



VCE SPECIALIST MATHEMATICS

INFORMATION GUIDE



120 CELEBRATING 100 YEARS
1904 2024

Kilbreda College

VCE SPECIALIST MATHEMATICS

RATIONALE

This study is designed to provide access to worthwhile and challenging mathematical learning. It is designed to promote students' awareness of the importance of mathematics in everyday life in a technological society and globalised world, and to develop confidence and the disposition to make effective use of mathematical concepts, processes and skills in practical and theoretical contexts. Specialist Mathematics Units provides for the study of various mathematical structures, reasoning and proof. The areas of study in Units 3 and 4 extend content from Mathematical Methods Units 3 and 4 to include rational and other quotient functions as well as other advanced mathematics topics such as logic and proof, complex numbers, vectors, differential equations, kinematics, and statistical inference.

UNIT 1

Area of Study 1

Algebra, number and structure

In this area of study students cover the development of formal mathematical notation, definition, reasoning and proof applied to number systems, graph theory, sets, logic, and Boolean algebra, and the development of algorithms to solve problems.

Area of Study 2

Discrete mathematics

In this area of study students cover the study of sequences, series, and first-order linear difference equations, combinatorics, including the pigeon-hole principle, the inclusion-exclusion principle, permutations and combinations, combinatorial identities, and matrices.

UNIT 2

Area of Study 1

Data analysis, probability and statistics

In this area of study students cover the study of linear combinations of random variables and the distribution of sample means of a population, with the use of technology to explore variability of sample means.

Area of Study 2

Space and measurement

In this area of study students cover trigonometry and identities, rotation and reflection transformations of the plane and vectors for working with position, shape, direction and movement in the plane and related applications.

Area of Study 3

Algebra, number and structure

In this area of study students cover the arithmetic and algebra of complex numbers, including polar form, regions and curves in the complex plane and introduction to factorisation of quadratic functions over the complex field.

Area of Study 4

Functions, relations and graphs

In this area of study students cover an introduction to partial fractions; reciprocal and inverse circular functions and their graphs and simple transformations of these graphs; locus definitions of lines, parabolas, circles, ellipses and hyperbolas and the cartesian, parametric and polar forms of these relations.



CAREER OPTIONS

- Aerospace Engineer
- Air Traffic Controller
- Chemist
- Civil Engineer
- Economist
- Mechanical Engineer
- Pharmacist
- Physicist
- Robotics

UNIT 3 & 4

Area of Study 1

Discrete mathematics

In this area of study students cover the development of mathematical argument and proof. This includes conjectures, connectives, quantifiers, examples and counter-examples, and proof techniques including mathematical induction. Proofs will involve concepts from topics such as: divisibility, inequalities, graph theory, combinatorics, sequences and series including partial sums and partial products and related notations, complex numbers, matrices, vectors and calculus.

Area of Study 2

Functions, relations and graphs

In this area of study students cover rational functions and other simple quotient functions, curve sketching of these functions and relations, and the analysis of key features of their graphs including intercepts, asymptotic behaviour and the nature and location of stationary points and points of inflection and symmetry.

Area of Study 3

Algebra, number and structure

In this area of study students cover the algebra of complex numbers, including polar form, factorisation of polynomial functions over the complex field and an informal treatment of the fundamental theorem of algebra.

Area of Study 4

Calculus

In this area of study students cover the advanced calculus techniques for analytical and numerical differentiation and integration of a broad range of functions, and combinations of functions; and their application in a variety of theoretical and practical situations, including curve sketching, evaluation of arc length, area and volume, differential equations and kinematics, and modelling with differential equations drawing from a variety of fields such as biology, economics and science.

Area of Study 5

Space and measurement

In this area of study students cover the arithmetic and algebra of vectors; linear dependence and independence of a set of vectors; proof of geometric results using vectors; vector representation of curves in the plane and their parametric and cartesian equations; vector kinematics in one, two and three dimensions; vector, parametric and cartesian equations of lines and planes.

Area of Study 6

Data analysis, probability and statistics

In this area of study students cover the study of linear combinations of random variables and introductory statistical inference with respect to the mean of a single population, the determination of confidence intervals, and hypothesis testing for the mean using the distribution of sample means.



To find out more information
about VCE Specialist Mathematics
at Kilbreda College, please contact:

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This flyer is correct as of July 2024, however may be subject to change.

