

■ **MA518 LINEAR PROGRAMMING AND GAME THEORY**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths)

This unit aims to offer students from diverse backgrounds an introduction to the use of elementary mathematical methods in finding optimal choices in business, industry, economics, medicine, social sciences, behavioural sciences, and biological sciences. It will present and explore some of the ideas and problems in the areas of game strategies and optimisation through a geometric approach to linear programming, matrix algebra, game theory and the Simplex Method for linear programming.

■ **MA550 UPON THE SHOULDERS OF GIANTS (INTRODUCTORY LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths)

EXCLUSION MA650

This unit is aimed at a broad audience interested in the development of mathematical thought through a guided investigation of the history of mathematics. Concepts will be introduced in cultural and historical contexts. Students will gain an appreciation of the fundamental mathematical themes that have emerged during the past 3000 years. Practical application of some more elementary concepts of number theory, algebra, geometry and functions will be taught. The unit would be particularly valuable to prospective teachers of mathematics at primary and secondary level and to students interested in improving their understanding of basic mathematical principles and techniques.

■ **MA551 MODELLING AND CHANGE (INTRODUCTORY LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths), or MA550

EXCLUSION MA651

This unit is aimed at a broad audience interested in solving real world problems. The main focus will be on learning and applying standard calculus techniques to model motion, growth and change. Problems considered will include analysis of velocity and acceleration for vehicles and athletes, growth and decline of populations under different environmental constraints and aspects of marginal costs for business. The unit will be particularly valuable to science students, prospective secondary school mathematics teachers and any student interested in improving their understanding of these commonly encountered areas of applied mathematics.

■ **MA552 BITS BYTES & ALGORITHMS (INTRODUCTORY LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths), or MA550

EXCLUSION MA652

This unit is aimed at a broad audience interested in developing their understanding of the mathematical concepts underlying electronic computing. Topics include the representation and manipulation of numbers and symbols, the mathematical structures which underlie the storage of information, and the algorithms or sets of instructions which underlie computer software programs. Note that whilst this unit addresses the logical principles of algorithm design, it does not involve writing computer programs as such.

■ **MA553 PROFIT LOSS AND GAMBLING (INTRODUCTORY LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths), or MA550

EXCLUSION MA653

This unit is recommended for students from any field of study interested in gambling and investment. Through the investigation of popular gambling games, such as Lotto, Keno, casino games, and gaming machines, students will be introduced to the concepts of probability. Financial mathematics will also be covered to deal with common problems encountered in everyday financial decisions. This unit will be valuable to both primary and high school teachers interested in teaching with real-life illustrations.

■ **MA558 TOPICS IN MATHEMATICS (INTRODUCTORY LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths)

EXCLUSION Nil

The principal objective is to enable students to study an area that is not covered in the students' course. The unit may be taught by associate staff or visiting lecturers. Specific objectives will depend on the topic and staffing. The unit will be offered only when the staff is available and there is an established high level of interest from sufficient students.

**■ MA559 SPACE, SHAPE AND DESIGN
(INTRODUCTORY LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE Year 11 Mathematics or equivalent (excluding Foundation Maths), or MA550
EXCLUSION MA659

This unit is aimed at a broad audience interested in studying the patterns and order evident in the shapes of nature and the spatial design of art, architecture and industry. It will provide students with some experience of the thinking and techniques necessary to establish evidence of general patterns and calculations related to spatial measurement and design. Activities will be as diverse as: constructing 3D shapes, analysing art and architecture, working out fencing lines for land subdivisions, finding paths to fit constraints and analysing optimum shapes for industrial designs. This unit will be particularly valuable to prospective teachers and other students interested in improving their understanding of 2-D and 3-D shapes.

**■ MA650 UPON THE SHOULDERS OF GIANTS
(INTERMEDIATE LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE At least one introductory level mathematics unit, or equivalent.
EXCLUSION MA550

This unit forms part of a general sequence of mathematics units, and will be taught at an intermediate level. It is aimed at a selected audience interested in the development of mathematical thought through a guided investigation of the history of mathematics. Concepts will be introduced in cultural and historical contexts. Students will gain an appreciation of the fundamental mathematical themes that have emerged during the past 3000 year. Practical application of some concepts of number theory, algebra, geometry and functions will be taught. The unit will be particularly valuable to prospective teachers of mathematics at primary and secondary level and to students interested in advancing their understanding of basic mathematical principles and techniques.

**■ MA651 MODELLING AND CHANGE
(INTERMEDIATE LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE At least one introductory level mathematics unit or equivalent
EXCLUSION MA551

This unit forms part of a general sequence of mathematics units, and will be taught at an intermediate level. It is aimed at an audience who have a sound mathematical background and are interested in solving real world problems. The main focus will be on learning and applying both basic and advanced calculus techniques to model motion, growth and change. We will also consider problems requiring differential equations, optimisation techniques and calculation of area and volume. The unit will be particularly valuable to science students, prospective senior secondary school mathematics teachers and any student interested in improving their understanding of these commonly encountered areas of applied mathematics.

**■ MA652 BITS BYTES & ALGORITHMS
(INTERMEDIATE LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE At least one introductory level mathematics unit or equivalent
EXCLUSION MA552

This unit is aimed at a broad audience interested in developing their understanding of the mathematical concepts underlying electronic computing, and will be taught at an intermediate level. Topics include the representation and manipulation of numbers and symbols, the mathematical structures which underlie the storage of information, and the algorithms or sets of instructions which underlie computer software programs. Note that whilst this unit addresses the logical principles of algorithm design, it does not involve writing computer programs as such.

**■ MA653 PROFIT LOSS AND GAMBLING
(INTERMEDIATE LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE At least one introductory level mathematics unit or equivalent
EXCLUSION MA553

This unit forms part of a general sequence of mathematics units, and will be taught at an intermediate level. Through the investigation of popular gambling games, such as Lotto, Keno, casino games, and gaming machines, students will be introduced to the concepts of probability. Common gambling fallacies and misconceptions will also be investigated. A wide variety of statistical distributions and simulations are used to examine important probability concepts. Financial mathematics will also be covered to deal with common problems encountered in everyday financial decisions. This unit will be valuable to both primary and high school teachers interested in teaching with real-life illustrations.

**■ MA655 LOGIC AND IMAGINATION
(INTERMEDIATE LEVEL)**

CREDIT POINTS 15
OFFERED Semester 1 or 2
PREREQUISITE At least one introductory level mathematics unit or equivalent
EXCLUSION MA755

This unit forms part of a general sequence of mathematics units, and will be taught at an intermediate level. It is aimed at students who are interested in the role of both logic and imagination in mathematics. Content includes mathematical reasoning and proof, aspects of number theory, graph theory, combinatorics and topology. The unit would be particularly valuable to prospective teachers of mathematics at primary and secondary level and to students interested in improving their understanding of basic mathematical principles and techniques. In the latter case this unit can be used by students interested in pursuing more advanced mathematical units, particularly in the areas of Computing, Applied Science and Human Movement and Sports Science courses.

■ **MA656 MODELLING REALITY (INTERMEDIATE LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE MA551 or MA651
 EXCLUSION MA756

This unit forms part of a general sequence of mathematics units, and will be taught at an intermediate level. It is aimed at students who have successfully completed either MA551 or MA651. The focus will be on applying a range of mathematical techniques to model real world problems. These techniques will include numerical methods, multivariate calculus, linear algebra and interpolation. It will build upon the concepts and techniques developed in modelling and change.

■ **MA658 TOPICS IN MATHEMATICS (INTERMEDIATE LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE At least one introductory level mathematics unit or equivalent

The principal objective is to enable students to study an area that is not covered in the students' course. The unit may be taught by associate staff or visiting lecturers. Specific objectives will depend on the topic and staffing. The unit will be offered only when the staff is available and there is an established high level of interest from sufficient students.

■ **MA659 SPACE, SHAPE AND DESIGN (INTERMEDIATE LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE At least one introductory level mathematics unit or equivalent
 EXCLUSION MA559

This unit is aimed at a broad audience with experience in the use of symbols and mathematical language, who are interested in studying the patterns and order evident in nature and the spatial design of art, architecture and industry. It will provide students with some experience of the thinking and techniques necessary to establish evidence of general patterns and calculations related to spatial measurement and design. This unit will cover a broader range of topics than MA554 and include further experience of the formal use of mathematics to solve spatial problems. This unit will be particularly valuable to prospective teachers of mathematics at both primary and secondary level and to other students interested in developing a broad understanding of 2-D and 3-D shapes.

■ **MA755 LOGIC AND IMAGINATION (ADVANCED LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE At least one intermediate level mathematics unit or equivalent
 EXCLUSION MA655

This unit forms part of a general sequence of mathematics units, and will be taught at an advanced level. It is aimed at students who are interested in the role of both logic and imagination in mathematics. Content includes mathematical reasoning and proof, aspects of number theory, graph theory, combinatorics and topology. The unit would be particularly valuable to prospective teachers of mathematics at primary and secondary level and to students interested in improving their understanding of basic mathematical principles and techniques. In the latter case this unit can be used by students interested in pursuing more advanced mathematical units, particularly in the areas of Computing, Applied Science and Human Movement and Sports Science courses.

■ **MA756 MODELLING REALITY (ADVANCED LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE MA551 or MA651
 EXCLUSION MA656

This unit forms part of a general sequence of mathematics units, and will be taught at an advanced level. It is aimed at students who have successfully completed either MA551 or MA651. The focus will be on applying a range of mathematical techniques to model real world problems. These techniques will include numerical methods, multivariate calculus, linear algebra and interpolation. It will build upon the concepts and techniques developed in modelling and change.

■ **MA758 TOPICS IN MATHEMATICS (ADVANCED LEVEL)**

CREDIT POINTS 15
 OFFERED Semester 1 or 2
 PREREQUISITE At least one intermediate level mathematics unit or equivalent

The principal objective is to enable students to study an area that is not covered in the students' course. The unit may be taught by associate staff or visiting lecturers. Specific objectives will depend on the topic and staffing. The unit will be offered only when the staff is available and there is an established high level of interest from sufficient students.

■ **MB521 BUSINESS STATISTICS**

CREDIT POINTS 15
 OFFERED Semester 2

This unit covers simple and compound interest, time value of money, annuities, present and future values, data classification and terminology, describing and displaying data, probability and probability distributions, estimation and hypothesis testing, linear regression and correlation, index numbers and time series, computer analysis of data using MINITAB and EXCEL.

■ **MG410 STATISTICAL METHODS IN HSE**

CREDIT POINTS 10
OFFERED Block

This unit is designed specifically to introduce students to statistics in the context of occupational hazard management. Content of the unit includes organisation and display of data; summary measures of location, dispersion, correlation and trend; an introduction to statistical analysis software; an introduction to statistical inference; hypothesis testing; and an overview of more advanced inference techniques.

■ **MR811 ADVANCED STATISTICAL RESEARCH METHODOLOGY**

CREDIT POINTS 20
OFFERED Semester 1
PREREQUISITE A substantial first course in Statistics.

This unit is designed for students enrolled in honours level courses in areas which require substantial statistical expertise. It is designed to provide theoretical and practical knowledge in advanced experimental design and multivariate statistics.

■ **MR816 ADVANCED STATISTICAL RESEARCH METHODS**

CREDIT POINTS 20
OFFERED Semester 1
PREREQUISITE A substantial first course in Statistics.

This unit is designed to provide theoretical and practical knowledge in advanced experimental design and multivariate statistics, through an individually tailored program which may involve some coursework, as well as individual and/or group discussions with the lecturer on topics such as research design, data entry, methods of analysis, and interpretation of results from statistical packages.

■ **MR817 STATISTICAL RESEARCH METHODS**

CREDIT POINTS 20
OFFERED Semesters 1 & 2
(2 semesters)
PREREQUISITE A substantial first course in Statistics.

The course is designed to provide theoretical and practical knowledge in advanced experimental design and multivariate statistics, through an individually tailored program which may involve some coursework, as well as individual and/or group discussions with the lecturer on topics such as research design, data entry, methods of analysis, and interpretation of results from statistical packages.

■ **MR818 STATISTICAL RESEARCH METHODS**

CREDIT POINTS 15
OFFERED Semester 1 & 2
PREREQUISITE MS501 or equivalent

This unit is designed to provide theoretical and practical knowledge in advanced experimental design and multivariate statistics, through an individually tailored program which may involve some coursework, as well as individual and/or group discussions with the lecturer on topics such as research design, data entry, methods of analysis, and interpretation of results from statistical packages.

■ **MR819 STATISTICAL RESEARCH METHODS**

CREDIT POINTS 15
OFFERED Semesters 1 & 2
(2 semesters)

PREREQUISITE MS501 or equivalent

The course is designed to provide theoretical and practical knowledge in advanced experimental design and multivariate statistics, through an individually tailored program which may involve some coursework, as well as individual and/or group discussions with the lecturer on topics such as research design, data entry, methods of analysis, and interpretation of results from statistical packages.

■ **MR825 QUANTITATIVE RESEARCH SEMINARS**

CREDIT POINTS 10
OFFERED Semester 2
PREREQUISITE MR811

This unit is designed to provide research support for postgraduate students through individual and group discussions with the lecturer on topics such as research design, data entry, methods of analysis, and interpretation of results from statistical packages.

■ **MS401 BASIC STATISTICS FOR PROCESS MANAGEMENT**

CREDIT POINTS 15
OFFERED Semester 1 & 2, & block

This unit introduces students to appropriate descriptive statistical techniques as they apply in industrial settings, and also introduces the key concepts underlying statistical inference. A limited range of basic inferential techniques is introduced. Data specific to a variety of manufacturing processes is utilised, with a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS402 STATISTICAL PROCESS DESIGN AND CAPABILITY**

CREDIT POINTS 15
OFFERED Semester 1 or 2, & block
PREREQUISITE MS401 or equivalent

This unit introduces students to appropriate statistical techniques used to identify, analyse and interpret the relationships between key process input variables and key process output variables as they apply in manufacturing processes. A limited range of experimental design techniques are introduced, as well as methods enabling students to establish accuracy and precision of metrology systems. Case specific data will be utilised, with a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS403 STATISTICAL PROCESS CONTROL AND EVALUATION**

CREDIT POINTS 10
OFFERED Semester 1 or 2, & block
PREREQUISITE MS402

This unit introduces students to appropriate statistical techniques as they apply in industrial settings, with an emphasis upon the key concepts underlying process control, evaluation and management. Data specific to a variety of manufacturing processes is utilised, with computing skills, interpretation of computer output and communication of statistical results and conclusions strongly emphasised.

■ **MS404 STATISTICAL PROCESS MANAGEMENT WORKPLACE PROJECT**

CREDIT POINTS 20
OFFERED Semester 1 or 2, & block
PREREQUISITE MS403

This unit consists of an investigative report on a specific manufacturing process identified in consultation with the lecturer and appropriate personnel from the company concerned.

■ **MS501 STATISTICAL METHODS**

CREDIT POINTS 15
OFFERED Semesters 1 & 2

This unit introduces students to the full range of descriptive statistical techniques, and also introduces the key concepts underlying statistical inference. A wide range of basic inferential techniques are introduced. Data from various disciplinary contexts is utilised, and there is a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS502 SAMPLING & SAMPLE SURVEYS**

CREDIT POINTS 15
OFFERED Semester 2
PREREQUISITE MS501 or equivalent

This unit introduces the key concepts underlying a range of sample survey designs, and the design of questionnaires and other instruments. Data from various disciplinary contexts is utilised, and there is a strong emphasis on data management and computer analysis of sample survey data, and on the interpretation of computer output and communication of statistical results and conclusions.

■ **MS521 STATISTICS FOR NURSING RESEARCH**

CREDIT POINTS 15
OFFERED Semester 2

This is the first of two units that introduce nurses to research. This unit orientates nurses to applied statistics. It aims to provide students with sufficient statistical knowledge to appreciate and interpret routine statistical analyses of data in the nursing context and to confidently read the results of quantitative research in the field of nursing and health care.

■ **MS601 EXPERIMENTAL DESIGN & ANALYSIS**

CREDIT POINTS 15
OFFERED Semester 1
PREREQUISITE MS501 or equivalent

This unit introduces the key concepts underlying the design and analysis of statistical experiments. A range of experimental designs is considered. Data from various disciplinary contexts is utilised, and there is a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS602 STATISTICS FOR PREDICTION**

CREDIT POINTS 15
OFFERED Semester 2
PREREQUISITE MS501 or equivalent

This unit introduces the two main themes of predictive statistical analysis - regression and time series methods. Data from various disciplinary contexts is utilised, and there is a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS703 MULTIVARIATE ANALYSIS**

CREDIT POINTS 15
OFFERED Semester 1
PREREQUISITE MS501 or equivalent

This unit provides a theoretical framework and practical skills in advanced experimental design and a range of multivariate statistical analysis techniques. Data from various disciplinary contexts is utilised, and there is a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

■ **MS704 CATEGORICAL DATA ANALYSIS AND STATISTICAL CONSULTING**

CREDIT POINTS 15
OFFERED Semester 2
PREREQUISITES MS501, MS502, MS601, MS602 and MS703

This unit provides a theoretical framework and practical skills in multivariate statistical analysis, in the particular areas of classification and the analysis of categorical data. It also provides an introduction to the activity of statistical consulting in a range of disciplinary contexts, and an overview of the entire range of statistical techniques covered in the applied statistics sequence.