MC-SCIMAT Master of Science (Mathematics and Statistics)

Year and Campus:	2016 - Parkville
CRICOS Code:	062189B
Fees Information:	Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees
Level:	Graduate/Postgraduate
Duration & Credit Points:	200 credit points taken over 24 months full time. This course is available as full or part time.
Coordinator:	Professor Aihua Xia Email: aihuaxia@unimelb.edu.au
Contact:	Currently enrolled students: # General information: **https://ask.unimelb.edu.au (https://ask.unimelb.edu.au)** # **Contact Stop 1 (http://students.unimelb.edu.au/stop1)** Future students: # Further information: **http://science.unimelb.edu.au/ (http://science.unimelb.edu.au/)**
Course Overview:	The Master of Science (Mathematics and Statistics) is a coursework masters degree incorporating a substantial research project. The Master of Science gives students the opportunity to undertake a substantive research project in a field of choice as well as a broad range of coursework subjects including a professional skills component, as a pathway to PhD study or to the workforce.
Learning Outcomes:	After completing this course students should have: # discovered the challenge of research in Mathematics and Statistics; # a deeper knowledge of Mathematics and Statistics; # completed a substantial piece of research; and # a sound preparation for future research in Mathematics or Statistics.
Course Structure & Available Subjects:	Students must complete a total of 200 pts comprising: # Discipline subjects (137.5 points); # Professional Skills Subject (12.5 points); # Research Project Component (50 points or in special cases, with approval of the MSc program coordinator, 25 points with an additional 25 points of Masters level Mathematics and Statistics discipline subjects).
Subject Options:	Students must select a specialisation from one of the following: # Applied Mathematics and Mathematical Physics # Discrete Mathematics and Operations Research # Pure Mathematics # Statistics and Stochastic Processes -

Subjects to be taken from the student's specialisation

Applied Mathematics and Mathematical Physics Specialisation

Students must take two compulsory specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90067 Advanced Methods: Transforms	Semester 1	12.5

MAST90064 Advanced Methods: Differential Equations	Not offered 2016	12.5

Students must select three elective specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90103 Random Matrix Theory	Semester 1	12.5
MAST90026 Computational Differential Equations	Semester 1	12.5
MAST90011 Mathematical Biology	Semester 2	12.5
MAST90069 Introduction to String Theory	Semester 2	12.5
MAST90060 Mathematical Statistical Mechanics	Not offered 2016	12.5
MAST90065 Exactly Solvable Models	Not offered 2016	12.5
MAST90080 Advanced Modelling: Case Studies	Not offered 2016	12.5

Discrete Mathematics and Operations Research Specialisation

Students must take two compulsory specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90030 Advanced Discrete Mathematics	Semester 2	12.50
MAST90014 Optimisation for Industry	Semester 1	12.50

Students must select three elective specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90098 Approximation Algorithms and Heuristics	Semester 2	12.5
MAST90050 Scheduling and Optimisation	Not offered 2016	12.50
MAST90098 Approximation Algorithms and Heuristics	Semester 2	12.5
MAST90013 Network Optimisation	Not offered 2016	12.5
MAST90031 Enumerative Combinatorics	Not offered 2016	12.5
MAST90053 Experimental Mathematics	Semester 1	12.5

Pure Mathematics Specialisation

Students must take two compulsory specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90012 Measure Theory	Not offered 2016	12.5
MAST90023 Algebraic Topology	Semester 1	12.5

Students must select three elective specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90097 Algebraic Geometry	Semester 2	12.5
MAST90025 Commutative and Multilinear Algebra	Semester 1	12.5

MAST90068 Groups, Categories & Homological Algebra	Semester 2	12.5
MAST90020 Functional Analysis	Semester 2	12.5
MAST90017 Representation Theory	Not offered 2016	12.5
MAST90029 Differential Topology and Geometry	Not offered 2016	12.5
MAST90056 Riemann Surfaces and Complex Analysis	Not offered 2016	12.5

Statistics and Stochastic Processes Specialisation

Students must take two compulsory specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90082 Mathematical Statistics	Semester 1	12.50
MAST90019 Random Processes	Semester 2	12.50

Students must select three elective specialisation subjects:

Subject	Study Period Commencement:	Credit Points:
MAST90059 Stochastic Calculus with Applications	Not offered 2016	12.5
MAST90085 Multivariate Statistical Techniques	Not offered 2016	12.5
MAST90083 Computational Statistics and Data Mining	Not offered 2016	12.5
MAST90081 Advanced Probability	Semester 1	12.5
MAST90084 Statistical Modelling	Semester 1	12.5
MAST90027 The Practice of Statistics	Semester 2	12.5
MAST90051 Mathematics of Risk	Semester 2	12.5

Further Discipline subjects

Students must also select:

- Two subjects (25 points) from a single specialisation different to their selected specialisation; and

- **Four subjects (50 points) from any of the specialisations (including up to two approved Masters level subjects from other departments (../../view/current/%21MC-SCIMAT-MIN%2B1000)).**

Up to two of these subjects can be replaced with approved undergraduate subjects. Where it is necessary for the student to acquire the required knowledge for Masters level Mathematics & Statistics discipline subjects, up to two further Masters level subjects can be replaced with approved undergraduate subjects.

Professional Skills

Students must take:

Subject	Study Period Commencement:	Credit Points:
MAST90045 Systems Modelling and Simulation	Semester 1	12.50

*Students who have completed one of the introductory programming subjects MAST30028, COMP10001, COMP10002, COMP20005, INFO10001, 615-145, 433-151, 433-171, or 600-151, are not required to take this subject. Students who have also completed one of the introductory probability subjects MAST20004, MAST20006, 620-201, or 620-205, or who have completed

620-131, must obtain the permission of the MSc co-ordinator to enrol in this subject. Students not taking MAST90045 Systems Modelling and Simulation as part of their masters program must complete an additional 12.5 point masters-level discipline Mathematics and Statistics subject in its place.

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Research Project - 50 points

A typical course structure for full time students

Full time students are advised to structure their enrolments as follows:

Semester 1 -- 50.0 points of coursework and no research project.
Semester 2 -- 37.5 points of coursework and Research Project Part A (12.5 points).
Semester 3 -- 37.5 points of coursework and Research Project Part B (12.5 points).
Semester 4 -- 25.0 points of coursework and Research Project Part C (25 points).

Other structures that are suitable for part time study, or for students who enroll with credit from earlier degrees, can be negotiated with the student's supervisor and the departmental MSc program coordinator.

Research Project Component

The first semester of study is meant for coursework only. During the first semester, students should finalize their choice of research project supervisor and research topic.

The research project should be conducted in three consecutive semesters. Typically, work on the project, including associated thesis and presentation, starts at the beginning of the second semester of study and is conducted in 60 of the next 66 weeks. An indicative total time commitment of 800 hours for the duration of the project is expected.

The assessment requirements below are applicable to the entire 50 point Research Project.

A preliminary literature survey and research plan (of 2 pages) is due at the end of week eight of Research Project Part A (hurdle; pass/fail).
An intermediate report on the progress in the research project (of 2 pages) is due at the end of week eight of Research Project Part B (hurdle; pass/fail).
A thesis (90% of assessment) is the main requirement due after the full 50 points of enrolment in the research project component, Theses are expected to be 40-60 pages in length, excluding references, appendices, figures and tables. Two bound hard copies of the thesis are to be submitted two weeks prior to the end of the teaching period in the final semester of Research project enrolment;
students will have to give 30 minute presentations (10% of assessment) on their research projects in the last week of that teaching period, on a date to be announced by the Department of Mathematics and Statistics at the beginning of semester.

Leave of absence during enrolment in a research project and outside of university holidays requires the approval of the student’s supervisor.

Under special circumstances, with the permission of the program coordinator, students may be allowed to complete two 25 point research projects in lieu of a single 50 point project.

Subject	Study Period Commencement:	Credit Points:
MAST90075 Research Project Part A	Semester 1, Semester 2	12.50
MAST90076 Research Project Part B	Semester 1, Semester 2	12.50
MAST90077 Research Project Part C	Semester 1, Semester 2	25

Research Project - 25 points

A typical course structure for full time students

Full time students are advised to structure their enrolments as follows:

Semester 1 -- 50.0 points of coursework and no research project.
Semester 2 -- 50.0 points of coursework and no research project.
Semester 3 -- 37.5 points of coursework and Minor Research Project Part A (12.5 points).
Semester 4 -- 37.5 points of coursework and Minor Research Project Part B (12.5 points).

Other structures that are suitable for part time study, or for students who enroll with credit from earlier degrees, can be negotiated with the student's supervisor and the departmental MSc program coordinator.

Research Project Component

The research project starts at the beginning of the third semester of study. Typically, work on the project, including associated thesis and presentation, should be conducted in 40 of the next 44 weeks.
An indicative total time commitment of 400 hours for the duration of the project is expected. Leave of absence during enrolment in a research project and outside of university holidays requires the approval of the student's supervisor.

Two bound hardcopies of the research thesis are to be submitted two weeks prior to the end of the teaching period in the final semester of research project enrolment, being the forth semester of study. The students will have to give presentations on their research projects in the last week of that teaching period, on a date to be announced by the Department of Mathematics and Statistics at the beginning of that semester.

Subject	Study Period Commencement:	Credit Points:
MAST90073 Minor Research Project Part A	Semester 1, Semester 2	12.50
MAST90074 Minor Research Project Part B	Semester 1, Semester 2	12.50

Students completing this option will be required to select a further 25 points of coursework subjects from the relevant specialisation.

Entry Requirements:

In order to be considered for entry, applicants must have completed:

• an undergraduate degree in a discipline appropriate to the stream of the Master of Science into which entry is sought, with a weighted average mark of at least H3 (65%) in the best 50 points in appropriate discipline studies at third year; and

• appropriate prerequisite studies for the stream into which entry is sought

For stream specific requirements please **click here (http://science.unimelb.edu.au/available-stream-requirements)** .

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Meeting these requirements does not guarantee selection.

In ranking applications, the Selection Committee will consider prior academic performance.

The Selection Committee may seek further information to clarify any aspect of an application in accordance with the Academic Board **rules (http://about.unimelb.edu.au/academicboard/resolutions)** on the use of selection instruments.

Applicants are required to satisfy the university's **English language requirements for postgraduate courses (http://www.policy.unimelb.edu.au/schedules/MPF1035-ScheduleA.pdf)** . For those applicants seeking to meet these requirements by one of the standard tests approved by the Academic Board, performance band 6.5 is required.

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Notes:

• Quotas may be applied to the degree as a whole, or to an individual stream, and preference may be given to applicants with evidence of appropriate preparation or potential to undertake research.

• Entry into a stream of the Master of Science is subject to the capacity of the department(s) or schools(s) offering the program stream to provide adequate supervision in a research project appropriate to the interests and preparation of the individual student and may be subject to the agreement of a member of academic staff to supervise the project module.

Core Participation Requirements:

The Master of Science (Mathematics and Statistics) welcomes applications from students with disabilities. It is University and degree policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the degree. The Master of Science (Mathematics and Statistics) requires the following for all enrolled students: (1) the ability to comprehend complex science and technology related information; (2) the ability to clearly and independently

	communicate knowledge and application of science, and technology principles and practices during assessment tasks; (3) the ability to spend significant time behind a computer screen. Students must possess behavioural and social attributes that enable them to participate in a complex learning environment. Students are required to take responsibility for their own participation and learning. They also contribute to the learning of other students in collaborative learning environments, demonstrating interpersonal skills and an understanding of the needs of other students. Assessment may include the outcomes of tasks completed in collaboration with other students. There may be additional inherent academic requirements for some subjects, and these requirements are listed within the description of the requirements for each of these subjects. Students who feel their disability will impact on meeting this requirement are encouraged to discuss this matter with the relevant Subject Coordinator and the Disability Liaison Unit: http://www.services.unimelb.edu.au/disability/
Further Study:	The Master of Science offers a pathway to a PhD.
Graduate Attributes:	Graduates will: have the ability to demonstrate advanced independent critical enquiry, analysis and reflection; have a strong sense of intellectual integrity and the ethics of scholarship; have in-depth knowledge of their specialist discipline(s); reach a high level of achievement in writing, research or project activities, problem-solving and communication; be critical and creative thinkers, with an aptitude for continued self-directed learning; be able to examine critically, synthesise and evaluate knowledge across a broad range of disciplines; have a set of flexible and transferable skills for different types of employment; and be able to initiate and implement constructive change in their communities, including professions and workplaces.
Links to further information:	http://science.unimelb.edu.au/