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YOUR
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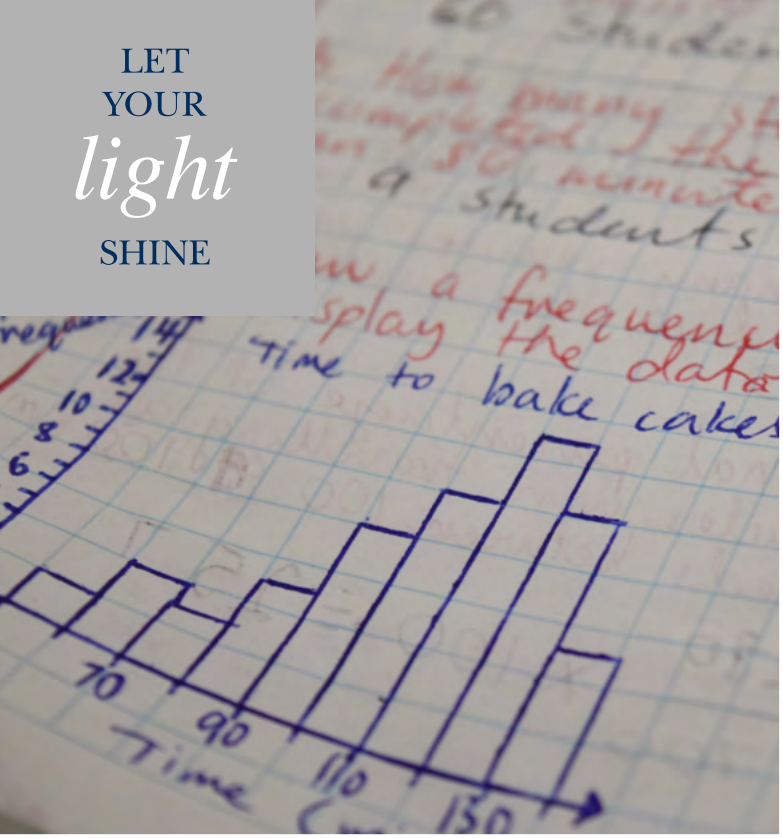

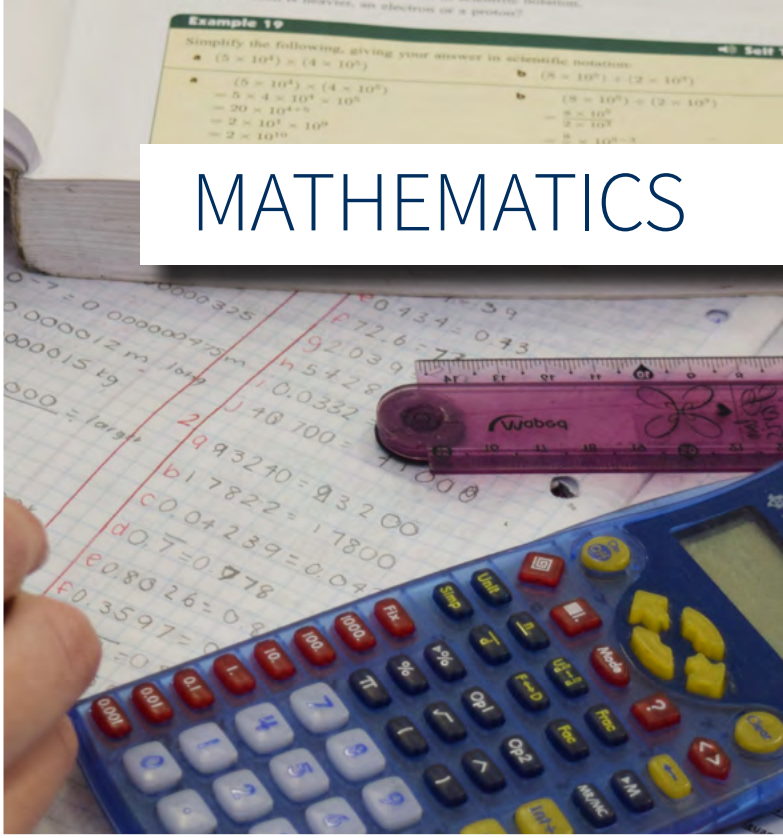

MATHEMATICS

TENISON WOODS COLLEGE

2018

CURRICULUM

YEAR 10-12

Learning Area Coordinator
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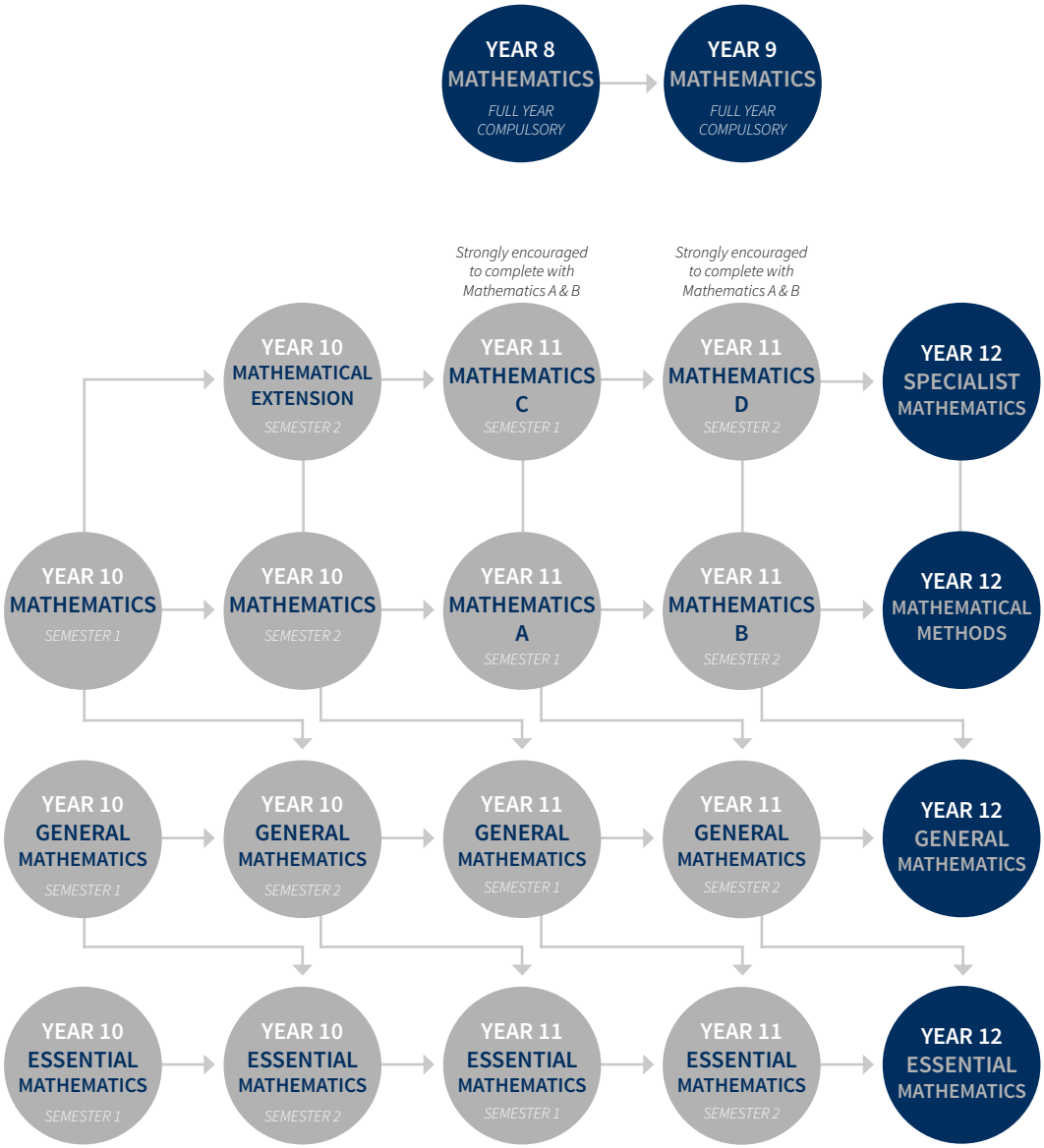
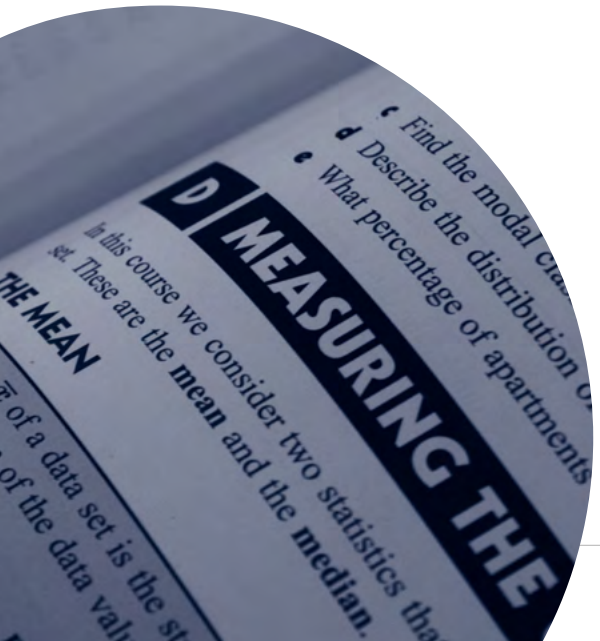
CONTENT STRANDS: NUMBER AND ALGEBRA • MEASUREMENT AND GEOMETRY • STATISTICS AND PROBABILITY

[MATHEMATICS]





All students in Mathematics from Year 10 are required to have a CASIO graphics calculator. The current model for 2018 is the CASIO fx-CG50 AU. However, the following older models are still permissible in SACE examinations: fx-CG20 AU, fx-9860G AU, fx-9860G AU Plus, cfx-9850G, cfx-9850G Plus, cfx-9850GB Plus.

[MATHEMATICS]

Mathematics is a diverse and growing field of human endeavour. Mathematics can make a unique contribution to the understanding and functioning of our complex society. By facilitating the current and new technologies and institutional structures, mathematics plays a critical role in shaping society.

It is important that students have the opportunity to gain the grasp of Mathematics that will allow them to be designers of the future, and leaders in various fields. They may be involved in product design, industrial design, production design, engineering design, or the design of new financial and commercial instruments. All students, regardless of gender or background, should have access to mathematical opportunities that accommodate and extend their experiences, broaden their perspective on mathematics, and allow them to appreciate the variety of its past and present roles in society. Mathematics is the study of number and its processes. The Mathematics curriculum at Tenison Woods College aims to instill in all students the social and work purposes of Mathematics, its understandings, practices and applications in a given context. Students will be able to participate independently or collaboratively in authentic experiences to provide the pathways for further education and training.

ESSENTIAL MATHEMATICS

Year Level: 10
SACE Credits: N/A
Pathways: Stage 1 Essential Mathematics
Prerequisites: Nil
Length: 1 year

Course Description:
Students will undertake the following topics:

- Calculations - solving simple and more complex calculations required for everyday living (both calculator and non-calculator);
- Scale and Ratio - writing and solving problems involving ratios, drawing and interpreting scale diagrams;
- Measurement - perimeter, area, surface area, volume and students learn how measurement is incorporated into a range of work and everyday contexts;
- Pythagoras and Trigonometry - trigonometric ratios, Pythagoras' Theorem and solving problems using trigonometry;
- Geometric Reasoning - geometrical construction, angle properties, classifying triangles, quadrilaterals and polygons;
- Saving and Borrowing - solving problems involving simple and compound interest using digital technologies;
- Earning and Spending - income, budgeting, banking skills and different methods of payment;
- Data Representation and Interpretation - types of data, and collecting, organising, analysing and interpreting data to make informed decisions and predictions.

Assessment:
Assessment components each semester include Skills and Application Tasks (tests and a semester exam) and Mathematical Investigations.

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

GENERAL MATHEMATICS

Year Level: 10
SACE Credits: N/A
Pathways: Stage 1 General Mathematics, Stage 1 Essential Mathematics
Prerequisites: Successful completion of Year 9 Mathematics
Length: 1 year

Course Description:
Students will undertake the following topics:

- Measurement - perimeter, area, surface area, volume and students learn how measurement is incorporated into a range of work and everyday contexts;
- Pythagoras and Trigonometry - trigonometric ratios, Pythagoras's Theorem, problem solving and true bearings;
- Scale and Ratio - writing and solving problems involving ratios, drawing and interpreting scale diagrams;
- Algebra – simplifying, inverse operations, problem solving with equations, using technology to solve an equation and substituting into formulae;
- Saving and Borrowing - solving problems involving simple and compound interest using digital technologies;
- Earning and Spending - income, budgeting, banking skills and different methods of payment;
- Linear Function - coordinate geometry and solving linear equations, introduction to simultaneous equations
- Data Representation and Interpretation - types of data, measuring the centre, measuring spread and an introduction to the normal distribution.

Assessment:
Assessment components each semester include Skills and Application Tasks (tests and a semester exam) and Mathematical Investigations.

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

[MATHEMATICS]

MATHEMATICS

Year Level: 10 **SACE Credits:** N/A
Pathways: Stage 1 Mathematics, Stage 1 General Mathematics
Prerequisites: Successful completion of Year 9 Mathematics, with a minimum of a B grade
Length: 1 year

Course Description:
Students will undertake the following topics:

- Linear relationships - solving linear equations with multiple steps, inequalities and coordinate geometry;
- Pythagoras and Trigonometry - trigonometric ratios, Pythagoras's Theorem, sine and cosine rules, solving problems using trigonometry;
- Geometric Reasoning - congruent and similar triangles, angle properties and proofs;
- Patterns and Algebra - Factorising algebraic expressions, expansion, perfect squares, difference of perfect squares, factorising by sum and product, algebraic solutions of quadratic equations and quadratic formula;
- Non-linear Relationships - models of growth and decay, operations involving indices, index laws and exponential equations;
- Data Representation and Interpretation - types of data, measuring the centre, measuring spread and an introduction to the normal distribution; and
- Chance - two and three step chance experiments, probabilities of events and conditional statements.

Assessment:
Assessment components each semester include Skills and Application Tasks (tests and a semester exam) and Mathematical Investigations.

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

MATHEMATICAL EXTENSION

Year Level: 10
Pathway: This course is highly recommended for students who are considering SACE Stage 1 Mathematics and Stage 2 Specialist Mathematics.
SACE Credits: N/A
Prerequisite: Successful completion of Year 9 Mathematics
Length: 1 semester (second)

Course Description:
Students will undertake the following topics:

- Using units of measurement, geometric reasoning and trigonometry - students study congruent and similar triangles, circle theorems, problem-solving, sine and cosine rules, area formula, Pythagoras' theorem in three-dimensional contexts;
- Trigonometric Functions - students use the unit circle to define and graph trigonometric functions and solve simple trigonometric equations; and
- Real Numbers - students study rational and irrational numbers, surds, fractional indices, logarithms and solving exponential equations.

Assessment:
Assessment components each semester include Skills and Application Tasks (tests and a semester exam) and Mathematical Investigations.

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

ESSENTIAL MATHEMATICS

Year Level: 11 (Stage 1)
SACE Credits: 10 per semester
Pathway: Stage 2 Essential Mathematics
Prerequisite: Nil
Length: 1 year

Course Description:
Essential Mathematics offers senior secondary students the opportunity to extend their mathematical skills in ways that apply to practical problem solving in everyday and workplace contexts. Students apply their mathematics to diverse settings, including everyday calculations, financial management, business applications, measurement and geometry, and statistics in social contexts.

In Essential Mathematics there is an emphasis on developing students' computational skills and expanding their ability to apply their mathematical skills in flexible and resourceful ways. This subject is intended for students planning to pursue a career in a range of trades or vocations.

Students will undertake the following topics:

- Calculations, Time, and Ratio;
- Data in Context;
- Measurement;
- Earning and Spending;
- Geometry;
- Investing.

Assessment:
Stage 1 Essential Mathematics allows students to achieve the numeracy requirement in the SACE. Students who achieve a C grade or better in this subject meet the compulsory 10-credit numeracy requirement.
Assessment components include Skills and Application Tasks (a minimum of two tests) (50%), and two Folio Tasks (50%).

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

[MATHEMATICS]

GENERAL MATHEMATICS

Year Level: 11 (Stage 1)
SACE Credits: 10 per semester
Pathways: Stage 2 General Mathematics, Stage 2 Essential Mathematics.
Prerequisites: Satisfactory achievement in Year 10 General Mathematics.
Length: 1 year

Course Description:
General Mathematics extends students' mathematical skills in ways that apply to practical problem solving. A problems-based approach is integral to the development of mathematical models and the associated key ideas in the topics. These topics cover a diverse range of applications of mathematics, including personal financial management, measurement and trigonometry, the statistical investigation process, modelling using linear and non-linear functions, and discrete modelling using networks and matrices.
Successful completion of this subject at Stage 2 prepares students for entry to tertiary courses requiring a non-specialised background in mathematics.

Assessment:
Stage 1 General Mathematics allows students to achieve the numeracy requirement in the SACE. Students who achieve a C grade or better in this subject meet the compulsory 10-credit numeracy requirement.
Assessment components include three Skills and Application Tasks (tests) (65%), and Mathematical Investigations (35%).

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

MATHEMATICS A & B

Year Level: 11 (Stage 1)
SACE Credits: 10 per semester
Pathways: Stage 2 Mathematical Methods or Stage 2 General Mathematics. It is recommended that students also undertake Mathematics C if intending to study Stage 2 Mathematical Methods.
Prerequisites: Successful completion of Year 10 Mathematical Methods, with a minimum of a B grade.
Length: 2 semesters

Course Description: Mathematics A and B develops an increasingly complex and sophisticated understanding of calculus, statistics, mathematical arguments, and proofs, and using mathematical models. By using functions, their derivatives, and integrals, and by mathematically modelling physical processes, students develop a deep understanding of the physical world through a sound knowledge of relationships involving rates of change. Students use statistics to describe and analyse phenomena that involve uncertainty and variation.

Mathematics A and B provides the foundation for further study in mathematics in Stage 2 Mathematical Methods and Stage 2 Specialist Mathematics.

Assessment:
Stage 1 Mathematics A and B allows students to achieve the numeracy requirement in the SACE. Students who achieve a C grade or better in this subject meet the compulsory 10-credit numeracy requirement.

Assessment components include:
- Skills and Application Tasks;
- Mathematical Investigations.

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

MATHEMATICS C & D

Year Level: 11 (Stage 1)
SACE Credits: 10 per semester
Pathways: Stage 2 Specialist Mathematics, Stage 2 Mathematical Methods.
Prerequisites: Successful completion of Year 10 Mathematical Methods, with a minimum of a B grade. Students must have studied or be concurrently studying Stage 1 Mathematics A and B.
Length: 2 semesters

Course Description: Mathematics C and D draws on and deepens students' mathematical knowledge, skills, and understanding and provides opportunities for students to develop their skills in using rigorous mathematical arguments and proofs, and using mathematical models. It includes the study of Arithmetic and Geometric Sequences and Series, Geometry, Vectors, Trigonometry, Matrices and Real and Complex Numbers.

The subject leads to study in a range of tertiary courses such as mathematical sciences, engineering, computer science, and physical sciences. Students envisaging careers in related fields will benefit from studying this subject.

Assessment:
Stage 1 Mathematics C and D allows students to achieve the numeracy requirement in the SACE. Students who achieve a C grade or better in this subject meet the compulsory 10-credit numeracy requirement.
Assessment components include:
- Skills and Application Tasks
- Mathematical Investigations

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator).

[MATHEMATICS]

ESSENTIAL MATHEMATICS

Year Level: 12 (Stage 2)
SACE Credits: 20
Pathways: This subject is intended for students planning to pursue a career in a range of trades or vocations.
Prerequisites: Satisfactory achievement in Stage 1 Essential Mathematics with a minimum B grade or enrolment in Stage 1 General Mathematics or Stage 1 Mathematics A & B.
Length: 1 year

Course Description:
Essential Mathematics offers senior secondary students the opportunity to extend their mathematical skills in ways that apply to practical problem-solving in everyday and workplace contexts. Students apply their mathematics to diverse settings, including everyday calculations, financial management, business applications, measurement and geometry, and statistics in social contexts.

In Essential Mathematics there is an emphasis on developing students' computational skills and expanding their ability to apply their mathematical skills in flexible and resourceful ways. This subject is intended for students planning to pursue a career in a range of trades or vocations.

- Scales, Plans, and Models;
- Measurement;
- Business Applications;
- Statistics;
- Investments and Loans.

Students will undertake the following topics:
Assessment components include four Skills and Application Tasks (30%), three Folio Tasks (40%) and one External Examination (30%).

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-9860 G AU PLUS is recommended or another SACE Board approved CASIO graphics calculator) and a computer with Microsoft Excel or similar. It is recommended that students purchase an Essential Mathematics Revision Guide (at an approximate cost of $30).

GENERAL MATHEMATICS

Year Level: 12 (Stage 2)
SACE Credits: 20
Pathways: This subject prepares students for a trade or tertiary study requiring a non-specialised background in mathematics.
Prerequisites: Satisfactory achievement in Stage 1 General Mathematics with a minimum B grade or enrolment in Stage 1 Mathematics A & B.
Length: 1 year

Course Description:
General Mathematics extends students' mathematical skills in ways that apply to practical problem-solving. A problem-based approach is integral to the development of mathematical models and the associated key concepts in the topics. These topics cover a diverse range of applications of mathematics, including personal financial management, the statistical investigation process, modelling using linear and non-linear functions, and discrete modelling using networks and matrices.
Successful completion of this subject at Stage 2 prepares students for entry to tertiary courses requiring a non-specialised background in mathematics.

Assessment:
Assessment components include five Skills and Application Tasks (tests) (40%), two mathematical investigations (30%) and one External Examination (30%).

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU is recommended or another SACE Board approved CASIO graphics calculator). It is recommended that students purchase a General Mathematics Revision Guide (at an approximate cost of $30).

MATHEMATICAL METHODS

Year Level: 12 (Stage 2) **SACE Credits:** 20
Pathways: This is a prerequisite subject for a number of tertiary Science, Mathematics and Engineering degrees. Refer to the current university admission guides for assumed knowledge and prerequisite requirements.
Prerequisites: Successful completion of Stage 1 Mathematics A & B with a minimum B grade. **Length:** 1 year

Course Description:
Mathematical Methods develops an increasingly complex and sophisticated understanding of calculus and statistics. By using functions and their derivatives and integrals, and by mathematically modelling physical processes, students develop a deep understanding of the physical world through a sound knowledge of relationships involving rates of change. Students use statistics to describe and analyse phenomena that involve uncertainty and variation.
Mathematical Methods provides the foundation for further study in mathematics, economics, computer sciences, and the sciences. It prepares students for courses and careers that may involve the use of statistics, such as health or social sciences. When studied together with Specialist Mathematics, this subject can be a pathway to engineering, physical science, and laser physics.

Assessment:
Assessment components include five Skills and Application Tasks (tests) (50%), one Mathematical Investigation (20%) and an External Examination (30%).

[MATHEMATICS]

SPECIALIST MATHEMATICS

Year Level: 12 (Stage 2)
SACE Credits: 20
Pathways: This is a prerequisite subject for a number of tertiary Mathematics and Engineering degrees. Refer to the current university admission guides for assumed knowledge and prerequisite requirements.
Prerequisites: Successful achievement in Stage 1 Mathematics C & D with a minimum B grade. Students must have studied or be concurrently studying Stage 2 Mathematical Methods.
Length: 1 year

Course Description:
This subject extends many of the concepts introduced in Stage 1 Mathematics C & D and complements the Stage 2 Mathematical Methods Course. All students taking this course must be studying Stage 2 Mathematical Methods or have already completed it.

In this course students will continue to develop their skills in mathematical problem solving. Students will be required to use mathematical techniques and strategies to find solutions to abstract and real-world problems. Appropriate communication of mathematical reasoning is also an important aspect of the course.

The content includes Mathematical Induction, Complex Numbers, Functions and Graphs, Vectors in 3-dimensions, Integration, Rates of Change and Differential Equations.

Students studying this course must have very highly developed algebraic skills and good problem solving ability. A sound understanding of the use of graphics calculators in mathematics will also be important as the graphics calculator will be used extensively as a tool to provide graphical representations and numerical solutions.

Assessment:
Assessment in this course consists of six Skills and Applications Tasks (50%), one Mathematical Investigation (20%) and an External Examination (30%).

Additional Information:
It is compulsory that students have access to a graphics calculator (the CASIO fx-CG50 AU PLUS is recommended or another SACE Board approved CASIO graphics calculator). It is recommended that students purchase a Specialist Mathematics Revision Guide (at an approximate cost of $30).