

Year Level: 12

Subject: Further Mathematics

Week	Unit	Learning Focus
Term 1 1	Summarising Numerical Data	Draw Dots Plots, Stem Plots and Box and Whisker Plots. Calculate the five-figure summary of data. Describe and compare distributions by centre and spread. Draw the normal distribution and analyse using the 68-95-99.7% rule. Calculate and interpret stand z-scores.
2-3	Investigating Associations Between Two Variables	Define response and explanatory variables. Investigate associations between categorical variables. Investigate associations between a numerical and categorical variable. Investigate associations between two numerical variables. Using CAS technology draw a scatterplot. Interpret a scatterplot using form, direction and strength. Calculate the correlation coefficient and coefficient of determination, and be able to interpret and analyse both. Define the difference between correlation and causality.
4 - 5	Regression: Fitting Lines to Data	Be able to draw a least squares regression line. Calculate the regression equation Perform an analysis of the line and the raw data.
6 - 7	Data Transformation	Be able to draw a residual plot of a scatterplot and regression line. Identify if a transformation is required and which transformation. Be able to transform data to linearise a scatterplot. Perform a squared, log and a reciprocal transformation
8 - 9	Investigating Modelling and Time Series	Recognise time series data and graphs. Apply smoothing by the moving means method. Apply smoothing by the moving medians method. Calculate seasonal indices. Fit a trend line and be able forecast.
10	Data Analysis SAC	
Term 2 1 -2	Finance: Modelling Growth and Decay using Recursion	Generate a sequence from a recurrence relation. Model linear growth and decay. Calculate simple interest and compound interest Define and calculate depreciation.
3 - 6	Modelling and Analysing Reducing-balance Loans and Annuities	Generate a sequence from a recurrence relation to model situations of geometric growth and decay. Analyse reducing-balance loans. Read and interpret an amortisation table. Use the finance solver on CAS technology to solve practical problems associated with loans, annuities and perpetuities, and investments.
7	Finance SAC	

8 - 10	Matrices	<p>Set up a matrix to display information</p> <p>Apply addition, subtraction, scalar multiplication and the product of matrices.</p> <p>Calculate matrix powers.</p> <p>Solve practical problems involving permutation, communication and dominance matrices.</p> <p>Calculate the determinant of a matrix.</p> <p>Calculate the inverse of a matrix</p>
Term 3 1	Matrices	<p>Transition matrices and their applications.</p> <p>Calculating and interpreting steady state matrices.</p>
2- 3	Matrices	<p>Matrices Revision.</p> <p>Matrices SAC. (3 periods)</p>
4	Networks	<p>Understanding basic concepts of Networks.</p> <p>Representing connections with graphs.</p> <p>Defining and describing graphs.</p> <p>Defining and applying Euler's Rule.</p> <p>Finding the adjacency matrix from a graph.</p> <p>Defining walks, paths, circuits and cycles.</p>
5 - 7	Networks	<p>Understanding weighted graphs and finding the shortest path.</p> <p>Apply Dijkstra's Algorithm.</p> <p>Define trees and solve connector problems.</p> <p>Understand maximum flow and minimum capacity.</p> <p>Apply the cut capacity for maximum flow to a network.</p> <p>Apply the Hungarian Algorithm and draw bipartite graphs to solve allocation problems.</p> <p>Draw an activity networks from precedence tables and vice versa.</p> <p>Be aware of when and how to draw in a dummy activity.</p> <p>Be able to solve scheduling problems (a critical path analysis) by applying float times, earliest starting times, and performing backward scanning to networks.</p> <p>Crash a scheduling network to minimise completion times.</p>
8 - 9	Networks	<p>Revision and SAC (3 periods)</p>
10	Exam Revision	<p>Exam strategies for the two exams.</p> <p>Completing exam papers with both speed and accuracy.</p> <p>Strategising Multiple Choice and Short Answer styles of questions.</p>
Term 4 1 -3	Exam Revision	<p>Complete past exams and assess results.</p>