MATHEMATICS
Head of Department: Deb Woodard-Knight

Year 7 MATHEMATICS (Australian Curriculum) – Core Subject

Students choose one of two options in Year 7; Year 7 Mathematics or Year 7 Essential Mathematics. Essential Mathematics is based on the same content as the Mathematics course but topics are covered more slowly. The three areas of study are Number and Algebra, Measurement and Geometry, and Statistics and Probability. Developing student’s abilities to communicate their understandings of Mathematics and how it is relevant to the real world is an important objective.

Calculators, geometrical software and statistics software are integral instruments in the learning process. Assessment tasks include tests, assignments, project work and investigations, and end of semester tests.

Year 8 MATHEMATICS (Australian Curriculum) – Core Subject

Students choose one of two options in Year 8; Year 8 Mathematics or Year 8 Essential Mathematics. Essential Mathematics is based on the same content as the Mathematics course but topics are covered more slowly.

The Year 8 Mathematics courses build on the foundational work studied in Year 7. i.e understanding and application of skills in number and place value, real numbers, money and financial mathematics, patterns and algebra, linear and non-linear relationships, units of measurement, geometric reasoning, chance and data representation and interpretation. Incorporated within the topics are investigative components of work which serve to link the learning in the classroom with applications and events of the outside world.

The focus on skill development is on communication. Students are encouraged to articulate their understandings through concise, accurate and meaningful solutions. An emphasis is placed on being organised in learning, disciplined and confident in approach, and willing to explore and trial new ideas. The use of technological tools such as Tinker Plots software, spreadsheets and scientific and graphics calculators add to the important focus on developing problem solving skills.

Assessment tasks include regular summative topic tests, assignments, directed investigations, homework tasks and projects. End of Semester tests are held at the conclusion of both Semesters.

Year 9 MATHEMATICS (Australian Curriculum) - Core Subject

In 2017 the Australian Curriculum will be taught after being introduced in 2013. Students choose one of two options in Year 9; Year 9 Mathematics or Year 9 Essential Mathematics. Essential Mathematics is based on the same content as the Mathematics course but topics are covered more slowly.
The Year 9 Mathematics course builds on the knowledge and skills developed in the Year 8 program. i.e. understanding and application of skills in, real numbers, money and financial mathematics, patterns and algebra, linear and non-linear relationships, units of measurement, geometric reasoning, Pythagoras and trigonometry, chance and data representation and interpretation. The initial topics of Algebra, Pythagoras’ Theorem, Fractions and Measurement serve to consolidate and strengthen students’ understandings of critical mathematical concepts.

The course expands into a series of more complex topics including Deductive Geometry, statistics, Quadratic Theory and Business Mathematics, and relies on students developing their skills as problem solvers, critical thinkers and investigators.

Links between the learning and its application to situations outside the classroom become more prominent as students involve themselves in the key processes of mathematical modeling, estimation and prediction, and enquiry. Scientific and Graphics calculators, Geometry software and Statistics software continue to support the mathematics program.

Assessment tasks include regular summative topic tests, assignments, directed investigations, homework tasks and projects. End of Semester tests are held at the conclusion of each Semesters.

**Year 10 MATHEMATICS**

At Year 10, students can choose one of three Year 10 options in Mathematics; Mathematics 10/10A, Mathematics General or Mathematics Essential. Students who have completed the Year 10/10A in an accelerated program may choose a Stage 1 Mathematics course (two semesters).

**Year 10 MATHEMATICS (10/10A)**

Mathematics 10/10A prepares students for the demands of any Mathematics subject at SACE Stage 1 level. This course continues to build on the concepts and methods taught in Year 9. Students will work with linear and quadratic functions, simple and compound interest, statistical relationships, measurement and trigonometry. Students’ skills in the appropriate use of graphics calculators and computer applications continue to be developed. The importance of presenting, rationalising and applying mathematical knowledge is a focus of the program.

Success, wisdom, balance
Year 10 MATHEMATICS GENERAL

The second option for studies in Mathematics at Year 10 is the Mathematics General course. This program prepares students for Year 11 Mathematics General – a two semester courses at SACE Stage 1. Topics include financial mathematics, measurement, linear equations and graphs, trigonometry and statistics. The use of spreadsheets, geometry software and scientific and graphic calculators is extensive.

All of the Year 10 courses include the assessment tasks of summative and formative tests, investigations, projects and assignments. Students of each course will sit an examination paper at the end of both Semesters 1 and 2.

Year 10 MATHEMATICS ESSENTIAL

The third option at Year 10 is Year 10 Essential Mathematics. This course prepares students for Year 11 Essential Mathematics. Topics will include calculations, some without calculators, simple straight line graphs, ratios, financial mathematics and some measurement.

All of the Year 10 courses include the assessment tasks of summative and formative tests, investigations, projects and assignments. Students of each course will sit an examination paper at the end of both Semesters 1 and 2.

YEAR 11 MATHEMATICS - SACE Stage 1

SACE requirements
The SACE Board requires all students to achieve a level of Numeracy within a Mathematics course at stage 1. This is a compulsory component of the SACE. All students must achieve a C grade standard in a Mathematics stage 1 course to qualify for the compulsory 10 points of Numeracy.

At SACE Stage 1 students at St John’s Grammar usually study at least 2 units of Mathematics.

Stage 1 MATHEMATICS ESSENTIAL – Full Year (20 Credits)

Pre-requisites: - Successful completion of a Year 10 Mathematics course.

This two semester course meets the needs of students who are interested in gaining skills required in the workplace and in everyday life. They will learn how to approach new challenges by investigating, modelling, reasoning, visualising and problem-solving. Communicating their results to others is also a focus of the course.

The course design is flexible and may be composed of topics such as financial management, business applications, measurement and geometry and statistics.

Assessment includes summative tests and investigations.

The course prepares students for the SACE Stage 2 subject of the same name in 2017: Essential Mathematics. This subject is intended for students planning to pursue a career in a range of trades or vocations.

Success, wisdom, balance
Stage 1 MATHEMATICS GENERAL – Full Year (20 Credits)

Pre-requisites: - Successful completion of the Year 10 Mathematics General or Mathematics 10/10A course.

The 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. Assessment tasks include project and assignment work, formative and summative tests, investigations and examinations.

The course prepares students for the SACE Stage 2 subject of the same name in 2017: Mathematics General. Studies in this subject lead to tertiary courses requiring a non-specialised background in mathematics.

Stage 1 MATHEMATICAL METHODS – 2 Semesters (20 Credits)

Pre-requisites: - Successful completion of the Year 10 Mathematics 10/10A course at the A or B level.

Mathematics includes the topics of Functions and Graphs, Polynomials, Trigonometry, Counting & Statistics, Introductory Calculus and Growth and Decay. The development of skills of investigating, analysing, evaluating and inferring form a crucial part of the program, highlighted by the many investigative tasks and project work incorporated. Technological tools (graphics calculators and graphing/geometric software) are extensively employed.

Assessment includes: - summative tests and investigations. Examinations occur at the end of both semesters.

The course prepares students for the Stage 2 subject in 2017; Mathematical Methods. The Mathematical Methods subject caters for further studies in areas such as health or social sciences which involve the use of statistics.

Stage 1 MATHEMATICS SPECIALIST – 2 Semesters (20 Credits)

Pre-requisites: A or B grade in the Year 10 Mathematics 10/10A Course.

This subject is to be taken in conjunction with the Stage 1 subject Mathematical Methods. Topics studied in depth are Arithmetic and Geometric Sequences and Series, Geometry, Vectors, Further Trigonometry, matrices and Real and complex numbers. The course encourages students to theorise, explore and make conjectures and proofs based on a host of mathematical principles and is complemented by a large range of investigations and tests. Graphics calculators are extensively employed

Assessment includes: - Summative tests and investigations.

Success, wisdom, balance
The course is a pre-requisite for the Stage 2 subject Mathematics Specialist in 2017 which must be studied in conjunction with Stage 2 Mathematical Methods. This subject caters for those students who want to continue their studies in Mathematics at the tertiary level in fields such as Mathematical Science, Engineering, Computer Science, laser physics and space science.

The Senior (MASA) Maths Quiz night winners in General Knowledge & Mathematics Category 2015.

In 2017 the new Stage 2 SACE courses will be introduced.

Stage 2 MATHEMATICAL METHODS – Full Year (20 Credits)

Pre-requisite: Stage 1 Mathematics (2 unit course called Stage 1 Mathematical Methods)

Mathematical Methods develops an increasingly complex and sophisticated understanding of calculus and statistics. Students develop a deep understanding of the physical world by studying functions, their derivatives and integrals, mathematical modelling and relationships involving rates of change. The study of statistics allows students to describe and analyse phenomena that involve uncertainty and variation.

This subject provides the foundation for further study in mathematics, economics, computer science, and the sciences. When studied with Specialist Mathematics this subject can be a pathway to engineering, physical science and laser physics.

Mathematical Methods prepares students for courses and careers that may involve the use of statistics, such as health or social sciences.

Assessment includes: - six Skills and Applications Tasks (50%), one Investigation (20%) and a final 3 hour external examination (30%).
Stage 2 MATHEMATICS SPECIALIST – Full Year (20 Credits)

Pre-requisite: Stage 1 Mathematics x2 (Stage 1 Mathematics Specialist and Stage 1 Mathematical Methods)

Requirement: Must be studied with Stage 2 Mathematical Methods (unless a student is accelerated and has undertaken Stage 2 Mathematical Methods as a Year 11 student the previous year)

Mathematics Specialist includes the study of functions and calculus. It draws on and deepens students’ mathematical knowledge, skills, and understanding, and provides opportunities for students to develop their skills in using rigorous proofs, and using mathematical models.

Mathematics Specialist leads to tertiary courses such as engineering, computer science, and physical sciences. Studying this course will enhance the possibility of future careers in these related fields.

Assessment includes: - six Skills and Application Tasks (50%), one Investigation (20%), and an external examination (30%).

Stage 2 MATHEMATICS GENERAL – Full Year (20 Credits)

Pre-requisite: Stage 1 Mathematics General or Stage 1 Mathematical Methods.

Mathematics General extends students’ skills in ways that apply to practical problem solving. Topics cover applications of mathematics in the areas of personal finance management, statistical investigations process, modelling using linear and non-linear functions, and discrete modelling using networks and matrices.

This subject prepares students for entry to tertiary courses requiring a non-specialised background in mathematics.

Assessment includes five Skills and Applications Tasks (40%), two Investigations (30%) and a final 2 hour external examination (30%)

Stage 2 MATHEMATICS ESSENTIAL – Full Year (20 Credits)

Pre-requisite: Stage 1 Essential Mathematics at A or high B level, or Stage 1 Mathematics General.

This subject offers students the opportunity to extend their skills in practical problem solving in everyday and workplace contexts. Topics cover everyday calculations, financial management, business applications, measurement and geometry and statistics.

This subject is intended for students planning to pursue a career in a range of trades or vocations.

Assessment includes: - four Skills and Application Tasks (30%), three Investigations (40%), and a 2 hour external examination (30%).

Success, wisdom, balance