MAST20026 Real Analysis with Applications

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2011, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. Semester 2, Parkville - Taught on campus. Lectures, practice classes and computer laboratory classes.
Time Commitment:	Contact Hours: 3 x one hour lectures per week, 1 x one hour practice class per week, 4 x one-hour computer laboratory classes during semester Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	One of **Subject** | **Study Period Commencement:** | **Credit Points:** MAST10006 Calculus 2 | Semester 1, Semester 2 | 12.50 # 620-143 Applied Mathematics (prior to 2009) 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 (620-190) UMEP Maths for High Achieving Students # 620-122 Mathematics B Advanced (prior to 2008) # 620-142 Mathematics B (prior to 2009) # 620-211 Mathematics 2 Advanced (prior to 2008)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students who gain credit for MAST20026 Real Analysis with Applications may not also gain credit for any of # MAST10009 Accelerated Mathematics 2 # 620-113 Applied Mathematics Advanced Plus (prior to 2008) # 620-123 Applied Mathematics Advanced (prior to 2008) # 620-121 Mathematics A Advanced (prior to 2008) # 620-120 UMEP Maths for High Achieving Students (prior to 2008)
Core Participation Requirements:	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/
Coordinator:	Dr Alexandru Ghitza, Prof Barry Hughes

Contact:	Second Year Coordinator **Email: sycoord@ms.unimelb.edu.au (mailto:sycoord@ms.unimelb.edu.au)**
Subject Overview:	This subject introduces the field of mathematical analysis both with a careful theoretical framework and its application in numerical approximation. A review of number systems; the fundamentals of topology of the real line; continuity and differentiability of functions of one variable; definition and properties of the Riemann integral; sequences and series including the concepts of convergence and divergence, absolute and conditional, and tests for convergence; Taylor's theorem and series representation of elementary functions with application to Fourier series. The subject will introduce methods of proof such as induction and also introduce the use of rigorous numerical approximations.
Objectives:	On completion of this subject students should # Acquire an appreciation of rigour in mathematics, be able to use proof by induction, proof by contradiction, and to use epsilon-delta proofs both as a theoretical tool and a tool of approximation; # Understand the theory and applications of the Riemann integral; # Be able to determine the convergence and divergence of infinite series; # Have a good knowledge of the theory and practice of power series expansions and Taylor polynomial approximations; # Understand the power of analysis to explain the behaviour of simple numerical methods for integration and solution of equations.
Assessment:	Ten to twelve written assignments due at weekly 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:	
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/2011/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2011/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2011/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2011/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, 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 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 commitments.
Notes:	This subject is available for science credit to students enrolled in the BSc (both pre-2008 and new degrees), BASc or a combined BSc course. Students undertaking this subject are required to regularly use computers with the numerical software MATLAB installed.

Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	B-ENG Electrical Engineering stream Science credit subjects* for pre-2008 BSc, BASc and combined degree science courses
Related Breadth Track(s):	Mathematics and Statistics