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# Sample course outline

**Mathematics Essential – General Year 12**

**Unit 3 and Unit 4**

**Semester 1**

<table>
<thead>
<tr>
<th>Week</th>
<th>Key teaching points</th>
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| 1 (2 hours) | Linear measure  
Practical applications of perimeter of polygons and circles and composites of familiar shapes.  
Use of the mathematical thinking process to solve problems involving perimeter.  
3.1.1 |
| 1–2 (6 hours) | Area measure  
Practical applications of area of parallelograms, trapeziums, circles and semi-circles. The area of composite figures using decomposition into familiar shapes. Surface area of cubes, rectangular and triangular prisms, spheres and cylinders. Use of the mathematical thinking process to solve problems involving area and surface area.  
3.1.2–3.1.5 |
| 3–4 (6 hours) | Volume and capacity  
Practical applications of volume and capacity of cylinders, pyramids and spheres. The relationship between cubic centimetres and millilitres, cubic metres and kilolitres. The use of the mathematical thinking process to solve problems involving volume and capacity.  
3.1.6–3.1.7 |
| 4–5 (6 hours) | Shapes, plans and models  
Scale drawings, diagrams, plans and elevation views from practical situations to estimate and compare quantities, materials and costs. Construct scale drawings. Sketch elevation views of different models.  
3.2.1–3.2.11 |
| 6–7 (8 hours) | Right-angled triangles  
Apply Pythagoras’ Theorem and trigonometric ratios to solve problems in practical, two-dimensional views.  
3.2.12–3.2.16 |
| 8 (4 hours) | Cartesian plane  
Interpret and plot points on a two-dimensional Cartesian plane. Generate tables and graph co-ordinates for linear functions from practical situations. Interpret, use and draw graphs from practical situations, including travel graphs, time series and conversion graphs. Describe trends in time series data.  
3.3.1–3.3.6 |
| 9 (4 hours) | Using graphs in practical situations  
Describe, determine and use the features of linear functions from practical situations; rate of change, vertical intercept, point of intersection, ‘break-even’ point.  
3.3.7–3.3.10 |
| 10–12 (10 hours) | Data collection  
Investigate the conducting of a census or survey, with reference to the target population.  
Investigate methods of sampling. Interpret results from surveys, including those in the media.  
3.4.1–3.4.11 |
| 12–14 (10 hours) | Bivariate scatterplots  
Patterns and features of bivariate data, including dependent and independent variables and their association. Trend lines by eye, relationships between variables and predictions by interpolation and extrapolation.  
3.4.12–3.4.19 |
| 15 | Examination week |
## Semester 2

<table>
<thead>
<tr>
<th>Week</th>
<th>Key teaching points</th>
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| 1–3 (10 hours) | Probability and simulations  
Language of probability and numerical expressions using fractions, decimals, ratios and percentages. Simulations using technology. The law of large numbers and the relationship of relative frequency to probability.  
4.1.1–4.1.6                                                                                                                                                                                                                   |
| 3–5 (10 hours) | Simple probabilities in practical situations  
Experiments and sample spaces which represent practical situations. Applications of probability for decision making, predicting proportions and number or outcomes that are likely to occur.  
4.1.7–4.1.11                                                                                                                                                                                                                  |
| 6–7 (8 hours) | Earth geometry  
Methods of locating positions on the earth’s surface given latitude and longitude; global positioning system, globe, atlas and digital technologies. Calculations of distance between two places on Earth on same longitude using arc length formula. Distance between two places on Earth using technology.  
4.2.1–4.2.3                                                                                                                                                                                                                  |
| 8–9 (8 hours) | Time  
Link between longitude and time. Problems involving time zones in Australia and neighbouring nations, Greenwich Mean Time and International Date Line, time differences, travel involving time zone changes.  
4.2.4–4.2.9                                                                                                                                                                                                                  |
| 10 (4 hours) | Compounding relationships  
Real-life, compounding situations expressed as a recurrence relationship; compound interest, population growth.  
4.3.1–4.3.3                                                                                                                                                                                                                  |
| 11–12 (8 hours) | Compounding loans and investments  
Future values and total interest, numerical and graphical comparison between simple interest and compound interest loans and investments. Effects of change of interest rate and number of compounding periods.  
4.3.4–4.3.6                                                                                                                                                                                                                  |
| 13–14 (8 hours) | Reducing balance loans  
Use of technology and recurrence relation to model reducing balance loans. Effect of interest rates and repayment amount when repaying a loan.  
4.3.7–4.3.8                                                                                                                                                                                                                  |
| 15 | Year 12 Examination week – work experience                                                                                                                                                                                                                                                                                                           |