**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)**

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 1-6 | 2.1  Application 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 | 2.2  Applications 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)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **Week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 2-1 | 3.1  Bivariate Statistics | The statistical investigation process  Explanatory and response variables  Scatter plots |  |
| 2-2 | Correlation coefficients  The effects of outliers  Causality |  |
| 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 curve  68%-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)**

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

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Term**  **week** | **Subtopic** | **Concepts and Content -** Technology is incorporated into all aspects of this topic as appropriate | **Assessment Task** |
| 3-5 | 5.1  Critical Path Analysis | Precedence tables  Drawing networks |  |
| 3-6 | Dummy links  Forward and backward scan |  |
| 3-7 | Minimum completion time  Critical path  Earliest/latest starting times  Slack time |  |
| 3-8 | 5.2  Assignment Problems | The Hungarian algorithm  Minimum cost |  |
| 3-9 | Maximum profit  Non-square arrays | **SAT 5: Discrete Models.**  **Calculator and notes not permitted.** |

**Revision**

|  |  |  |  |
| --- | --- | --- | --- |
| **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)