OPPORTUNITY
INDIVIDUALITY
PROGRESS

THOMAS ALLEYNE`S HIGH SCHOOL
Further Mathematics
LEARNING JOURNEY

University

Student return to Linear programming with the Simplex Method and Big-M Method and complete the Decision section with Critical path analysis

The Core Pure section of the course is complete with Polar coordinates and a return to Volumes of revolution

Students return to Complex numbers and learn different uses of De Moivre's theorem, finding roots of complex numbers and proof of trig identities. The Differential equations units introduce first and second order differential equations

POST-18 PATHWAY

Final Exam

Linear programming
Critical path analysis
Elastic collisions in two dimensions

Polar coordinates
Volumes of revolution

Assessment Point 3

Complex numbers
Differential equations

Apprenticeships

The Elastic collisions in two dimensions unit complete the Further Mechanics section with Oblique impacts

Assessment Point 2 – Mock Exam

The second year begins with Hyperbolic Functions, definitions, graphs, solving, differentiating and integration, and Series, method of differences and Maclaurin series. Both building on the calculus skills learnt at the end of Year 12

Students return to the Decision module with Floyd's Algorithm, the Planarity Algorithm and an extension of the Route Inspection Algorithm.

Calculus skills and developed further as students learn improper integrals, mean value and work with inverse trig functions

Methods in calculus

Hyperbolic functions
Series

Algorithms on graphs

Assessment Point 1

Momentum and Impulse
Elastic springs and strings and elastic energy

We begin Further Mechanics in Year 13 with extending the Momentum and Impulse unit from Year 12 and introducing Hooke's Law with Elastic springs and strings and elastic energy

Year 13

During the final half term, as well as sitting the AS exam as a end of Year assessment, students are introduced to the Trigonometry, Differentiation and Integration from the Year 2 Mathematics A-Level

The AS course is completed with the final Further Mechanics chapter of Elastic collisions in one dimension

The AS Core Pure content is completed with Proof by Induction and Volume of Revolution, building on their algebra skills and introduces a further practical application for integration

Trigonometry
Differentiation
Integration

Assessment Point 5

Elastic collisions in one dimension

Proof
Calculus

After Christmas students begin their study of Mechanics. This begins with an introduction to resolving forces, Newton's second law and friction before starting the Further Mechanics 1 topics of: Momentum and Impulse Work, Energy and Power

The Core Pure Vectors section of the course takes students into 3D coordinate geometry with alternative forms for the equation of a line and equations of a plane

Assessment Point 4

The Core Pure course continues with: Algebra and Functions – roots of polynomials

Momentum and impulse
Work, energy and power

Assessment Point 3

Algorithms on graphs 2
Linear programming
Critical path analysis

Vectors

Algebra and functions

The Decision module continues with Algorithms on Graphs 2, Linear Programming, Critical Path Analysis. Following on from the algorithm covered earlier in the year and two variable inequalities from GCSE

Assessment Point 2

The study of Complex Numbers continues in the second half term with Argand diagrams. Building on their knowledge of trigonometry, Pythagoras' theorem, Loci and constructions.
Students encounter the summation, ∑ notation and the sums of squares and cube with the series chapter.

Algorithms
Graphs and networks
Algorithms on graphs 1

Complex Numbers 2
Series

Assessment Point 1

Complex Numbers 1
Matrices

Year 12

Y11 Taster Sessions

Student are introduced to the Applied section of the course and to Decision Mathematics with – Algorithms, Graphs and networks, Algorithms on graphs 1
Here they study: flow charts, network, Bin Packing, quick sort, bubble sort, Kruskal's, Dykstra's and Prim's algorithms.

Students start the course with Complex Numbers 1 and Matrices. Complex numbers is a brand new topic which challenges the preserved reality of Mathematics, while building on current knowledge of algebra and surds.
Matrices extends their limited knowledge of Matrices from the Level 2 Further Mathematics qualification.