Government of **Western Australia**
School Curriculum and Standards Authority

SAMPLE COURSE OUTLINE

MATHEMATICS METHODS
ATAR YEAR 12

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Sample course outline

Mathematics Methods – ATAR Year 12

Unit 3 and Unit 4

Semester 1

Week	Topic/Syllabus content	Assessment
1–2	**Further differentiation and applications (3.1.1–3.1.16)** Exponential functions – estimate and identify *e* and establish its derivative, use the exponential growth function and its derivative to solve problems Trigonometric functions – use geometric constructions, graphical and numerical methods to establish the derivative of sin *x* and cos *x* and use them to solve practical problems	
3	Differentiation rules – examine, apply and use the product, quotient and chain rule to differentiate a range of functions	**Task 1** (Week 3)
4–5	The second derivative and applications of differentiation – identify and apply differentiation techniques and concepts to optimisation problems, rates of change and graph sketching	**Task 2** (Week 5)
6	**Integrals (3.2.1–3.2.22)** Anti-differentiation – identify anti-differentiation as a process that reverses differentiation, establish and use notation and formulas and use linearity of anti-differentiation	
7–8	Definite integrals and the Fundamental theorem – estimate the area under a curve, link and interpret the limit of sums to area using integrals, examine develop and apply the Fundamental theorem as a link between differentiating and integrating	
9–10	Applications of integration – apply techniques of integration to rates of change, area and motion problems	**Task 3** (Week 10)
11–12	**Discrete random variables (3.3.1–3.3.16)** General discrete random variables – identify and develop discrete random variables and their associated probability functions, identify parameters and use DRVs to model and solve practical problems	
13	Bernoulli distributions – identify and use Bernoulli random variables and associated probabilities, determine parameters and model and solve problems	**Task 4** (Week 13)
14	Binomial distributions – examine the concept of a binomial random variable, determine associated parameters and probabilities and solve practical problems	
15	**Semester 1 examination**	**Task 5** (Examination week)

Semester 2

Week	Topic/Syllabus content	Assessment
1–2	**The logarithmic function (4.1.1–4.1.14)** Logarithmic functions – define logarithms, establish and use algebraic properties, solve equations and examine features of graphs, interpret and use logarithmic scales and identify suitable contexts to model by logarithmic functions	
3–5	Calculus of the natural logarithmic functions – define the natural logarithm and its inverse relationship to *e*, establish and use integrals and derivatives related to the natural logarithm and use them to solve practical problems	**Task 6** (Week 3) **Task 7** (Week 5)
6–7	**Continuous random variables and the normal distribution (4.2.1–4.2.7)** General continuous random variables – examine and use the concepts of a continuous random variable and associated parameters and probabilities in appropriate contexts	
8–9	Normal distributions – identify the features of the graph of a normal distribution, calculate probabilities and use these to solve practical problems that are suitable for modelling by normal random variables	**Task 8** (Week 9)
10	**Interval estimates for proportions (4.3.1–4.3.10)** Random sampling – examine the concept of randomness and bias and investigate variability of random samples from various distributions	
11–12	Sample proportions – examine the concept of the sample proportion and simulate repeated random sampling to illustrate the approximate normality of the distribution of sample proportions for large numbers of samples	**Task 9** (Week 13)
13–14	Confidence intervals for proportions – examine and use the concept of an interval estimate, define confidence intervals and margins of error and their relationship and use simulation to illustrate variations between samples	**Task 10** (Week 14)
15	**Semester 2 examination**	**Task 11** (Examination week)