

# MAST30005 Algebra

<b>Credit Points:</b>	12.50						
<b>Level:</b>	3 (Undergraduate)						
<b>Dates &amp; Locations:</b>	2012, Parkville This subject commences in the following study period/s: Semester 1, 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>	One of <table border="1" style="margin-top: 10px;"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>MAST20022 Group Theory and Linear Algebra</td> <td>Semester 2</td> <td>12.50</td> </tr> </tbody> </table> 620-222 Linear and Abstract Algebra (prior to 2009)	Subject	Study Period Commencement:	Credit Points:	MAST20022 Group Theory and Linear Algebra	Semester 2	12.50
Subject	Study Period Commencement:	Credit Points:					
MAST20022 Group Theory and Linear Algebra	Semester 2	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>	Dr Lawrence Reeves						
<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>	Algebra has a long history of important applications throughout mathematics, science and engineering, and is also studied for its intrinsic beauty. In this subject we study the algebraic laws satisfied by familiar objects such as integers, polynomials and matrices. This abstraction simplifies and unifies our understanding of these structures and enables us to apply our results to interesting new cases. Students will gain further experience with abstract algebraic concepts and methods. General structural results are proved and algorithms developed to determine the invariants they describe.						
<b>Objectives:</b>	On completion of this subject, students should Have an understanding of: <ul style="list-style-type: none"> <li># rings, factorization in rings, principal ideal domains, Euclidean domains;</li> <li># modules, free modules, structure theorem for finitely generated modules over a principal ideal domain;</li> <li># fields, field extensions, finite fields, Galois extensions; splitting fields and the Galois correspondence.</li> </ul> Be able to: <ul style="list-style-type: none"> <li># prove results about rings, modules and fields;</li> <li># apply the Euclidean algorithm in a general context, including polynomials;</li> </ul>						

	<ul style="list-style-type: none"> <li># calculate the Jordan Normal form of a matrix;</li> <li># describe the Galois correspondence for the splitting field of a polynomial.</li> </ul>
<b>Assessment:</b>	Two or three written assignments due at regular 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>	<p>Michael Artin, Algebra, 1st Ed. Prentice Hall, New Jersey, 1991.</p> <p>B. Hartley and T.O. Hawkes, Rings, modules and linear algebra, 1st Ed. Chapman &amp; Hall, London, 1970.</p>
<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/2012/B-ARTS">https://handbook.unimelb.edu.au/view/2012/B-ARTS</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2012/B-COM">https://handbook.unimelb.edu.au/view/2012/B-COM</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2012/B-ENVS">https://handbook.unimelb.edu.au/view/2012/B-ENVS</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2012/B-MUS">https://handbook.unimelb.edu.au/view/2012/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 Majors/Minors/Specialisations:</b>	<p>Pure Mathematics (specialisation of Mathematics and Statistics major)</p> <p>Science credit subjects* for pre-2008 BSc, BAsc and combined degree science courses</p> <p>Science-credited subjects - new generation B-SCI and B-ENG. Core selective subjects for B-BMED.</p>