MAST10012 Introduction to Mathematics

Credit Points:	12.5
Level:	1 (Undergraduate)
Time Commitment:	Contact Hours: 3 x one hour lectures per week, 2 x one hour practice classes per week. Total Time Commitment: Estimated total time commitment of 170 hours
Prerequisites:	Successful completion of VCE Mathematical Methods 1/2 or equivalent - coordinator approval is required
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students with a study score of 25 or more in VCE Mathematical Methods 3/4 or equivalent will not be permitted to enrol in this subject for credit. This subject is not available to students enrolled in the Bachelor of Science.
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:	Ms Elizabeth Bailey
Contact:	First Year Coordinator **Email: fycoord@ms.unimelb.edu.au (mailto:fycoord@ms.unimelb.edu.au)**
Subject Overview:	Students will strengthen and develop algebraic and conceptual skills, building a firm mathematical base for MAST10005 Calculus 1. Fundamental concepts about number systems and set theory will be followed by introductory counting principles and techniques. These will be applied to the laws of probability, leading to the study of discrete and continuous random variables. Basic ideas about functions and their inverses will be introduced using examples such as the logarithmic, exponential and trigonometric functions. Differential and integral calculus will be studied with applications to graph sketching and optimization problems. Students will also learn integration techniques, with applications to areas between curves.
Learning Outcomes:	Students completing this subject should # Understand fundamental concepts of number systems and counting techniques and be able to use logic and set notation; # Understand the concept of a mathematical function, domain, range and inverse function; # Be able to apply transformations and the ideas of sum, difference, product and composite functions to graphing polynomial, exponential, logarithmic and circular functions; # Understand the derivative as a limit and use the product, quotient and chain rules of differentiation with polynomial, circular, exponential and logarithmic functions and apply these techniques to graph sketching and optimisation problems; # Understand the process of integration as anti-differentiation and be able to find definite and indefinite integrals of polynomials, exponential and circular functions with application to calculating the area of a region under a curve and between curves; # Understand the fundamental concepts of probability and be able to calculate probabilities for discrete and continuous random variables, including binomial and normal probabilities.

Assessment:	For Summer term (online): The course is split into two modules (Functions & Calculus and Probability) which need to be taken concurrently. Functions & Calculus will run for the full 6 weeks, Probability for the first 4 weeks. 6 assignments (one per week) with 4 from the Functions & Calculus module and 2 from the Probability module (24%) Written examination (3 hour) at the end of semester 76% For Semester 1: Nine written assignments due at weekly intervals during semester amounting to a total of up to 25 pages (10%), a 50-minute written test held mid-semester (10%), and a 3-hour written examination in the examination period (80%). Students are required to attend at least 16 out of 22 practice classes to be eligible for assessment.
Prescribed Texts:	Summer Term: All materials are available online through the LMS. Semester 1: Lecture notes for MAST10012, Department of Mathematics and Statistics.
Recommended Texts:	M Evans, K Lipson, P Jones and S Avery, *Essential Mathematical Methods 3 & 4 CAS,* Cambridge University Press, 2010
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/2015/B-ARTS)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2015/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2015/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 mathematical skills, students will have the opportunity to develop generic skills that will assist them in any 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 not available for science credit or commerce credit in any course.** This subject is equivalent for pre-requisite purposes to VCE Mathematical Methods 3/4. Students with a score of 25 or more in VCE Mathematical Methods 3/4 will not be permitted to enrol in this subject.
Related Course(s):	Bachelor of Environments
Related Majors/Minors/ Specialisations:	Civil (Engineering) Systems major Engineering Systems Environmental Engineering Systems major Environments Discipline subjects Geomatics (Geomatic Engineering) major Spatial Systems