

Advanced Mathematics 2021 and 2022

2 units for each of Year 11 and Year 12 HSC

Board Developed Course

Prerequisites: The Mathematics Advanced Year 11 course has been developed on the assumption that students have studied the content and achieved the outcomes of the NSW *Mathematics Years 7–10 Syllabus*. In particular, the content and outcomes of all substrands of Stage 5.1 and Stage 5.2, the following substrands of Stage 5.3: Algebraic techniques, Surds and indices, Equations, Linear relationships, Trigonometry and Pythagoras' theorem, Single variable data analysis and at least some of the content from the following substrands of Stage 5.3: Non-linear relationships and Properties of Geometrical Shapes.

Exclusions: Students may **not** study the Mathematics Advanced course in conjunction with the Mathematics Standard 1 or the Mathematics Standard 2 course

Course Description:

- The Mathematics Advanced course is a calculus-based course focused on developing student awareness of mathematics as a unique and powerful way of viewing the world to investigate order, relation, pattern, uncertainty and generality.
- The Mathematics Extension 1 Year 11 course includes the Mathematics Advanced Year 11 course. The Mathematics Extension 1 Year 12 course includes the Mathematics Advanced Year 12 course.
- All students studying the Mathematics Advanced course will sit for an HSC examination.

The study of Mathematics Advanced in Stage 6:

- enables students to develop their knowledge, understanding and skills in working mathematically and in communicating concisely and precisely
- provides opportunities for students to consider various applications of mathematics in a broad range of contemporary contexts through the use of mathematical modelling and use these models to solve problems related to their present and future needs
- provides opportunities for students to develop ways of thinking in which problems are explored through observation, reflection and reasoning
- provides a basis for further studies in disciplines in which mathematics and the skills that constitute thinking mathematically have an important role
- provides an appropriate mathematical background for students whose future pathways may involve mathematics and its applications in a range of disciplines at the tertiary level

Content:

The Mathematics Advanced Year 11 course content is comprised of five Topics, with the Topics divided into Subtopics. The Topics and Subtopics are:

Year 11

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| Topic: Functions | Working with Functions |
| Topic: Trigonometric Functions | Trigonometry and Measure of Angles |
| | Trigonometric Functions and Identities |
| Topic: Calculus | Introduction to Differentiation |
| Topic: Exponential and Logarithmic Functions | Logarithms and Exponentials |
| Topic: Statistical Analysis | Probability and Discrete Probability Distributions |

Year 12

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| Topic: Functions | Graphing Techniques |
| Topic: Trigonometric Functions | Trigonometric Functions and Graphs |
| Topic: Calculus | Differential Calculus |
| | The Second Derivative |
| | Integral Calculus |
| Topic: Financial Mathematics | Modelling Financial Situations |
| Topic: Statistical Analysis | Descriptive Statistics and Bivariate Data Analysis |
| | Random Variables |