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

SAMPLE COURSE OUTLINE

MATHEMATICS APPLICATIONS
ATAR YEAR 11

Sample course outline

Mathematics Applications – ATAR Year 11

Unit 1

In Unit 1 students will be provided with opportunities to:

- understand the concepts and techniques in consumer arithmetic, algebra and matrices, and shape and measurement
- apply reasoning skills and solve practical problems in consumer arithmetic, algebra and matrices, and shape and measurement
- communicate their arguments and strategies when solving problems, using appropriate mathematical language
- interpret mathematical information, and ascertain the reasonableness of their solutions to problems
- choose and use technology appropriately and efficiently.

This course outline assumes an allocation of 4 hours contact time per week for the course.

Each semester is based on a 15 week block.

Time placement (and allocation)	Topic/s	Key teaching points
Semester 1 (Unit 1)		
Weeks 1–5 (20 hours)	Topic 1.1 Consumer arithmetic	**Applications of rates and percentages and use of spread sheets** (1.1.1 – 1.1.8) • Salary, wages (including piecework/overtime) allowances and commissions • Government allowances and pensions • Prepare personal budgets • Unit cost method for price comparison • Percentage increase and decrease, simple and compound interest • Currency exchange rates • Share dividends and price earnings ratio • Use a spreadsheet for above computations as appropriate
Weeks 6–7 (5 hours)	Topic 1.2 Algebra and Matrices	**Linear and non-linear expressions** (1.2.1 – 1.2.3) • Numerical substitution into expressions • Formulae evaluation • Spread sheets, tables and formulas
Weeks 7–9 (10 hours)	Topic 1.2 Algebra and Matrices	**Matrices and matrix arithmetic** (1.2.4 – 1.2.7) • Matrices and storage/displaying of information • Size and type of matrices • Matrix arithmetic • Solve problems using matrices
Week 10 (4 hours)	Topic 1.3 Shape and measurement	**Pythagoras' Theorem** (1.3.1) • Solve problems in 2 and 3 dimensions using Pythagoras' theorem
Weeks 11–12 (8 hours)	Topic 1.3 Shape and measurement	**Mensuration** (1.3.2 – 1.3.4) • Perimeter and area of 2-D shapes, including sectors and other composite shapes • Volume of standard objects such as prisms, pyramids, cones, spheres, practical applications • Surface area, standard and composite shapes, practical applications

Time placement (and allocation)	Topic/s	Key teaching points
Weeks 13–14 (8 hours)	Topic 1.3 Shape and measurement	**Similar figures and scale factors** (1.3.5 – 1.3.8) • Conditions of similarity, similar triangles • Scale factors and linear scaling problems • Scale drawings (maps and building plans),problem solving • Scale factors and areas of similar figures • Scale factors and surface area/volume of similar solids
Week 15	**Revision/end of Unit 1 assessment**	

Sample course outline

Mathematics Applications – ATAR Year 11

Unit 2

In Unit 2 students will be provided with opportunities to:

- understand the concepts and techniques used in univariate data analysis and the statistical process, linear equations and their graphs, and applications of trigonometry
- apply reasoning skills and solve practical problems in univariate data analysis and the statistical process, linear equations and their graphs, and the applications of trigonometry
- implement the statistical investigation process in contexts requiring the analysis of univariate data
- communicate their arguments and strategies, when solving mathematical and statistical problems, using appropriate mathematical or statistical language
- interpret mathematical and statistical information, and ascertain the reasonableness of their solutions to problems and answers to statistical questions
- choose and use technology appropriately and efficiently.

This course outline assumes an allocation of 4 hours contact time per week for the course.

Each semester is based on a 15 week block.

Time placement (and allocation)	Topic/s	Key teaching points
Semester 2 (Unit 2 – plus review of Unit 1)		
Weeks 16–20 (18 hours)	Topic 2.1 Univariate data analysis and the statistical investigation process	**The statistical investigation process** (2.1.1) • Identifying a problem and posing a statistical question • Collecting or obtaining data • Analysing the data • Interpreting and communicating the results **Making sense of data relating to a single statistical variable** (2.1.2 – 2.1.9) • Classifying categorical variables – organising the data • Classifying numerical variables (discrete/continuous) – describe the distribution, modality, shape, location and spread – interpret in context • Mean and standard deviation (using technology) • Deviations from the mean in normally distributed data • Quantiles in normally distributed data, the 65%, 95% and 99.7% rule, calculating probabilities for normal distributions
Week 20–22 (7 hours)	Topic 2.1 Univariate data analysis and the statistical investigation process	**Comparing data for a numerical variable across two or more groups** (2.1.10 – 2.1.12) • Box plots, outliers • Compare groups, interpret and report findings • The statistical process for comparing groups
Week 22–24 (10 hours)	Topic 2.2 Applications of trigonometry	**Applications of trigonometry** (2.2.1 – 2.2.4) • Trigonometry of the right triangle • Area of triangles, Heron's rule and solution of practical problems • Sine and cosine rule and application to problems (excluding ambiguous case) • Solve practical problems involving right-angled and non-right-angled triangles, including problems involving angles of elevation and depression and the use of bearings in navigation

Time placement (and allocation)	Topic/s	Key teaching points
Week 24–27 (10 hours)	Topic 2.3 Linear equations and their graphs	**Linear equations** (2.3.1 – 2.3.2) • Identify and solve linear equations • Word problems **Straight-line graphs and their applications** (2.3.3 – 2.3.6) • Construction of graphs • Gradient and intercepts, model linear relationships • Interpret graphs and analyse practical situations
Week 27–29 (10 hours)	Topic 2.3 Linear equations and their graphs	**Simultaneous linear equations and their applications** (2.3.7 – 2.3.8) • Solving simultaneous equations – graphically, algebraically and using technology appropriately • Solve practical problems **Piece-wise linear graphs and step graphs** (2.3.9 – 2.3.10) • Sketch piece-wise linear graphs, step graphs • Interpret and use to model practical situations
Week 29–30	**Revision/end of course assessment**	

Hours allocated	Consumer arithmetic	Algebra and matrices	Shape and measurement	Univariate data analysis	Applications of trigonometry	Linear equations and their graphs	Total
In this program	20	15	20	25	10	20	110
Suggested in the syllabus	20	15	20	25	10	20	110