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

SAMPLE COURSE OUTLINE

MATHEMATICS APPLICATIONS
ATAR YEAR 12

Sample course outline

Mathematics Applications – ATAR Year 12

Unit 3 and Unit 4

Semester 1

Week	Topic/Syllabus content	Assessment
1–2	**Bivariate data analysis (3.1.1–3.1.19)** Identifying and describing associations in categorical and numerical data – model and analyse associations using the framework of the data investigation process	
3–5	Fitting a linear model to numerical data, association and causation – model and analyse linear associations using the framework of the statistical investigation process	**Task 1** (Week 3)
6	**Growth and decay in sequences (3.2.1–3.2.11)** The arithmetic sequence – generate, display and use sequences and their rules to model and analyse practical situations involving linear growth and decay	**Task 2** (Week 6)
7	The geometric sequence – generate, display and use sequences and their rules to model and analyse practical situations involving geometric growth and decay	
8–9	First order linear recurrence relations – generate, display and use sequences and their rules to model and analyse practical situations involving increasing, decreasing and steady-state solutions	**Task 3** (Week 9)
10–11	**Graphs and networks (3.3.1–3.3.9)** The definition of a graph and associated terminology – demonstrate and use associated terminology, identify/construct networks and adjacency matrices to model and analyse everyday situations	
12–14	Planar graphs, paths and cycles – demonstrate and use associated terminology, use concepts to investigate and solve practical problems involving shortest path, Eulerian and Hamiltonian graphs	**Task 4** (Week 13)
15	**Semester 1 examination**	**Task 5** (Examination week)

Semester 2

Week	Topic/Syllabus content	Assessment
1–2	**Time series analysis (4.1.1–4.1.8)** Describing and interpreting patterns in time series data – construct time series plots, identify and describe features	
3–4	Analysing time series data – examine and use concepts and techniques of time series analysis including smoothing data, calculating seasonal indices, deseasonalising a time series, modelling long-term trends and making predictions	**Task 6** (Week 4)
5	**Loans, investments and annuities (4.2.1–4.2.7)** Compound interest loans and investments – model, investigate and solve practical problems to compare compound interest loans, investments and depreciating assets	
6–7	Reducing balance loans – model, investigate and solve practical problems involving loans with periodic repayments using a recurrence relation and with the aid of a financial calculator	**Task 7** (Week 7)
8–9	Annuities and perpetuities – investigate, model and solve practical problems associated with compound interest investments and loans with periodic payments made from the investment using a recurrence relation and with the aid of a financial calculator	**Task 8** (Week 9)
10	**Networks and decision mathematics (4.3.1–4.3.1)** Trees and minimum connector problems – identify minimal spanning trees and solve minimal connector problems using practical examples that can be represented by trees	
11	Flow networks – solve small-scale network flow problems in practical situations including use of the 'maximum flow-minimum cut' theorem	
12–13	Assignment problems – use graphs, tabular and/or matrix form to determine optimum assignment(s) by inspection or by using the Hungarian algorithm	**Task 9** (Week 13)
14	Project planning and scheduling using critical path analysis (CPA) – construct a network to represent a project and use a network to determine minimum time for completion, represent interdependencies and identify EST/LST and float times	**Task 10** (Week 14)
15	**Semester 2 examination**	**Task 11** (Examination week)