



LEVEL 3 MATHEMATICS/PĀNGARAU 3MAT

What is this course about?

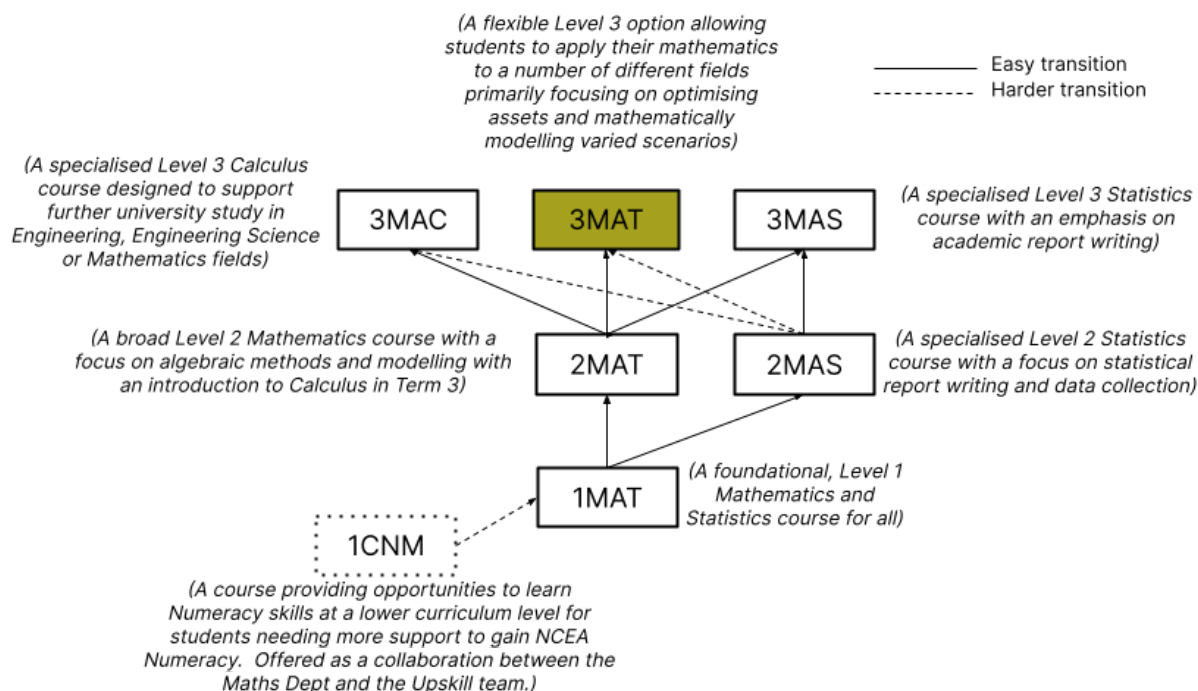
This is a flexible Level 3 course offering students the opportunity to apply their mathematics and/or statistics understanding to a number of different fields; primarily focusing on mathematical modelling, logistics and data analysis with a view towards predicting future outcomes and optimising assets. These topics are developed further at University level within the fields of Decision Mathematics, Operational Research and Logistics.

This course will prepare students to follow further study or career paths in areas which require strong levels of strategic and logical thinking, accuracy, and analytical and communication skills such as Health Sciences, Economics and Business, Real Estate, Town Planning, or Project Management.

This 'hybrid' course straddles the gap between the specialised fields of evidence-based Statistics and the more theoretical Calculus and looks to demonstrate the ways in which a combination of both mathematics and statistics are used to explain, optimise and predict the world around us.

How does this course fit in?

By its very nature, the 3MAT course overlaps significantly with both 3MAC & 3MAS so this course should not be taken concurrently with any other Level 3 Mathematics course.



It is recommended that students should have at least gained Achieved (preferably Merits or above) in NCEA achievement standards 91262 (Calculus) before selecting internals with a Mathematics component in this course. Students who have not studied any Calculus before will need to show strong commitment and seek additional support as the ground work provided by the level 2 course has been shown to support success at level 3.

What sorts of things might I do?

Over the year we might:

- learn how Gantt charts, systems of simultaneous equations, linear programming techniques and critical path analysis can be used and combined to schedule a project effectively and ensure assets and work flow are optimised efficiently;
- investigate new methods for solving simultaneous equations beyond 2 variables to include graphical methods and matrices;
- observe and analyse the relationship between quantitative variables and use this to draw conclusions in a forensic science context;
- use differentiation and statistical regression techniques to understand and analyse the rates that variables are changing;
- model real life scenarios using trigonometric or statistical models;
- learn about the way that data is commonly distributed and make predictions about likely outcomes.

Learning capabilities/ critical skills

Significant Learning

- This course has a very sizable emphasis on student agency, self-direction, flexibility and choice. Students will be asked to construct their own learning plan for the year with support from their teacher and will build confidence in driving their own learning forward.

Rangatiratanga: (as it appears in the Hikairo Schema)

Rangatiratanga (self-determination) supports ākonga to achieve. Thinking and meaning-making are promoted. Learning is meaningful and connected.

To experience success, students will have opportunities to develop their learning dispositions through:

Engagement:

- You will: engage with kaiako instruction, think critically, access and utilise resources during class time, at home and during self-directed learning.
- You will work in partnership with kaiako to be reflective and inclusive of multiple perspectives in your learning.
- You will take control of your learning, participate in activities or tasks and seek to clarify and understand learning objectives, assessment criteria, and your learning needs.

Managing self:

- You will work in partnership with kaiako to establish and meet personal learning goals and milestones.
- You will take the initiative to make informed choices, develop language skills, and clarify understanding.
- You will manage your time to avoid distractions and complete a variety of learning tasks.

Learning relationships:

- You will develop and demonstrate good communication skills with your teachers and peers to be able to relate to others effectively. This will enable you to extend your learning and deepen your understanding through questioning, dialogue, discussion, and group work.

What standards could I enter?

Students will write their own course plan from a selection of the standards below. They will be guided in their decision making and provided with learning resources at the start of the year.

It is common for students to learn at approximately a rate of 2 weeks per credit so a realistic credit load in this course would be a selection that add to around 16 credits

NCEA Level	Standard Number	Name of standard	Version number	Credits	Assessment
3	91581	Investigate bivariate measurement data	2	4	Internal N
3	91575	Apply trigonometric methods in solving problems	3	4	Internal N
3	91576	Use critical path analysis in solving problems	2	2	Internal N
3	91587	Apply systems of simultaneous equations in solving problems	2	3	Internal N
3	91574	Apply linear programming methods in solving problems	2	3	Internal N
3	91578	Apply differentiation methods in solving problems	2	6	External N
3	91586	Apply probability distributions in solving problems	2	4	External N
3	91585	Apply probability concepts in solving problems	2	4	External N
			TOTAL	30	

Key for assessment column:

N - L1 and UE numeracy

Scholarship Opportunity

In this subject area:

- Students who are working a year or more in advance (eg, a Year 12 student working at Level 3) are encouraged to select 3MAT as their foundational course.
- If these same students wish to enter Scholarship exams in their following year then they should select 3MAC if they wish to enter Scholarship Calculus or 3MAS if they wish to enter Scholarship Statistics.
- Success in Scholarship Mathematics requires sustained effort over 2 years and may be supported by university level study.