**Sample Course Outline**

Mathematics Applications

ATAR Year 11

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# 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 |
| 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 |
| 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 |