MATHEMATICS and STATISTICS

CAREERS:

Mathematics is a core component of modern education. Mathematic skills are essential for problem solving and decision making in the 21st century. Students that specialise in Mathematics benefit from having a rigorous qualification at the end of schooling. Mathematics is a core prerequisite for numerous tertiary courses and careers.

Vocational Pathways for Mathematics

Construction and Infrastructure (CI)

If you are interested in a career that involves physical work, working with your hands, tools, machinery and equipment and primarily focussing on building, repair or maintenance work then this sector is for you.

Types of jobs for this Vocational Pathway include:

• Architect • Boat builder • Building contractor • Cabinet maker • Environmental engineer • Landscape architect • Mining engineer • Quantity surveyor • Survey technician

Manufacture and Technology (MT)

If you are interested in a career from hands on production and assembly to construction or even computer design then this is the ideal pathway for you to follow.

Types of jobs for this Vocational Pathway include:

• Aeronautical engineer • Architect • Biomedical Engineer • Boat builder • Importer/exporter • Programmer

Primary Industry Sector (PI)

You'll be contributing to an important and sustainable sector that's one of New Zealand's biggest employers and exporters. Whether you're from a rural background or a townie, there's something here for you.

Types of jobs for this Vocational Pathway include:

• Agricultural technician • Biochemist • Forestry Scientist • Geophysicist • Science technician • Veterinarian

Service Industry Sector (SI)

With skills from this sector you can work and travel the world. It can be truly inspirational – from travel to tourism, hairdressing to hospitality, physical fitness to financial services. In these jobs you're the brand, dealing directly with people.

Types of jobs for this Vocational Pathway include:

• Accountant • Actuary • Aeronautical engineer • Aeroplane pilot • Air Force • Economist • Energy Auditor • Financial advisor • Pharmacist

Social and Community Services (SC)

This sector is all about caring for people and keeping them safe. This is a large and growing sector with jobs and services that are essential for community well-being and safety.

Types of jobs for this Vocational Pathway include:

• Ambulance officer • Anaesthetist • Audiologist • Biomedical technician • Cardiac technician • Environmental Scientist • Forensic Scientist • Podiatrist • Policy Analyst • Teacher • Psychiatrist

Creative Industries (CR)

Whether you are looking to move onto further study, training or work, or you're unsure about your options, the yellow pathway will help you plan your study and career options in the Creative Industries.

Types of jobs for this Vocational Pathway include:

• Sales & Marketing manager • Events Manager • Game Developer • Graphic Designer • Naval architect/boat builder

Level 1	MATHEMATICS WITH CALCULUS
Prerequisite:	•Students will consistently achieve at Merit and Excellence level •Year 10 Teachers will advise students on suitability for this course •Majority will be from the 10MXA cohort and some 10MXG are considered
Summary of Course:	This is the course recommended for those students that have displayed a strong ability in Mathematics. Students entered into the Advanced Mathematics class have the option of taking Mathematics through to Level Two/Three Calculus and/or Statistics. The course assessments will consist of seven Standards, totalling 26 credits (12 of which are externally assessed). Students will be encouraged to work towards an endorsement in Mathematics (that is gaining at least 14 credits plus at Merit or Excellence level).
Equipment:	Students serious about taking a continued advanced programme of Mathematics should invest in their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91026	•	•	•	•	•	•	4	Number 1.1 -Apply numeric reasoning in solving problems *(N)*
91032	•	•	•	•		•	3	Trigonometry 1.7 – Apply right-angled triangles in solving measurement problems *(N)*
91035	•	•	•	•	•		4	Statistics 1.10 – Investigate a given multivariate data set using the statistical enquiry cycle *(N)(L)*
91036			•	•	•	•	3	Statistics 1.11 – Investigate bivariate numerical data using the statistical enquiry cycle *(N)(L)*
91029	•	•	•	•	•	•	3	Apply linear algebra in solving problems *(N)*
								Externally assessed
91027	•	•	•	•	•	•	4	Algebra 1.2 – Apply algebraic procedures in solving problems MCAT *(N)*
91028	•	•	•	•		•	4	Graphing 1.3 – Investigate relationships between tables, equations or graphs *(N)*
91037			•	•	•	•	4	Probability 1.12 – Demonstrate understanding of chance and data *(N)*

(L) = Literacy (N) = Numeracy

Level 1	MATHEMATICS WITH STATISTICS
Prerequisite:	•Students eligible for this course will have a consistent record of results and effort at Year 10 (Achieved and Merit) •Teachers will advise students on their suitability for this course. •It is recommended students have at least 14 Mathematics credits at Level one for a successful transition into level two Mathematics.
Summary of Course:	This course is recommended for those students who have displayed a good ability in Mathematics. Students entered into General Mathematics will work through six Standards (totalling 24 credits – of which 4 credits are external). There is a bias towards internal Standards, with students enrolled to sit one external standard, probability, in November. Level 1 General Mathematics leads to Level 2 Mathematics with Statistics or Level 2 Mathematics and then onto Level 3 Statistics or Level 3 Mathematics, of which both are university approved subjects.
Equipment:	Students intending on a continued programme of Mathematics would benefit from investing in their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91026	•	•	•	•		•	4	Number 1.1 -Apply numeric reasoning in solving problems *(N)*
91029	•	•	•	•	•	•	3	Mathematics 1.4 -Apply linear algebra in solving problems *(N)*
91035		•	•	•		•	4	Statistics 1.10 – Investigate a given multivariate data set using the statistical enquiry cycle *(N)(L)*
91036			•	•		•	3	Statistics 1.11 – Investigate bivariate numerical data using the statistical enquiry cycle *(N)(L)*
91038			•			•	3	Probability 1.13 – Investigate a situation involving elements of chance *(N)(L)*
								Externally assessed
91037	•	•	•	•		•	4	Probability 1.12 – Demonstrate understanding of chance and data *(N)*

(L) = Literacy (N) = Numeracy

Level 1	MATHEMATICS FINANCIAL LITERACY
Prerequisite:	This course is set up for students who do not meet the prerequisites of Level One Advanced and General Mathematics courses. This is the right course for students who only achieved a few Year 10 Mathematics assessments.
Summary of Course:	This course is designed to ensure students achieve the NCEA Level One Numeracy requirement through Unit Standards but also has Achievement standards available to extend selected students. Evidence for Number, Measurement and Statistics Unit Standards is gathered through portfolio work which means no test or exam situations. This course is fully internally assessed. It is important to note that this course does not form the basis of progression into Level Two Mathematics, however it does progress into Level Two Financial Literacy.
Equipment:	Students must have a calculator (preferably the Casio FX series)

Assessment	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
US26623							4	Portfolio Unit Standard – Use number to solve problems *(N)*
US26627							3	Portfolio Unit Standard – Use measurement to solve problems *(N)*
US26626							3	Portfolio Unit Standard – Interpret statistical information for a purpose *(N)*
91026	•	•	•	•	•	•	4	Number 1.1 - Apply numeric reasoning in solving problems *(N)*
91034	•	•	•	•		•	2	Mathematics 1.9 –Apply transformation geometry in solving problems *(N)*

(L) = Literacy (N) = Numeracy

			MATHEMATICS WITH CALCULUS						
Level 2									

Level 2   MATHEMATICS WITH CALCULUS

Prerequisite:	Students in this class will be primarily from the 1MXA courses. Students should have a particular strength in Algebra and Graphing (Merit or above at Level One). Endorsement secures placement. This is a top stream class (students looking for endorsement).
Summary of Course:	This course comprises eight units of work exclusively based on NCEA Achievement standards. Students will be introduced at Level Two to Calculus, Co-ordinate Geometry and Advanced Algebra. Students entered in the Calculus Themed course are also eligible to take the Statistics Themed course as well. This course will lead into Level Three Calculus.
Equipment:	Students intending on a continued programme of Mathematics would benefit from investing in their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91257		•	•	•	•		•	4	Graphing 2.2 – Apply graphical methods in solving problems
91259		•	•				•	3	Trigonometry 2.4 – Apply trigonometric relationships in solving problems
91269		•	•				•	2	Algebra 2.14 – Apply systems of equations in solving problems
91256		•	•		•		•	2	Co-ordinate Geometry 2.1 – Apply co-ordinate geometry methods in solving problems
									Externally assessed
91261		•	•	•				4	Algebra 2.6 – Apply algebraic methods in solving problems
91262		•	•	•				5	Calculus 2.7 – Apply calculus methods in solving problems
91267				•	•	•		4	Probability 2.12 – Apply probability methods in solving problems

Level 2   MATHEMATICS WITH STATISTICS

Prerequisite:	Students eligible for 2MXS should have gained success at Level 1 Achievement Standards. Core standards of interest are Level One Number, Bivariate and Multivariate. Teachers will advise students on their suitability for this course. This is a top stream class (students looking for endorsement). It is recommended students achieve at least 14 Level One Mathematics credits for a successful transition into Level Two.
Summary of Course:	2MXS is comprised of seven units of work exclusively based on NCEA Achievement Standards. This course specialises in Probability and Statistically based standards.
Equipment:	Students intending on a continued programme of Mathematics would benefit from investing in their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91256		•	•		•		•	2	Co-ordinate Geometry 2.1 – Apply co-ordinate geometry methods in solving problems
91263				•	•	•	•	3	Statistics 2.8 – Design a questionnaire
91264				•	•	•		4	Statistics 2.9 – Use statistical methods to make an inference
91265		•	•	•	•	•	•	3	Statistics 2.10 – conduct an experiment to investigate a situation using statistical methods
91846	R					•		4	Conduct psychological research with guidance
									Externally assessed
91267				•	•	•		4	Probability 2.12 – Apply probability methods in solving problems

University Literacy W = writing R = reading

Level 2	MATHEMATICS
Prerequisite:	This is an academic class. Students eligible for 2MXG should have gained success at Level 1 Achievement Standards. It is recommended students have at least 14 credits in Maths (not portfolio Unit Standards) for a successful transition into level two. Core standards of interest are Level One Number, Bivariate and Multivariate (at Achieved Level or better). Teachers will advise students on their suitability for this course. This class parallels the 2MXS class (but is focussed on gaining the credits at Achieve). Students aiming for endorsement should choose 2MXS. Students having success in this course will have a pathway through to Level Three Mathematics.
Summary of Course:	2MXM is comprised of eight units of work exclusively based on NCEA Achievement Standards. This course specialises in Probability and Statistically based standards.
Equipment:	Students intending on a continued programme of Mathematics would benefit from investing in their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91256		•	•		•		•	2	Co-ordinate Geometry 2.1 – Apply co-ordinate geometry methods in solving problems
91263				•	•	•	•	3	Statistics 2.8 – Design a questionnaire
91264				•	•	•		4	Statistics 2.9 – Use statistical methods to make an inference
91265		•	•	•	•	•	•	3	Statistics 2.10 – conduct an experiment to investigate a situation using statistical methods
91268				•		•		2	Probability 2.13 – Investigate a situation involving elements of chance using a simulation
91260		•	•	•	•	•	•	2	Mathematics 2.5 – Apply network methods in solving problems
91846	R					•		4	Conduct psychological research with guidance

University Literacy W = writing R = reading

Level 2	MATHEMATICS FINANCIAL LITERACY
Prerequisite:	Students must have met the Level One Numeracy requirement. None of the Unit Standards in this course count towards the Level One Numeracy requirement so if students have not met this requirement they must select a Level One Mathematics course.
Summary of Course:	This courses comprises five units of work exclusively based on NCEA Personal Financial Management Unit Standards. Students will gain a greater appreciation of balancing budgets, the different aspects of finances, the tax system and other useful skills that will enable them to have good financial literacy once they have completed the course. This course leads into Level Three Financial Literacy. It does not lead into any Level Three Calculus, Statistics or Mathematics programme.
Equipment:	A calculator is necessary.

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
US28094								3	Produce a balanced budget
US24695								2	Explain taxation
US28092								3	Analyse stages of personal financial income
US28093								3	Describe financial responsibilities of utilising tertiary study funding options
US28097					•			3	Evaluate personal banking products
US28096					•			3	For selected students – Evaluate and select insurance product types – OPTIONAL
US24699								2	Make an informed decision relating to personal income and explain its consequences.

Level 3	MATHEMATICS WITH CALCULUS – [Total of 24 credits – 17 External]
Prerequisite:	These students will exclusively come from 2MXC classes of 2014, preferably with merit in 2.6 Algebra and 2.7 Calculus. Students entered into this course have the right to enter into Level 3 Statistics. Teacher recommendations will be a prerequisite for this course.
Summary of Course:	3MXC comprises only five standards (all with large credit weighting). There is a large focus on pure Calculus with 12 credits split between Differentiation and Integration. There are only 2 internal standards (7 credits) and 3 external standards (17 credits).
Equipment:	Students in this advanced programme of Mathematics would benefit from being confident in using their own graphics calculator (preferably the Casio 9750 series), a minimum is to have a scientific calculator (Casio FX series).

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91575		•	•					4	Apply trigonometry methods in solving problems
91573		•	•				•	3	Apply the geometry of conic sections in solving problems
									Externally assessed
91577								5	Apply algebra of complex numbers
91578		•	•	•		•		6	Apply differentiation methods in solving problems
91579		•	•	•				6	Apply integration methods in solving problems

Level 3	MATHEMATICS WITH STATISTICS – [Total of 24 credits – 8 External]
Prerequisite:	Successful students from 2MXS will make up this class. Prior achievement in 2.8 or 2.9 or 2.10 Statistics and 2.12 It is recommended students have at least 14 credits at level 2 for a successful transition into level 3 statistics. Probability is an expectation. Teacher recommendations will be a prerequisite for this course. This is a top tier academic course.
Summary of Course:	3MXS is a rigorous academic course where students work through five Achievement standards.
Equipment:	Students in this advanced programme of Mathematics would benefit from being confident in using their own graphics calculator (preferably the Casio 9750 series), a scientific calculator will not suffice.

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91580				•		•		4	Investigate time series data
91581				•				4	Investigate bivariate data
91582				•	•	•	•	4	Use statistical methods to make a formal inference
91583				•	•	•		4	Conduct an experiment to investigate a situation using experimental design principles
University Literacy W = writing R = reading									**Externally assessed**
91584	**R, W**			•	•	•		4	Evaluate Statistical Reports
91586				•	•	•		4	Apply probability distributions in solving problems

Level 3	MATHEMATICS – [Total of 20 credits – All Internal]
Prerequisite:	This is a full academic maths class at level eight (highest) of the curriculum. Only able mathematicians should attempt. It is recommended students have at least 14 credits at level 2 for a successful transition into level 3 mathematics. Typically these will be students from 2MXS or students from 2MXM (with high number of passing grades). Teacher recommendations will be a prerequisite for this course.
Summary of Course:	This course has a primary focus of getting students the requirements of the 'University Entrance' qualification (14+ credits in three academic subjects).
Equipment:	A calculator is necessary.

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
91580				•		•		4	Statistics 3.8 - Investigate Time Series
91581				•				4	Statistics 3.9 - Investigate bivariate measurement data
91582				•	•	•	•	4	Statistics 3.10 - Use statistical methods to make an informal inference
91574		•	•	•				3	Mathematics 3.2 - Apply linear programming methods in solving problems
91587		•	•	•				3	Mathematics 3.15 - Apply systems of simultaneous equations in solving problems
91576		•		•		•		2	Mathematics 2.4 - Use critical path analysis in solving problems

Level 3	MATHEMATICS FINANCIAL LITERACY
Prerequisite:	Students must have met the Level One Numeracy requirement. None of the Unit Standards in this course count towards the Level One Numeracy requirement so if students have not met this requirement they must select a Level One Mathematics course.
Summary of Course:	This courses comprises units of work exclusively based on NCEA Personal Financial Management Unit Standards. Students will gain a greater appreciation of planning for financial stability through investment portfolios and other useful skills that will enable them to have good financial literacy once they have completed the course.
Equipment:	A calculator is necessary.

Assessment	Uni Lit	CI	MT	PI	SI	SC	CR	Credits	Internally assessed
US28098								3	Evaluate options to increase personal income
US28100								4	Develop a plan to achieve long-term personal financial goal
US28104								3	Analyse the impact of external factors on personal finances
US28102								4	Demonstrate understanding of risk and return of a personal finances
US28101								4	Plan a long term personal financial investment portfolio – OPTIONAL