



## SAMPLE COURSE OUTLINE

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**MATHEMATICS APPLICATIONS**  
**ATAR YEAR 12**

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## Sample course outline

### Mathematics Applications – ATAR Year 12

#### Unit 3 and Unit 4

##### Semester 1

Week	Topic/Syllabus content	Assessment
1–2	<b>Bivariate data analysis (3.1.1–3.1.19)</b> 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	<b>Task 1</b> (Week 3)
6	<b>Growth and decay in sequences (3.2.1–3.2.11)</b> The arithmetic sequence – generate, display and use sequences and their rules to model and analyse practical situations involving linear growth and decay	<b>Task 2</b> (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	<b>Task 3</b> (Week 9)
10–11	<b>Graphs and networks (3.3.1–3.3.9)</b> 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	<b>Task 4</b> (Week 13)
15	<b>Semester 1 examination</b>	<b>Task 5</b> (Examination week)

## Semester 2

Week	Topic/Syllabus content	Assessment
1–2	<p><b>Time series analysis (4.1.1–4.1.8)</b></p> <p>Describing and interpreting patterns in time series data – construct time series plots, identify and describe features</p>	
3–4	<p>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</p>	<b>Task 6</b> (Week 4)
5	<p><b>Loans, investments and annuities (4.2.1–4.2.7)</b></p> <p>Compound interest loans and investments – model, investigate and solve practical problems to compare compound interest loans, investments and depreciating assets</p>	
6–7	<p>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</p>	<b>Task 7</b> (Week 7)
8–9	<p>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</p>	<b>Task 8</b> (Week 9)
10	<p><b>Networks and decision mathematics (4.3.1–4.3.1)</b></p> <p>Trees and minimum connector problems – identify minimal spanning trees and solve minimal connector problems using practical examples that can be represented by trees</p>	
11	<p>Flow networks – solve small-scale network flow problems in practical situations including use of the ‘maximum flow-minimum cut’ theorem</p>	
12–13	<p>Assignment problems – use graphs, tabular and/or matrix form to determine optimum assignment(s) by inspection or by using the Hungarian algorithm</p>	<b>Task 9</b> (Week 13)
14	<p>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</p>	<b>Task 10</b> (Week 14)
15	<p><b>Semester 2 examination</b></p>	<b>Task 11</b> (Examination week)