

# MAST30001 Stochastic Modelling

<b>Credit Points:</b>	12.50																		
<b>Level:</b>	3 (Undergraduate)																		
<b>Dates &amp; Locations:</b>	2011, Parkville This subject commences in the following study period/s: Semester 2, Parkville - Taught on campus. Lectures and practice classes.																		
<b>Time Commitment:</b>	Contact Hours: 3 x one hour lectures per week, 1 x one hour practice class per week Total Time Commitment: Estimated total time commitment of 120 hours																		
<b>Prerequisites:</b>	<p>One of</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20026 Real Analysis with Applications</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> <tr> <td>MAST10009 Accelerated Mathematics 2</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p>and one of</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20004 Probability</td> <td>Semester 1</td> <td>12.50</td> </tr> <tr> <td>MAST20006 Probability for Statistics</td> <td>Semester 1</td> <td>12.50</td> </tr> </tbody> </table>	Subject	Study Period Commencement:	Credit Points:	MAST20026 Real Analysis with Applications	Semester 1, Semester 2	12.50	MAST10009 Accelerated Mathematics 2	Semester 2	12.50	Subject	Study Period Commencement:	Credit Points:	MAST20004 Probability	Semester 1	12.50	MAST20006 Probability for Statistics	Semester 1	12.50
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MAST20004 Probability	Semester 1	12.50																	
MAST20006 Probability for Statistics	Semester 1	12.50																	
<b>Corequisites:</b>	None																		
<b>Recommended Background Knowledge:</b>	None																		
<b>Non Allowed Subjects:</b>	None																		
<b>Core Participation Requirements:</b>	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: <a href="http://www.services.unimelb.edu.au/disability/">http://www.services.unimelb.edu.au/disability/</a>																		
<b>Coordinator:</b>	Prof Peter Taylor																		
<b>Contact:</b>	Third Year Coordinator <b>Email: <a href="mailto:tycoord@ms.unimelb.edu.au">tycoord@ms.unimelb.edu.au</a> (mailto:tycoord@ms.unimelb.edu.au)</b>																		
<b>Subject Overview:</b>	<p>Stochastic processes occur in finance as models for asset prices, in telecommunications as models for data traffic, in computational biology as hidden Markov models for gene structure, in chemistry as models for reactions, in manufacturing as models for assembly and inventory processes, in biology as models for the growth and dispersion of plant and animal populations, in speech pathology and speech recognition and many other areas.</p> <p>This course introduces the theory of stochastic processes including Poisson processes, Markov chains in discrete and continuous time, and renewal processes. These processes are illustrated using examples from real-life situations. It then considers in more detail important applications in areas such as queues and networks (the foundation of telecommunication models), finance, and genetics.</p>																		

<b>Objectives:</b>	<p>After completing this subject students should:</p> <ul style="list-style-type: none"> <li># understand the basic concepts of random processes in discrete and continuous time;</li> <li># acquire an appreciation of how randomness and variability in time can be mathematically described using probability theory;</li> <li># be able to build, analyze and simulate basic stochastic models for simple real-life random phenomena evolving in time.</li> </ul>
<b>Assessment:</b>	Two written assignments due mid-semester and at the end of semester amounting to a total of up to 50 pages (20%), and a 3-hour written examination in the examination period (80%).
<b>Prescribed Texts:</b>	K. Borovkov, Elements of Stochastic Modelling. World Scientific, Singapore, 2003.
<b>Breadth Options:</b>	<p>This subject potentially can be taken as a breadth subject component for the following courses:</p> <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-ARTS">https://handbook.unimelb.edu.au/view/2011/B-ARTS</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-COM">https://handbook.unimelb.edu.au/view/2011/B-COM</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-ENVS">https://handbook.unimelb.edu.au/view/2011/B-ENVS</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2011/B-MUS">https://handbook.unimelb.edu.au/view/2011/B-MUS</a>)</li> </ul> <p>You should visit <b>learn more about breadth subjects</b> (<a href="http://breadth.unimelb.edu.au/breadth/info/index.html">http://breadth.unimelb.edu.au/breadth/info/index.html</a>) and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>
<b>Fees Information:</b>	Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>
<b>Generic Skills:</b>	<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"> <li># problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies;</li> <li># 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;</li> <li># collaborative skills: the ability to work in a team;</li> <li># time-management skills: the ability to meet regular deadlines while balancing competing commitments.</li> </ul>
<b>Notes:</b>	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.
<b>Related Course(s):</b>	Bachelor of Science
<b>Related Majors/Minors/Specialisations:</b>	<p>Applied Mathematics (specialisation of Mathematics and Statistics major)          Mathematics and Statistics Major          Operations Research / Discrete Mathematics (specialisation of Mathematics and Statistics major)          Science credit subjects* for pre-2008 BSc, BAsc and combined degree science courses          Statistics / Stochastic Processes (specialisation of Mathematics and Statistics major)</p>