p>