

# MAST30020 Probability and Statistical Inference

<b>Credit Points:</b>	12.50																					
<b>Level:</b>	3 (Undergraduate)																					
<b>Dates &amp; Locations:</b>	This subject is not offered in 2014. 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</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>Plus either</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> </tbody> </table> <p>Or</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20006 Probability for Statistics</td> <td>Semester 1</td> <td>12.50</td> </tr> </tbody> </table> <p>(MAST20006 must have a result grade of H2B or above)</p>	Subject	Study Period Commencement:	Credit Points:	MAST20026 Real Analysis	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	Subject	Study Period Commencement:	Credit Points:	MAST20006 Probability for Statistics	Semester 1	12.50
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<b>Corequisites:</b>	None																					
<b>Recommended Background Knowledge:</b>	None																					
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<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>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>	This subject presents a measure-theoretic approach to probability theory, its fundamental concepts and results. It also demonstrates how the theory relates to the key ideas of mathematical statistics, explaining why one is able to make meaningful statistical inference from data and how to apply probability theory to analysing the properties of statistical procedures.																					

	Topics covered include: probability spaces and random variables, conditional expectations and sufficient statistics, modes of convergence in probability theory, characteristic functions and key limit theorems, large sample theory and analysis of the maximum likelihood estimators.
<b>Learning Outcomes:</b>	On completion of this subject students should: <ul style="list-style-type: none"> <li># Have a systematic understanding of modern probability theory;</li> <li># Have a good knowledge of general conditional expectations, integral transforms and key ideas of different modes of convergence of random variables and distributions;</li> <li># Be able to interpret and apply fundamental concepts of statistical inference, such as sufficiency and efficiency.</li> </ul>
<b>Assessment:</b>	Ten written assignments due at weekly intervals during 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>	None
<b>Recommended Texts:</b>	A.F. Karr, Probability, 1st Ed. Springer, New York, 1993.
<b>Breadth Options:</b>	This subject potentially can be taken as a breadth subject component for the following courses: <ul style="list-style-type: none"> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-COM">https://handbook.unimelb.edu.au/view/2014/B-COM</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-ENVS">https://handbook.unimelb.edu.au/view/2014/B-ENVS</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-MUS">https://handbook.unimelb.edu.au/view/2014/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>	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: <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 Majors/Minors/Specialisations:</b>	Science credit subjects* for pre-2008 BSc, BAsC and combined degree science courses Science-credited subjects - new generation B-SCI and B-ENG. Selective subjects for B-BMED Statistics / Stochastic Processes Statistics / Stochastic Processes Statistics / Stochastic Processes (specialisation of Mathematics and Statistics major)