MAST20006 Probability for Statistics

Credit Points: 12.5

Level: 2 (Undergraduate)

Dates & Locations:

2016, Parkville

This subject commences in the following study period/s:
Semester 1, Parkville - Taught on campus.

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 170 hours

Prerequisites:

One of

Subject	Study Period Commencement:	Credit Points:
MAST10009 Accelerated Mathematics 2	Semester 2	12.50
MAST10006 Calculus 2	Semester 1, Semester 2	12.50

and 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
MAST10010 Data Analysis 1	Semester 2	12.50
MAST10011 Experimental Design and Data Analysis	Semester 1, Semester 2	12.50

MAST10013 UMEP Maths for High Achieving Students

Corequisites:

None

Recommended Background Knowledge:

None

Non Allowed Subjects:

Students may only gain credit for one of

- MAST20004 Probability
- MAST20006 Probability for Statistics
- MAST30015 Statistics for Mechanical Engineers (prior to 2011)
- ELEN30002 Stochastic Signals and Systems (prior to 2011)

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 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.
Learning Outcomes:	At the completion of the subject, students are expected to: # 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. 8th Edition, Prentice Hall, 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/2016/B-ARTS)** # **Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2016/B-COM)** # **Bachelor of Environments (https://handbook.unimelb.edu.au/view/2016/B-ENVS)** # **Bachelor of Music (https://handbook.unimelb.edu.au/view/2016/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 should progressively acquire generic skills from this subject 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. # Become familiar with statistical computing packages.
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 Actuarial Studies should take MAST20004 Probability instead of MAST20006 Probability for Statistics.

	Students undertaking this subject are required to regularly use computers with the computer algebra system Maple and statistics package R installed. 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.
Related Majors/Minors/ Specialisations:	Applied Mathematics Applied Mathematics Discrete Mathematics / Operations Research Discrete Mathematics / Operations Research Environmental Science major Environments Discipline subjects Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED Statistics / Stochastic Processes Statistics / Stochastic Processes
Related Breadth Track(s):	Accelerated Mathematics Mathematics and Statistics Mathematics for Economics