MAST90053 Experimental Mathematics

Credit Points:	12.5
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	This subject is not offered in 2015.
Time Commitment:	Contact Hours: 36 hours: One 1-hour lecture per week and one 2-hour practical class per week Total Time Commitment: 170 hours
Prerequisites:	One of the following, or equivalent.

Subject	Study Period Commencement:	Credit Points:
MAST30028 Numerical and Symbolic Mathematics	Semester 2	12.50
MAST30005 Algebra	Semester 1	12.50
MAST30012 Discrete Mathematics	Semester 2	12.50

Corequisites:	None
Recommended Background Knowledge:	It is recommended that students have completed the following, or a similar subject.

Subject	Study Period Commencement:	Credit Points:
MAST30028 Numerical and Symbolic Mathematics	Semester 2	12.50

Non Allowed Subjects:	None
Core Participation Requirements:	Students will be expected to carry out computational experiments using symbolic packages.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/
Contact:	Coordinator: Assoc Prof Jan De Gier Email: **jdgier@unimelb.edu.au (mailto:jdgier@unimelb.edu.au)**
Subject Overview:	Modern computers have developed far beyond being great devices for numerical simulations or tedious but straightforward algebra; and in 1990 the first mathematical research paper was published whose sole author was a thinking machine known as Shalosh B Ekhad. This course will discuss some of the great advances made in using computers to purely algorithmically discover (and prove!) nontrivial mathematical theorems in for example Number Theory and Algebraic Combinatorics. Topics include: Automated hypergeometric summation, Groebner basis, Chaos theory, Number guessing, Recurrence relations, BBP formulas.
Learning Outcomes:	After completing this subject, students will: # have been introduced to non-numerical symbolic computation packages used in modern research in the areas of discrete mathematics and number theory; # acquire insight into the use of computers for discovering and formally proving mathematical theorems; # gain the ability to pursue further studies in this and related areas.

Assessment:	Up to 40 pages of written assignments (30%: two assignments worth 15% each, due mid and late in semester), a take home exam (70%, in the examination period).
Prescribed Texts:	None
Recommended Texts:	M. Petkovsek, H. Wilf and D. Zeilberger, A=B
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:	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: # problem-solving skills: the ability to engage with unfamiliar problems and identify relevant solution strategies; # 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; # collaborative skills: 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 Philosophy - Engineering Master of Science (Mathematics and Statistics) Ph.D.- Engineering
Related Majors/Minors/ Specialisations:	Mathematics and Statistics