

## MAST90025 Commutative and Multilinear Algebra

<b>Credit Points:</b>	12.50
<b>Level:</b>	9 (Graduate/Postgraduate)
<b>Dates &amp; Locations:</b>	This subject is not offered in 2011. On-campus
<b>Time Commitment:</b>	Contact Hours: 36 hours comprising 2 one-hour lectures per week and 1 one-hour practice class per week. Total Time Commitment: 3 contact hours plus 7 hours private study per week.
<b>Prerequisites:</b>	None
<b>Corequisites:</b>	None
<b>Recommended Background Knowledge:</b>	It is recommended that students have completed a third year subject in algebra (equivalent to 620-321 Algebra).
<b>Non Allowed Subjects:</b>	None
<b>Core Participation Requirements:</b>	For the purposes of considering requests 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 for 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>	Email: <a href="mailto:jrjg@unimelb.edu.au">jrjg@unimelb.edu.au</a> ( <a href="mailto:jrjg@unimelb.edu.au">mailto:jrjg@unimelb.edu.au</a> )
<b>Subject Overview:</b>	The subject covers aspects of multilinear and commutative algebra as well as two substantial applications. Within multilinear algebra this includes bilinear forms and 'multilinear products' of vector spaces, such as tensor products. Commutative algebra concerns itself with properties of commutative rings, such as polynomial rings and their quotients and to modules over such rings. Both topics have wide application, both to other parts of mathematics and to physics. Much of this theory was developed for applications in geometry and in number theory, and the theorems can be used to cast substantial light on problems from geometry and number theory.
<b>Objectives:</b>	After completing this subject, students should gain: <ul style="list-style-type: none"> <li>- a deeper understanding of the theory of rings, modules and multilinear algebra;</li> <li>- an understanding of the basic concepts of Commutative Algebra such as localisation, Noetherian, associated primes and integral extensions;</li> <li>- an understanding of the basic concepts of Multilinear Algebra such as bilinear forms and tensor, symmetric and exterior powers of algebras;</li> <li>- an understanding of how these basic concepts apply in areas of mathematics other than algebra;</li> <li>- the ability to pursue further studies in this and related areas.</li> </ul>
<b>Assessment:</b>	Up to 60 pages of written assignments (75%: three assignments worth 25% each, due early, mid and late in semester), a two-hour written examination (25%, in the examination period).
<b>Prescribed Texts:</b>	TBA
<b>Recommended Texts:</b>	"Algebra", M. Artin, Prentice Hall, 1991 ; "Advanced Modern Algebra", J. Rotman, Prentice Hall, 2002
<b>Breadth Options:</b>	This subject is not available as a breadth subject.
<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> </ul>

	<ul style="list-style-type: none"><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>Related Course(s):</b>	Master of Science (Mathematics and Statistics)