

MAST20029 Engineering Mathematics

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2010, 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.
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:	One of # 620-155 Calculus 2 (/view/2010/620-155) # 620-158 Accelerated Mathematics 2 (/view/2010/620-158) Plus one of # 620-156 Linear Algebra (/view/2010/620-156) # 620-157 Accelerated Mathematics 1 (/view/2010/620-157) # 620-190 UMEP Maths for High Achieving Students Or # 431-201 Engineering Analysis A (prior to 2010)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of # 620-293 Engineering Mathematics # 620-232 Mathematical Methods (prior to 2010) # 620-234 Mathematical Methods Advanced (prior to 2009) # 431-202 Engineering Analysis B (prior to 2009)
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 participation are encouraged to discuss this with the subject coordinator and the Disability Liaison Unit.
Coordinator:	Dr Christine Mangelsdorf
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; first and second order

	partial differential equations, including characteristics, fans, shocks, D'Alembert's solution and separation of variables.
Objectives:	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 first order partial differential equations using the method of characteristics # solve second order partial differential equations using separation of variables # use Matlab to perform simple numerical and symbolic calculations
Assessment:	Four written assignments due at regular intervals during semester amounting to a total of up to 50 pages (20%), and a 3-hour written examination in the examination period (80%).
Prescribed Texts:	None
Recommended Texts:	E Kreysig, <i>Advanced Engineering Mathematics</i> , Ninth Edition, Wiley, 2006.
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/2010/B-ARTS) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2010/B-COM) # Bachelor of Environments (https://handbook.unimelb.edu.au/view/2010/B-ENVS) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2010/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.
Notes:	Students enrolled in the BSc (new degree only) will receive science credit for the completion of this subject. 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. Students undertaking this subject are required to regularly use computers with Matlab installed.
Related Course(s):	Bachelor of Engineering Bachelor of Science

Related Majors/Minors/ Specialisations:	Bioengineering Systems 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
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