

MAST20006 Probability for Statistics

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, 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, and 1 x one hour computer laboratory class per week Total Time Commitment: Estimated total time commitment of 120 hours
Prerequisites:	One of <ul style="list-style-type: none"> # 620-155 Calculus 2 (/view/2010/620-155) # 620-158 Accelerated Mathematics 2 (/view/2010/620-158) and one of <ul style="list-style-type: none"> # 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 # 620-159 Data Analysis 1 (/view/2010/620-159) # 620-168 Experimental Design and Data Analysis (/view/2010/620-168) # 620-160 Experimental Design & Data Analysis (prior to 2008) Or One of <ul style="list-style-type: none"> # 620-121 Mathematics A Advanced (prior to 2008) # 620-120 UMEP Maths for High Achieving Students (prior to 2008) # 620-140 Intermediate Mathematics (prior to 2008) # 620-141 Mathematics A (prior to 2008) and one of <ul style="list-style-type: none"> # 620-113 Applied Mathematics Advanced Plus (prior to 2008) # 620-123 Applied Mathematics Advanced (prior to 2008) # 620-143 Applied Mathematics (prior to 2009) # 620-193 Applied Mathematics (prior to 2006) # 620-131 Scientific Programming and Simulation (prior to 2008)
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of <ul style="list-style-type: none"> # 620-201 Probability (/view/2010/620-201) # 620-205 Probability for Statistics # 620-370 Statistics for Mechanical Engineers (/view/2010/620-370) # 431-325 Stochastic Signals and Systems
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 active and safe participation in a subject are encouraged to discuss this with the relevant subject coordinator and the Disability Liaison Unit.

Coordinator:	Dr Guoqi Qian
Contact:	Second Year Coordinator Email: sycoord@ms.unimelb.edu.au (mailto:sycoord@ms.unimelb.edu.au)
Subject Overview:	This subject develops the probability theory that is necessary to understand statistical inference. Properties of probability are reviewed, random variables are introduced, and their properties are developed and illustrated through common univariate probability models. Models for the joint behaviour of random variables are introduced, along with conditional probability and Markov chains. Methods for obtaining the distributions of functions of random variables are considered along with techniques to obtain the exact and approximate distributions of sums of random variables. These methods will be illustrated through some well known normal approximations to discrete distributions and by obtaining the exact and approximate distributions of some commonly used statistics. Computer packages are used for numerical and theoretical calculations but no programming skills are required.
Objectives:	At the completion of the subject, students are expected to: <ul style="list-style-type: none"> # Develop a systematic understanding of probability, random variables, probability distributions and probability models, and their relevance to statistical inference; # Be able to formulate standard probability models from real world applications and critically assess them; # Be able to apply the properties of probability distributions, moment generating functions, variable transformations and conditional expectations to analyse common random variables and probability models; # Be able to use a computer package to perform algebraic and computational tasks in probability analyses.
Assessment:	Five written assignments due at regular intervals during semester amounting to a total of up to 50 pages (20%), a 45-minute computer laboratory test held at the end of semester (10%), and a 3-hour written examination in the examination period (70%).
Prescribed Texts:	Hogg and Tanis, Probability and Statistical Inference. Seventh Edition, Prentice Hall, 2005.
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 skills that will assist students in their future careers in science, they should progressively acquire generic skills from this subject that will assist them in any future 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 commitments. # Become familiar with statistical computing packages.

Notes:	<p>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.</p> <p>Students undertaking Actuarial Studies should take 620-201 Probability (/view/2010/620-201) instead of 620-205 Probability for Statistics.</p> <p>Students undertaking this subject are required to regularly use computers with the computer algebra system Maple and statistics package R installed.</p> <p>Students undertaking this subject are not assumed to have any special computer skills at the beginning. They will learn the basic skills of using Maple in the subject.</p>
Related Course(s):	Bachelor of Science
Related Majors/Minors/ Specialisations:	Environmental Science