

# MATHEMATICS (MATH)

## MATH 0002 Foundations of Mathematics (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0002/>) **Legacy Code:** 900055

Foundations of Mathematics is designed to develop knowledge, understanding and skills in Mathematics to a level, which is appropriate for day-to-day life and also as a basis for further study at university entrance level. The course aims to build on existing skills, develop skills in new areas and encourage students' confidence in their own ability.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0003 Introductory Business Mathematics (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0003/>) **Legacy Code:** 900114

This subject consists of two modules. The first module has been designed to provide a revision of basic mathematical concepts and methods that apply to business situations. They include basic mathematical operations, percentages, equations, index numbers, logarithms, direct and inverse variation, and graphs. The second module has been designed to provide students with the necessary skills for making practical financial decisions. The concepts taught include simple interest, compound interest, annuities and their applications as they apply in a business environment.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0007 - Mathematics 1

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0004 Mathematics (WSTC Prep) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0004/>) **Legacy Code:** 700044

The Mathematics subject is designed and written to prepare students for further mathematical study at first year university level. It provides a comprehensive introduction to the study of calculus and its applications in the real world. The subject develops those skills peculiar to the mathematical requirements of further study in the areas of Business, Computing, Information Technology, Science and Engineering.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0005 - Mathematics (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0005 Mathematics (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0005/>) **Legacy Code:** 900032

The Mathematics subject is designed and written to prepare students for further mathematical study at first year university level. It provides a comprehensive introduction to the study of calculus and its applications in the real world. The subject develops those skills peculiar to the mathematical requirements of further study in the areas of Business, Computing, Information Technology, Science and Engineering.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0006 Mathematics 1 (WSTC Prep) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0006/>) **Legacy Code:** 700284

This subject has been designed to enhance students' numeracy skills and their understanding of basic mathematical concepts taught in high school mathematics. The topics include arithmetic and algebra, elementary functions, and basic geometry and trigonometry. The subject will prepare students and help them follow more advanced topics in Mathematics 2, Mathematics for Engineers Preliminary and Mathematics for Engineers 1, as well as various other Engineering and ICT subjects.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0007 Mathematics 1 (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0007/>) **Legacy Code:** 900085

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0008 Mathematics 2 (WSTC Prep) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0008/>) **Legacy Code:** 700146

This subject has been specifically designed for students who need to refresh or upgrade their understanding of basic mathematical concepts taught in high school mathematics. The topics include basic arithmetic and algebra, elementary functions, geometry, trigonometry and coordinate geometry.

**Level:** Undergraduate Level 0 Preparatory subject

**Pre-requisite(s):** Students enrolled in 7162 Diploma in Engineering Extended 7138 Diploma in Information and Communication Technology Extended - ICT 7139 Diploma in Information and Communication Technology Extended 7140 Diploma in Information and Communication Technology Extended – Information Systems and 7141 Diploma in Information and Communication Technology (Health Information Management) Extended must pass MATH 0006 Mathematics 1 prior to enrolling in this unit

**Equivalent Subjects:** MATH 0009 - Mathematics 2 (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

## MATH 0009 Mathematics 2 (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0009/>) **Legacy Code:** 900086

This subject has been specifically designed for students who need to refresh or upgrade their understanding of basic mathematical concepts taught in high school mathematics. The topics include basic arithmetic and algebra, elementary functions, geometry, trigonometry and coordinate geometry.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0008 - Mathematics 2 (WSTC Prep)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0010 Mathematics 3 (WSTC Prep) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0010/>) **Legacy Code:** 700203

This subject is designed to prepare students for further mathematical study at first year university level. It provides a comprehensive introduction to the study of calculus and its applications in the real world. The concepts studied also include arithmetic and geometric series, trigonometry, inverse trigonometric functions, vectors and matrices.

**Level:** Undergraduate Level 0 Preparatory subject

**Pre-requisite(s):** MATH 0008

**Equivalent Subjects:** MATH 0011 - Mathematics 3 (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0011 Mathematics 3 (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0011/>) **Legacy Code:** 900087

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0012 Mathematics B (WSTC Prep) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0012/>) **Legacy Code:** 700069

This subject is replaced by 700146 - Foundation Mathematics 2 (UWSCFS) from Term 1 2014. This subject has been specifically designed for students who need to refresh or upgrade their understanding of basic mathematical concepts taught in high school mathematics. The topics include basic arithmetic and algebra, geometry, trigonometry, coordinate geometry, quadratic functions, indices, logarithms and an introduction to differential calculus.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0013 - Mathematics B

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0013 Mathematics B (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0013/>) **Legacy Code:** 900033

The Mathematics B course is designed and written to prepare students for further mathematical study at first year university level in courses that do not demand an in-depth study of Calculus. The course particularly develops those skills peculiar to the mathematical requirements of further study in the area of Business, Finance and Economics. It is usually studied in conjunction with 'Commercial Mathematics'.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0014 Mathematics C (WSTC Prep) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0014/>) **Legacy Code:** 700025

The Mathematics C subject is designed and written to prepare students for mathematical study at first year university level, specifically in the area of Engineering. It provides a comprehensive introduction to the study of calculus and its applications in the real world.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0015 Mathematics Extension (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0015/>) **Legacy Code:** 900034

The course Mathematics Extension is designed and written to prepare students for further mathematical study at first year university level, particularly in the areas of Science and Engineering. Mathematical concepts developed in the 'Mathematics' course are expanded upon and harder mathematical concepts are introduced. The course develops those skills peculiar to the mathematical requirements of further study in the areas of Computing, Information Technology, Science and Engineering. Undergraduate study in the Physics and Engineering areas of university require the student to have been exposed to the mathematics presented at Extension level.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0017 Mathematics for Health Science (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0017/>) **Legacy Code:** 900088

This subject is designed to prepare students for further study at university level in the areas of Health Science and, in particular, Nursing. Undergraduate study in Health Science places a particular emphasis on mathematical skills in the workplace and this subject provides a basis for developing those skills. The subject places equal emphasis on both theoretical and practical application of mathematical techniques as would apply in practice in the Health environment.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** None

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0018 Maths Start Algebra 1 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0018/>) **Legacy Code:** 900646

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0019 Maths Start Algebra 2 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0019/>) **Legacy Code:** 900647

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0020 Maths Start Calculus (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0020/>) **Legacy Code:** 900648

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0021 Maths Start Preparation for Calculus (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0021/>) **Legacy Code:** 900652

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0022 Maths Start Statistics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0022/>) **Legacy Code:** 900650

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0023 Maths Start Trigonometry (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0023/>) **Legacy Code:** 900651

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0024 Maths Start for Engineering (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0024/>) **Legacy Code:** 900649

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0025 Nursing Numeracy (5 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0025/>) **Legacy Code:** 900206

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0026 Practical Mathematics (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0026/>) **Legacy Code:** 900115

This subject has been designed to develop the students' mathematical literacy and mathematical thinking necessary for further education, work and everyday life. The subject aims to build on existing skills, develop skills in new areas and encourage students' confidence in their own ability by applying mathematical concepts to a series of real life problems.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0002 - Foundations of Mathematics (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0027 Scientific Methods for Construction Management (WSTC Prep) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0027/>) **Legacy Code:** 700264

This subject is designed to assist students to become competent in the fields of mathematics and basic physical science. It reinforces the mathematical skills in the areas of basic arithmetic, algebra, geometry and trigonometry. The subject introduces the study of forces, work and energy and selected applications of these concepts. Emphasis is placed on developing the key competencies of scientific methods to provide the necessary introduction for Building Design and Construction Technology.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0028 Statistics for Academic Purposes (WSTC Prep) (5 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0028/>) **Legacy Code:** 700045

Understanding, creating and working with statistics are fundamental skill requirements in many areas and career pathways within the arts, business, science and the humanities disciplines. This subject will provide students with a comprehensive overview of statistics in order to prepare them for success in first year university subjects of study where they will further develop their skills. Through both individual and group tasks students will use statistics to organize and display data as well as draw valid inferences, based on data, by using appropriate statistical tools.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0029 - Statistics for Academic Purposes (UWSC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0029 Statistics for Academic Purposes (WSTC) (5 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0029/>) **Legacy Code:** 900011

Understanding, creating and working with statistics are fundamental skill requirements in many areas and career pathways within the arts, business, science and the humanities disciplines. This subject will provide students with a comprehensive overview of statistics in order to prepare them for success in first year university subjects of study where they will further develop their skills. Through both individual and group tasks students will use statistics to organize and display data as well as draw valid inferences, based on data, by using appropriate statistical tools.

**Level:** Undergraduate Level 0 Preparatory subject

**Equivalent Subjects:** MATH 0028 Statistics for Academic Purposes (WSTC Prep)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 0030 Introduction to Building Calculations (WSTC Prep) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math0030/>) **Legacy Code:** 700317

This subject is designed to assist students to become competent in the field of basic and introductory senior mathematics. It introduces and reinforces mathematical skills in the areas of basic arithmetic, algebra and geometry. Emphasis is placed on developing key competencies in building calculations.

**Level:** Undergraduate Level 0 Preparatory subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1001 Analysis of Change (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1001/>) **Legacy Code:** 300830

This Level 1 subject introduces students to the mathematical modelling techniques that are used to formulate and solve problems in the physical and biological sciences. To use these techniques successfully, students must develop the ability to formulate a problem mathematically and then be able to use the appropriate knowledge to test conclusions by analytical and numerical means. These skills will be emphasized as each technique is introduced. Apart from some introductory work on logarithms and exponentials (essential concepts in the sciences), the main techniques developed involve aspects of differential calculus, culminating in the use of differential equations to model real phenomena in the sciences.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1011 - Fundamentals of Mathematics LGYB 0484 - Analysis of Change (WSTC)

**Incompatible Subjects:** MATH 1014 - Mathematics 1A

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1002 Analytics Programming (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1002/>) **Legacy Code:** 301107

This subject covers the use of computers and computer programming for Data Science. After briefly considering spreadsheet systems, the subject will consider programming in the statistical system "R" in depth. Finally, other special purpose languages will be touched briefly (eg. SQL).

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1003 Biometry (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1003/>) **Legacy Code:** 200263

Biometry introduces students to various statistical techniques necessary in scientific endeavours. Presentation of the content will emphasize the correct principles and procedures for collecting and analysing scientific data, using a hands-on approach. Topics include effective methods of gathering data, statistical principles of designing experiments, error analysis, describing different sets of data, probability distributions, statistical inference, non-parametric methods, simple linear regression and analysis of categorical data.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1032 - Statistics for Science MATH 1028 - Statistical Decision Making MATH 1030 - Statistics for Business ECON 1006 - Introduction to Economic Methods MATH 1004 - Biometry (WSTC) MATH 1029 - Statistical Decision Making (WSTC) 30123 - Management Analytics

**Incompatible Subjects:** MATH 1025 - Quantitative Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1004 Biometry (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1004/>) **Legacy Code:** 700033

This subject introduces students to various statistical techniques necessary in scientific endeavours. Presentation of the content will emphasize the correct principles and procedures for collecting and analysing scientific data, using a 'hands-on' approach. Topics include effective methods of gathering data, statistical principles of designing experiments, error analysis, describing different sets of data, probability distributions, statistical inference, non-parametric methods, and simple linear regression and correlation.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1030 Statistics for Business ECON 1006 Introduction to Economic Methods MATH 1032 Statistics for Science MATH 1003 Biometry MATH 1028 Statistical Decision Making MATH 1031 Statistics for Business (WSTC) MATH 1029 Statistical Decision Making (WSTC)

**Incompatible Subjects:** MATH 1025 Quantitative Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1006 Discrete Mathematics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1006/>) **Legacy Code:** 200025

Discrete Mathematics introduces set theory, symbolic logic, graph theory and some counting techniques. The subject develops mathematical thinking and builds problem solving skills. It provides a solid foundation for further study in mathematics or computing.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** LGYB 0448 - Discrete Mathematics (UWSC)

**Incompatible Subjects:** MATH 2004 - Discrete Structures and Complexity

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1010 Fundamentals for Engineering Studies (WSTC****AssocD) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1010/>) **Legacy Code:** 700112

This subject serves as an introduction to the key mathematics and physics concepts required to study engineering at a tertiary level. This subject has two major components, physics and mathematics. The physics component includes physical quantities, scalars and vectors, kinematics and dynamics. The mathematics component includes basic arithmetic and algebra, trigonometry, coordinate geometry, relations and functions and introduction to differentiation.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1012 Management Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1012/>) **Legacy Code:** 301123

Management Analytics provides students with introductory knowledge and skills in identifying, analysing and interpreting data relevant to Business, Human Resources and Management. In order to develop evidence-based decision-making skills, students will learn how to work with data. Students will organise and summarise data, present data visually and design surveys for new data collection and use. Students will develop skills in understanding decision-making models and forecasting as a means of improving business processes and HR, management and business metrics.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1030 Statistics for Business ECON 1006 Introduction to Economic Methods MATH 1028 Statistical Decision Making MATH 1003 Biometry MATH 1032 Statistics for Science MATH 1031 Statistics for Business (WSTC) MATH 1029 Statistical Decision Making (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1014 Mathematics 1A (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1014/>) **Legacy Code:** 300672

This Level 1 subject provides a solid foundation in the theory and applications of differential calculus, as well as some introductory work on complex numbers. It is the first of two subjects developing aspects of calculus.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** LGYA 4423 Concepts of Mathematics  
**Incompatible Subjects:** LGYA 4295 Mathematics for Business MATH 1016 Mathematics for Engineers 1

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1015 Mathematics 1B (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1015/>) **Legacy Code:** 300673

This Level 1 subject provides a solid foundation in the theory and applications of integral calculus, as well as some introductory work on linear algebra and infinite sequences and series. It is the second of two subjects developing aspects of calculus.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1014

**Equivalent Subjects:** LGYA 4423 - Concepts of Mathematics  
**Incompatible Subjects:** LGYA 4295 - Mathematics for Business MATH 1016 - Mathematics for Engineers 1

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1016 Mathematics for Engineers 1 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1016/>) **Legacy Code:** 200237

This subject is the first of two mathematics subjects to be completed by all students enrolled in an engineering degree during their first year of study. The content covers a number of topics that underpin the later-stage engineering mathematics subjects. The subject matter includes: differential and integral calculus of a single variable, complex numbers, aspects of matrix algebra, vectors, and some elementary statistics and probability theory. The aim of this subject is to introduce a number of key mathematical concepts needed in the study of Engineering, and to provide a solid foundation for the follow-on subject Mathematics for Engineers 2.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** Students enrolled in 3740 Bachelor of Engineering (Honours) or 3689 Bachelor of Engineering must have passed MATH 1021 Mathematics for Engineers Preliminary otherwise permission is required

**Equivalent Subjects:** MATH 1007 Engineering Mathematics 1 LGYA 4425 Mathematical Methods A LGYA 4426 Mathematical Methods B MATH 1018 Mathematics for Engineers 1 (WSTC) MATH 1017 Mathematics for Engineers 1 (WSTC Assoc Deg)

**Incompatible Subjects:** LGYA 4295 Mathematics for Business LGYA 4423 Concepts of Mathematics MATH 1014 Mathematics 1A MATH 1015 Mathematics 1B

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1017 Mathematics for Engineers 1 (WSTC AssocD) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1017/>) **Legacy Code:** 700101

The content of this subject covers a number of topics in mathematics essential to the study of engineering. The subject matter includes: matrix algebra, complex numbers, vectors, functions and inverse functions, differential and integral calculus of a single variable and some elementary statistics and probability theory.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1022

**Equivalent Subjects:** MATH 1016 - Mathematics for Engineers 1 MATH 1018 - Mathematics for Engineers 1 (WSTC)

**Incompatible Subjects:** MATH 1014 - Mathematics 1A MATH 1015 - Mathematics 1B MATH 1011 - Fundamentals of Mathematics MATH 1021 - Mathematics for Engineers Preliminary

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1018 Mathematics for Engineers 1 (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1018/>) **Legacy Code:** 700019

The content of this subject covers a number of topics that underpin the later-stage engineering mathematics subjects. The subject matter includes: differential and integral calculus of a single variable, complex numbers, aspects of matrix algebra, vectors and some elementary statistics and probability theory.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1023

**Equivalent Subjects:** MATH 1016 - Mathematics For Engineers 1 MATH 1017 - Mathematics for Engineers 1 (WSTC Assoc Deg)

**Incompatible Subjects:** MATH 1014 - Mathematics 1A MATH 1015 - Mathematics 1B MATH 1011 - Fundamentals of Mathematics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1019 Mathematics for Engineers 2 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1019/>) **Legacy Code:** 200238

This subject is the second of two mathematics subjects to be completed by students enrolled in an Engineering degree during their first year of study. The content covers a number of topics that build on the calculus knowledge from Mathematics for Engineers 1. The subject matter includes: ordinary differential equations, Laplace transforms and multi-variable calculus.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1016

**Equivalent Subjects:** LGYB 0454 Mathematics for Engineers 2 (WSTC) MATH 1020 Mathematics for Engineers 2 (WSTC Assoc Deg)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1020 Mathematics for Engineers 2 (WSTC AssocD) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1020/>) **Legacy Code:** 700102

The content of this subject covers a number of topics that build on the student's calculus knowledge from Mathematics for Engineers 1. The subject matter includes: ordinary differential equations, Laplace transforms and multi-variable calculus. Offerings of alternate subjects are dependent on there being sufficient student enrolment numbers. If enrolments are low, the College may cancel delivery of the alternate subject.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1017

**Equivalent Subjects:** MATH 1019 - Mathematics for Engineers 2 LGYB 0454 - Mathematics for Engineers 2 (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1021 Mathematics for Engineers Preliminary (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1021/>) **Legacy Code:** 300743

This subject is specifically designed for students enrolling in the Bachelor of Engineering (Honours) and Bachelor of Engineering Science degree courses, who do not have a mathematical background in differential and integral calculus. The content of the subject consists of topics in arithmetic and algebra, trigonometry and trigonometric functions, logarithmic and exponential functions, differential and integral calculus.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1023 - Mathematics for Engineers Preliminary (WSTC) MATH 1022 - Mathematics for Engineers Preliminary (WSTC Assoc Deg)

**Incompatible Subjects:** LGYA 4425 - Mathematical Methods A MATH 1011 - Fundamentals of Mathematics MATH 1016 - Mathematics for Engineers 1 MATH 1018 - Mathematics for Engineers 1 (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1022 Mathematics for Engineers Preliminary (WSTC AssocD) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1022/>) **Legacy Code:** 700103

This subject covers the fundamental mathematical concepts and techniques necessary for the study of Engineering. Topics include Arithmetic and Algebra, Trigonometry, Functions, and Introductory Differential and Integral calculus.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1021 - Mathematics for Engineers Preliminary MATH 1023 - Mathematics for Engineers Preliminary (WSTC)

**Incompatible Subjects:** MATH 1011 - Fundamentals of Mathematics  
**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1023 Mathematics for Engineers Preliminary (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1023/>) **Legacy Code:** 700100

This subject covers the fundamental mathematical concepts and techniques necessary for the study of Engineering. Topics include Arithmetic and Algebra, Trigonometry, Functions, and Introductory Differential and Integral calculus.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** Students enrolled in 6033 Diploma in Engineering Bachelor of Engineering Studies 7034 Diploma in Engineering or 7162 Diploma in Engineering Extended must pass MATH 0008 Mathematics 2 (WSTC Prep) before enrolling in this unit Students enrolled in 7066 Diploma in Engineering Extended must pass MATH 0010 Mathematics 3 (WSTC Prep) before enrolling in this unit

**Equivalent Subjects:** MATH 1021 - Mathematics for Engineers Preliminary MATH 1022 - Mathematics for Engineers Preliminary (WSTC Assoc Deg)

**Incompatible Subjects:** MATH 1011 - Fundamentals of Mathematics  
**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1026 Quantitative Thinking (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1026/>) **Legacy Code:** 300831

This level 1 subject develops the quantitative skills that underpin many fields of study in the sciences. The content covered includes basic algebra, functions, graphs, equations, linear and quadratic, introductory probability and descriptive statistics. These mathematical/statistical concepts will be revised and developed using scientific concepts such as molarity and dilution, optical density, population growth, and predator-prey models. In all aspects of this subject, students will be developing and using critical thinking skills to solve mathematical/statistical problems set in a scientific context.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1011 - Fundamentals of Mathematics MATH 1027 Quantitative Thinking (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1027 Quantitative Thinking (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1027/>) **Legacy Code:** 700123

This Level 1 subject develops the quantitative skills that underpin many fields of study in the sciences. The content covered includes basic algebra, functions, graphs, equations - linear and quadratic, introductory probability and descriptive statistics. These mathematical/statistical concepts will be revised and developed using scientific concepts such as molarity and dilution, optical density, population growth, and predator-prey models. In all aspects of this subject, students will be developing and using critical thinking skills to solve mathematical/statistical problems set in a scientific context.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1011 - Fundamentals of Mathematics  
MATH 1026 - Quantitative Thinking

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1028 Statistical Decision Making (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1028/>) **Legacy Code:** 300700

Statistical Decision Making introduces students to various statistical techniques supporting the study of computing and science. Presentation of the content will emphasize the correct principles and procedures for collecting and analysing scientific data, using information and communication technologies. Topics include describing different sets of data, probability distributions, statistical inference, and simple linear regression and correlation.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1032 Statistics for Science MATH 1003 Biometry MATH 1030 Statistics for Business ECON 1006 Introduction to Economic Methods MATH 1012 Management Analytics MATH 1031 Statistics for Business (WSTC) MATH 1004 Biometry (WSTC) MATH 1029 Statistical Decision Making (WSTC)

**Incompatible Subjects:** MATH 1025 Quantitative Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1029 Statistical Decision Making (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1029/>) **Legacy Code:** 700041

Statistical Decision Making introduces students to various statistical techniques supporting the study of computing and science. Presentation of the content will emphasise the correct principles and procedures for collecting and analysing scientific data, using information and communication technologies. Topics include describing different sets of data, probability distributions, statistical inference and simple linear regression and correlation.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** Students enrolled in 7005 Diploma in Information and Communications Technology 7067 Diploma in Information and Communications Technology Extended 7104 Diploma in Information and Communications Technology (Health Information Management) 7106 Diploma in Information and Communications Technology (Health Information Management) Extended must pass MATH 0028 Statistics for Academic Purposes (WSTC Prep) before enrolling in this unit

**Equivalent Subjects:** MATH 1032 - Statistics for Science MATH 1003 - Biometry MATH 1030 - Statistics for Business ECON 1006 - Introduction to Economic Methods MATH 1028 - Statistical Decision Making MATH 1031 - Statistics for Business (WSTC) MATH 1004 - Biometry (WSTC)

**Incompatible Subjects:** MATH 1025 - Quantitative Techniques

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1030 Statistics for Business (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1030/>) **Legacy Code:** 200032

Statistics for Business introduces the basic concepts and techniques of statistics that are particularly relevant to problem solving in business. It also provides a sound base for more advanced study in statistics and forecasting in subsequent sessions. Topics include: presentation of data; descriptive statistics; the role of uncertainty in business decision making; hypothesis testing; and basic forecasting.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1032 Statistics for Science MATH 1028 Statistical Decision Making MATH 1003 Biometry ECON 1006 Introduction to Economic Methods MATH 1012 Management Analytics MATH 1031 Statistics for Business (WSTC) MATH 1004 Biometry (WSTC) MATH 1029 Statistical Decision Making (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1031 Statistics for Business (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1031/>) **Legacy Code:** 700007

Statistics for Business introduces the basic concepts and techniques of statistics that are particularly relevant to problem solving in business. It also provides a sound base for more advanced study in statistics and forecasting in subsequent sessions. Topics include: presentation of data; descriptive statistics; the role of uncertainty in business decision making; hypothesis testing; and basic forecasting.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** For students enrolled in courses 71024 and 7177

BUSM 0029 Decision Making for Business

For students enrolled in courses 7005 7098 71021 71022 and 71023

MATH 0028 Statistics for Academic Purposes (WSTC Prep)

**Equivalent Subjects:** MATH 1030 - Statistics for Business MATH 1032 - Statistics for Science ECON 1006 - Introduction to Economic Methods  
**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1033 Thinking About Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1033/>) **Legacy Code:** 301108

This subject covers basic concepts of data centric thinking. The main areas discussed are; Populations and Samples; Sampling concepts; Types of Data; Descriptive Methods; Estimation and Inference; Modelling. The subject takes a computational and nonparametric approach, before briefly discussing theoretical concepts and distribution theory.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** COMP 1014 Thinking About Data

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1034 Mathematics for Engineers 1 (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1034/>) **Legacy Code:** 301333

This subject will be offered at Engineering Innovation Hub - Hassall St, Parramatta campus. This subject provides foundational knowledge in key mathematical concepts which are essential for other mathematics subjects in engineering degrees. The subject matter includes: differential and integral calculus of a single variable, complex numbers, aspects of matrix algebra, vectors, and some elementary statistics and probability theory. In applying maths concepts to problems, students develop analytical thinking and problem solving skills, as well as communication skills to present clear and logical arguments. Students are encouraged to be independent and reflective learners in completing tutorial problems and online assessments.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1035 Mathematics for Engineers 2 (Advanced) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1035/>) **Legacy Code:** 301337

This subject will be offered at Engineering Innovation Hub - Hassall St, Parramatta campus. This subject covers a number of topics that build on calculus knowledge from Mathematics for Engineers 1 (Advanced). Calculus is essential for engineering as it involves studying how things change over small intervals of time and allows for modelling such changes. Topics include ordinary differential equations, Laplace transforms and multi-variable calculus. In applying mathematical concepts to problems, students develop analytical thinking and problem solving skills, as well as communication skills to present clear and logical arguments. Students are encouraged to be independent and reflective learners in completing tutorial problems and online assessments.

**Level:** Undergraduate Level 1 subject

**Pre-requisite(s):** MATH 1034

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1036 Mathematics for Engineers Preliminary (UG Cert) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1036/>) **Legacy Code:** 500065

This subject covers the fundamental mathematical concepts and techniques necessary for the study of Engineering. Topics include Arithmetic and Algebra, Trigonometry, Functions, and Introductory Differential and Integral calculus.

**Level:** Undergraduate Level 1 subject

**Equivalent Subjects:** MATH 1021 Mathematics for Engineers Preliminary MATH 1023 Mathematics for Engineers Preliminary (WSTC) MATH 1022 Mathematics for Engineers Preliminary (WSTC AssocD)

**Incompatible Subjects:** LGYA 4425 Mathematical Methods A MATH 1011 Fundamentals of Mathematics MATH 1016 Mathematics for Engineers 1 MATH 1018 Mathematics for Engineers 1 (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 1038 Mathematics for Computing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math1038/>)

Mathematics forms the backbone of information and communication technology. Video games and multimedia programmers use linear algebra to control movement, actions and animations; analysts depend on number and graph theory to devise models of complex systems; data scientists and machine learning specialists use statistics to train their machine counterparts. The knowledge of mathematics is the difference between a good programmer and a great one. In this subject, we build a foundation of mathematical concepts that computing graduates require for their careers. During tutorials students will use an online interactive system allowing them to interactively explore mathematical concepts.

**Level:** Undergraduate Level 1 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2001 Advanced Calculus (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2001/>) **Legacy Code:** 200028

This subject is designed for students undertaking studies in mathematics, statistics, operations research and mathematical finance. It provides further mathematical training in the areas of multivariable and vector calculus, which is essential to the understanding of many areas of both pure and applied mathematics.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH 1015

**Equivalent Subjects:** LGYA 3785 - Advanced Calculus LGYA 3865 - Mathematics 4 LGYB 9666 - Mathematics 21

**Incompatible Subjects:** MATH 1019 - Mathematics for Engineers 2

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2003 Differential Equations (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2003/>) **Legacy Code:** 200030

Differential equations arise naturally both in abstract mathematics and in the study of many phenomena. This subject provides the theory of ordinary differential equations and an introduction to partial differential equations together with methods of solution. Examples are drawn from a wide range of biological, chemical, physical and economic applications.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH1015 - Mathematics 1B

**Incompatible Subjects:** MATH 1019 - Mathematics for Engineers 2

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2004 Discrete Structures and Complexity (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2004/>) **Legacy Code:** 300699

The fact that computers work at all in the way they do is due to the formal mathematical structure that is used in their design. The same holds for establishing important matters such as the reliability of our computer networks. This subject presents, in their computing context, a range of mathematical concepts that are essential for understanding a number of topics concerning computers: the ways they work, they ways they interact, and the ways we interact with them.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH 1028

**Incompatible Subjects:** MATH 1006 - Discrete Mathematics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject



**MATH 2006 Experimental Design and Analysis (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2006/>) **Legacy Code:** 100013

This subject is driven by the scientific method with a focus on experimental design and related data analysis. Research design and methodology and ethical issues, statistical concepts and techniques, computer analysis of data, and communicating research findings are all features of this subject, which build on the content in its prerequisite.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** For students NOT enrolled in programs 1630 Graduate Diploma in Psychological Studies 1796 Graduate Diploma in Psychology and 1837 Bachelor of Cyber Security and Behaviour - BEHV 1016

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2009 Introduction to Data Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2009/>) **Legacy Code:** 301033

Analysis of data is essential for scientific investigation, modelling processes and predicting future events. Data Science is the investigation of the tools required that allow us to perform this modelling and prediction. The increase in accessible data over the past few decades has promoted the use of Data Science, making it a desired skill in many professions. In this subject we further investigate the methods of regression, clustering and classification that form the basis of a data scientist's toolbox.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** For students NOT enrolled in 3769 Bachelor of Data Science or 3770 Bachelor of Applied Data Science - MATH 1028 Statistical Decision Making or MATH 1003 Biometry or MATH 1030 Statistics for Business

**Co-requisite(s):** For students enrolled in 3769 Bachelor of Data Science or 3770 Bachelor of Applied Data Science - MATH 1033 Thinking About Data

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2010 Linear Algebra (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2010/>) **Legacy Code:** 200027

The objective of this subject is to present the main fundamentals of linear algebra and includes such topics as solving systems of linear equations, matrix algebra, determinants, eigenvalues and eigenvectors, Euclidean vector spaces, general vector spaces, inner product spaces and linear transformations.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2011 Making Sense of Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2011/>) **Legacy Code:** 301032

The subject builds on the basic statistical concepts introduced in first year, and also prepares students for broader application of statistics for those majoring in science or business. Topics include hypothesis testing; analysis of categorical data; analysis of variance; non-parametric methods; re-sampling (cross validation/bootstrapping); Introduction to visual data analysis; simple Multivariate statistics and sampling and design.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH 1028 OR  
MATH 1003 OR  
MATH 1030

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2012 Mathematics for Engineers 3 (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2012/>) **Legacy Code:** 200242

Students enrolled in Bachelor of Engineering who are yet to successfully complete 200242 Mathematics for Engineers 3, are to seek advice from Dr Jamal Rizk to enable them to complete the course. This subject is a core subject in the Computer, Electrical, or Telecommunications key programmes of the Bachelor of Engineering course. It builds on the first two mathematics subjects in that course and provides mathematical tools and techniques needed for the above key programmes. The subject covers topics from advanced calculus including vector calculus, complex analysis, Fourier series, heat and wave equations, Fourier integrals and transforms; discrete mathematics including logic and set theory; random variables and random processes including mean, correlation and covariance functions, ergodicity, ensemble averages, and Gaussian processes.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** MATH 1008 OR  
MATH 1019

**Equivalent Subjects:** MATH 2005 - Engineering Mathematics 3

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2013 Object Oriented Analysis (WSTC) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2013/>) **Legacy Code:** 700039

The core strength of this subject is to analyse and model business objectives and critical requirements of software systems to be developed using object-oriented (OO) approaches. The system analysis is taken to greater depths within the context of object orientation. The Unified Modelling Language version 2.0 (notably use cases, activity diagrams, class diagrams and sequence diagrams) is used as a modelling standard for creating OO models in the problem space. The subject also covers the rational unified process methodology and applications of design patterns for software development through practical case studies.

**Level:** Undergraduate Level 2 subject

**Pre-requisite(s):** Students enrolled in 7004 Diploma in Information and Communications Technology Fast Track 7005 Diploma in Information and Communications Technology 7067 Diploma in Information and Communications Technology Extended 7134 Diploma in Information and Communications Technology Extended – ICT 7138 Diploma in Information and Communications Technology Extended - ICT 7139 Diploma in Information and Communications Technology Extended - Information Systems 7163 Diploma in Information and Communications Technology 6035 Diploma Bachelor of Information and Communications Technology 6036 Diploma in Information and Communications Technology Bachelor of Information Systems 6039 Diploma Bachelor of Information and Communications Technology and 6040 Diploma in Information and Communications Technology Bachelor of Information Systems must pass INFS 1007 Systems Analysis and Design before enrolling in this unit

**Equivalent Subjects:** INFS 2006 Object Oriented Analysis INFS 2011 Object Oriented Analysis (WSTC)

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 2014 Visual Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math2014/>) **Legacy Code:** 301109

This subject introduces the fundamentals and technologies of visual analytics to understand big data. It covers major concepts of information visualisation, human computer perception and methods for visual data analysis. Students will learn knowledge and skills for identifying suitable visual analytics techniques, methods and tools for handling various data sets and applications. The subject provides students with opportunities to explore novel research in visual analytics and visualisation.

**Level:** Undergraduate Level 2 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3001 Abstract Algebra (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3001/>) **Legacy Code:** 200193

This subject develops algebraic thought to a high level. The abstract concepts involved in the main topics (group theory and number theory) have many applications in science and technology, and the subject includes an application to cryptography.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1006

**Equivalent Subjects:** LGYA 3893 - Advanced Algebra LGYA 3789 - Algebra 3

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3003 Analysis (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3003/>) **Legacy Code:** 200023

Analysis provides the theoretical basis of real and complex numbers, including differentiation and integration. Topics include: field axioms and completeness, sequences, series, convergence, compactness, continuity, differentiability, integrability, and related theorems in both the real and complex number systems.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 2001

**Equivalent Subjects:** LGYA 3794 - Advanced Mathematical Topics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3004 Discovery Project (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3004/>) **Legacy Code:** 301111

In this subject students will gain experience in applying data science skills and using knowledge gained during their bachelor's course of their primary discipline. Students will carry out a real life project transforming data to knowledge under the supervision of an academic mentor. Students will develop a knowledge discovery project proposal and carry out a literature review highlighting the current status of the problem. Assisted by a mentor they will apply the data science skills learned through-out the degree and produce a final discovery project report and/or interactive project tool and give an oral presentation.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3005 Environmental Informatics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3005/>) **Legacy Code:** 301035

Today, the environment is becoming more and more in the public eye. Methods of environmental monitoring and data analysis are an important source of information for science, business and government regulation. This subject aims to give students a good introduction to environmental informatics and the analysis of spatio-temporal data.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1028 OR

MATH 1003 OR

MATH 1030

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3006 Mathematical Modelling (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3006/>) **Legacy Code:** 200022

Mathematical Modelling is about solving real world problems. The real world is a complicated place which we often need or want to understand better. One way to do this is to set up a mathematical model which we hope can provide insights, predictions and a greater understanding of a complex system. Selected real-world problems are approximated by mathematical models that are amenable to being written in terms of linear and non-linear equations or differential equations. Once equations are solved emphasis is placed on interpreting solutions, modifying models as required and using models for prediction.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 2003

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3007 Predictive Modelling (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3007/>) **Legacy Code:** 301034

In this information age, business and science depend on accurate predictions to make informed decisions. Machine learning is the process of allowing a computer to learn from data, which at its heart is used in making these important decisions. This unit provides students with the knowledge and practice required to implement and effectively use these predictive models such as Neural Networks and Support Vector Machines. Students will use the Python programming language throughout this unit.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** For students not enrolled in 3734 Bachelor of Data Science 3769 Bachelor of Data Science or 3770 Bachelor of Applied Data Science - MATH 1028 Statistical Decision Making or MATH 1003 Biometry or MATH 1030 Statistics for Business

**Co-requisite(s):** Students in Bachelor of Data Science or Bachelor of Applied Data Science must be enrolled in MATH 1033 Thinking About Data

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3008 Quantitative Project (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3008/>) **Legacy Code:** 200045

In this subject, students can deepen or apply knowledge gained during their course and practise verbal and written presentation skills. Students will carry out a project under the supervision of an academic staff member. Assisted by their supervisor, students will define the problem to be studied and then acquire, develop and apply the appropriate theory or methodology. They will prepare a final report presenting theoretical results or methodology, an analysis and a discussion followed by an appropriate conclusion, as well as a literature review or a list of references as appropriate. Students will also give a talk on their project.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** Students must have successfully completed 30 credit points of Level 2 mathematics/statistics units from MATH 2010 Linear Algebra

MATH 2001 Advanced Calculus

MATH 2003 Differential Equations

COMP 2003 Computer Algebra

MATH 2011 Making Sense of Data

MATH 2009 Introduction to Data Science

Students must also have completed 30 credit points of Level 3 mathematics/statistics units from MATH 3006 Mathematical Modelling

MATH 3003 Analysis

MATH 3001 Abstract Algebra

COMP 3020 Social Web Analytics

MATH 3007 Predictive Modelling MATH 3005 Environmental Informatics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3011 Probabilistic Models and Inference (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3011/>) **Legacy Code:** 301250

The subject provides students with an understanding of probabilistic models and inference. It covers model-based approaches for complex systems - from constructing these models to applying information to models. The models, which can be created manually and obtained by learning from data, will also be useful to make decisions under uncertainty. A variety of models and techniques will be discussed; examples include Monte Carlo Methods, Decision Theory, Bayesian networks, Markov networks, and the use of information theory.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1033

OR

MATH 1028

AND

COMP 1013

OR

COMP 2023

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3012 Combinatorics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3012/>) **Legacy Code:** 301378

This subject builds upon the knowledge acquired in the prerequisite subject Discrete Mathematics and helps students to develop understanding and mathematical maturity. The subject covers more sophisticated counting techniques, additional concepts in graph theory, and it introduces coding theory. Many applications of these concepts are included, and some combinatorial algorithms are studied. The applications and techniques presented in the subject are used to model systems such as transport networks and social networks, and they have relevance for communication, computing, probability, statistics, and science, and for many everyday problems such as scheduling.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1006 AND

MATH 1015

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3013 Fields and Equations (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3013/>) **Legacy Code:** 301377

This subject develops abstract algebraic thought to a higher level. The abstract concepts introduced in the subject, ring theory, field theory and algebraic equations, have many applications in science and technology. The theory of algebraic equations is the study of solutions of polynomial equations. Although the problem originates in explicit manipulations of polynomials, the modern (and far more powerful) treatment is in terms of field extensions. The subject is an introduction to ring theory and field theory; it includes applications to cryptography (RSA) and geometry (proving that it is impossible to trisect an arbitrary angle using only a straightedge and compass).

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 3015

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3014 Financial Mathematics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3014/>) **Legacy Code:** 301380

This subject is an introduction to stochastic calculus and relevant simulation techniques applied to modern finance and the mathematical modelling of financial markets. The core topics developed in the subject are the Ito stochastic integral, Ito's formula, and basic stochastic differential equations, as well as computer simulation techniques with emphasis on Monte Carlo simulations. Some mathematical background is assumed, but the subject will cover any necessary material that is not contained in prerequisites subjects.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1014 AND

MATH 1015 AND

MATH 2010 AND

MATH 2003

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3015 Groups and Symmetry (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3015/>) **Legacy Code:** 301376

This subject develops abstract algebraic thinking to a higher level. The abstract concepts introduced in the subject, the theory of groups and abstract symmetry, have many applications in science and technology. Symmetry plays a role in many different contexts: in crystals, in visual arts, in music and in architecture, to name a few. Analysing and exploiting the symmetries of a particular problem often is the first step towards finding a practical solution to the problem. Group theory is the study of symmetry. This subject develops the language of groups and techniques to understand the structure of groups.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** MATH 1006

**Equivalent Subjects:** MATH 3001 Abstract Algebra

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3016 Mathematics Project (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3016/>) **Legacy Code:** 301379

In this subject, students can deepen or apply knowledge gained during their course and practise verbal and written presentation skills. Students will carry out a project under the supervision of an academic staff member. Assisted by their supervisor, students will define the problem to be studied and then acquire, develop and apply the appropriate theory or methodology. They will prepare a final report presenting theoretical results or methodology, an analysis and a discussion followed by an appropriate conclusion, as well as a literature review or a list of references as appropriate. Students will also give a talk on their project.

**Level:** Undergraduate Level 3 subject

**Pre-requisite(s):** Students not enrolled in 3778 must have successfully completed 30 credit points of Level 2 mathematics/statistics units from the following list

MATH 2010 Linear Algebra

MATH 2001 Advanced Calculus

MATH 2003 Differential Equations

MATH 2011 Making Sense of Data

MATH 2009 Introduction to Data Science

COMP 2023 Mathematical Programming

Students not enrolled in 3778 must also have successfully completed 30 credit points of Level 3 mathematics/statistics units from the following list

MATH 3006 Mathematical Modelling

MATH 3003 Analysis

MATH 3001 Abstract Algebra

COMP 3020 Social Web Analytics

MATH 3007 Predictive Modelling

MATH 3005 Environmental Informatics

MATH 3015 Groups and Symmetry

MATH 3013 Fields and Equations

MATH 3012 Combinatorics

MATH 3014 Financial Mathematics

**Equivalent Subjects:** MATH 3008 Quantitative Project

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 3017 Data Analysis and Visualisation for Social Policy (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math3017/>)

This subject provides students with an applied interdisciplinary understanding of statistics and quantitative data science methods, commonly used within the social sciences and social policy environments. The subject will equip learners with quantitative tools and methods utilised with small and large datasets, and data visualisation techniques to answer questions of cultural, social, economic, and policy interest. The subject develops students' theoretical knowledge of statistical methods, practical knowledge of commonly used statistical software package, and applied knowledge through the analysis of real-world social problems. The knowledge and skills of this subject are of relevance to students seeking to work in social policy and/or social research within academia, government, industry and/or NGOs.

**Level:** Undergraduate Level 3 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 4001 Mathematics Honours Thesis (20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math4001/>) **Legacy Code:** 200413

This is a 40 credit point year-long subject taken over two terms (20 credit points in each term). The aim of this subject is to further develop the student's research and problem solving skills. The student is required to implement the research plan, complete a substantive piece of research in the field of Mathematics/Statistics, and to communicate the results of that work to an interested and technically literate audience. All projects will therefore contain at least two broad areas of assessment: the substantive work itself, and the oral and written communication of the work to others. All assessment components submitted in both of these areas are expected to be of a high professional standard. Students will present their research in the thesis. The thesis topic and structure will vary according to the area of interest of the student and the expertise of the supervisor. Throughout this subject regular planned consultations between the student and supervisor will occur. Students are expected to work to a schedule devised in consultation with their supervisor. The schedule will include set dates for the presentation of draft chapters for review by the supervisor.

**Level:** Undergraduate Level 4 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7001 Advanced Mathematical Investigations (20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7001/>) **Legacy Code:** 301176

Advanced Mathematical Investigations is an integral part of the Master of Research for students planning a future in mathematical and/or statistical research. Students will carry out extensive investigations under the supervision of an academic staff member that will allow the development of skills, knowledge and a way of thinking that will assist in the learning of mathematics and/or statistics needed for research in their chosen field of mathematics. They will also develop their written and oral communication skills, culminating in a paper which will be written as though it is to be submitted to a mathematics/statistics journal for publication (including following the journal's requirements for presentation) and an oral presentation of the style expected at a mathematics/statistics conference.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7002 Advanced Statistical Methods (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7002/>) **Legacy Code:** 301115

There has been a significant trend away from simple statistical models for complex and Big Data. Advanced Statistical Methods is a technical subject that looks at computer intensive statistical techniques for modelling complex data. Students will learn about methods including Density Estimation, the Expectation-Maximisation (EM) algorithm, Bayesian, Markovian and Hidden Markov Models, enabling them to apply sophisticated statistical tools in a Data Science setting.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** MATH 7012 AND MATH 7016

**Co-requisite(s):** COMP 7006

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7003 Applied Business Statistics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7003/>) **Legacy Code:** 300962

This subject introduces the basic statistical concepts and techniques for descriptive and inferential data analysis. It will aid and improve business decision-making, especially when faced with uncertain outcomes.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7005 Approximation Theory (20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7005/>) **Legacy Code:** 301060

Approximation theory is concerned with approximating functions of a given class using functions from another, usually more elementary, class. The efficient solution of such problems is of great importance for computing, and this online unit will provide a general introduction to the mathematical theory behind many approximation methods in common use.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7008 Mathematical Investigations (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7008/>) **Legacy Code:** 301106

Mathematical Investigations will prepare Master of Research for students planning a future in mathematical/statistical research. Students will carry out investigations under the supervision of an academic staff member that will allow development of skills, knowledge and a way of thinking that will assist in the learning of mathematics/statistics that will prepare them for research in their chosen field of mathematics. They will also develop their written and oral communication skills, culminating in a poster presentation of significant findings as if being submitted at a mathematics/statistics conference, following that conference's directions for submission.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7009 Mathematical Proof and Reasoning (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7009/>) **Legacy Code:** 301177

Proving and getting a new proposition by careful reasoning from given propositions, is the essence of mathematics. Proof is what makes mathematics special and eternal. This subject looks at the different methods of proof and reasoning that can be employed to verify that statements are true or not. Students will consider propositions and theorems from various areas of mathematics and look at classic, interesting and sometimes novel ways these can be proved. Successful students taking this subject will not only be able to follow and determine if a proof is correct, but become proficient at mathematical reasoning.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7011 Predictive Analytics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7011/>) **Legacy Code:** 301117

The information age has allowed business and science to take advantage of the vast amount of available data for predicting outcomes and estimating trends, to make informed decisions. Machine learning is the process of allowing a computer to learn from data, which at its heart is used in making these important decisions. This subject provides students with the knowledge and practice required to implement and effectively use these predictive models such as Neural Networks and Support Vector Machines, and provides opportunity for students to investigate state-of-the-art. Students will use the Python programming language throughout this subject.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** MATH 7016

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7012 Programming for Data Science (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7012/>) **Legacy Code:** 301113

The use of computers and computer programming for Data Science is fundamental to the discipline. This introductory subject will briefly cover the use of spreadsheet systems and then will consider programming in the statistical system "R" in detail. Other special purpose languages will also be touched on briefly including SQL (Structured Query Language).

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7014 Social Media Intelligence (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7014/>) **Legacy Code:** 301116

Social Media Intelligence presents the theory and practice of extracting and analysing information from social media networks. The aims are to identify properties of social networks, and to make predictions about future events. Topics included will cover areas such as Graph theory, Game theory and Network dynamics and we will identify how these can be used to model and extract information from Facebook and Twitter.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7015 Statistics for Accountants (PG) (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7015/>) **Legacy Code:** 200424

Statistics for Accountants introduces the basic concepts and techniques for statistical inference and decision making in a business context.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7016 The Nature of Data (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7016/>) **Legacy Code:** 301114

This subject covers concepts of data centric thinking. The main areas discussed are; Populations and Samples; Sampling concepts; Types of Data; Descriptive Methods; Estimation and Inference; and Modelling. The subject takes a computational and nonparametric approach, before discussing theoretical concepts and Normal distribution theory as large sample approximations.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7017 Probabilistic Graphical Models (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7017/>) **Legacy Code:** 301365

Modelling data provides us with a method for inference, but there are many occurrences when interest lies in the reasoning behind the decision making. In this subject, students learn to model processes and the reasoning behind the processes using probabilistic graphical models. The subject investigates the construction and application of model-based approaches for complex systems. Students will manually create models based on prior knowledge and investigate methods of learning model structures from data, which can be used to make decisions under uncertainty. Topics covered include Monte Carlo Methods, Decision Theory, Bayesian networks, Markov networks, and the use of information theory.

**Level:** Postgraduate Coursework Level 7 subject

**Pre-requisite(s):** MATH 7016

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7018 Scientific Informatics (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7018/>) **Legacy Code:** 301388

This subject discusses the most important scientific revolutions in informatics throughout history and the role of Scientific Informatics in modern scientific research. It examines the influence of computing and informatics on the major paradigm shifts in the social, behavioural, biological, health and physical sciences and assesses the societal impact of future discoveries. The subject aims to provide training for Research and Coursework Masters in the computational techniques that are integral to much of modern scientific research as well as cultural and philosophical perspectives on the Science, Technology, Engineering and Mathematics (STEM). Students complete practical assessment items that are relevant to their field of research, which are designed to develop transferrable skills and familiarity with computing tools.

**Level:** Postgraduate Coursework Level 7 subject

**Equivalent Subjects:** MATH 7013 - Scientific Informatics

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 7019 Mathematics of Signal Processing (10 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math7019/>) **Legacy Code:** 301440

This subject teaches students to abstract and develop algorithms, in Python, for analysing and processing deterministic and stochastic data/signals. Students are taught strategies in developing solutions that are optimal and efficient to implement. They learn how to analyse signals under the Fourier transform and under different bases, allowing for an appreciation of how lossy compression works, and how to formulate and solve some convex optimisation algorithms. This subject will be undertaken at Parramatta City - Hassall St campus.

**Level:** Postgraduate Coursework Level 7 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 9001 Higher Degree Research Thesis - Centre for Research in Mathematics (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math9001/>) **Legacy Code:** 800165

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject

**MATH 9002 Higher Degree Research Thesis - Quantitative Methods and Mathematical Sciences (10,20 Credit Points)**

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/math9002/>) **Legacy Code:** 800047

**Level:** PhD and Research Masters Level 9 subject

**Restrictions:** Please see the Subject Details page for any restrictions for this subject