

# Mathematics: Specialist

## Units 1-2

All students who study Specialist Units 1 and 2 must also study Mathematical Methods Units 1 and 2. Students need to have satisfactorily completed Specialist Mathematics Units 1 and 2 and Mathematical Methods Units 1 and 2 prior to studying Specialist Mathematics Units 3 and 4. This subject should only be considered by students with a strong passion for mathematics and a desire to pathway into university courses that require advanced mathematics.

Students in this course must have an approved CAS calculator.

### UNIT 1

Students study techniques in the simplification and solution of a range of algebraic expressions and equations, graphing techniques, matrices and transformations of linear and non-linear relations and complex numbers. Students use CAS calculators to explore skills and concepts as well as practicing skills without using technology.

#### LEARNING ACTIVITIES

Explicit instruction of theory and use of technology, textbook exercises, problem-solving and modelling, application of skills to real-world problems.

#### KEY SKILLS REQUIRED

Mathematical skills and understanding, graphing calculator technology, application of mathematical skills and knowledge.

#### ASSESSED TASKS

Topic tests, application SAC tasks.

### UNIT 2

Students extend their knowledge of geometry, apply their understanding from Unit 1 to develop techniques in working with vectors, kinematics and explore simulation and sampling techniques in statistics. Students use CAS calculators to explore skills and concepts as well as practicing skills without using technology.

#### LEARNING ACTIVITIES

Explicit instruction of theory and use of technology, textbook exercises, problem-solving and modelling, application of skills to real-world problems.

#### KEY SKILLS REQUIRED

Mathematical skills and understanding, CAS calculator technology, application of mathematical skills and knowledge.

#### ASSESSED TASKS

Topic tests, application SAC tasks and two end of semester written examinations.

# Specialist Mathematics

## Units 3-4

Specialist Mathematics is recommended for students intending to study mathematics, science, computing or engineering based university subjects. A high level of mathematics is essential in our rapidly changing and technologically advanced world. Students enrolled in this course must also be enrolled in Mathematical Methods Units 3 and 4. Successful completion of both Specialist Mathematics Units 1 and 2 and Mathematical Methods Units 1 and 2 is highly recommended to undertake Specialist Mathematics Units 3 and 4.

**Students in this course must have an approved CAS calculator.**

### UNIT 3

Students will study vectors, complex numbers, coordinate geometry, trigonometry and calculus.

#### LEARNING ACTIVITIES

Textbook exercises, revision activities, note taking, writing of summaries, analysis and applications exercises. Many of these activities will also incorporate the use of technology, primarily the TI-Nspire graphing calculator.

#### KEY SKILLS REQUIRED

High level mathematical skills and understanding is required. A large bank of key skills and knowledge from studying Year 11 Advanced General Mathematics and Maths Methods CAS is assumed. Students are expected to be able to apply techniques, routines and processes related to the areas of study with and without the use of technology.

#### ASSESSED TASKS

Two school assessed analysis SAC tasks.

### UNIT 4

Students will study calculus techniques and applications, particularly integral calculus. This leads to the study of the mathematics of movement and motion, with topics include differential equations, kinematics, vector calculus, statics and dynamics. The study of probability and statistics includes statistical inference related to the definition and distribution sample means, simulations and confidence intervals.

#### LEARNING ACTIVITIES

Textbook exercises, revision activities, note taking, writing of summaries, analysis and applications exercises. Many of these activities will also incorporate the use of technology, primarily the TI-Nspire graphing calculator.

#### KEY SKILLS REQUIRED

High level mathematical skills and understanding is required. A large bank of key skills and knowledge from studying Specialist Mathematics Units 1 and 2 and Maths Methods Units 1 and 2 is assumed. Students are expected to be able to apply techniques, routines and processes related to the areas of study with and without the use of technology.

#### ASSESSED TASKS

Application SAC, topic test SACs and two end of year written examinations.

**VCAA ASSESSMENT** – The overall Study Score will consist of:

School Assessed Coursework (40%)

Examination (technology free) in November (20%)

Examination (technology active) in November (40%)