The English Martyrs Catholic School and Sixth Form College

Year 12 Further Maths	Module 1	Module 2	Module 3
Topic Theme and Intent	In Module 1, we cover the majority of the of the 9 Core chapters before moving on to Decision and Further Statistics in Module 2.	Students begin studying Further Stats 1 and Decision 1 (AS Level topics only) in this module.	Students finish their last remaining chapter and begin to practice exam technique before their end of year exams.
Knowledge	• Imaginary and complex numbers and their uses. • Use and apply standard formulae for $\sum r, \sum r^2$ and $\sum r^3$ to prove and evaluate what the question is asking. • Represent loci on the Argand Diagram (lines and regions). • Know and use the identity matrix, find the determinant of a matrix (up to a 3x3) and understand what it means when it is non singular.	• Use and understand an algorithm given in words, carry out bubble sort, quick sort and bin packing algorithm. • Know how graphs and networks can be used to create a mathematical model, understand how they can be represented as matrices • Use and apply Kruskal's, Prim's and Dijkstra's algorithm. • Find the expectation and variance of a discrete random variable	• Distinguish between one and two tailed tests and be able to summarise the results of the test clearly. • Calculate the degrees of freedom of a chi squared test. • Vectors- how to understand and use the vector and Cartesian forms of the equation of a straight line/plane in three dimensions.
Skills	• Use the Complex mode on 991 calculator to find the modulus, argument and to simplify a complex number. • Use the matrix mode on calculator to find the inverse, determinant, check matrix addition/multiplication. • How to use the Sigma button on calculator to check the sum of a specific sequence.	• Know the difference between the three algorithms used. Understand what would happen if the size of a problem is increased by k. • Label each vertex when replacing with a box. • Be able to consider all possible pairings if a network has more than two odd vertices.	• Use trigonometry to calculate angles between two vectors, to lines, a line and a plane or two planes. • Calculate distances using Pythagoras' Theorem. •
Literacy Links	**Reading Skills** Students should pick out the type of loci that needs to be drawn on the Argand Diagram. **Writing** Write correctly in set notation when finding the range/domain of a function.	**Reading Skills** In Decision, students need to pick the key definitions out of the text and have knowledge of their meaning. **Writing** Be clear when answering exam questions as certain specific words need to be seen to get full marks	**Reading Skills** Interpret a vector question which has context, be able to use the information to draw a simplified diagram. **Writing** Write the equation of the line or plane in the correct form which will be told to you in the question.
Essential Vocabulary	Function, Interval, Surd, Rationalise, Minima/Maxima, Series, Sequence, Matrix, Non singular, Identity, Cofactor, Transpose, Matrix of	Algorithm, approximate, ascending, descending, bubble sort, comparison, cycle, graph, valencies, arc, spanning tree, adjacency matrix, distance,	optimal, minimum spanning tree, , vertices, route inspection algorithm, linear programming, inequalities,

Disciplinary Reading **Reading for Pleasure**