

UNIT 1 & 2 SPECIALIST MATHEMATICS

Specialist Mathematics is intended to provide an appropriate foundation for students wishing to undertake further study in, but not limited to, areas such as Science and Engineering. Enrolment in Specialist Mathematics requires a concurrent enrolment in, or previous completion, of Mathematical Methods.

UNIT 1

In this unit students will investigate geometry in the plane with an emphasis on derivation and proof of theorems. Students will undertake an investigation of the definitions and properties of natural, rational and complex numbers and formal proofs techniques including direct proof, contradiction, contrapositive and induction. Students will review trigonometry and apply the sine and cosine rules. Students will discuss arithmetic and geometric sequences and series. The definition and properties of the complex numbers will be investigated. The topic of kinematics will be discussed and will include modelling and analysis of rectilinear motion under constant acceleration, including the use of the constant acceleration formulas.

AREA OF STUDY

- Algebra, number and structure
- Discrete mathematics

OUTCOMES

Outcome 1: Define and explain key concepts as specified in the content from the areas of study and apply a range of related mathematical routines and procedures.

Outcome 2: Apply mathematical processes in non-routine contexts, including situations with some open-ended aspects requiring investigative, modelling or problem-solving techniques or approaches, and analyse and discuss these applications of mathematics.

Outcome 3: Apply computational thinking and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring investigative, modelling or problem-solving techniques or approaches.

UNIT 2

In this unit students will cover vectors in the plane. They will also be introduced to vector algebra and the application of vectors to geometric proofs, orienteering, navigation and statics. Cartesian, polar and parametric forms and graphs of lines, parabolas, circles, ellipses and hyperbola will be explored. Students will be introduced to and apply trigonometric identities including the Pythagorean identity; the angle sum, difference and double angle identities. Linear transformations of the plane will be explored. Students will also undertake the study of statistics which includes simulations, sampling and sampling distributions including the introduction to random variables for discrete distributions.

AREA OF STUDY

- Functions, relations and graphs
- Space and measurement
- Data analysis, probability and statistics
- Algebra, number and structure

OUTCOMES

Outcome 1: Define and explain key concepts as specified in the content from the areas of study and apply a range of related mathematical routines and procedures.

Outcome 2: Apply mathematical processes in non-routine contexts, including situations with some open-ended aspects requiring investigative, modelling or problem-solving techniques or approaches, and analyse and discuss these applications of mathematics.

Outcome 3: Apply computational thinking and use numerical, graphical, symbolic and statistical functionalities of technology to develop mathematical ideas, produce results and carry out analysis in situations requiring investigative, modelling or problem-solving techniques or approaches.