

620-201 Probability

Credit Points:	12.50
Level:	2 (Undergraduate)
Dates & Locations:	2009, This subject commences in the following study period/s: Semester 1, - Taught on campus. Lectures, practice classes and computer laboratory classes.
Time Commitment:	Contact Hours: 36 one-hour lectures (three per week), 11 one-hour practice classes (one per week); and 11 one-hour computer laboratory classes (one per week) Total Time Commitment: 120 hours total time commitment
Prerequisites:	<p><i>Calculus 2</i> with a grade of H2B or above, plus <i>Linear Algebra</i>;</p> <p>Or</p> <p>One of</p> <ul style="list-style-type: none"> # <i>Accelerated Mathematics 1</i> (620-157 Mathematics 1 prior to 2009); # 620-190 (UMEP Maths for High Achieving Students); <p>plus <i>Accelerated Mathematics 2</i> (620-158 Mathematics 2 prior to 2009);</p> <p>Or</p> <p>One of</p> <ul style="list-style-type: none"> # 620-120 (UMEP Maths for High Achieving Students)(prior to 2008) # 620-121 (prior to 2008) # 620-140 (prior to 2008) # 620-141 (prior to 2008) <p>plus one of</p> <ul style="list-style-type: none"> # 620-113 (prior to 2008) # 620-123 (prior to 2008) # 620-131 (prior to 2008) # 620-143 (prior to 2009) with a grade of H2B or above # 620-193 (prior to 2006) with a grade of H2B or above
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	Students may only gain credit for one of <i>Probability</i> , <i>Probability for Statistics</i> , <i>Statistics for Mechanical Engineers</i> , 431-325.
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:	Prof Konstantin Borovkov
Subject Overview:	This subject offers a thorough grounding in the basic concepts of mathematical probability and probabilistic modelling. Topics covered include random experiments and sample spaces, probability axioms and theorems, discrete and continuous random variables/distributions (including measures of location, spread and shape), expectations and generating functions, independence of random variables and measures of dependence (covariance and correlation), methods for deriving the distributions of transformations of random variables or approximations for them (including the central limit theorem).

	The probability distributions and models discussed in the subject arise frequently in real world applications. These include a number of widely used one- and two-dimensional (particularly the bivariate normal) distributions and also fundamental probability models such as Poisson processes and Markov chains.
Objectives:	<p>After completing this subject students should:</p> <ul style="list-style-type: none"> # have a systematic understanding of the basic concepts of probability space, probability distribution, random variable (including the bivariate case) and expectation # be able to use conditional expectations, generating functions and other basic techniques taught in the subject; # be able to interpret a number of important probabilistic models, including simple random processes such as the Poisson process and finite discrete time Markov chains, and appreciate their relevance to real world problems; # be able to formalize simple real-life situations involving uncertainty in the form of standard probabilistic models and to analyse the latter; # develop understanding of the relevance of the probabilistic models from the subject to the important areas of applications such as statistics and actuarial studies.
Assessment:	Up to 50 pages of written assignments due during semester (20%); a 3-hour written examination in the examination period (80%).
Prescribed Texts:	None
Breadth Options:	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> # Bachelor of Arts (https://handbook.unimelb.edu.au/view/2009/D09) # Bachelor of Commerce (https://handbook.unimelb.edu.au/view/2009/F04) # Bachelor of Environments (https://handbook.unimelb.edu.au/view/2009/A04) # Bachelor of Music (https://handbook.unimelb.edu.au/view/2009/M05) <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:	<p>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:</p> <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.
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 <i>Probability</i> instead of <i>Probability for Statistics</i>.</p> <p>Students undertaking this subject will regularly use computers in weekly computer classes, with all the necessary software installed.</p> <p>Students undertaking this subject are not assumed to have any special computer skills at the beginning.</p>
Related Course(s):	Bachelor of Engineering (Computer Engineering)/Bachelor of Science Bachelor of Engineering (Electrical Engineering)/Bachelor of Science

Related Majors/Minors/ Specialisations:	Economics Major Mathematics & Statistics Major
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