

MAST90017 Representation Theory

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2010, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus. On-campus.
Time Commitment:	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 and 7 hours private study per week.
Prerequisites:	None.
Corequisites:	None.
Recommended Background Knowledge:	It is recommended that students have completed a third year subject in algebra (equivalent to 620-321 [2008] Algebra).
Non Allowed Subjects:	None.
Core Participation Requirements:	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: http://www.services.unimelb.edu.au/disability/
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Subject Overview:	Symmetries arise in mathematics as groups. Representation Theory is the study of groups via their action on vector spaces. It has important applications in many fields: physics, chemistry, economics, biology and others. This subject provides students with the opportunity to study modules, SL_2 , cyclic and dihedral groups, diagram algebras: Temperley-Lieb, symmetric group and Hecke algebras, Brauer and BMW algebras, compact Lie groups, loop groups, affine Lie algebras and Dynkin diagrams, characters and character formulas, Induction, restriction and tensor products, connections to statistical mechanics, mathematical physics and geometry.
Objectives:	After completing this subject students should be able to: <ul style="list-style-type: none"> - understand the concepts of irreducible representations, indecomposable representations, group algebras, semisimplicity; - understand the concepts of characters, composition series, induction and restriction; - understand how to label representations of small groups and diagram algebras; - describe dimensions and characters of representations of symmetric groups, dihedral groups, and cyclic groups; - describe dimensions and characters of semisimple Lie algebras; - give examples of nonsemisimple algebras and representations. - have the ability to pursue further studies in this and related areas.
Assessment:	Up to 50 pages of written assignments (50%: two assignments worth 25% each, due mid and late in semester), a 3 hour written examination (50%, in the examination period).
Prescribed Texts:	TBA
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Breadth Options:	This subject is not available as a breadth subject.
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees

Generic Skills:	Upon completion of this subject, students should gain the following generic skills: <ul style="list-style-type: none">- Problem-solving skills including the ability to engage with unfamiliar problems and identify relevant solution strategies- Analytical skills through the ability to construct and express logical arguments and to work in abstract or general terms to increase the clarity and efficiency of analysis- Through interactions with other students, the ability to work in a team- Time management skills: the ability to meet regular deadlines while balancing competing commitments
Related Course(s):	Master of Science (Mathematics and Statistics)