Senior Mathematical Methods (General)
Learning and Assessment Overview 2021

Year 11		Year 12	
MAM Unit 1 **Algebra, statistics and functions**	**MAM Unit 2** **Calculus and further functions**	**MAM Unit 3** **Further calculus**	**MAM Unit 4** **Further functions and statistics**
In Unit 1, students will develop mathematical understandings and skills to solve problems relating to the topics listed below. Arithmetic and geometric sequences are introduced and their applications are studied. Simple relationships between variable quantities are reviewed and these are used to introduce the key concepts of a function and its graph. Quadratic functions and index rules are revised. The study of inferential statistics begins in this unit with a review of the fundamentals of probability and the introduction of the concepts of conditional probability and independence. The algebraic expansion of powers of a binomial are found using the binomial theorem.	In Unit 2, students will develop mathematical understandings and skills to solve problems relating to the topics listed below. Exponential graphs are examined and their applications in a wide range of settings are explored. Logarithms are introduced and the basic trigonometric functions are studied. Rates and average rates of change are also introduced, and this is followed by the key concept of the derivative as an 'instantaneous rate of change'. These concepts are reinforced numerically by calculating difference quotients both geometrically, as gradients of chords and tangents, and algebraically. Calculus is developed to study the derivatives of polynomial and power functions, with applications of the derivative to curve sketching, calculating gradients and equations of tangents (a link to linear function assumed knowledge), determining instantaneous velocities and solving optimisation problems. Discrete random variables are introduced; this supports the development of a framework for statistical inference.	In Unit 3, students will develop mathematical understandings and skills to solve problems relating to the topics listed below: Logarithmic laws and definitions are developed and used. Logarithmic functions are explored graphically and algebraically. The study of calculus continues with the derivatives of exponential, logarithmic and trigonometric functions and their applications, together with some differentiation techniques and applications to optimisation problems and graph sketching. Integration, both as a process that reverses differentiation and as a way of calculating areas and the fundamental theorem of calculus, is introduced.	In Unit 4, students will develop mathematical understandings and skills to solve problems relating to: The study of calculus continues with some differentiation techniques and applications to optimisation problems and graph sketching. The cosine and sine rules are established and used. Use of discrete random variables in modelling random processes involving chance and variation are studied. Continuous random variables and their applications are explored and the normal distribution is used in a variety of contexts. The study of statistical inference in this unit is the culmination of earlier work on probability and random variables. The goal of statistical inference is to estimate an unknown parameter associated with a population using a sample of data drawn from that population. In Mathematical Methods, statistical inference is restricted to estimating proportions in two-outcome populations.
Topics	**Topics**	**Topics**	**Topics**
1. Arithmetic and geometric sequences and series 1 2. Functions and graphs 3. Counting and probability 4. Exponential functions 1 5. Arithmetic and geometric sequences and series 2.	1. Exponential functions 2 2. The logarithmic function 1 3. Trigonometric functions 1 4. Introduction to differential calculus 5. Further differentiation and applications 1 6. Discrete random variables 1.	1. The logarithmic function 2 2. Further differentiation and applications 2 3. Integrals.	1. Further differentiation and application 3 2. Trigonometric functions 2 3. Discrete random variables 2 4. Continuous random variables and the normal distribution 5. Interval estimates for proportions.
Unit Duration	**Unit Duration**	**Unit Duration**	**Unit Duration**
Yr 11 Weeks 1 - 16 (16 weeks)	Yr 11 Weeks 17 - 32 (16 weeks)	Yr 11 Weeks 33-38, Year 12 Weeks 1 - 10 (16 weeks)	Yr 12 Weeks 11-26, Revision 27-33, External Exam Weeks 34-37 (22 weeks)
Assessment Task/s	**Assessment Task/s**	**Assessment Task/s**	**Assessment Task/s**

FIA1 **Problem-solving and modelling task** *Weighting:* 20% *Conditions:* up to 10 pages, maximum of 2000 words, 4 weeks including 3 hours of classtime *Issued:* T 1 Week 5 *Due:* T 1 Week 8	**FIA2** **Examination** *Weighting:* 25% *Conditions:* 120 mins + 5 mins perusal short response items *Issued:* n/a *Due:* T 2 Week 6	**FIA3** **Examination** *Weighting:* 15% *Conditions:* 120 mins + 5 mins perusal short response items *Issued:* n/a *Due:* T 3 Week 4	**FIA4** **Examination** *Weighting:* 40% *Conditions:* 2 papers short response items *Issued:* n/a *Due:* T 4 Week 2	**IA1** **Problem-solving and modelling task** *Weighting:* 20% *Conditions:* up to 10 pages, maximum of 2000 words, 4 weeks including 3 hours of classtime *Issued:* T 1 Week 3 *Due:* Week 7	**IA2** **Examination** *Weighting:* 15% *Conditions:* 120 mins + 5 mins perusal short response items *Issued:* n/a *Due:* T 2 Week 6	**IA3** **Examination** *Weighting:* 15% *Conditions:* 120 mins + 5 mins perusal short response items *Issued:* n/a *Due:* T 3 Week 5	**EA4** **External Examination** *Weighting:* 50% *Conditions:* 2 papers short response items *Issued:* n/a *Due:* T 4 Week 4