Semester 1 Course Overview

Faculty: Mathematics **Subject:** Mathematics

Year level: 10A (Extension Mathematics)

Course Outline

Year 10 Extension Mathematics aims to prepare students who intend on studying Mathematical Methods and/or Specialists Mathematics in senior school. Mathematics curriculum is built around the three content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability. The proficiency strands of Understanding, Fluency, Problem Solving and Reasoning are an integral part of content across the curriculum. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed and further provide the language to build in the developmental aspects of the learning of mathematics.

Term 1

Finance, Chance, and Data Representation and Interpretation

In this unit students will develop Microsoft Excel skills to evaluate simple vs. compounded growth. They will compare data sets, describe bivariate data, and describe statistical relationships between two continuous variables.

Money and financial mathematics

- Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies

Chance

- Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence
- Use the language of 'if ....then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language

Data representation and interpretation

- Determine quartiles and interquartile range
- Construct and interpret box plots and use them to compare data sets
- Compare shapes of box plots to corresponding histograms and dot plots
- Use scatter plots to investigate and comment on relationships between two numerical variables
- Investigate and describe bivariate numerical data where the independent variable is time
- Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data
- (10A) Calculate and interpret the mean and standard deviation of data and use these to compare data sets
- (10A) Use information technologies to investigate bivariate numerical data sets. Where appropriate use a straight line to describe the relationship allowing for variation

Assessment

Task Number	Task 1.1
Technique	Examination
Due Date	Week 8, Lessons 1 and 2 (14/3/22 & 16/3/22)
Conditions	

- 2x 70 minutes
- 5 minute perusal time each lesson
- Calculator permitted

Term 2

Quadratics, Parabolas, Surds, Indices, and Logarithms

In this unit students will develop mathematical report writing skills and conventions as they solve a problem using quadratics and sketching parabolas. They will also be extended by learning how to work with surds, index laws, and logarithm laws.

Patterns and algebra

- Factorise algebraic expressions by taking out a common algebraic factor
- Simplify algebraic products and quotients using index laws
- Apply the four operations to simple algebraic fractions with numerical denominators
- Expand binomial products and factorise monic quadratic expressions using a variety of strategies
- Substitute values into formulas to determine an unknown

Linear and non-linear relationships

- Solve problems involving linear equations, including those derived from formulas
- Explore the connection between algebraic and graphical representations of relations such as simple quadratics, circles and exponentials using digital technology as appropriate
- Solve linear equations involving simple algebraic fractions
- Solve simple quadratic equations using a range of strategies
- (10A) Solve simple exponential equations
- (10A) Describe, interpret and sketch parabolas, hyperbolas, circles and exponential functions and their transformations
- (10A) Factorise monic and non-monic quadratic expressions and solve a wide range of quadratic equations derived from a variety of contexts

Real numbers

- (10A) Define rational and irrational numbers and perform operations with surds and fractional indices
- (10A) Use the definition of a logarithm to establish and apply the laws of logarithms

Assessment

Task Number	Task 2.2
Technique	Problem Solving and Modelling Task (PSMT)
Due Date	Week 5, Friday (20/05/22)
Conditions	

- Up to 6 pages
- 6 weeks, including 6 in-class lessons
- Annotated draft provided

Task No. & Title	Task 2.3
Technique	Examination
Due Date	Week 10, Lessons 1-2 (20/06/22 & 22/06/22)
Conditions	

- 2x 70 minutes
- 5 minute perusal time each lesson
- Calculator NOT permitted