Mathematics

Course Index

Mathematics Advanced

COURSE DETAILS

Hours	240 hours
Type	Board Developed Course
Duration	2 years
Unit Value	2-unit Year 11 2-unit Year 12
HSC Exam	Yes
ATAR	Yes
Exclusions	Nil
RECOGNITION	HSC Qualification

COURSE DESCRIPTION

The course is very abstract in nature and requires advanced algebraic and graphical skills. It is intended for students who studied Stage 5.3 in Years 9 and 10 Mathematics and demonstrated general competence in this course. Students who completed the Stage 5.2 course should have achieved a very high understanding of concepts learned.

There will be some revision of prior learning but most content will be new to students. Students will learn Calculus which prepares students more effectively for success in university STEM course subjects such as Computer Science and Physics.

AIMS

The 2 Unit course will develop students understanding of and competence in further aspects of mathematics which are applicable to the real world and to adequately prepare students for further study at the tertiary level, particularly in STEM based courses.

TOPICS COVERED

Year 11 Course

- Working with Functions
- Trigonometry and Measure of Angles
- Trigonometric Functions and Identities
- Introduction to Differentiation
- Logarithms and Exponentials
- Probability and Discrete Probability Distributions

Year 12 Course

- Graphing Techniques
- Trigonometric Functions and Graphs
- Differential Calculus
- Applications of Differentiation
- Integral Calculus
- Modelling Financial Situations
- Descriptive Statistics and and Bivariate Data Analysis
- Random Variables

ASSESSMENT

Assessment strategies may include:

- Examinations
- Progress tests
- Investigation-style projects or assignments

POTENTIAL CAREERS / REASONS TO CHOOSE COURSE

The course is useful for concurrent studies in science and commerce. It is a sufficient basis for further studies in mathematics as a minor discipline at tertiary level in support of courses such as the life sciences or commerce.

Students who require substantial mathematics at a tertiary level supporting the physical sciences, computer science or engineering should undertake the Extension 1 or Extension 2 courses.

YEAR 11 COURSE OUTCOMES (from NESA)

MA11-1	uses algebraic and graphical techniques to solve, and where appropriate, compare alternative solutions to problems
MA11-2	uses the concepts of functions and relations to model, analyse and solve practical problems
MA11-3	uses the concepts and techniques of trigonometry in the solution of equations and problems involving geometric shapes
MA11-4	uses the concepts and techniques of periodic functions in the solutions of trigonometric equations or proof of trigonometric identities
MA11-5	interprets the meaning of the derivative, determines the derivative of functions and applies these to solve simple practical problems
MA11-6	manipulates and solves expressions using the logarithmic and index laws, and uses logarithms and exponential functions to solve practical problems
MA11-7	uses concepts and techniques from probability to present and interpret data and solve problems in a variety of contexts, including the use of probability distributions
MA11-8	uses appropriate technology to investigate, organise, model and interpret information in a range of contexts
MA11-9	provides reasoning to support conclusions which are appropriate to the context.

Mathematics Extension 1

COURSE DETAILS

Hours	120 hours
Type	Board Developed Course
Duration	2 years
Unit Value	1-unit Year 11 1-unit Year 12
HSC Exam	Yes
ATAR	Yes
Exclusions	Must study Mathematics
RECOGNITION	HSC Qualification

COURSE DESCRIPTION

The course is very abstract in nature and requires highly advanced algebraic and graphical skills. It is intended for students who only studied Stage 5.3 in Years 9 and 10 Mathematics and demonstrated general competence in this course.

All content learned will be new to students. This course is designed for students who wish to pursue Mathematics as a major discipline at university or enter other fields that require high levels of Mathematics as a prerequisite, such as physical sciences, computer science or engineering. It contains the entire Mathematics course with the addition of extension topics and further topics.

AIMS

The Mathematics Extension 1 course is designed to develop students thorough understanding of and competence in further aspects of mathematics which are applicable to the real world and to adequately prepare students for further study at the tertiary level, particularly in STEM based courses such as Engineering or Computer Science.

TOPICS COVERED

Year 11 Course

- Further Work with Functions
- Polynomials
- Inverse Trigonometric Functions
- Further Trigonometric Identities
- Rates of Change
- Working with Combinatorics

Year 12 Course

- Proof by Mathematical Induction
- Introduction to Vectors
- Trigonometric Equations
- Further Calculus Skills
- Applications of Calculus
- The Binomial Distribution

ASSESSMENT

Assessment strategies may include:

- Examinations
- Progress tests
- Investigation-style projects or assignments

POTENTIAL CAREERS / REASONS TO CHOOSE COURSE

The course is useful for concurrent studies in science and commerce. It is a sufficient basis for further studies in courses which require substantial mathematics at a tertiary level supporting the physical sciences, computer science or engineering.

YEAR 11 COURSE OUTCOMES (from NESA)

ME11-1	uses algebraic and graphical concepts in the modelling and solving of problems involving functions and their inverses
ME11-2	manipulates algebraic expressions and graphical functions to solve problems
ME11-3	applies concepts and techniques of inverse trigonometric functions and simplifying expressions involving compound angles in the solution of problems
ME11-4	applies understanding of the concept of a derivative in the solution of problems, including rates of change, exponential growth and decay and related rates of change
ME11-5	uses concepts of permutations and combinations to solve problems involving counting or ordering
ME11-6	uses appropriate technology to investigate, organise and interpret information to solve problems in a range of contexts
ME11-7	communicates making comprehensive use of mathematical language, notation, diagrams and graphs

Mathematics Standard

COURSE DETAILS

Hours	240 hours
Type	Board Developed Course
Duration	2 years
Unit Value	2-unit Year 11 2-unit Year 12
HSC Exam	Compulsory if studying Standard 2 in HSC course Students studying Standard 1 may elect to do an HSC
ATAR	Yes. However, the Standard 1 course is a category B ATAR course
Exclusions	Nil
RECOGNITION	HSC Qualification

COURSE DESCRIPTION

Mathematics Standard focuses on mathematical skills and techniques which have direct application to everyday activity. The course content includes focus studies and five strands of study in which the mathematics is presented in real-life contexts. There is an emphasis on applications of specific skills and on tasks that involve integrating mathematical skills and techniques across a range of familiar and unfamiliar situations. These tasks may draw from more than one area of study, and encourage transfer of knowledge across the entire course, as well as linking with study in other Stage 6 subjects.

The Year 11 Standard course is undertaken by students intending to study either the Year 12 Mathematics Standard 2 course or the Year 12 Mathematics Standard 1 course.
Students studying the Mathematics Standard 2 course will sit for an HSC examination. Students studying the Mathematics Standard 1 course may elect to undertake an optional HSC examination. Standard 1 course have been categorised as Category B ATAR courses for the 2019 HSC onwards

AIMS

The Year 11 Mathematics General course, the Year 12 Mathematics General 2 course and the Year 12 Mathematics General 1 course are designed to promote the development of knowledge, skills and understanding in areas of mathematics that have direct application to the broad range of human activity, including a range of post-school pathways requiring a variety of mathematical and statistical techniques.

TOPICS COVERED

Year 11 Course

- Formulae and Equations
- Linear Relationships
- Applications of Measurement
- Working with Time
- Money Matters
- Data Analysis
- Relative Frequency and Probability

Year 12 Standard 2 Course
A continuation of learning concepts in the topics undertaken in the Year 11 course including the additional topic of Networks. Content includes Non-right-angled Trigonometry, Rates and Ratios, Investments and Loans, Annuities, Bivariate Data Analysis, The Normal Distribution, Network Concepts and Critical Path Analysis.

Year 12 Standard 1 Course
The Mathematics Standard 1 Year 12 course content includes continuation of learning concepts from the same topics undertaken in Year 11 and the additional topic of Networks. Content includes Right-angled Triangles, Rates, Scale Drawings, Investment, Depreciation and Loans, Further Statistical Analysis and Networks and Paths.

ASSESSMENT

Assessment strategies will include:

- Examinations
- Progress tests
- Investigation-style projects or assignments

POTENTIAL CAREERS / REASONS TO CHOOSE COURSE

The Year 11 Standard/Year 12 Standard 2 course is fully prescribed, and is designed to support TAFE and other vocational courses. It provides an appropriate mathematical background for students who do not wish to pursue the formal study of mathematics at tertiary level, while giving a strong foundation for university study in the areas of business, humanities, nursing and paramedical sciences.

The Year 12 Mathematics Standard 1 course provides an appropriate foundation for a range of vocational pathways, either in the workforce or in further training.

YEAR 11 COURSE OUTCOMES (from NESA)

MS11-1	uses algebraic and graphical techniques to compare alternative solutions to contextual problems
MS11-2	represents information in symbolic, graphical and tabular form
MS11-3	solves problems involving quantity measurement, including accuracy and the choice of relevant units
MS11-4	performs calculations in relation to two-dimensional figures
MS11-5	models relevant financial situations using appropriate tools
MS11-6	makes predictions about everyday situations based on simple mathematical models
MS11-7	develops and carries out simple statistical processes to answer questions posed
MS11-8	solves probability problems involving multistage events
MS11-9	uses appropriate technology to investigate, organise and interpret information in a range of contexts
MS11-10	justifies a response to a given problem using appropriate mathematical terminology and/or calculations