**Stage 2 General Mathematics**

**Program 1**

This program is for a cohort of students studying Stage 2 General Mathematics. It is assumed that students have completed Topics 1 – 6 from Stage 1 General Mathematics.

**Topic 1 – Modelling with Linear Relationships (5 weeks)**

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| **Term****week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 1-1 | 1.1Simultaneous Linear Equations | Graphical solutionTrial and error and substitution methodsProblems in context |  |
| 1-2 | 1.2Linear Programming | Setting up constraints and the objective functionGraphing the feasible region |  |
| 1-3 | Finding the optimal solution |  |
| 1-4 | Considering wastage |  |
| 1-5 | Dealing with discrete only solutionsChanging the original parameters | **SAT 1 – Modelling with Linear Relationships. Calculator permitted.** |

**Topic 2 – Modelling with Matrices (5 weeks)**

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| **Term****week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 1-6 | 2.1Application of Matrices to Network Problems | Connectivity matrices |  |
| 1-7 | Powers of matrices and multi-stage connections |  |
| 1-8 | Dominance matrices | **Investigation 1: Dominance Matrices** |
| 1-9 | 2.2Applications of Matrices to Transition Problems | What is a transition matrix?The steady state |  |
| 1-10 | 3 x 3 and higher systems Limitations/assumptions of the transition model | **SAT 2 – Matrices. Calculator permitted.** |

**Topic 3 – Statistical Models (8 weeks)**

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| **Term****Week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 2-1 | 3.1Bivariate Statistics | The statistical investigation processExplanatory and response variablesScatter plots |  |
| 2-2 | Correlation coefficientsThe effects of outliersCausality |  |
| 2-3 | Linear regression |
| 2-4 | Residual plots |  |
| 2-5 | Exponential regression | **Investigation 2:Rates of Cooling** |
| 2-6 | Interpolation and extrapolation |  |
| 2-7 | 3.2 The Normal Distribution | Properties of the bell shaped curve68%-95%-99.7% properties |  |
| 2-8 | Finding probabilities of both integral and non-integral standard deviations from the mean.Inverse normal problems  | **SAT 3 – Statistical Models.****Calculator permitted.** |

**Topic 4 – Financial Models (6 weeks)**

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| **Term****week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 2-9 | 4.1Models for Saving | Compound interest Finding FV, PV, n and I |  |
| 2-10 | Future value annuitiesEffects of changing payments, rates, timesTaxation/inflation/chargesEffective rate of interest  |  |
| 3-1 | Superannuation |  |
| 3-2 | 4.2Models for Borrowing | The cost of borrowing moneyInterest only loans and sinking funds |  |
| 3-3 | Reducing balance loans |  |
| 3-4 | Strategies to reduce the amount of interest paid on a loanComparison interest rates | **SAT 4 – Financial Models.****Calculator permitted.** |

**Topic 5 – Discrete Models (5 weeks)**

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| **Term****week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 3-5 | 5.1Critical Path Analysis | Precedence tablesDrawing networks |  |
| 3-6 | Dummy linksForward and backward scan |  |
| 3-7 | Minimum completion timeCritical pathEarliest/latest starting timesSlack time |  |
| 3-8 | 5.2Assignment Problems | The Hungarian algorithmMinimum cost |  |
| 3-9 | Maximum profitNon-square arrays | **SAT 5: Discrete Models.****Calculator and notes not permitted.** |

**Revision**

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| **Term****week** | **Subtopic** | **Concepts and Content**  | **Assessment Task** |
| 3-10 |  | Revision |  |
| 4-1 |  | Revision |  |
| 4-2 |  | Revision |  |
| 4-3 |  | Swot Vac |  |
| 4-4 |  | Exam |  |

**NOTES AND COMMENTS**Please note that this is a working document and will change as the course progresses.

**SUGGESTED ALLOCATION OF TIME**Topic 1: Modelling with Linear Relationships (5 weeks)
Topic 2: Modelling with Matrices(5 weeks)
Topic 3: Statistical Models (8 weeks)
Topic 4: Financial Models (6 weeks)
Topic 5: Discrete Models (5 weeks)