MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

YOUR 2016 GUIDE TO SCIENCES, AGRICULTURE AND ENGINEERING

I AM AN EXPLORER I AM THE NEW NEW ZEALAND

THE ENGINE OF THE NEW NEW ZEALAND

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UPDATED JANUARY 2015

STUDYING SCIENCES AGRICULTURE & ENGINEERING

Massey graduates are advancing knowledge and making a difference. Science offers exciting possibilities for study from genetics to nanoscience and smart systems to wildlife conservation. It underpins almost everything and those who understand science have an important part to play in our future.

Our professional and applied learning programmes have sciences as an important part, this includes our veterinary programmes, construction, engineering, food technology and information sciences.

Massey's heritage is in science and agriculture. Leaders in their fields came to New Zealand to teach students and develop the research programmes that underpin New Zealand's success today.

The University continues to attract leading researchers from around the world who choose to base themselves in New Zealand and continue to work in internationally leading research.

Our students benefit from these thought leaders, their involvement in the latest findings and their connections to fellow expertise around the world.

PATHWAYS FOR SCIENCES

Your successful future matters to us. We will help you get to where you want to be. Success demands background learning from school or other programmes of learning. If you don't have University Entrance we can help. Take a look at our Fast Track Foundation (Certificate of University Preparation). If you have University Entrance and need to catch up in one or more subjects then look at our Certificate in Science and Technology.

SCHOLARSHIPS – GO ON, APPLY!

New Zealand's science institutions want employees who know their industry and therefore invest in the future workforce by providing scholarships to students. Why not have a crack at helping fund your study with a share of hundreds of thousands of dollars on offer every year? For more information visit: **awards.massey.ac.nz**

TRAVEL WHILE YOU STUDY

Our Student Exchange Programme provides an international experience with the chance to study papers at overseas universities and cross-credit them back to a Massey qualification. You'll pay the same tuition fees while abroad and it's a great chance to gain the overseas experience and knowledge that many employers value.

Some of the top science universities available within the exchange programme are:

- University of Calgary, Canada
- Wageningen University, The Netherlands
- University of Edinburgh, Scotland
- Nanyang Technological University, Singapore
- University of Wisconsin-Madison, USA
- University of California, USA.

To apply or receive further information, please visit the International Office, Palmerston North.

Email: **studyabroad@massey.ac.nz**
Web: **massey.ac.nz/studyabroad**

POTENTIAL CAREERS

- Ecologist
- Software engineer
- Software developer
- Plant biologist
- Statistician
- Mathematician
- Zoologist
- Physiologist
- Microbiologist
- Wildlife biologist
- Veterinarian
- Engineer
- Construction manager
- Farm manager
- Farm consultant
- Rural valuer.

AM I READY FOR STUDY?

I AM UNDER 20, HAVE UNIVERSITY ENTRANCE BUT AM MISSING (OR FEEL I WILL MISS) A FEW IMPORTANT SUBJECTS

I would like to study a...

BVSc
BVetTech
BE(Hons)
BFoodTech(Hons)
BNatSc
BSc *majoring in:*
Chemistry, Statistics, Nanoscience, Maths, Physics

ENROL IN A...
Diploma in Science and Technology, or
Certificate in Science and Technology
with the subjects you need.

BSc (majors other than in column to the left)
BInfSc
BConst
BAgriScience
BAgriCommerce

I have plenty of time before I want to start university

TAKE AN INTRODUCTORY PAPER
Certificate of Proficiency
You need to take preparatory paper(s)

I am finishing high school and wish to start university in February of the next year

JOIN SUMMER SCHOOL
Certificate of Proficiency
Take preparatory paper(s) in Summer School.
If the results of your UE show that you no longer need these subjects you can withdraw.
See: **www.massey.ac.nz/summerschool**

I AM UNDER 20 AND DO NOT HAVE UNIVERSITY ENTRANCE (UE)

I have...

- Achieved at least 50 credits in approved subjects at NCEA Level 2 or above. These include at least one of:
  - English: 18 credits at Level 1 or higher
  - Mathematics: 10 credits at NCEA Level 1 or higher.

I would like to study a...

BSc *majoring in:*
Chemistry, Maths, Statistics, Physics, Nanoscience
BVSc
BVetTech
BE(Hons)
BFoodTech(Hons)
BNatSc

APPLY FOR THE...
Certificate in Foundation Studies
Take science-focused papers, then progress to the **Diploma in Science and Technology**.

BSc *(majors other than in column to the left)*
BInfSc
BConst
BAgriScience
BAgriCommerce

APPLY FOR THE...
Certificate in Foundation Studies
Take science-focused papers.

- Great NCEA Level 2
- Plenty of sciences standards at Excellence or Merit
- Literacy and Numeracy
- I wish to progress to university soon.

I would like to study a...

BSc *majoring in:*
Chemistry, Maths, Statistics, Physics, Nanoscience
BVSc
BVetTech
BE(Hons)
BFoodTech(Hons)
BNatSc

TALK TO US
For these specialist qualifications, missing Year 13 is not advisable. In special circumstances you may be admitted to a **Diploma in Science and Technology** in preparation for one of these qualifications.

BSc *(majors other than in column to the left)*
BInfSc
BConst
BAgriScience
BAgriCommerce

APPLY FOR...
Discretionary Entrance
You may enter either the **Diploma in Science and Technology** or **Certificate in Science and Technology**
NOTE: If you have progressed more than halfway through the NCEA Level 3 year you will not be eligible for discretionary entrance.

- 14 NCEA Level 3 credits in an approved subject
- 10 credits each in two other subjects
- Literacy and numeracy

I would like to study a...

BSc *majoring in:*
Chemistry, Maths, Statistics, Physics, Nanoscience
BVSc
BVetTech
BE(Hons)
BFoodTech(Hons)
BNatSc

APPLY FOR THE...
Certificate of University Preparation
You should then progress to the **Diploma in Science and Technology** in preparation for one of these qualifications

BSc *(majors other than in column to the left)*
BInfSc
BConst
BAgriScience
BAgriCommerce

APPLY FOR THE...
Certificate of University Preparation

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

BACHELOR OF AGRICOMMERCE
BAgriCommerce

YOU'LL BE IN-DEMAND
At Massey many of our AgriCommerce students have jobs before they even graduate.

WHY MASSEY?
From running large farm-based agribusinesses right through to international food trade, sound business knowledge is essential for the future of New Zealand's primary production sector.
You'll join a growing, innovative industry.
New Zealand's economy is dominated by agriculture and food – it generates $25 billion in export earnings a year – and international demand is predicted to continue to grow rapidly.
At Massey many of our AgriCommerce students have jobs before they even graduate and are going on to bright futures.

JOIN A WORLD-LEADING UNIVERSITY
Massey is New Zealand's No 1 university in agriculture and ranks 19th in the world.
Our proud record dates back to 1927 when we offered New Zealand's first degrees in agriculture and horticulture.
Massey graduates and staff are helping to define the future of our nation's agriculture and food businesses.

RELEVANT INTERNATIONAL KNOWLEDGE
Massey's AgriCommerce programme aligns itself with agribusiness industries throughout the world – ensuring our graduates have the skills and industry knowledge employers want today, and in the future.

WHAT WILL YOU LEARN?
This three-year world-class programme will:
- Teach you about farm production systems, supply chain management, marketing, food economies, and international agribusiness.
- Teach you to apply and integrate scientific, technological and business knowledge to meet marketplace demands.
- Give you a strong understanding of what it takes to be sustainable and competitive along the food value chain and in global food and fibre markets.
- Provide you with the knowledge and skills needed to deliver in future workplaces.
- Give you a sound knowledge of land-based systems and agribusiness along with specialist knowledge in one area of agribusiness.
- Ensure you will be a good analytical thinker able to synthesise information in development of sound and innovative solutions. Alongside an understanding of ethics, multi-cultural and international environments, you'll develop into an effective communicator and a self-directed, independent learner.
- Give you management skills applicable across the primary industries. You'll integrate new scientific, technological, and business knowledge to shape a brighter future for an area of enterprise that sustains us all.

SCHOLARSHIPS
There are many scholarships provided by industry and agricultural companies – nearly $500,000 worth – for students studying agriculture. Find out more on our website.

CAREERS
New Zealand's agribusiness sector is flourishing, and there is strong demand for graduates, from running large farm-based businesses through to international trade. Massey's AgriCommerce programme is cognisant of the most recent developments in both business and primary production because we actively research in all our subjects. Therefore, you'll have the knowledge and foundation skills for several career paths.
- International Marketing
- Economics
- Rural Banking
- Rural Valuation
- Government
- Business
- Sales
- Purchasing
- Consultancy
- Farm Management
- Farm Ownership
- Purchasing Manager.

THE AGRICOMMERCE DEGREE AT MASSEY OPENS DOORS TO MANY JOB OPPORTUNITIES...

■ **HANNAH GOODWIN** Bachelor of AgriCommerce
Mobile Consultant, FMG Advice and Insurance
During Year 13 I decided that I wanted to pursue a career in agriculture with the plan of one day owning my own sheep and beef farm. I completed a Bachelor of AgriCommerce as this course offered a wide range of skills that kept my options open for various job opportunities, as it included both agribusiness and science-based papers. In my final year, I applied for the FMG Graduate Programme and was given a role as a Mobile Rural Consultant.
This is an out-in-the-field role working with farmers and life-stylers alike, where I provide risk management advice and recommendations regarding their insurance requirements. FMG is a fantastic organisation and has a comprehensive Graduate Programme, which teaches you many skills which you can then go out and apply.

PATHWAYS TO POSTGRADUATE STUDY

ENROL IN...

Bachelor of AgriCommerce [3 years]

Postgraduate Diploma [1 year]

Master's degree [2 years]

Doctor of Philosophy [3]

WHAT TO EXPECT

Completing the minimum 360 credits needed for the Bachelor of AgriCommerce degree usually takes a full-time student three years. If you are not sure what you want to major and minor in then keep your options open by choosing a first-year course offering several options. Make sure you include the first year (xxx.1xx level) papers for the majors and minors you may wish to study. For each paper, check for prerequisites, co-requisites and restrictions that may affect you. See:
study.massey.ac.nz

MAJORS

The specialist areas or 'majors' within the BAgriCommerce degree are as follows.

- Agricultural Economics
- Farm Management
- Food Marketing and Retailing
- International Agribusiness
- Māori Agribusiness
- Rural Valuation (This major meets the academic requirements for registration by the Valuers Registration Board).

ENTRY REQUIREMENTS

To help make your move into university life as smooth as possible we suggest you have credits for NCEA Level 3 in the subject areas you'll be studying at Massey. These subjects include accountancy, business, economics, mathematics, statistics, biology, science, geography, agriculture, horticulture, and literacy and numeracy.

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

AGRICULTURAL ECONOMICS

A major of the BAgriCommerce

What works and what doesn't in agribusiness, and why? What influences consumer demand and how do you know in advance?
Industry and government seek graduates who can analyse company and market behaviours, structures, the competition, and regulatory issues.

MASSEY ADVANTAGE

In this programme you'll gain the applied economics and agribusiness skills, and competencies necessary to analyse markets and policy regulations. For example, you'll find out how to price fresh milk, learn about the supply and demand of wine, international trade partnerships and incentives, and the regulations required to protect New Zealand's clean green image.

CAREER OPPORTUNITIES

- Bank economist
- Banking
- Farm equipment companies
- Food processing firms
- Government
- Grain companies
- Policy makers
- Rural finance.

PRACTICAL WORK

As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available with rural businesses and on farms. You'll also need to report on your work, and these reports will be assessed.

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

FARM MANAGEMENT

A major of the BAgriCommerce

Want to be a Fonterra milk supplier, grow kiwifruit for Zespri to market, or produce superfine wool for New Zealand Merino? If so, New Zealand needs you and you need a Massey degree in farm management.

MASSEY ADVANTAGE

Our farm management major prepares you for the strategic, operational, financial, production and organisational demands of the farming business to ensure optimum profits on an ongoing and sustainable basis. Your learning will focus on real-world case studies and will include field trips to provide the experience sought by employers.

CAREER OPPORTUNITIES

> Agricultural economics consultancy
> Natural resource management
> Agricultural policy analyst.

PRACTICAL WORK

As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available with rural businesses and on farms. You'll also need to report on your work, and these reports will be assessed.

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

FOOD MARKETING AND RETAILING

A major of the BAgriCommerce

Do you love the latest food products? Do you want to spend your days telling people how great they are? Do you want to own a café, restaurant or manage an exciting new supermarket like 'Nosh'?

QUALIFICATION OVERVIEW

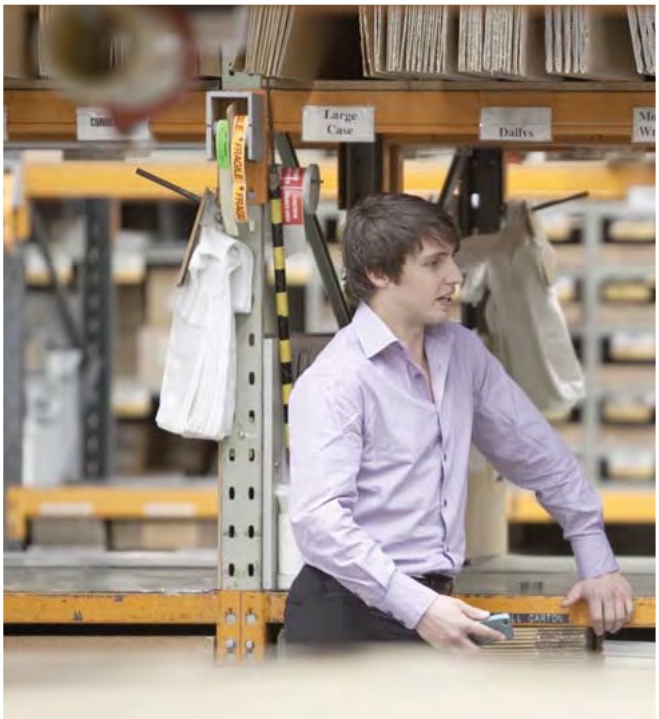
At Massey we'll teach you about sales, marketing, branding and management of food manufacturing, wholesaling, and retailing operations. You'll learn about food economics and management, and be prepared for a successful career in the food distribution system of the 21st century.

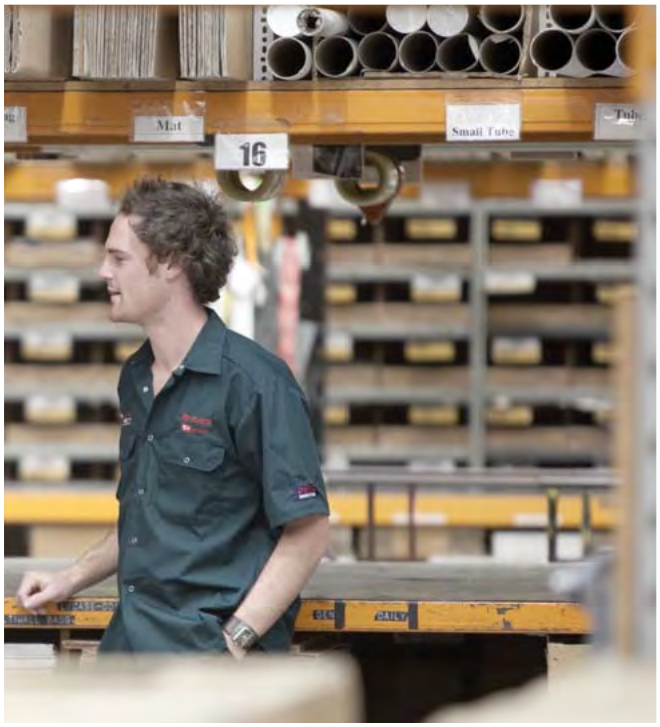
PRACTICAL WORK

As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available with rural businesses and on farms. You'll also need to report on your work, and these reports will be assessed.

CAREER OPPORTUNITIES

- Affiliated wholesale groups
- Chain store organisations
- Food brokerage firms and related organisations
- Food manufacturing
- Food service distributors
- Grocery product wholesalers
- Independent grocery firms.





DURATION
3 YEARS FULL-TIME
AVAILABLE
MANAWATŪ
DISTANCE LEARNING

INTERNATIONAL AGRIBUSINESS

A major of the BAgriCommerce

Does managing the marketing and distribution of meat, kiwifruit, or milk to retailers in Tokyo or Nestlé in Switzerland excite you? How about finding and processing billions of litres of milk every year?

WHY MASSEY?

With this degree you'll learn about the commerce of major international agribusiness, including everything from on-farm procurement in New Zealand to final distribution and delivery of food and other agricultural products to consumers around the world.

You'll gain an understanding of the production sciences, value chain analysis, manufacturing, distribution and logistics, international finance and the trade and marketing skills required to take New Zealand's agri-food industry to the global marketplace.

CAREER OPPORTUNITIES

- Business analyst
- Business and industry leadership roles
- Business management
- Export and import
- International trade.

PRACTICAL WORK

As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available with rural businesses and on farms. You'll also need to report on your work, and these reports will be assessed.

DURATION
3 YEARS FULL-TIME
AVAILABLE
MANAWATŪ
DISTANCE LEARNING

MĀORI AGRIBUSINESS

A major of the BAgriCommerce

There is a huge opportunity to develop Māori land (1.5 million hectares) and build businesses. This includes businesses in energy, fisheries, tourism, and food and beverage.

WHY MASSEY?

An understanding of Māori culture is important to developing businesses. Māori cultural identity is tied to the land (turangawaewae), and owners live by the concepts of manaakitanga (to protect), and kaitiakitanga (to improve).

WHAT TO EXPECT

This major will provide you with the understanding and skills to work in Māori Agribusiness. You will learn about the land, business and culture. You will discover how to work with the people and gain the skills to help develop the many opportunities in Māori agriculture.

■ **KIRI SYMONDS** Bachelor of AgriCommerce
I love the land and grew up in Mangatainoka wanting to be a builder. When I left school, I became a dairy farmer and now I am combining my interests. I needed to find a new career to fit in with my young whanau and I always wanted to get my degree. Massey's AgriCommerce degree fitted well with my love for farming the land and business. This degree has given me the additional knowledge I needed to pursue a career in any of the agribusiness sectors especially Māori Argibusiness. Helping my whanau is also important to me. My grandmother is a shareholder in Aohanga Incorporation, which owns Owahanga Station, a 7300 ha farm near Pongaroa in the Tararua district. Now with the skills and knowledge I have leant from this degree, I am able to provide more guidance to my nana about the farm, the value of the land and help them out. Now my goal is to become a registered property valuer focusing on rural properties.

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

RURAL VALUATION
A major of the BAgriCommerce

Whether it's a dairy farm sale, estimation of orchard capital value, or getting a bank loan to purchase a new farm, almost every financial transaction involving land requires a valuation to support it.

WHY MASSEY?
Massey's rural valuation major provides the knowledge, skills and competencies to be a registered valuer, specifically in the rural context. You'll learn about property markets, resource management, property law and building technology. The programme is accredited by the Valuers Registration Board and the Property Institute of New Zealand.

CAREER OPPORTUNITIES
- Banking
- Consultancy
- Insurance companies
- Local and regional authorities
- Rural valuation practices.

PRACTICAL WORK
As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available with rural businesses and on farms. You'll also need to report on your work, and these reports will be assessed.

BACHELOR OF AGRISCIENCE
BAgriScience

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

WHY MASSEY?

MEET THE CHALLENGES AGRICULTURE FACES

Massey's world-class Bachelor of AgriScience programme focuses on the overlapping areas of agriculture, management and technology, enabling you to come up with innovative solutions to the challenges our primary industries face today.

DEVELOP THE SKILLS YOU NEED

The Bachelor of AgriScience degree gives you an understanding of agricultural systems within the wider context of the economy and society. Your study will focus on the key areas of agriculture systems – for example soils, plants and animals, economics and agricultural systems and management. Your study will also give you an insight into the environmental impact and sustainability of these systems.
You will also learn key skills in communication, information technology, creativity, innovation, problem solving, teamwork and analysis. These are essential for your future career and will make you a sought-after employee.

IN-DEMAND BY EMPLOYERS

Many of our students have jobs even before they graduate and are going on to great careers.

JOIN A WORLD-LEADING AGRICULTURE UNIVERSITY

Massey is New Zealand's number one university in agriculture and the only world-ranked agricultural and life sciences university. It ranks 19th out of the thousands of universities offering agriculture globally.

SKILLS EMPLOYERS SEEK

Massey aligns its world-ranked agriculture programmes to agribusiness industries throughout the world – ensuring our students graduate with the skills and industry knowledge employers want today, and in the future.

SCHOLARSHIPS

There are many scholarships provided by industry and agricultural companies – nearly $500,000 worth – for students studying agriculture. Find out more on our website: **awards.massey.ac.nz**

CAREER OPPORTUNITIES

The industry is made up of a huge range or organisations, including:

- Farming
- Processing and marketing produce
- Logistics of product supply
- Banking
- Company representation and consultancy.

There is a huge range of careers on offer for those with the right skills. Industries where agriscience skills are used include:

- Fertiliser
- Banking
- Biosecurity
- Breeding
- Consultancy
- Farming in all sectors
- Farm tourism
- Horticulture
- Management
- Policy
- Equestrian sports including racing
- Research and development
- Sales and marketing
- Teaching.

ABBY SCOTT Bachelor of AgriScience
Graduated in 2013
Consulting Officer, DairyNZ
I never had a boring day while studying at Massey. It was awesome and it really opened my eyes to the real world and many exciting opportunities. I have always had a passion for agriculture and farming so I wanted a job where I could be working in that industry. I studied AgriScience (formerly Applied Science) and I learnt from world-leading experts. It was challenging – especially at the start of the course – however once I got used to the systems and lifestyle it became very enjoyable, fun and interesting. Massey's degree lets you visit real farms and talk to farmers rather than just learning from a textbook, which is important.
There are plenty of jobs out there for graduates and i was lucky enough to be offered three jobs. There are a lot of excellent graduate and internship programmes available too. As a consulting officer for dairynz, i work with farmers in many different settings – including one-on-one and group discussions – to create positive on farm change and to help them achieve their goals. My advice to others is be passionate, motivated and most of all enjoy what you're doing!

WHAT TO EXPECT

YOUR FIRST YEAR

One of the best things about this degree is the variety of study. You'll learn about animals and agriculture, soils and plants, be introduced to agribusiness and physical geography. You'll also study economics, chemistry, physics and ecology.

PRACTICAL WORK

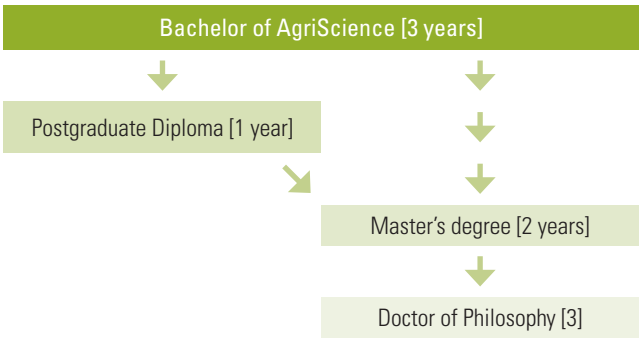
As part of this programme, you'll need to do at least 26 weeks of full-time work in an area related to your major. This is usually done during the summer when work is readily available on farms and with rural businesses. You'll also need to report on your work, and these reports will be assessed.

ENTRY REQUIREMENTS

To help make your move into university life as smooth as possible we suggest you have credits for NCEA Level 3 in the subject areas you'll be studying at Massey. These subjects include biology or science, chemistry, one of the mathematics subjects, as well as literacy and numeracy.

PATHWAYS TO POSTGRADUATE STUDY

ENROL IN...



TYPICAL PATTERN FOR A BAGRISCIENCE DEGREE

Year 1	Year 2	Year 3
Statistics paper 15 credits	100-level 15 credits	300-level 15 credits
Business paper 15 credits	200-level 15 credits	300-level 15 credits
Economics paper 15 credits	200-level 15 credits	200-level 15 credits
Science paper 15 credits	200-level 15 credits	300-level 15 credits
Science paper 15 credits	200-level 15 credits	300-level 15 credits
Science paper 15 credits	200-level 15 credits	300-level 15 credits
Science paper 15 credits	15 credits	15 credits
Science paper 15 credits	15 credits	15 credits
120 credits	120 credits	120 credits

Compulsory | Major | Elective

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

AGRICULTURE
A major of the BAgriScience

You'll gain the knowledge base and the analytical and management skills for you to have a career helping improve the productivity and sustainability of agricultural systems.

WHY MASSEY?

Studying the Bachelor of AgriScience (Agriculture) degree gives you an understanding of agribusiness and modern farming practices within the wider context of the economy and society.

JOIN A WORLD-LEADING AGRICULTURE UNIVERSITY

Massey is New Zealand's number one university in agriculture and the only world-ranked agricultural and life sciences university. It ranks 19th out of the thousands of universities offering agriculture globally.
Our proud record dates back to 1927 when we offered New Zealand's first degrees in agriculture and horticulture.

TAKE ON THE CONTEMPORARY FARMING ISSUES

As a BAgriScience student you will develop a broad overview of the issues confronting New Zealand farmers and agribusiness. Introductory papers in pastures, animals, soils, economics, and business will give you a sound basis for more advanced study later in the programme.

SOUGHT-AFTER BY EMPLOYERS

In the final year, there is scope for you to focus on specific subjects. You'll emerge a well-rounded agriculture graduate, sought-after by employers.

FURTHER STUDIES

You are also able to enter honours, postgraduate diploma, or masters programmes to further your learning after completing the major. The agriculture major is structured to ensure that you develop professional skills in written and spoken presentation, computing, and working with professional colleagues and clients.

CAREER OPPORTUNITIES

EXCELLENT CAREER OPPORTUNITIES

Agriculture is a dynamic industry, constantly evolving in response to changes in the marketplace, technology and social attitudes. It encompasses farming, agricultural service industries, consultancy services, research and development and sales and marketing. There are excellent career opportunities in all of these sectors. Employment prospects in agriculture in New Zealand and overseas are very good. The diversity within agriculture results in a wide range of employment opportunities. The agriculture major in the BAgriScience degree is a broad-based qualification enabling you as a graduate to have careers such as:

- Farmers and farm managers
- Herd managers
- Operations managers
- Business managers
- Rural banking managers
- Farm consultants
- Scientists
- Technical officers
- Agricultural sales representatives
- Policy analysts.

You may find employment in a wide range of organisations including:

- Corporate farms
- Food processing companies
- Banks
- Agricultural chemical, fertiliser, machinery and seed and grain companies
- Local and central government.

You may also seek careers in non-agricultural professions, such as teaching, or pursue entrepreneurial opportunities in New Zealand and overseas.

CALVIN BALL Bachelor AgriScience (Agriculture)
Coming from a rural background in Northland I was keen to study agriculture so headed off to Massey University to do a BAgriScience degree. I enjoyed the whole university experience. Many of the activities I got into, including sport and social events, were organised through the Massey Young Farmers Club.
The BAgriScience sets you up with a broad education covering all aspects of agriculture so you have lots of career options after graduating. I decided to stay for an extra year to do an honours degree and found it very worthwhile because I was able to gain advanced knowledge in subjects I was most interested in and it gave me a different perspective on problems and issues in agriculture. The lecturers were great. I'm looking forward to starting a career working for Ballance Agri-Nutrients.

THE BAGRISCIENCE SETS YOU UP WITH A BROAD EDUCATION COVERING ALL ASPECTS OF AGRICULTURE SO YOU HAVE LOTS OF CAREER OPTIONS AFTER GRADUATING...

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

EQUINE
A major of the BAgriScience

You'll gain the knowledge base and the analytical and management skills for you to have a career helping improve the productivity and sustainability of agricultural systems.

WHY MASSEY?

The equine major will provide you with the knowledge base and skills to meet current and emerging opportunities in the equine industries. It is structured to support strong links with equine industries in New Zealand.

BUSINESS SKILLS COMBINED WITH EQUINE KNOWLEDGE

Your learning will cover the scientific principles of equine husbandry, agriculture, and agronomy with business skills. You will learn about equine health, nutrition, reproduction, structure, and function. You'll also obtain knowledge of production and management issues, including equine welfare and regulatory issues.

SKILLS EMPLOYERS SEEK

You'll develop problem-solving skills and learn how to analyse a range of theoretical and practical problems relevant to the equine industry. You will develop skills in written and oral presentation, information technology, innovation, and working with professional colleagues, clients, and employers. You can continue to gain postgraduate qualifications if you wish to specialise further.

WIDE CAREER OPPORTUNITIES

The AgriScience degree prepares you to apply and integrate scientific, technological and business knowledge to meet current and emerging opportunities in the primary industries. It will prepare you to take future leadership roles in this sector that continues to underpin New Zealand's economy.

CAREER OPPORTUNITIES

The equine industry is large, diverse, and economically important both in New Zealand and worldwide. The equine major will prepare you for a career in a wide variety of equine enterprises anywhere in the world. You will acquire a broad understanding of health and production issues, and you'll be able to offer the equine industry up-to-date, scientifically-based knowledge.

Potential employers include equine regulatory, breeding, racing, breed, and sport organisations, and other equine enterprises in New Zealand and around the world.

■ **LAURA BREBNER** Bachelor of AgriScience (Equine) IRT

I've always wanted to work with horses but I knew I needed to gain a qualification and experience to be successful in the industry. I chose to study equine at Massey because I thought it would provide me with a great head start in finding employment.

The degree has been a constant challenge but what I have learnt is invaluable and I will always be thankful that I chose to get a degree that set me up for the industry.

Job opportunities began opening up quickly, and I had a job lined up long before I had completed my degree. I work for IRT which is an equine quarantine facility in Auckland. The job involves daily care of a range of horses, making sure they are healthy after long travelling periods, and running regulation tests to ensure no diseases are being brought into the country.

I love horses because no two horses are the same. They challenge me on a day-to-day basis and keep me on my toes.

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

HORTICULTURE
A major of the BAgriScience

Horticulture graduates contribute to the production of vital food and nutrition for humanity – you could make a real difference. There is an increasing demand for horticulture graduates.

MASSEY ADVANTAGE

Horticulture combines science, technology and business in the production, marketing, use and improvement of fruits, vegetables, and other plants globally. This vital industry provides food for a growing global population, and is one of the most rapidly expanding primary industries in New Zealand.

As a Massey Bachelor of AgriScience (Horticulture) student you will also learn how a vibrant and resilient horticultural industry can ensure continuing production and supply of high-value food products for maximum return.

JOIN A WORLD-LEADING AGRICULTURE UNIVERSITY

Massey is New Zealand's number one university in agriculture and the only world-ranked agricultural and life sciences university in New Zealand. It ranks 19th out of the thousands of universities offering agriculture globally. Our proud record dates back to 1927 when we offered New Zealand's first degrees in agriculture and horticulture.

SKILLS EMPLOYERS SEEK

Today's industry requires graduates who are problem-solvers, have good quantitative skills, are highly motivated, can think and act independently, and shoulder responsibility. We will work with you to ensure that you develop these highly-developed technical, business, communication, leadership, and interpersonal skills that employers seek.

SOLVE THE BIG ISSUES

As a Massey Bachelor of AgriScience (Horticulture) student you will develop an understanding of the big challenges confronting this global industry. These include biosecurity and continual innovation to create new fruit and vegetable varieties and products.

FLEXIBILITY OF FOCUS

The aim of this qualification is to help you become a highly-employable graduate. You are expected to gain a deeper understanding of particular areas you are interested in. Initially you will cover a broad range of areas. This flexibility gives you the opportunity to forge your own future career pathway.

Introductory papers covering horticulture, soils, geography, engineering principles, pests and diseases, economics, business management and plant biology will give you the basis for more advanced study later in the programme. In the final year, you will have the option to further focus in an area you are interested in.

FURTHER STUDY

After completing a BAgriScience (Horticulture) you are also able to enter honours, postgraduate diploma or masters programmes to further your learning. A postgraduate qualification in horticulture allows you to consider leadership opportunities as a consultant, technician, or scientist within private companies or Crown Research Institutes or universities, both in New Zealand and overseas.

CAREER OPPORTUNITIES

A diverse range of horticultural businesses on a local and international scale are tasked with meeting food production challenges. They are constantly improving product quality for delivery to a demanding world. Modern-day horticulture is efficient and innovative. Our programme will help you better understand components such as postharvest technology and systems, supply chain and integrated production management. You could work in any of these areas.

EXCELLENT CAREER PROSPECTS

Career prospects are excellent for motivated, innovative, and well-educated horticulture graduates. Graduates with the ability to meet horticultural industry targets for sustainable export growth are in high demand.

The horticulture major will enable you to enter a wide range of careers in the diverse horticultural industry including:

- An entrepreneur owning your own business
- Managing one of the diverse range of horticultural enterprises
- Consultancies; providing technical/expert advice and products to the production sector
- Global marketing
- Logistics and supply chain management of horticultural crops both nationally and internationally
- Research scientist or technician.

BACHELOR OF CONSTRUCTION

BConst

DURATION
3 YEARS FULL-TIME

AVAILABLE
ALBANY

Become a construction expert! You can contribute to all sectors of the construction industry and be sought-after by employers.

WHAT'S IT LIKE?

The Massey University Bachelor of Construction will teach you how to develop and implement best practice building solutions and construction management techniques. You'll learn how to add value to the sustainable development of the built environment, and its use, by integrating sound technical and theoretical knowledge with industry experience, management and interpersonal skills.

WHY MASSEY?

SOUGHT-AFTER BY EMPLOYERS

There is great demand for people with a Bachelor of Construction. Most students are offered employment before they have even completed their qualification.

EXCELLENT SALARIES AND CAREER PROGRESSION

As a construction graduate you will be in line for the excellent starting salaries that are available in the industry. As you progress through your career, salary levels remain higher than for many other sectors. Many graduates are able to have their own business within 10 years of graduation.

FLEXIBLE

Although you do need to choose a major when you enrol, you can change from one major to the other after one year of study. In your final year you can choose to complete your final year in distance mode. This means that you can continue to study while gaining valuable work experience and starting to earn the excellent salaries that are available to you with your qualification.

RELEVANT TO INDUSTRY

There are two majors available; Quantity Surveying and Construction Management. These majors focus on relevant industry sectors, such as:

- Project management consultancy
  Buildings renovation and earthquake strengthening
- Construction companies
- Development consortiums
- Local authorities and regulatory bodies
- Property development or property management
- Industrial and commercial building services
- Insurance rebuild costs.

The Bachelor of Construction is a three-year degree (or 3.5 years if you commence your study in semester two).

ENTRY REQUIREMENTS

There are no admission requirements specific to this qualification other than those for admission to the University. However, we encourage students who are weak in mathematics to get a head start by enrolling in foundation mathematics or physics. You will be granted credits if you have qualified for the New Zealand National Diploma in Quantity Surveying, Construction Management or an equivalent qualification. You must apply for the cross credits at the time of enrolment.

YOUR FIRST YEAR

You will learn about building and construction, materials and computer-aided design. Along with this you'll gain knowledge in accounting, law, finance and construction economics. You'll also be introduced to the built environment and measuring systems.

RICS the mark of property professionalism worldwide | Accredited course

THE PACIFIC ASSOCIATION OF QUANTITY SURVEYING PAQS

CAREER OPPORTUNITIES

WIDE RANGE OF EMPLOYMENT

Quantity Surveyors are typically involved in the feasibility, costing and financial control of projects. Construction Managers are typically involved in managing the health and safety and resource optimisation of projects. Both disciplines are vital to the successful conclusion of exciting projects from new commercial buildings, bridges and motorways, housing estates and development of waterfront sites. Graduates may be self-employed or act as consultants for clients or banks, or work for a contractor. Bachelor of Construction graduates will enjoy varying and challenging careers across a range of industries and sectors.

- Professional quantity-surveying practices
- Construction companies
- Development consortiums
- Local authorities and regulatory authorities
- Allied sectors such as insurance.

YOU WILL BE IN DEMAND

The New Zealand construction industry is experiencing unprecedented growth which has led to acute shortages of construction graduates. This growth is due to the rebuild of Christchurch, population growth in Auckland, and growth in the export sectors. The demand for construction graduates is expected to stay strong for many years. Demand for construction graduates is equally strong in the UK and many parts of Europe leading to extensive International opportunities.

RAPID CAREER PROGRESSION

There are opportunities in all sectors of the built environment including new construction and civil projects, building restoration, earthquake strengthening and insurance valuation. Construction graduates gain employment within dynamic teams and can be equipped to lead significant developments within a few years of graduation.

GAIL ROYSTON Bachelor of Construction
To graduate in 2015
Assistant Cost Manager, Beca
Completing my final year, I am loving this exciting industry. I am working for Beca, an engineering consulting in Christchurch. With the flexibility distance learning provided by Massey University, I am able to work full time, learning within the industry, while finishing my degree. What I find rewarding is being part of a team and helping to influence the rebuild of Christchurch.

DURATION
3 YEARS FULL-TIME

AVAILABLE
ALBANY

CONSTRUCTION MANAGEMENT

A major of the BConst

WHAT'S IT LIKE?

When you study Massey's Bachelor Construction (Construction Management) you will really be able to make an impact on the building industry. That's from the design stage right through to completion.

SKILLS EMPLOYERS SEEK

You will contribute to client needs assessment and offer advice on resolving buildability issues at the design stage. You'll plan, schedule, and organise for implementation of new construction projects and refurbishment or conversion of existing buildings. That includes making sure that things stay on track – financially, quality and time-wise and that you are meeting legal requirements.
You can follow your passion and create your own niche – you may be interested in sustainable construction. You could be an advocate for obligations for social and environmental friendliness in buildings, including minimising adverse impact of development process on society and the environment.

SOUGHT-AFTER GRADUATES

There is great demand for people with a Bachelor of Construction. Most students are offered employment before they have even completed their qualification.

CAREER OPPORTUNITIES

- Construction project management
- Construction and property development
- Consultancy
- Facilities management
- Government
- Insurance
- Mining
- Oil and gas
- Banking.

DURATION
3 YEARS FULL-TIME
AVAILABLE
ALBANY

QUANTITY SURVEYING

A major of the BConst

WHAT'S IT LIKE?

Massey's Bachelor of Construction (Quantity Surveying) will teach you all the skills you need to be a sought-after quantity surveyor.

SKILLS EMPLOYERS SEEK

A quantity surveyor is an exciting and vital role in the building industry. You'll work on projects from initiation to completion, helping them to stay on track financially. It's a challenging and interesting role where you'll be looked to for your problem-solving skills to help the project go to plan.

SOUGHT-AFTER GRADUATES

There is great demand for people with a Bachelor of Construction. Most students are offered employment before they have even completed their qualification.

CAREER OPPORTUNITIES

- Quantity surveying
- Commercial management
- Construction project management
- Consultancy
- Facilities management
- Mining
- Oil and gas
- Strategic planning.

BACHELOR OF ENGINEERING WITH HONOURS BE(Hons)

DURATION
4 YEARS FULL-TIME

AVAILABLE
ALBANY
MANAWATŪ

Start becoming an engineer from day one. You'll learn the skills to make you a sought-after employee in New Zealand and internationally.

WHY MASSEY?

YOU ARE GUARANTEED YOUR FIRST CHOICE OF MAJOR

Whether you choose your major at the start or the end of your first year, there are no limits on the places available. There's no chance of missing out – you can study what you're passionate about!

REAL-WORLD PROBLEM SOLVING

Every year you work on projects that can help both our communities and industry, giving you a real feel of what engineering involves, and the skills that distinguish you from the rest.

WANTED BY EMPLOYERS

Our practical learning environment, combined with having more work experience than any other New Zealand engineering graduate, will see you develop the skills that employers are looking for.

SUPPORTIVE LEARNING ENVIRONMENT

To help you transition to university patterns of independent study we provide you with a personal tutor.
A Year Dean coordinates your entire first year experience. Also, you're tutored in small-groups of up to 25 students, so you have easy access to our faculty experts.

MODULAR LEARNING

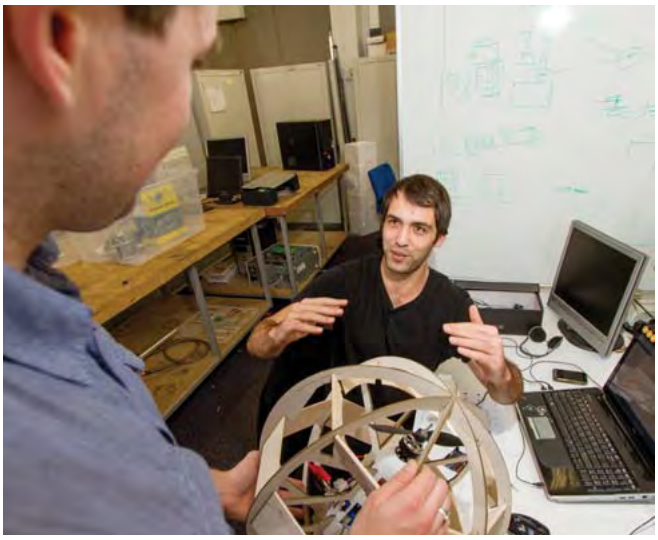
We teach and assess subjects in small blocks so that you know how you're doing throughout a semester. There are modular tests but no final 'big' exams. This takes the pressure off if you're having a bad day.

FLEXIBLE STUDY

If you wish to change from the BE(Hons), you may be able to transition into a Bachelor of Information Sciences or Bachelor of Science. The first years of several of these programmes' majors have many papers in common.

MAJORS

■ **JEREMY HILL** Chief Technology Officer
Fonterra Co-operative Group Ltd
"The Massey graduates we have employed have brought an excellent blend of engineering principles and practical relevance. In other words they hit the ground running and in Fonterra that has taken them far in the company and often far in the world."



CAREERS

Worldwide, engineering is recognised as vital to successful economies and more and more graduates are needed.

CAREER PROGRESSION

- You may find your early employment is in technical development project work or research.
- In five years, you are likely to be a manager in technical, research and development, production, or quality assurance.
- You may become a general manager, or start your own businesses. Our degree includes business so you have what's needed.
- Postgraduate study attracts those wanting to work in research and development.

EARNING POTENTIAL

The 2014 Remuneration Survey of the Institute of Professional Engineers New Zealand reports new graduates start on a median salary of $52,000 and after five years are earning around $75,000. Those further into their careers earn much more.

HELPING YOU LAND THE JOB YOU WANT

Massey engineering graduates are sought-after by employers for their ability to be valuable employees from Day One. Massey provides first-rate support to help you 'hit the ground running' – you'll stand out from the rest.

PRACTICAL EXPERIENCE

During your degree you spend 900 hours (six months, minimum) working as engineers with companies. That's more than any other programme in New Zealand. We want our students have a competitive edge.
Our staff help you find intern or summer work, and work with Massey's Career and Employment Service to ensure you get what you need.

- Dedicated website advertising work opportunities
- Tips on writing CVs
- Job interview guide and mock interviews
- Career planning workshops
- Engineering company staff to put you through your paces
- You will be prepared for the competitive world of finding a job.

CAREER OPPORTUNITIES

Our graduates can work in many industries:

- Food
- Pharmaceutical
- Petrochemical
- Biotech
- Chemical
- IT.
- Telecommunications
- Power and energy
- Manufacturing
- Consumer products
- Automotive

Our graduates get jobs around the country and around the world as:

- Process engineers
- Waste-water engineers
- Energy development engineers
- Project managers
- Process automation engineers
- Mechanical product engineers
- Research engineers
- Project planners
- Sales engineers
- Manufacturing engineers
- Commissioning and startup planners
- Robotics engineers
- Embedded software engineers
- Equipment reliability engineers
- Test method validation engineers
- Project managers for automation and controls
- Solidworks machine designers
- Mechanical – estimators
- Mechanical system design and analysis engineers
- Manufacturing managers – machining and assembly
- Machine designers
- Systems test engineers
- Software engineers
- Hardware engineers
- Electronics engineers
- Product developers.

ENTRY REQUIREMENTS

Entry into the Bachelor of Engineering with Honours will be guaranteed to applicants who gain university entrance and the appropriate levels specified in the relevant qualifications listed below:

MAJORS (AVAILABLE AT ALBANY AND MANAWATŪ)	NCEA LEVEL 3
> Chemical and Bioprocess Engineering > Engineering and Innovation Management with a minor in: Chemical and Bioprocess Engineering	> Mathematics (including standards in algebra, differentiation and integration) (16 credits) > Physics (16 credits) > Chemistry (14 credits)
> Electronics and Computer Engineering > Mechatronics > Engineering and Innovation Management with a minor in: Electronics and Computer Engineering or Mechatronics	> Mathematics (including standards in algebra, differentiation and integration) (16 credits) > Physics (16 credits)
CAMBRIDGE INTERNATIONAL EXAMINATIONS: A LEVEL Mathematics (C Grade) and physics (C Grade) plus (for Chemical and Bioprocess Engineering) chemistry (C Grade)	
INTERNATIONAL BACCALAUREATE: 29 POINTS Mathematics (5 points Higher Level) and Physics (5 points Higher Level) plus (for Chemical & Bioprocess Engineering) Chemistry (5 points Higher Level)	

ALTERNATIVE PATHWAYS TO THE BE(HONS)

Applicants who are currently in Year 13 who have not yet had confirmation of UE status and need to do, one or more of the Massey University preparatory papers before NCEA Level 3 results (or equivalent) become available in January, have to apply for discretionary entrance.

I HAVE UNIVERSITY ENTRANCE (UE) BUT NEED MORE PREPARATION IN ONE OR MORE OF THE SUBJECTS TO ENTER BE(HONS)

Certificate in Science and Technology
This one-semester pathway is for students who need extra preparation in mathematics, physics or chemistry. These papers can be taken separately (depending on your background) or as part of the CertSciTech qualification.

Diploma in Science and Technology
This is for students wanting to study a wide range of papers, but keep their options open just in case they change their mind and wish to enter another programme. This two-semester pathway is for students that need extra preparation in mathematics, physics or chemistry. You can also choose subjects from: biology, programming, statistics, food, accounting, marketing, finance, and management.

Summer Compact Courses
For students that need extra preparation in mathematics, physics or chemistry, we offer a Certificate of Proficiency. You can take 124.100 Introductory Physics, 160.103 Introductory Mathematics (or 160.132 Concepts In Mathematics), or 123.103 Introductory Chemistry. These courses are an intensive learning experience. Students are advised to only take two introductory subjects. Tuition in each course takes six weeks and attendance is required during January and early February. These papers can be put towards another qualification in the BSc, BInfSci and BBS.

I HAVE MET THE ENTRY REQUIREMENTS BUT NEED MORE ENGLISH LANGUAGE SKILLS

Direct Entry English Pathway This one-semester pathway is suitable for students wishing to increase their English language skills.

I HAVE STUDIED AT ANOTHER INSTITUTION AND WISH TO GET DIRECT ENTRY TO YEAR 2

Direct Entry Pathway Suitable for students who have completed the following:

- A first year of a BE programme at any other New Zealand tertiary institution
- The National Diploma in Engineering.

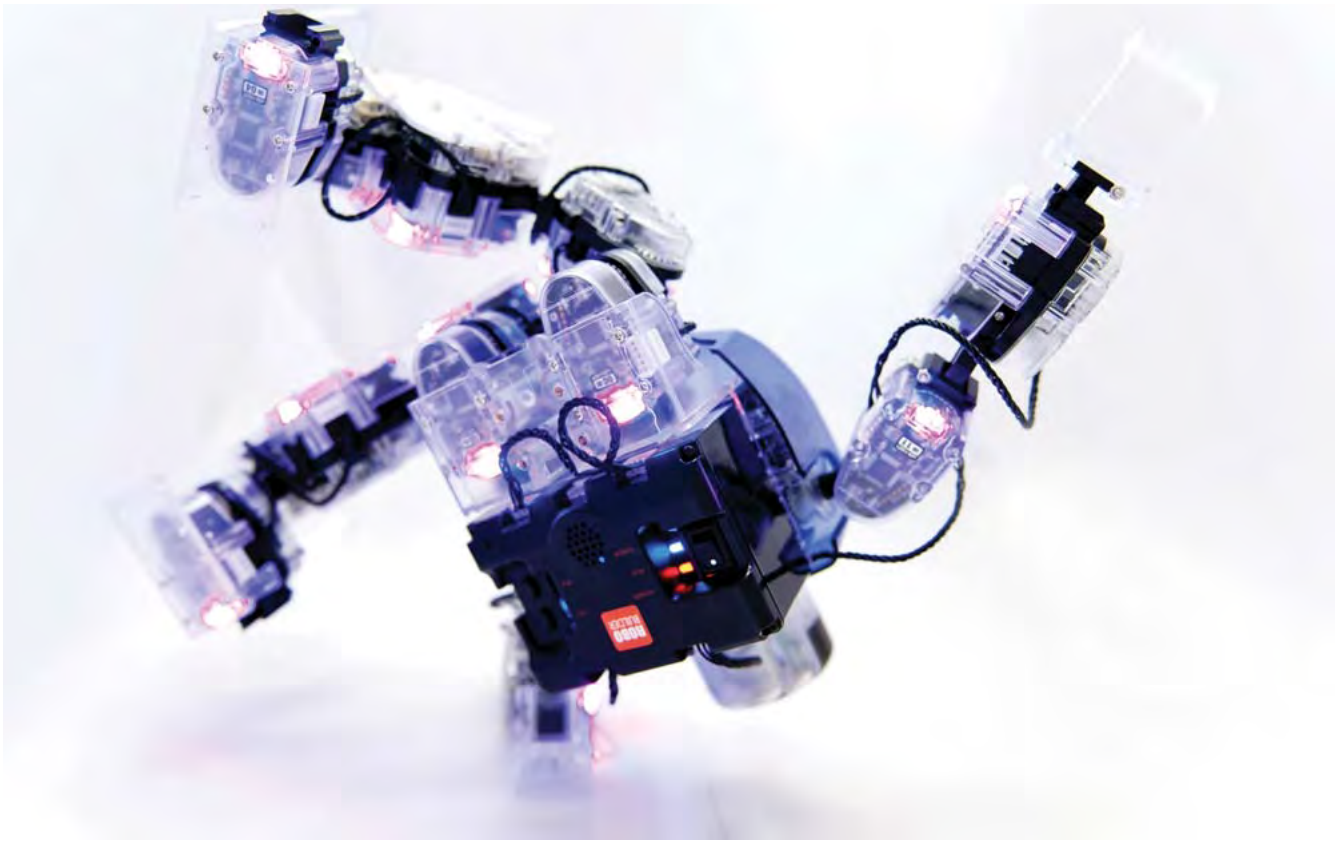
I NEED MORE ENGLISH LANGUAGE SKILLS AND MORE PREPARATION IN THE SUBJECTS TO ENTER THE BE(HONS)

Certificate of Foundation Studies Suitable for students wishing to increase their English language skills and attain University Entrance. This may be a one or two-semester programme depending on your background in maths, physics and chemistry. This is then followed by taking the one-semester Certificate in Science and Technology to get you up to speed in maths and physics and/or chemistry.

I'M NOT SURE WHETHER MY QUALIFICATION ALLOWS ME ADMITTANCE

Contact our Student Advice and Information team.

Phone: 0800 MASSEY
Email: courseadvice@massey.ac.nz



DEGREE CONTENT AND STRUCTURE

LEARN BY DOING – OUR UNIQUE PROJECT SPINE

A unique feature of our degree is constant engineering practice through projects in each of your four years. You become technically proficient – you learn by doing! You learn to work in teams, leadership, communication and project management. Employers have told us this is what they look for in graduates.

YEAR ONE

Here we provide you with a strong basis of engineering science. You also have the flexibility to change majors if you want to. If you choose the Chemical and Bioprocess Engineering major you will also have the option of switching to a Bachelor of Food Technology (Honours) degree.

YEAR TWO

Here you delve deeper into your chosen major and we provide a stronger technical basis for the engineering principles you'll rely on as you make harder engineering or technological decisions.

YEAR THREE

In your third year the programme concentrates on providing the specialist knowledge unique to each major. The projects are year-long and you will have to rely heavily on the technical knowledge you've built up over the last couple of years.

YEAR FOUR

In your final year the programme concentrates on providing the specialist knowledge unique to each major. All students have a 'capstone' project to complete, which tests you to the limit about how you apply your technical knowledge to solve a real complex problem.

	Engineering practice Project Spine – learn by doing		Paper profiles					
Year 1	228.111 Eng Practice 1: Global Perspectives	228.111 Eng Practice 2: Creative Solutions	228.171 Eng Math 1A	228.172 Eng Maths 1B	124.171 Phys Princ for Eng&Tech 1	124.172 Phys Princ for Eng&Tech 2	123.171 Chem for Bio Sys 1 159.171 Comp Think Soft Dev	123.172 Chem for Bio Sys 2 159.172 Comp Think Algo
Year 2	228.211 Eng Practice 3: Product Development	228.212 Eng Practice 4: Mats & Manufact	228.271 Engineering Mathematics 2	Major paper	Major paper	Major paper	Major paper	Major paper
Year 3	228.311 Eng Practice 5: Engineering Design within Constraints		228.371 Statistical Modelling for Eng	Major paper	Major paper	Major paper	Major paper	Elective paper
Year 4	228.711 Engineering Practice 6: Design Capstone Project		228.798 Individual Research		Major paper	Major paper	Major paper	Elective paper

Project spine	Major paper	Core paper	Elective paper

WHAT TO EXPECT

OUR DISTINCTNESS – THE PROJECT SPINE

ENGINEERING PRACTICE COMING ALIVE

Our exceptional project spine allows you to develop the skills that real-engineers rely on in practice. This allows you to work in teams to solve real-world problems, and develop the skills that distinguish you from the rest. Our students lead others when it comes to problem solving.

■ In 2014 a Year 1 Massey team beat other universities from New Zealand and Australia to be the Champion Team in the Engineers Without Borders (EWB) Challenge. This is a huge coup by Massey as the competition is fierce and proves that we produce engineers that possess the capability to think 'outside the box'. This is in addition to our previous three wins at the National Challenge (2012-2014) beating all competitors from other New Zealand universities.

THE PROJECTS

PROJECT 1

The first project provides tangible benefits for a third-world community that must be realistic and fit within social, economic and environmental constraints. We've helped communities in Vietnam, Timor-Leste and Nepal.

PROJECT 2

Looking ahead – designing for the Year 2070! You get to think about what will meet a not-yet-identified future need. You won't be constrained by today's environment, but will be free to develop products, processes or technologies that you feel will be appropriate at that time.

PROJECT 3

Here you help a company develop a concept for a new product. The companies you will advise include:

> Bell Booth
> EasiYo
> Goodman Fielder
> Heinz Wattie's
> McCain
> New Zealand Pharmaceuticals
> Methven
> Spidertracks
> Tait Communications
> Fisher and Paykel Healthcare.

PROJECT 4

You're working for a large dairy company that wants to market a new coffee creamer for export. You'll design a full-scale manufacturing process and actually build a 'pilot' scale of your design.
OR
You design and manufacture a new prototype for an international supplier of high quality electronics equipment.

PROJECT 5

You're working on a full-scale brewing plant to ensure that the plant operates effectively. The right selection of boilers, refrigeration and waste water treatment is essential.
OR
You develop a soccer robot-based product that will be sold in Europe, which has some of the world's most stringent environmental legislation. This challenges your ability to trade-off profit against functionality, environment and social considerations.

PROJECT 6 – CAPSTONE

You work together and integrate your previous study and practice developing your professional skills. This project is important as it is as close as you'll get to practicing like a real engineer. Some projects will involve helping a real company.

WHAT THE STUDENTS SAY

■ These project-based courses help students build their portfolio of designs and solutions that they can use to showcase their skills and talents to future employers.

■ These competitions (ref EWB Challenge) help motivate me to create innovative solutions to problems and help build my presentation skills, and enhance my networking skills.

WHAT OUR FINAL-YEAR ENGINEERING STUDENTS CAN DO

OUR PROJECTS PUT STUDENTS TO THE TEST. YOU WILL BE UTILISING YOUR KNOWLEDGE AND EXPERTISE TO SOLVE COMPLEX ENGINEERING PROBLEMS

HANDS-FREE SAILING

- **CHRISTI ENSLIN** Centurion College
  The tiller pilot comes into its own when you are alone, out on the water and need something to hold the sail-boat on course for a few minutes while you reel in a fish or just want to prepare a cup of coffee. The pilot uses various sensors to determine the boat's heading and compares it with the desired heading, calculates the error and the rate of change, and processes this information using a fuzzy logic algorithm. Proportional control is used to adjust the speed of the motor which is connected to a mechanical reduction gearbox which in turn controls the rudder angle.

ROBOTIC INSPECTION VEHICLE

- Based on a children's quad-bike, this is a versatile remote utility platform. It is designed from the ground up to be used in remote locations for mobile video surveillance in various terrain and weather.
  It can be controlled via the 'Internet of things' over large (global) distances with real-time video and sensory feedback.

SPRAY-DRIED FRUIT EXTRACT

- **LEO LAI ACG** Strathallan, Auckland
  New Zealand Pharmaceuticals Ltd (NZP) manufactures pharmaceutical and biotechnology products. The project specifies the best conditions for spray-drying an anthocyanin-rich extract to produce a free-flowing powder. Being able to maximise the yield of the extract from the spray dryer, minimise the loss of anthocyanin in the extract, and minimise the moisture content of the final product is crucial for NZP.

LIFE AS A FIRST-YEAR STUDENT

We understand you may need some time to settle in to study and find new friends. Our learning environment allows you free time so you can meet with your colleagues and friends, work on your studies or just have free time for you to do what you want. Our facilities have lots of space for you to sit together to work and chat.
In engineering we work to ensure your on campus commitments are between 9am and 5pm. This differs from some other areas where commitments may range from 8am to 9pm. A typical 40-hour week will include about 22 hours of lectures and workshops and 18 hours of recommended personal study time.

	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm
Mon	228.111 Engineering Practice 1: Global Perspectives							Personal study	
Tue	159.171 Comp Think & Software Dev	228.171 Engineering Maths 1A		124.171 Phys Princ for Eng & Tech 1	228.171 Engineering Maths 1A		124.171 Phys Princ for Eng & Tech 1		
Wed	159.171 Computational Thinking & Software Development			159.171 Comp Think & Software Dev	Personal study or additional tutoring if required				
Thu	228.171 Engineering Maths 1A	124.171 Phys Princ for Eng & Tech 1			124.171 Physical Principles for Engineering & Technology 1		Personal study, social activities or just FREE TIME! A workout at the Sports Centre?		
Fri	124.171 Phys Princ for Eng & Tech 1		228.171 Engineering Maths 1A	228.171 Engineering Maths 1A		Personal study			

Key to timetable – Massey's teaching methods

Lecture: This is where you will be taught in a large group where the lecturer will engage you in discussion
Workshop: This is where you will be working on problems in small groups and the lecturer will be facilitating your learning

CHEMICAL AND BIOPROCESS ENGINEERING

A major of the BE(Hons)

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY (FIRST 2 YEARS ONLY)
MANAWATŪ

World economies are strongly based on adding value to raw materials through processing. Chemical and Bioprocess Engineering is the industrial processing of raw materials to higher value products through combinations of physical, chemical or biochemical action. These processes can be very diverse and Chemical and Bioprocess Engineers design, optimise and operate these processes. Examples include fermentation of sugars to alcohol, production of pharmaceutical products, extraction of high value compounds, composting of organic waste, conversion of milk solids to dairy ingredients, conversion of wood into paper and the production of fuels from waste streams.
The distinctive feature of this course at Massey is that as well as equipping you with core chemical engineering skills for more traditional industries (oil, gas), there is a focus on innovative approaches such as nanotechnologies, biocatalysts, and clean processing techniques (based on our excellent research).

AMY HARROD Environmental Engineer, Opus
Since completing my degree in 2005 I have been working as an Environmental Engineer for Opus in Christchurch. Over the last four years I have been the programme manager for a large professional services contract, covering water, roading and solid waste services. My role involves project and client management, design, tender evaluations, preparation of contract documents, public health risk management plans for drinking water supplies, and issues and options reports. I'm also involved in contract management for a range of works including water supply upgrades, pipeline renewals and other physical works.
Studying Engineering at Massey helped me develop strong skills in defining and solving problems, which is essential for a career in Engineering. Massey's emphasis on all forms of effective communication has provided me with a reliable skill set that I use on a daily basis

PAPERS

YEAR 1
- Chemistry for Biological Systems 1 and 2
- Physical Principles for Engineering and Tech 1 and 2
- Engineering Mathematics 1A and 1B
- Engineering Practice 1 and 2: Global Perspectives and Creative Solutions

YEAR 2
- Molecules to Materials
- Engineering Mathematics 2
- Heat and Mass Transfer
- Chemical Energetics
- Fluid Flow and Particle Technology
- Industrial Microbiology
- Engineering Practice 3 and 4: Product Development
- Materials and Manufacture

YEAR 3
- Statistical Modelling
- Environmental Technology
- Process Engineering Operations
- Reaction Technologies
- Bio-separation and Purification
- Engineering Practice 5: Process Engineering
- Elective options: Nanoscience or Energy Systems & Mgmt or Microbial Biotech or Organic & Bio Chem

YEAR 4
- Research Project
- Process Improvement
- Chemical and Bioprocess Engineering
- Process Control Engineering
- Practice 6: Design Capstone
- Elective options: Packaging or Renewable energy or Innovation Mgmt

ELECTRONICS AND COMPUTER ENGINEERING

A major of the BE(Hons)

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

Tablet computers, smart phones and internet banking are commonplace today – just examples of how electronics and computers have integrated and become all pervasive in modern day life and ensures the continued relevance of this area of engineering.
Electronics and Computer engineers are multi-disciplinary, have excellent practical skills and can design, develop and manage both software and hardware projects. They are capable of working in a team environment to solve problems from the device level to networks, communication systems and embedded systems. The distinctive feature of this course at Massey is that much of our teaching is based in the laboratory where you get real hands-on practice; strong emphasis on embedding computing & electronics technologies in every-day consumer products and as we're focused on consumer products the user interface is really important.

■ **HAYDEN SHORT** TELECOMMUNICATIONS TECHNICIAN
DOWNER GROUP
I am working for Downer Group as the telecommunication technician at Scott Base, Antarctica. This role is a 13-month winter over role. I maintain all of the communications systems for the base. This includes the satellite link with New Zealand, the fibre network, the PABX telephone system, UHF, VHF, and HF radio systems for field communications, satellite phones and solar charging systems.
In addition I develop solutions for field events that require interfacing with specialist equipment for scientific research.
Since leaving Massey I have worked with point-to-point microwave radio systems, IT software and hardware systems including networking, and design and development of custom electronics solutions.
Massey University's Engineering degree has enabled to get to amazing places like Antarctica to work and achieve my goals anywhere in the world. It gave me a solid understanding of telecommunications and electronics and helped me to develop methodical fault finding and analysis skills that are invaluable in my day to day work life.

PAPERS

YEAR 1
> Computational Thinking: Software Development and Algorithms
> Physical Principles for Engineering & Technology
> Engineering Mathematics 1A and 1B
> Engineering Practice1 and 2: Global Perspectives
> Creative Solutions

YEAR 2
> Communication Network Architectures
> Analogue and Digital Electronic Systems
> Hardware-Oriented Computing
> Signals and Systems
> Eng Practice 3 and 4: Product Dev, Materials and Manufacture

YEAR 3
> Communication Systems
> Data Communication Networks
> Advanced Electronic Circuits
> Embedded Systems Design
> Statistical Modelling
> Engineering Practice 5: Engineering Design
> Elective options: Control Eng, Software Design and Construction

YEAR 4
> Digital Signal Processing
> Advanced Computer and Communication Engineering
> Research Project
> Engineering Practice 6: Design Capstone
> ELECTIVE OPTIONS: Advanced Micro- and Nano-Electronics, Image and Video Processing

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY (FIRST 2 YEARS ONLY)
MANAWATŪ

ENGINEERING & INNOVATION MANAGEMENT

A major of the BE(Hons)

WITH MINORS IN

- Chemical and Bioprocess Engineering
- Electronics and Computer Engineering
- Mechatronics

Industry needs talent-led innovation – engineers who have a well-developed ability to integrate their technical engineering skills with their enterprise skills to commercialise technical products/processes. Drawing on specialised technical engineering knowledge, together with experience in management, finance, sales, marketing, manufacturing and project management, these engineers are well placed to provide leadership to take companies to the next competitive level.

WHAT DIFFERENTIATES MASSEY ENGINEERS FROM OTHERS?

- A sound technical base, drawing on their specialised engineering knowledge in the methods of engineering analysis and design
- A strong ability to effectively manage projects within a commercial environment; utilising their enhanced communicative and facilitating skills, to get the most from finance, sales, marketing, manufacturing and suppliers.
- A core capability to take new products to market.
- A strong grasp of the technical challenges companies face, yet with an understanding of what these means in the global commercial world.

YEARS 1 AND 2

Common with other engineering majors
Students can choose a minor from the prescribed programme of papers for one of the following:

- Chemical and Bioprocess Engineering
- Electronics and Computer Engineering
- Mechatronics.

YEARS 3 AND 4

Students continue with a selection of papers from their chosen engineering minor with the addition of several Engineering and Innovation Management-specific papers.

CATHERINE BEARD Executive Director, Manufacturing NZ
Manufacturing NZ recently released a report that included interviews of 15 of our fast growing and most successful manufacturers to see what they had in common. Talent-driven innovation was rated as the most important aspect of being globally competitive. Engineering graduates with a mix of engineering, innovation and business skills will be critical to the success of the manufacturing firms employing them. Manufacturers tell us they like to employ people with a mix of practical as well as theoretical knowledge. The most successful manufacturers are offering services to their customers so 'soft skills' matter too. This course looks like it ticks a lot of those boxes.

ENGINEERING KNOWLEDGE RELATING TO YOUR MINOR			INNOVATION MANAGEMENT OPTIONS
Chemical	Electronics	Mechatronics	
> Heat and Mass Transfer > Chemical Energetics > Industrial Microbiology > Process and Control > Reaction Technologies and Modelling	> Digital systems > Embedded Systems > Communication Systems > Advanced Electronic Circuits > Software Engineering	> Manufacturing > CAD > Solid Dynamics > Mechanism and Component Design > Computational Thinking	> Agile Manufacturing > Product Design > Business Finance > New Product Development > Advanced Manufacturing Strategies > Lean Operations > Business Process Improvement > Quality System Management > Supply Chain Management and Logistics

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

MECHATRONICS
A major of the BE(Hons)

Mechatronics engineers are in demand as more and more products and processes are becoming smarter. Mechatronics is the interdisciplinary field of engineering dealing with the integration of mechanical, electronics, computer, software and control engineering.
This degree focuses on getting you to go forward with the multidisciplinary skills, knowledge and confidence to slot into general industry, to design smart products and to automate their manufacture. It balances the need for a broad engineering education with the demand that students be comfortable with the nuts and bolts of engineering. Through intensive papers and challenging design projects, our graduates are competitive and confident in product innovation and all aspects of mechanical and electronic engineering. Some examples of projects undertaken by our students include heavy-duty search and rescue robots, assistive robots for stroke rehabilitation, large scale 3D printers, composite electric vehicles, RFID secure chemical storage systems, humanoid robots and more.

■ **ELLIE SEAVER** Control, Electrical and Instrumentation Engineer, Ballance Agri-Nutrients Ltd
After graduating in 2010 I set off to Europe for five months, living in Germany for two months and backpacking around for three. On my return, I worked in Auckland programming logic controllers before gaining my current position. Now, I am a site engineer at Ballance Agri-Nutrients in Taranaki, where natural gas is converted into ammonia and urea. I manage and complete control systems, instrumentation and electrical projects. The work is both challenging and rewarding.
In four years, it's impossible to learn all the engineering knowledge you will ever need. Massey Engineering provided a valuable career start, not by feeding every fact, but providing numerous open-ended design projects that encourage learning independence.

PAPERS

YEAR 1
> Computational Thinking: Software Development and Algorithms
> Physical Principles for Engineering & Technology
> Engineering Mathematics 1A and 1B
> Engineering Practice1 and 2: Global Perspectives and Creative Solutions

YEAR 2
> Manufacturing Engineering and CAD
> Analogue and Digital Electronic Systems
> Hardware-Oriented Computing
Signals and Systems
> Engineering Practice 3 and 4: Product Development, Materials and Manufacture

YEAR 3
> Solid Dynamics
> Mechanism and Component Design
> Fluid Mechanics and Thermodynamics
> Embedded Systems Design
> Control Engineering
> Statistical Modelling
> Engineering Practice 5: Engineering Design

YEAR 4
> Industrial Systems Design and Integration
> Mechatronics
> Robotics and Automation
> Research Project
> Engineering Practice 6: Design Capstone
> ELECTIVE OPTIONS: Agile Software, User Interface Design, Computer Vision, Machine Learning

BACHELOR OF FOOD TECHNOLOGY WITH HONOURS
BFoodTech(Hons)

DURATION
4 YEARS FULL-TIME

AVAILABLE
ALBANY
MANAWATŪ

Join one of the fastest-growing industries in the world. With a career in food technology you can really make your mark on the world. Food is an important part of our everyday life. The focus on health and wellbeing through food consumption is increasing. The world's economies are looking for new ways to add value to raw produce. All this adds up to an exciting career with excellent salaries. There's increasing international and domestic demand for people with the skills you will gain by studying food technology.

WHY MASSEY?

A UNIQUE QUALIFICATION

Massey University's Food Technology has been producing graduates for the New Zealand and international food industries for the last 50 years.
It is the only degree in Australasia that combines food science, food engineering and food business. That gives you more than a food science degree – you'll gain the technical and business skills to apply your knowledge in the commercial world.

AN INTERNATIONALLY-RECOGNISED FOOD TECHNOLOGY PROGRAMME

The Food Product Technology major of the BFoodTech(Hons) is accredited by the US-based Institute of Food Technologists – one of only a handful of programmes outside the Americas to have achieved this recognition.
The Food Process Engineering major is accredited by IPENZ (Institute of Professional Engineers New Zealand) as a professional engineering degree under the Washington Accord, an international agreement.
The Food Product Technology major also has provisional accreditation by IPENZ as an engineering degree under the Sydney Accord – an international agreement

IN DEMAND BY EMPLOYERS

Many of Massey's food technology graduates have jobs before they finish their qualification! Because of our international recognition, you can work in New Zealand, or around the world.

WORK ON REAL FOOD INDUSTRY ISSUES

Massey's food technology programme teaches you the fundamental food science and applied food technology skills that you will need in your career. You learn not only through the classroom, but practical laboratory and workshop sessions that focus on real industry problems and solutions. You'll get hands-on experience in industrial-standard food processing plants. Your lecturers are actively researching, with many having worked in the New Zealand and international food industries.

MORE WORK EXPERIENCE DURING YOUR STUDY

At Massey you're required to complete 900 hours of approved summer vacation employment (over three summer breaks). This is more than other food qualifications in New Zealand, which means that by the time you graduate you will have more work experience on your CV. You'll also gain a broader understanding of the food industry and will be ready to start work from the day you graduate.

SCHOLARSHIPS

Find out more about food technology scholarships through our scholarship search at **awards.massey.ac.nz**.

MAJORS

Food Process Engineering page 42
Food Product Technology page 43

MANY OF MASSEY'S FOOD TECHNOLOGY GRADUATES HAVE JOBS BEFORE THEY FINISH THEIR QUALIFICATION!

BECAUSE OF OUR INTERNATIONAL RECOGNITION, YOU CAN WORK IN NEW ZEALAND, OR AROUND THE WORLD.

CAREERS

There are many employment opportunities when you graduate with your Bachelor of Food Technology (Hons) in New Zealand and around the world.

RAPID PROGRESSION TO MANAGEMENT

Career progression in the food industry can be rapid. You may start out in your career with a technical role – often the stepping stones to senior management and leadership positions in the industry, or you could set up your own business.

SOUGHT-AFTER BY EMPLOYERS

With your Bachelor of Food Technology (Hons) from Massey University, you will be sought after by the food industry. Massey graduates are renowned for their ability to co-ordinate product development, process development, quality management and production management, and their ability to become specialists in specific technical areas such as food microbiology, food chemistry and packaging technology.

The wide variety of roles in the food technology industry include:

- Food technologist – researching new foods and drinks and developing new products, packaging or processes
- Product development technologist – creating a new food product and managing its development from concept to product launch
- Process technologist – improving and fixing food product processes
- Process engineer – designing and managing food production processes
- Flavour technologist – creating innovative food flavours and textures
- Packaging technologist – designing new food packaging solutions.

Others include:

- Quality manager
- Food safety manager
- Production team leader
- Technical sales and support
- Winemaker or brewer
- Food microbiologist or food chemist.

Or you could further your studies with a postgraduate research project.

■ **NICK DEVCICH** Bachelor of Food Technology (Product Development)
Graduated in 2011
Product Development Technologist, Tasti Products
I chose to study food technology at Massey because the degree was well regarded in the industry. Massey's degree has a great structure, backed up with direct industry-related work experience.
I really enjoyed my time at Massey as I was treated like a person and not a number. The staff were willing to go out of their way to help and there seemed to be more of a focus on getting me to understand the content, rather than just getting me to pass the course and sending me on my way. I was offered my job before I even graduated!

DEGREE CONTENT AND STRUCTURE

WHAT ARE THE MAJORS?

The Bachelor of Food Technology (Honours) majors are:

FOOD PRODUCT TECHNOLOGY

You will be able to develop new and innovative food products meeting consumer expectations of taste, texture, nutritional requirements, safety and price, and learn of methods to ensure products and processes are economical and sustainable. Graduates with this major will be able to undertake, lead and manage food product development projects from idea generation to product launch.

FOOD PROCESS ENGINEERING

You will apply advanced technology and engineering to develop new processes for the food industry. In order to achieve these new developments you will first learn about how to process food products and how to design new processes to operate on an industrial scale. Graduates will be able to lead and manage the development and installation of new processes and factories. Graduates from both majors will be able to become managers of technical and operation functions within companies or could develop businesses of their own.

YOU LEARN BY DOING

A unique feature of our food technology programme is that you'll constantly practice your discipline through projects - you learn by doing! In fact, each year you will be given projects to develop your ability to systematically solve food industry problems. You will also develop team working, leadership, communication and project management skills. Employers have told us this is what they look for in graduates. In addition, our programme also includes the technology and engineering aspects of food production. You will learn how to process food at an industrial-commercial scale.

	Food Technology Practice Project Spine 'learn by doing'		Paper Profiles					
Part 1	141.111 Food Tech 1: Global Prspctvs	141.112 Food Tech 2: Creative Solutions	228.171 Engineering Maths 1 A	228.172 Engineering Maths 1 B	124.171 Phys Princ for Eng & Tech 1	124.172 Phys Princ for Eng & Tech2	123.171 Chemistry for Biological Systems 1	123.172 Chemistry for Biological Systems 2
Part 2	141.211 Food Tech 3: Product Development	141.212 Food Tech 4: Manufacturing	228.271 Engineering Maths 2	280.201 Industrial Microbiology	280.271 Heat & Mass: Conservation & Transfer	280.272 Fluid Flow & Particle Technology	123.201 Chemical Energetics	123.271 Molecules to Materials
Part 3	141.311 Food Tech 5: Food Micro & Safety	141.312 Food Tech 6: Food Char	228.371 Stat Modelling for Engineers & Technologists	141.362 Food Formulation Technology	141.395 Food Chemistry	280.371 Process Engineering Operations	280.372 Reaction Tech & Process Modelling	Major specific paper
Part 4	Design project major specific		Individual Research Project		141.710 Food Pckg Eng & Legislation	141.723 Ind Systems Improvement	Major specific paper	Major specific paper

Project	Core paper	Major paper

LIFE AS A FIRST-YEAR STUDENT

We understand you may need some time to settle in to study and find new friends. Our learning environment allows you free time so you can meet with your colleagues and friends, work on your studies or just have free time for you to do what you want. Our facilities have lots of space for you to sit together to work and chat.

In the programme we work to ensure your on-campus commitments are between 9am and 5pm. This differs from some other areas where commitments may range from 8am to 9pm. A typical 40-hour week will include about 22 hours of lectures and workshops and 18 hours of recommended personal study time.

A TYPICAL FIRST SEMESTER TIMETABLE OF A FIRST YEAR BFOODTECH(HONS) STUDENT

	9am	10am	11am	12pm	1pm	2pm	3pm	4pm	5pm
Mon	141.111 Food Technology 1: Global Perspectives							Personal Study	
Tue	123.171 Chemistry for Biological Systems 1		228.171 Engineering Maths 1 A		124.171 Phys Princ for Eng & Tech		228.171 Engineering Maths 1 A	124.171 Phys Princ for Eng & Tech	
Wed	Personal Study or Additional Tutoring if Required								
Thu	124.171 Phys Princ for Eng & Tech		228.171 Eng Maths 1 A			124.171 Phys Princ for Eng & Tech	123.171 Chem for Bio Systems 1		
Fri	228.171 Eng Maths 1 A		Tests			Personal Study			

NOTE: Exact times and dates of lectures, workshops, and tests depends on the campus you study at

Lecture: This is where you will be taught in a large group where the lecturer will engage you in discussion

Workshop: This is where you will be working on problems in small groups and the lecturer will be facilitating your learning

Tests: a time booked for tests

ENTRY REQUIREMENTS

Entry into the BFoodTech(Hons) is guaranteed to all applicants who gain university entrance and meet the qualification criteria listed below. Applicants who are currently in Year 13 who have not yet had confirmation of UE status and need to do one or more of the Massey University preparatory papers before NCEA Level 3 results (or equivalent) become available in January, have to apply for discretionary entrance. Applicants without the entry requirements listed and planning to start in February may enrol in the Massey University preparatory papers (ie introductory maths, physics and/or chemistry) over Summer School.
All other applicants will be considered on a case-by-case basis by the Programme Director.

BFOODTECH (HONS) Majors	**ENTRY REQUIREMENTS FROM SECONDARY SCHOOL**			**PREPARATORY PAPERS** Massey University
	NCEA Level 3	International Baccalaureate	University of Cambridge International Examinations	
Food Product Technology Food Process Engineering	Mathematics (including standards in algebra, differentiation and integration) (16 credits) Physics (16 credits) Chemistry (14 credits)	Diploma with 29 points including at a Higher level: Mathematics (5 Points) Physics (5 Points) Chemistry (5 Points)	A levels in: Mathematics (C Grade) Physics (C Grade) Chemistry (C Grade)	160.103 Introductory Mathematics or 160.132 Concepts in Mathematics (C Grade) 124.100 Introductory Physics (C Grade) 123.103 Introductory Chemistry (C Grade)

ALTERNATIVE PATHWAYS TO THE BFOODTECH(HONS)

Applicants who are currently in Year 13 who have not yet had confirmation of UE status and need to do, one or more of the Massey University preparatory papers before NCEA Level 3 results (or equivalent) become available in January, have to apply for discretionary entrance.

I HAVE UNIVERSITY ENTRANCE (UE) BUT NEED MORE PREPARATION IN ONE OR MORE OF THE SUBJECTS TO ENTER BFOODTECH(HONS)

Certificate in Science and Technology
This one-semester pathway is for students who need extra preparation in mathematics, physics or chemistry. These papers can be taken separately (depending on your background) or as part of the CertSciTech qualification.

Diploma in Science and Technology
This is for students wanting to study a wide range of papers, but keep their options open just in case they change their mind and wish to enter another programme. This two-semester pathway is for students that need extra preparation in mathematics, physics or chemistry. You can also choose subjects from: biology, programming, statistics, food, accounting, marketing, finance, and management.

Summer Compact Courses
For students that need extra preparation in mathematics, physics or chemistry, we offer the Certificate of Proficiency. You can take 124.100 Introductory Physics, 160.103 Introductory Mathematics (or 160.132 Concepts In Mathematics), or 123.103 Introductory Chemistry. These courses are an intensive learning experience.
Students are advised to only take two introductory subjects. Tuition in each course takes six weeks and attendance is required during January and early February. These papers can be put towards another qualification in the BSc, BInfSci and BBS.

I HAVE MET THE ENTRY REQUIREMENTS BUT NEED MORE ENGLISH LANGUAGE SKILLS

Direct Entry English Pathway This one-semester pathway is suitable for students wishing to increase their English language skills.

I NEED MORE ENGLISH LANGUAGE SKILLS AND MORE PREPARATION IN THE SUBJECTS

Certificate of Foundation Studies Suitable for students wishing to increase their English language skills and attain University Entrance. This may be a one or two-semester programme depending on your background in maths, physics and chemistry. This is then followed by taking the one-semester Certificate in Science and Technology to get you up to speed in maths and physics and/or chemistry.

I'M NOT SURE WHETHER MY QUALIFICATION ALLOWS ME ADMITTANCE

Contact our Student Advice and Information team.
Phone: 0800 MASSEY
Email: courseadvice@massey.ac.nz

WHAT OUR FINAL-YEAR FOOD TECH STUDENTS CAN DO

In your final year you will work on a group project that mimics real professional practice. This is the pinnacle of the degree and is a chance for you to experience what working life as a food technologist or food engineer is like. Some projects are sponsored by food companies that will be keen to implement your solutions.

HALLOUMI CHEESE

LUKE LARSEN, EE SAN CHEOK, TAO LIANG, TIM OSBOLDSTONE

A manufacturer of specialty cheese products and yoghurts wishing to increase their product range gave us the brief to develop a cheese of a sub-continental Indian style containing both dairy and non-dairy proteins, and able to be stir-fried.

We developed a fry-able halloumi cheese made from a mixture of milk and cashew nut proteins. We identified several technical problems, so further product development will be needed before such a product can be taken to market.

MORNING ENERGY BLEND

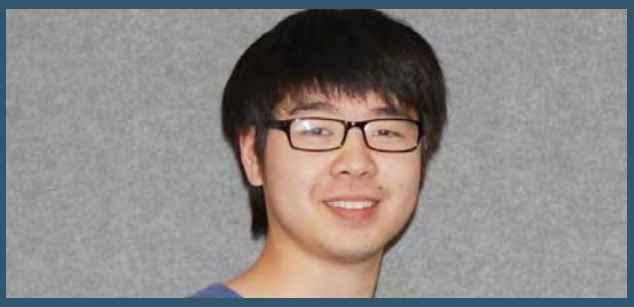
NEALA YE, AKSHAY TRIVEDI, SARAH LEWINGTON

We used idea-generation to develop our Morning Energy Blend cereal, and applied product development principles. Morning Energy Blend is an organic cereal developed to be a gourmet, gluten-free product. The product is unique in that it is in the form of extruded spheres containing three ancient grains – buckwheat, chia seeds and quinoa – in combination with a range of nuts, seeds and fruits. This makes it a good source of fibre and also extremely tasty. Although designed as a cereal, consumers have noted that this product is a delicious trail mix.

SPRAY-DRY LEMON JUICE

TAO LIANG

Meyer lemon juice has a high sugar and organic acid content, which can cause stickiness in the spray-drying process. My project was to work out the spray dryer conditions needed to dry concentrated into a free-flowing powder. I analysed its composition, predicted the glass transition temperature – the temperature where it goes from being rubbery, to being hard and brittle – and conducted pilot plant scale trials. I produced a free-flowing powder after adding malodextrins and running the spray dryer at its optimum operating conditions.



WHAT TO EXPECT

YEAR ONE

Our first year is flexible, in that students can change majors or even their degree programme. We recognise that many students want to keep their options open. Although there are differences between food technology and the computing-based engineering majors (electronics, mechatronics or engineering innovation management), if you wish to change major or programme then – depending on how you progress through the year – you may be able to switch. Certainly, there is no problem switching between the Food Product Technology and Food Process Engineering major, even up to half-way through Part 3.

Food Technology 1 Global Perspectives in the first semester provides tangible benefits for a third-world community. The projects are based on a need of a community, must be realistic and fit within social, economic and environmental constraints of that community. We've helped communities in Vietnam, Timor-Leste, and Nepal.

Food Technology 2 Creative Solutions looks ahead into the future – designing for the Year 2070! We challenge you to think about what will meet a not-yet-identified future need. You won't be constrained by today's environment, but will be free to develop products, processes or technologies that you feel will be appropriate at that time. Past themes include: Food preparation, Transportation, and New Zealand's primary industries.

YEAR TWO

In your second year you delve deeper into your chosen major and we provide a stronger technical basis for the science and engineering principles you'll rely on as you make harder technological decisions.

Food Technology 3 Product Development. Here you help a company to develop a concept for a new product. The companies you will advise include: Bell Booth, EasiYo, Goodman Fielder, Heinz Wattie's, McCain, New Zealand Pharmaceuticals, Prepared Foods Processing Ltd.

Food Technology 4 Manufacturing. Here your task is to design a food processing operation to manufacture a specified product for a given production volume. You will identify potential processes and evaluate them for suitability on the basis of technical feasibility, suitability for the scale of operation, quality and economic indicators. You will complete hands-on pilot-scale work by building your own plant, to validate key processes in your operation.

YEAR THREE

In your third year the programme concentrates on providing the specialist knowledge in areas fundamental to food technology. The two project papers will focus on the two important areas of food microbiology and safety, and food characterisation.

Food Technology 5 Food Microbiology and Safety. Here you will solve food microbiological and safety problems for a food manufacturing company by applying practical microbiology techniques combined with food risk analysis.

Food Technology 6 Food Characterisation. Here you will solve issues related to quality assurance, quality control, benchmarking, product improvement or product development for a food company, by applying and selecting important food characterisation techniques that can be used to evaluate food structure (material analysis, microscopy) and food perception (sensory, colour and flavour analysis).

YEAR FOUR

In your final year the programme concentrates on providing the specialist knowledge unique to each major. All students have a 'capstone' project to complete.

For the capstone project, you will work on a group project that mimics real professional practice, and integrates your previous study. This is the pinnacle of the degree and is a chance for you to experience what working life as a food technologist or food engineer is like. The Food Product Technology major students will work on developing a new food product or processing technology, while the Food Process Engineering major students work on the design of a new food processing facility. Some projects are even sponsored by food industry companies that will be keen to implement your solutions in the real world.

You will also complete an individual research project, which gives you a chance to showcase the development of your own abilities. Your individual research project may also help an external food industry company, or it may contribute to the university's research programmes. It is also an exciting opportunity to develop your own ideas!

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY (FIRST 2.5 YEARS ONLY)
MANAWATŪ (ENTIRE MAJOR)

FOOD PROCESS ENGINEERING

A major of the BFoodTech(Hons)

WHAT'S IT LIKE?

Graduates with the food process engineering major design and manage the processes to make either food products or high-value food ingredients.

WHY MASSEY?

GLOBAL OPPORTUNITIES

As a food technology graduate, you could go on to manage the development and implementation or installation of new processing lines and factories producing products meeting the customer requirements in a safe, economical and sustainable way. You could also turn your great ideas into new innovative solutions that can be developed into a business. The possibilities are endless and your skills can be applied all over the world.

ACCREDITATION

The Food Process Engineering major (which must be completed at the Manawatū campus) has Institution of Professional Engineers New Zealand (IPENZ) accreditation. Students can start the Food Process Engineering major at the Albany or Manawatū campuses but must complete the programme at Manawatū from Year 3 Semester Two onwards.

PAPERS

YEAR 1

- Chemistry for Biological Systems 1 & 2
- Physical Principles for Engineering and Tech 1 & 2
- Engineering Mathematics 1 & 2
- Food Technology 1: Global Perspectives
- Food Technology 2: Creative Solutions.

YEAR 2

- Molecules to Materials
- Engineering Mathematics 2
- Heat and Mass Transfer
- Chemical Energetics
- Fluid Flow and Particle Technology
- Industrial Microbiology
- Food Technology 3: Product Development
- Food Technology 4: Manufacturing.

YEAR 3

- Food Chemistry
- Food Formulation Technology
- Statistical Modelling for Engineering and Technology
- Process Engineering Operations
- Reaction Technologies and Process Modelling
- Bioseparation and Purification
- Food Technology 5: Food Microbiology and Safety
- Food Technology 6: Food Characterisation.

YEAR 4

- Food Engineering Research Project
- Food Engineering Design
- Food Packaging Engineering and Legislation
- Industrial Systems Improvement
- Process Control
- Chemical and Bioprocess Engineering.

ENTRY REQUIREMENTS

NCEA Level 3 (and approved alternatives)

- Chemistry (14 credits)
- Mathematics (including standards in algebra, differentiation and integration) (16 credits)
- Physics (16 credits).

■ **MICHAEL DIXON** Bachelor of Food Technology (Honours) graduate

I chose to study food technology at Massey as food is needed no matter where you are; food is a vital resource. I was always interested in the way large-scale food production took place.

The different methods used to prepare industrial-scale quantities of food and how the processes changes at the larger scale was interesting, and held my attention from an early age. I also wanted to be able to help people in places such as Thailand where food processing and safety are not as well developed as the western world. Massey let me study what interested me, and the possibility of taking me to where I wanted to be in the future.

I liked the practicals, such as learning how to make ice-cream and sausages. In my fourth year, we designed and built a piece of process equipment used to concentrate milk, called an evaporator. From this mini project I learnt not only what the process equipment did, but some of the problems that could be encountered in the real world.

This degree is interesting and a great opportunity, but also challenging, which for me was important.

I have started to study for my PhD at Massey. I am studying the growth of bacteria in dairy waste treatment plants as this will help these plants work more efficiently.

DURATION
4 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

FOOD PRODUCT TECHNOLOGY

A major of the BFoodTech(Hons)

Food is an important part of our everyday lives. People will always have to eat and the food industry is the foundation of the New Zealand economy. The world looks to New Zealand as a trustworthy provider of healthy, safe food.

WHAT'S IT LIKE?

Food Technologists contribute to economic growth by improvements in productivity and R&D, and play a key role in helping to develop new products and processes for the food industry. Developing and improving food products, nutrition, health and safety are a priority for Food Technologists.

WHY MASSEY?

GLOBAL OPPORTUNITIES

Massey food technologists know the global trend is towards healthier food. You could work on a sports drink to improve performance, a high-protein cereal, an extruded snack high in protein but low in fat, a low-calorie dessert or chocolate product.

INTERNATIONAL RECOGNITION

The United States-based Institute of Food Technologists accredits Massey's Bachelor of Food Technology (Hons) – one of only a few programmes recognised outside the US. The major also has provisional accreditation by IPENZ as an engineering degree under the Sydney Accord, an international agreement.

PAPERS

YEAR 1

> Chemistry for Biological Systems 1 & 2
> Physical Principles for Engineering and Tech 1 & 2
> Engineering Mathematics 1 & 2
> Food Technology 1: Global Perspectives
> Food Technology 2: Creative Solutions.

YEAR 2

> Molecules to Materials
> Engineering Mathematics
> Heat and Mass Transfer
> Chemical Energetics
> Fluid Flow and Particle Technology
> Industrial Microbiology
> Food Technology 3: Product Development
> Food Technology 4: Manufacturing.

YEAR 3

> Food Chemistry
> Food Formulation Technology
> Nutrition and Food Choice
> Statistical Modelling for Eng and Tech
> Process Engineering Operations
> Reaction Technologies and Process Modelling
> Food Technology 5: Food Microbiology and Safety
> Food Technology 6: Food Characterisation.

YEAR 4

> Food Technology Research Project
> Innovative Food Design and Dev
> Advanced Food Technology
> Food Packaging Eng and Legislation
> Industrial Systems Improvement
> ELECTIVE OPTIONS: Advanced Topics in Macronutrient Nutrition, Life Cycle Assessment, Quality System Development and Management, Chemical and Bioprocess Eng, Process Control.

■ **MARIANNE POH** Bachelor of Food Technology (Honours) Graduate

I work for one of the world's largest food snack companies – Mondelēz International (formerly Kraft Foods) Massey's Food Technology degree certainly prepared me for the job. Mondelēz International owns brands like Cadbury, Oreo, Kraft Peanut Butter, Philadelphia Cream Cheese, The Natural Confectionery Company and Pascalls. I currently work in the team that develop products for Cadbury. Within this team, I work on different projects to deliver new flavours and formulations. Some of the products I have worked on include Cadbury Dairy Milk Marvellous Creations and Cadbury Dairy Milk Bubbly. The programme was difficult, challenging, fun and extremely supportive. The small classes mean you all help one another and also allows you to receive lots of one-on-one help from lecturers.

The reality of a career in food technology has far exceeded my expectations and I was lucky enough to be offered three jobs before I had even finished my degree.

ENTRY REQUIREMENTS

NCEA Level 3 (and approved alternatives)

> Chemistry (14 credits)
> Mathematics (including standards in algebra, differentiation and integration) (16 credits)
> Physics (16 credits).

BACHELOR OF INFORMATION SCIENCES

BInfSc

DURATION
3 YEARS FULL-TIME

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING

Become an internationally sought-after employee. There is a huge demand around the world for people with information and communication technology skills. Massey's Bachelor of Information Sciences will give you the skills needed to make you a sought-after employee, both in New Zealand, and internationally.

WHAT'S IT LIKE?

At Massey University you can follow your interest in computing in a friendly and flexible learning environment.
Massey is one of the few universities in New Zealand where your information sciences qualification covers all three disciplines of computer science, information technology and software engineering. The majors are not isolated and you can choose to have more or less of these three areas as part of your study, depending on your area of interest or career ambitions.
You'll learn a broad spectrum of skills from business management through to developing software and hardware. So you'll emerge from your studies at Massey with a well-rounded understanding of the whole industry, as well as with the specialist skills that you'll need to become an excellent ICT professional.

WHY MASSEY?

CHOOSE YOUR MAJOR LATER ON

You may be thinking about studying in this area, but are not sure what major to choose. At Massey you have the flexibility to change your major right up until the end of your first year. So you can complete the first year of study, and once you've experienced the different subjects, make up your mind after that.

THE PERSONAL APPROACH

When you study the Bachelor of Information Sciences at Massey, you'll join small classes, where interaction with the lecturer is commonplace. You will be able to ask questions of the lecturers and get their support and advice.

FLEXIBLE START

You can start your BInfSc in any semester, and finish three years later.

WIDER OPTIONS FOR WHEN YOU STUDY

You can start in February or July. You can start your three-year degree at the beginning of the year, or in Semester Two (starting July).
Or if you'd like to do your degree in a condensed period of time you can complete extra papers during our Summer School (November to February).
Once you graduate you can move on to advanced study in the BinfSc (Honours) or the Postgraduate Diploma in InfSc or the Master of InfSc.

SCHOLARSHIPS

GET GOING WITH COMPUTING

A scholarship is available to Year 13 students in New Zealand who have an interest in studying computing. There are up to two scholarships every year, covering full tuition fees for two years of your study.

CAREERS

There is huge demand for people with information sciences skills.
Massey Bachelor of Information Sciences graduates continued to find employment even during the recent recession when graduates in other fields struggled.
Today, there are more employment opportunities in information communication technology (ICT) than any other sector in New Zealand. The same often applies internationally.
Don't take it from us – take a look at the SEEK website – about 2000 ICT jobs in New Zealand are advertised at any time on this website.

HELEN DURRANT Senior Software Engineer, Leafnode

I have an awesome job at Leafnode, which I love. A smaller service-oriented company, our biggest client is an international charity whose purpose is to combat poverty by assisting resource-poor farmers increase the resilience and yield of their crops in marginal environments. We build software that assists them in achieving this goal.

I love being able to use my skills to help businesses that are making a real difference.

When I started studying I chose a music degree, but quickly realised I was probably not going to make my living as a musician.

I decided to start the study process again – this time choosing a broad range of papers including Computer Science 101. I quickly became that student who spends far too long on assignments simply because I enjoyed them so much!

In my first computer science class, the lecturer asked us to write down the steps required to boil a kettle. Some students had as few as five steps, others as many as thirty. As we sat wondering what those thirty steps could possibly be, our lecturer began to dissect the process of boiling a kettle, step by step. In doing so he demonstrated the essence of programming. Computers don't know anything; you have to tell them everything from how to pick up the jug, to the physical steps involved with turning on the tap. Something about this logical way of looking at the world really appealed to me, and it wasn't long before I switched my major to computer science.

Studying was a great experience and my lecturers were passionate and helpful. I appreciated Massey's focus on the theoretical side of computer science – it provides a solid foundation and depth of understanding of programming that will allow you to thrive in the industry. Many aspects of software development can be picked up on the job, but some people never take the time to learn the theory, which can impact their ability to reach their full potential as a programmer.

I hadn't thought much about next steps, but upon graduating there were many jobs to apply for and I was soon offered a role as a Java Developer at Orion Health. Over the next four years I worked my way into a team leader position, before deciding to move back into development to further progress my skills. In the past year I have begun to specialise in front-end development and design, which I now do full time at Leafnode.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

COMPUTER SCIENCE
A major of the BInfSc

Would you like to develop the next computing revolution? Your computer science degree at Massey will help you turn your love of computing into a brilliant career.

WHAT'S IT LIKE?

Would you like to:
- Learn how to create computer programs?
- Find out more about the latest software and hardware development?
- Have a career doing what you love?

Massey's Bachelor of Information Sciences (Computer Science) will give you the skills to become a sought-after ICT professional, able to take on the best of the thousands of jobs that are available.

A CAREER WITH VARIETY

You already know that computers are part of every aspect of our society. It's a hugely varied area that is constantly growing and changing – and those exciting changes are being developed by people like you!

WHAT YOU WILL LEARN

You will learn about all aspects of computer programming and computer systems, from the theoretical foundations to the very practical aspects of developing the latest software applications. No programming skills are required.
This degree will give you the knowledge and skills to write software for fields such as artificial intelligence, graphics, web-based systems, networks and operating systems.
You'll learn about traditional and trending topics in computer science such as:
- Artificial intelligence
- Data structures and algorithms
- Object-oriented programming
- Computer graphics and image processing
- Mobile applications
- Logic circuits and low-level programming
- Concurrent programming
- A range of programming languages
- Data communications, networks and web applications
- Computer modelling and simulation.

Most of your undergraduate papers will focus on computer programming – the design and creation of software applications that enable computers to be used in all areas of human endeavour. You'll learn how to write these programs in various programming languages and how to use them in several application areas.
Suggested supporting minor subjects for a major in computer science include information technology, mathematics, physics, or statistics. Computer science can be taken as a supporting subject, and double majors are possible.

CAREER OPPORTUNITIES

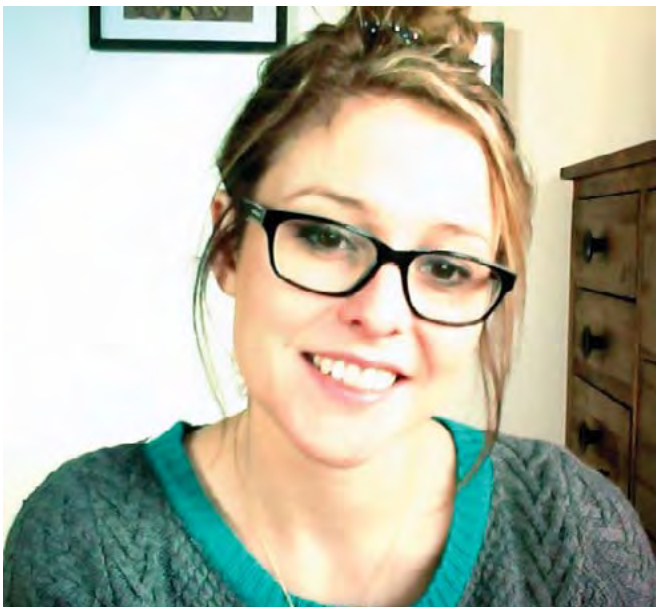
Some examples of computing professional careers that could lead on from this qualification include:
- Applications developer
- Systems programmer
- Network administration and support
- Education and training
- Team and project management
- Independent computer consultants.

There has also been increasing demand in recent years for scientists, engineers, and others who spend much of their time working with computers to have strong supporting studies in computing in addition to their professional discipline. A computer science qualification at Massey will give you the rigorous skills you need to help your understanding of computing needs in a wide range of industries.
There are a huge number of job opportunities in this area worldwide. Check out the SEEK website for the around 2000 ICT careers available in New Zealand at any one time.

AMY PALAMOUNTAIN Developer, GitHub

I graduated Massey University in 2009. Since entering the work force as a programmer I have had an extremely varied and exciting career. In 2012 I joined a small New Zealand start up called GreenButton. Here I took charge of the web stack, and had a blast while doing it. The company has since been acquired by Microsoft.

I now work for a company called GitHub. GitHub makes tools for other computer programmers, and is changing the face of not only open source software, but has the bold mission is to make every programmer in the world work better together. At GitHub, I work on the native applications – specifically GitHub for Windows. The company is US-based, but I am lucky enough to be able to work remotely in Wellington. I can be found in cafés all over the city, with my laptop open, coffee in hand, deep in thought about how best to make other programmers' lives easier.



DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY

DATA SCIENCE

A major of the BInfSc*

*Subject to CUAP approval

Would you like to be a part of the unfolding data revolution? Almost every aspect of human endeavour is undergoing change due to unprecedented amounts of available data, computational resources and the maturity of analysis techniques. The momentum towards data-driven discovery and decision-making is gathering pace. The way we conduct business, science and government is being radically affected by insights that can now be drawn from vast troves of data and consequently, no area of our society will remain untouched by this revolution.
Your data science degree at Massey will help you become a high-tech specialist with relevant skills to be at the forefront of this exciting revolution that is taking place world over.

WHAT'S IT LIKE?

We are in the midst of a data deluge. Whether it's in the commercial world, social media, internet, sciences, healthcare or government, every sector is inundated with data. Hidden within all this data is knowledge and we have woken up to the reality that we need it to stay ahead.
Businesses, governments and institutions have fully recognized that their future success is increasingly dependent on their ability to transform their data into information, insights and novel data-products. The industry is recruiting professionals to fill this skills shortage. The question is; who has the right skills to do this?
Essentially, it is the task of a Data Scientist to solve real-world problems using data in combination with cutting edge computing technologies and analytical methods. Data Scientists have the expertise to formulate business domain questions into series of queries that their data can answer. They apply techniques like data mining, machine learning, statistical analysis and data visualisation to discover and extract information from data. Beyond the mechanics, they are also skilled in communicating their findings to management as well as to wider non-technical audiences.

A DEGREE WITH OPTIONS AND A CAREER WITH VARIETY

Data science is a broad and multidisciplinary field. Data Scientists tend to work in teams where each member has different sets of complementing interests and strengths. Some have a greater expertise in computing, while others will contribute with a more maths/statistics focus, or an in-depth understanding of the given business domain context. If you would like to become a Data Scientist with expert knowledge in any of the key fields like computer science, IT, statistics or mathematics, the qualification's structure allows you to pursue a double major (or minors) combining these subjects.
If you are interested in natural and fundamental sciences, you can become a Data Scientist possessing domain-knowledge expertise in one of a number of disciplines like chemistry, biology, genetics, physics where computational and data processing skills are becoming increasingly central. This means that you may choose a double major/minor combination with any of the science disciplines offered by Massey.
Similarly, you may choose data science with a specialization in a form of a minor from any of the offerings under business, health, creative arts or humanities and social sciences in order to ensure that you gain the complementary expert knowledge in the domain you are passionate about, which will give you a distinct focus and advantage in the industry.

SOUGHT-AFTER SKILLS

As a data scientist, you will be equipped with a specific and a highly sought-after technical skill-set that enables you to drive innovation in any workplace sector. Data Science prepares you with a blend of computer science, IT, statistics and mathematics skills. Using industry-based tools and techniques, you will be taught the fundamentals of programming and how to apply this to transform, visualise and integrate data from different sources. You will learn how to manage data in databases and how to handle Big Data problems.
For many problems, computers are much better at making decisions than humans. You will study artificial intelligence and learn how to train computers to discover hidden patterns in data and use them to make automated predictions on complex problems. You will also be taught to understand the underlying structures of data and perform statistical inference. And finally, you will be instructed in effective ways of communicating the insights gained to a wide audience.

CAREER OPPORTUNITIES

'Data Scientist' is one of the newest job descriptions in the Information and Communication Technology (ICT) sector. Massey is the first and only university in New Zealand to offer to equip undergraduate students as Data Scientists.

Some examples of careers that could lead on from this qualification include:

- Data science engineer
- Business analytics consultant
- Data-product entrepreneur
- Banking fraud detection analyst
- Machine learning specialist
- Government researcher
- Government communications and security analyst
- Customer insight analyst
- Data management architect
- Text mining analyst
- Software developer
- Scientific researcher.

According to market research carried out by a third-party source, it is estimated there will be a shortage of 1200 data scientists in New Zealand by 2017. Tertiary education providers around the world cannot produce data scientists quickly enough to satisfy the demand. A shortage of 190,000 Data Scientists is expected to materialize in the United States alone over the next 5 years. The average paying salary for a Data Scientist in the United States is $90,000 and over $100,000 for those with working experience. The skills you learn at Massey University and the qualification you will receive are recognised throughout the world and enable you to work in any industry or government sector.

WE ARE IN THE MIDST OF A DATA DELUGE...

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

INFORMATION SYSTEMS

A major of the BInfSc

Learn how technology and enterprises combine in a connected world. Our information systems major will combine your interest in business, organisations and entrepreneurship with an understanding of how information systems drive the contemporary enterprise. This is in contrast to computer science and information technology that stress the underlying technologies.

WHAT'S IT LIKE?

If you are interested in computing, but would rather work with people than machines, would rather reach out to clients than sit at a computer writing code, or prefer creativity to mathematics, then the information systems major could be the right choice for you.
Information systems underlie all aspects of our lives, whether we are working, studying or at leisure. We spend more and more of our time online, using the Web, mobile apps, and all manner of internet connected devices (the 'Internet of Things'), while all around us our transport, manufacturing, banking and farming systems, among many others, are increasingly 'wired' and automated. More and more data is being created daily ('Big Data') changing the way that government agencies and businesses process and apply information about their products, services, customers and citizens. Such systems are not, however, only about technology. Their success depends on their designers having an expert understanding not just of computer software and hardware but of the social, human and organisational contexts of these systems. An information systems professional is not just a technologist, rather, they understand how information systems must be invented and designed to meet the needs of people in real-world situations.

SOUGHT-AFTER SKILLS

When you study information systems at Massey, you will not only gain skills in practical technical areas, such as how to create interactive websites or how to use databases to manage corporate data, but you will also learn the essential soft skills of working with the users of IT systems, learning to understand their needs and how systems can be designed to meet them. You will understand the impact of ICT from an enterprise perspective, seeing how information systems are part of the larger mission of an organisation. You will learn about computer systems not just from the perspective of the system developer, but from the perspective of the manager, the administrator, the salesperson and the entrepreneur.

There is a shortage of people with the skills that you will gain – as an information systems graduate you will be sought-after by employers around the world. You'll learn:

- How information systems are analysed, designed and deployed
- Topics such as computer security, the development of the Internet, web design and more
- How information systems projects and related knowledge are managed
- How social media networks are used in business
- How information systems are used in organisations and e-commerce
- Management, strategy and governance for information systems.

Suggested supporting minor subjects for a major in information systems include information technology, computer science, mathematics, physics, or statistics. Information systems can be taken as a supporting subject, and double majors are possible.
Note that you can change your major within the degree up until the end of your first year.

CAREER OPPORTUNITIES

Knowing the potential of information systems and having the ability to put this knowledge to work can result in a successful personal career, organisations that reach their goals, and a high quality of life.
Some examples of professional careers that could lead on from this qualification include:

- Business and systems analysts
- User support specialists
- Database administrators
- Technology officers
- Trainers
- Project managers
- Independent consultants.

There are a huge number of job opportunities in this area worldwide. Check out the SEEK website for the around 2000 ICT careers available in New Zealand at any one time.

TOBY HOLLAND Bachelor of Information Science (Information Systems)
Software developer at TradeMe Ltd.

Producing software is a very rewarding and amazingly diverse job with every day bringing new challenges. We predominantly use the Microsoft stack and I work right across the stack, from writing SQL queries and stored procedures in the back end, to the HTML, JavaScript and CSS up front and everything in between. At TradeMe we work in small independent squads, each comprise of two developers, a business analyst, a tester and a designer. Our squad is called "Mad Props" because we work on property-related projects and we are awesome :) There are around 23 of these small squads who all work independently across different areas of the business.

The high industry demand combined with a general shortage of skilled programmers means that finding a job was relatively easy (I was hired literally a few days after I finished my exams on the promise that I would pass the last few exams). Furthermore, most companies put a lot of effort into making their employees comfortable and happy and pay very well. At TradeMe we are quite spoilt and have video games, table tennis, pool, free lunches, slides between building levels and lots of activities organised for us. This is fairly common in the industry.

Overall I couldn't be happier with my job and career. I have a great work environment, colleagues, projects to work on and going to work every day is never something I dread. My education at Massey is a big contributor to my success, both in my career and in my own personal development but even more importantly, it gave me the initial guidance and direction that I needed to identify and pursue what I really wanted to do.

AT TRADEME WE ARE QUITE SPOILT...THIS IS FAIRLY COMMON IN THE INDUSTRY

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING*
*Subject to planning advice

INFORMATION TECHNOLOGY

A major of the BInfSc

Your information technology major will combine your love of people and team work with the skills needed to create and manage major IT resources.

WHAT'S IT LIKE?

Devices like smart phones and tablets are in our houses, pockets and vehicles and every day they are increasing in power and complexity. Our personal lives, too, are becoming more and more entwined in social networks, virtual worlds and gaming environments, while commerce and industry is increasingly dependent on new and improved information technology.

As a student, you'll learn to use the same developer tools and techniques as the industry professionals use including Microsoft .NET Framework and multimedia tools. Learning how to work in a team is also an important part of this major.

MEET THE NEEDS OF FUTURE CONSUMERS

When you study information technology at Massey, you'll examine the huge range of technology that we use, and gain skills in designing and building systems that will meet the needs of consumers today and in the future. This could range from a small business needing a new technology tool, to managing the many and varied IT resources in a big hospital. There is a shortage of people with the skills that you'll gain – as an information technology graduate you'll be sought-after by employers around the world.

As a student, you'll gain skills in:

- The analysis, design and deployment of complex information technologies.
- The use of professional software tools, and the administrative and organisational aspects of IT.
- Topics such as computer security, the development of the internet, user interface design and more.

Information technology can also be taken together with the major in computer science (double major), or another minor of your choice. Note that you can change your major within the degree up until the end of your first year.

CAREER OPPORTUNITIES

Knowing the potential of information technology and having the ability to put this knowledge to work can result in a successful personal career, organisations that reach their goals, and a higher quality of life. IT graduates command some of the highest salaries of any career. There is a strong demand for qualified ICT professionals, both in New Zealand and overseas. The qualification you'll receive from Massey is recognised around the world. Careers of previous graduates include:

- Business and Systems Analysts
- User Support Specialists
- Data Administrators
- Application Testers
- Trainers
- Web Developers
- Team Leaders
- Project Managers.

There are a huge number of job opportunities in this area worldwide. Check out the SEEK website for the around 2000 ICT careers available in New Zealand at any one time.

■ **DAVE LASIKE** Double major in Computer Science and Information Technology

I am of Tongan descent and went to school on Auckland's North Shore. After school I worked in various places and became interested in the way that Information Technology was used in the workplace. I decided to enrol in a bachelor's degree. My time at Massey was really worthwhile. I picked up many life skills including time management, people skills, research techniques and study skills, all of which are still useful to me in my everyday work.

An important part of study at Massey is the constant interaction with lecturers and tutors who are passionate about their subject and always willing to help. The introductory computer science papers gave me a really good technical foundation for further study. I also enjoyed the Internet programming paper as it is highly relevant to today's online world. The third year project was an excellent introduction to applied software development.

I am currently working as a software engineer with an Auckland-based company. I develop and update software applications to run on modern technologies. The double major of computer science and information technology really opens doors and has enabled me to advance my career in software development.

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY
MANAWATŪ

SOFTWARE ENGINEERING

A major of the BInfSc

Software engineering brings together the disciplines of computer science and information technology – giving you a highly-practical and sought-after qualification.

WHAT'S IT LIKE?

Studying software engineering will see you gain knowledge, tools and practical skills to be able to design, construct, test and maintain large software applications.
The software engineering major is a joint one – that means you will learn about both computer science and information technology.
You will focus on learning about:

- The design and construction of large software applications
- The technical knowledge of computer programming from computer science combined with the design and team skills of information technology.

IN DEMAND

Software engineers are in high demand throughout the world, which means there are plenty of jobs out there for hard working graduates.

WHY MASSEY?

CREATE REAL APPLICATIONS, WHILE YOU STUDY

An exciting part of the joint major is the team project in the third year, when you will work together with other students to create a new application.

I FELT THERE WAS A GOOD BALANCE BETWEEN LEARNING THE THEORY AND DIRECTLY APPLYING THAT KNOWLEDGE INTO PROJECTS...

CAREER OPPORTUNITIES

Graduates with the software engineering joint major possess a broad range of skills and practice and are able to move into any one of a wide range of employment opportunities.
The programme will give you the skills to enter the computing profession at the level of software engineer. Later, you may be able to move into management of large software projects, including those in safety critical systems.
You will also have the necessary background to fully participate in software development teams.
You will be particularly well-equipped to hold positions in the design and management of large software systems.
Some examples of roles available to graduates include:

- Software engineer
- Systems analyst
- Requirements engineer
- Software developer
- Usability engineer.

There are a huge number of job opportunities in this area worldwide. Check out the SEEK website for the around 2000 ICT careers available in New Zealand at any one time.

■ **SARAH HUI** Lead Engineer, Vend
I really enjoyed studying at Massey and the skills I acquired have provided extremely useful in the workforce. The first year papers were an excellent foundation which was built upon in the following years into more specialised areas such as graphical programming, internet programming, artificial intelligence and mobile systems development. In all the papers, I felt there was a good balance between learning the theory and directly applying that knowledge into projects. I was surrounded by extremely knowledgeable lecturers and tutors who were very approachable and keen to help. I particularly enjoyed the Graphical Programming and Simulations papers, which encouraged innovation and creativity. I also enjoyed creating an iPhone application in the Mobile Systems Development paper. The third year software engineering Project provided invaluable insight into large-scale software projects and team-work, and the Graduate Project educated me in hard-work, perseverance and time-management.
My current job title is Lead Engineer at Vend where I work on the front end. My job includes shipping code, leading teams, and speaking at industry events.

BACHELOR OF NATURAL SCIENCES

DURATION
3 YEARS FULL-TIME

AVAILABLE
ALBANY

BNatSc

The world needs scientists who have expertise not just in science, but also in putting science into a global context. Solutions to today's big issues like species extinction, climate change, spiralling population growth and the spread of disease require broader thinking.

WHY MASSEY?

LEADING SCIENCE IN NEW ZEALAND

In the study of natural sciences you will be encouraged to work across scientific areas, both independently and as part of a team.
You'll learn about the sociology of science, sustainability, philosophy and project management, putting fundamental sciences into the real world to come up with real solutions. This is unlike the traditional study of fundamental sciences, where the study of mathematics, chemistry, biology and physics are kept quite separate.
The degree is unique in New Zealand and is modelled after similar degrees offered at leading international universities.
When you graduate from the Bachelor of Natural Sciences, you will graduate ready to join the scientific community of today, and be equipped to help solve the global problems of tomorrow.

FAST-TRACK MASTERS

The Bachelor of Natural Sciences offers a unique fast-track masters. If you do well in your first three years you can complete a masters degree in your fourth year.

FLEXIBILITY IN SPECIALISATION

The Bachelor of Natural Sciences offers a number of prescribed pathways which allows you to focus on emerging fields such as sustainability and quantitative biology as well as classical fields such as chemistry, physics and biology from an interdisciplinary perspective.
Core subjects in your first year include chemistry and living systems, biology of cells, physics for life sciences as well as science and sustainability, and core skills for natural sciences.
The rest of your subjects and pathways through to graduation are very flexible, depending on your area of interest.

TAUGHT BY INTERNATIONAL EXPERTS

You will join the highest achievers in science to study across the disciplines of biological and physical science. You'll learn from international experts in their field.

$30,000 SCHOLARSHIPS AVAILABLE

The Massey University Albany Vice Chancellor's Natural Sciences Excellence Award offers a scholarship of up to $30,000 in total for two students who excel in their studies. This is awarded on a yearly basis.

MAKE YOUR OWN DISCOVERIES

The degree focuses on inquiry-based learning. That means you will work not only on solutions to problems, but on identifying those problems yourself.
First year study is based on structured inquiry. In Year 2, teachers provide guidance to stimulate self-directed exploration of questions. Open inquiry is the aim in Year 3, when you will come up with the questions you want to answer and independently research the answers.

CAREER OPPORTUNITIES

CAREERS IN DIVERSE FIELDS

More than any other science degree, the Bachelor of Natural Sciences opens the door to careers in diverse fields.

EMERGE AS A HIGHLY-EMPLOYABLE SCIENTIST

Employers are increasingly looking for graduates with a cross-disciplinary background, not only in sciences but across business and social issues.

BECOME AN INDEPENDENT THINKER

During the course of your studies there is a strong focus on fostering your research, analysis and discovery skills. This independent-thinking is highly-valued and vital for progressing scientific discovery in New Zealand and around the world.
Your career after you graduate could include working in the following fields:

- Academic research and education
- Applied science and technology
- Sustainability and conservation
- Policy making and regulation
- Business and entrepreneurship
- Counselling and consulting.

■ **COLIN HARVEY**, ONZM, Ancare Scientific Ltd, Auckland.
Employers are looking for graduates who have a solid and broad grounding in the sciences, a feel for business, and a good understanding of science-and-society issues such as the importance of sustainability. Above all, we want graduates who can think independently and communicate well.

CHARLOTTE ROBERTSON Current student BNatSc
Graduating in 2015. Intern, DairyNZ and AgResearch

The best part of this degree was creating my own pathway by selecting the papers that would be most interesting and useful to me rather than following a prescribed course.

I think the most valuable skills the degree teaches are: critical thinking, tackling global issues and self-directed research. Because it exposed me to a variety of topics in science, I can understand and communicate with people from scientific disciplines very different to my own.

Studying at Massey has set me up very well for my future – I was accepted for a 12 month internship at DairyNZ and AgResearch before I finished my undergrad!

This internship is broad and will give me the opportunity to explore the dairy industry from different sectors and gain experience in these different areas. I am very glad I have this opportunity because I will be able to see the dairy industry from different perspectives. I want to continue my studies after this internship and complete a Masters and PhD. My goal is to get a position where I can develop and implement environmentally sustainable farming practices.

ENTRY REQUIREMENTS

All applicants must meet the undergraduate admission requirements. Admission to the degree requires:

- You have achieved at least 16 credits in each of two of NCEA Level 3 Biology, Chemistry, Physics, Mathematics; OR
- Have achieved a minimum B grade at A level in two of Biology, Chemistry, Physics, Mathematics in the University of Cambridge International Examinations, OR
- Have achieved at least 29 points including 5 points in each of two of Biology, Chemistry, Physics, Mathematics in the International Baccalaureate; OR
- Passed with a minimum C grade two of 162.103 Introductory Biology, or 123.103 Introductory Chemistry, or 124.100 Introductory Physics; or have achieved to an equivalent level in an alternative examination; OR
- Have achieved 16 credits at Merit or Excellence in each of 5 subjects in NCEA Level 3; OR
- Have achieved a B grade average across previous University study.

... CRITICAL THINKING, TACKLING GLOBAL ISSUES AND SELF-DIRECTED RESEARCH

TYPICAL PATTERN FOR A BNATSC DEGREE

Year 1	Year 2	Year 3
Science & Sustainability 15 credits	Systems & Models 30 credits	Research Themes in Nat Sci 30 credits
Core Skills for Natural Scientists 15 credits		
Biology 15 credits	Project Mgt 15 credits	Project 15 credits
Chemistry 15 credits	Math/Stats 15 credits	300-level 15 credits
Physics or Mathematics 15 credits	Sciences 15 credits	Sciences 15 credits
Science elective 15 credits	Sciences 15 credits	Sciences 15 credits
Elective – Science or Beyond 15 credits	15 credits	Sciences 15 credits
Elective – Science or Beyond 15 credits	15 credits	15 credits
120 credits	120 credits	120 credits

Compulsory | Major | Elective

BACHELOR OF SCIENCE

DURATION
3 YEARS FULL-TIME

AVAILABLE
SEE THE CHART ON PAGE 59

BSc

Make a difference with an exciting and challenging career. The study of science in the BSc at Massey University provides a flexible programme that will challenge you, while giving you the satisfaction of discovery.

WHAT'S IT LIKE?

Leaders and influential thinkers around the world see the training, nurturing and appointment of well-qualified scientists and technologists as instrumental for positive growth and development. Studying science will put you in sync with this thinking, and set you up for an exciting and prosperous future.

WHY MASSEY?

HUGE CHOICE IN ANIMALS, BIOLOGY AND LIFE SCIENCES

We have the largest number of specialised majors across the biological sciences in New Zealand to feed your passion for animals, biology and life sciences.

STUDY WHAT YOU WANT

Massey's Bachelor of Science offers the flexibility to combine the major(s) and minor(s) you want to create your own unique skill-set.
We offer study in four key areas

- Living systems
- Human health and behaviour
- Computational materials science
- Earth and environmental sciences.

Our wide range of specialty majors means you study complementary areas for example animal science with agriculture, ecology with environmental science, or nanoscience and chemistry. You could also pair different areas like agriculture and physics for varied perspectives. This flexibility also means you can complete a conjoint degree with business or arts to study areas like agricultural science with rural valuation or physics and history.

YOUR PATHWAY TO THE TOP

Get to know some of the top science researchers and teachers in the world. As a student, you'll benefit from direct contact with your lecturers through our engaging and supportive class environments, well-regarded open door policy, and their passion and personal interest in your study progression both throughout the degree and beyond.

CAREER OPPORTUNITIES

Science graduates are in demand across hundreds of roles in a wide range of industries Whether you want to trek through native forest monitoring endangered species, work in labs to prevent infection break outs, join New Zealand's world-leading agriculture industry or travel the world with your internationally recognised degree studying a Bachelor of Science at Massey can take you there. Our students work in a range of roles including:

- Volcanologist
- Nutritionist
- Ecologist
- Software engineer
- Software developer
- Plant Biologist
- Psychologist
- Statistician
- Mathematician
- Zoologist
- Physiologist
- Microbiologist
- Personal Trainer
- Wildlife Biologist
- Conservation
- Agriculturalist
- Agronomist
- Animal Scientist.

WHAT TO EXPECT

Starting university can be both daunting and exciting. The structure is different, the location is new and so are the people. At Massey we do our best to make you feel right at home from day one. Your first year will focus on developing broad scientific knowledge and be introduced to your area of interest. You'll attend lectures as well as small class size tutorials to get to know your peers and lecturers. You may also find yourself spending time in labs and out in the field depending on your major. Above all you'll inspired, engaged and join our faculty of passionate and friendly staff ready to take you on a journey through science that will leave you wanting more.

CHRIS RODLEY Ngati Koata, Gene Scientist

Working on a cure for cancer. It's no clichéd scientific dream, but a reality for gene scientist Chris Rodley.

It was a love of science and asking questions that have never been asked before that led him from teen truant to top Maori scholar at Massey.

Today Chris is a long way from home – doing research on cancer cell research in Switzerland as part of an international team at the University of Geneva.

His successful academic career is a far cry from his days as a teenager who left Long Bay College aged 16, with no qualifications.

"I got in with the wrong crowd. I was bored," he said when he graduated with a Bachelor of Science in Molecular Biosciences with First Class Honours in 2008.

But his lifelong fascination with science, especially genetics, always remained with him. After a spell of apple picking in the South Island and then several years as a bank teller in Auckland, restlessness and boredom compelled him to pursue his dream of becoming a medical researcher.

Encouragement from one of his former schoolteachers also helped to spur him on, he says. "I had to do a lot of independent study to fill in the gaps in my knowledge base. I made a lot of sacrifices to do well. I didn't have much of a social life – I had to study ten to 12 hours a day."

The hard work and dedication paid off. Mr Rodley was named top Massey Maori student for 2007, and was awarded a Purehuroa Maori Postgraduate Award in 2007 for excellence and achievement. He also won a Health Research Council of New Zealand Māori PhD scholarship worth $105,000 for three years.

One of the highlights of his time at Massey was being a finalist in the MacDiarmid Young Scientist of the Year competition, as well as publishing three papers in international journals, which he says helped him obtain his current position.

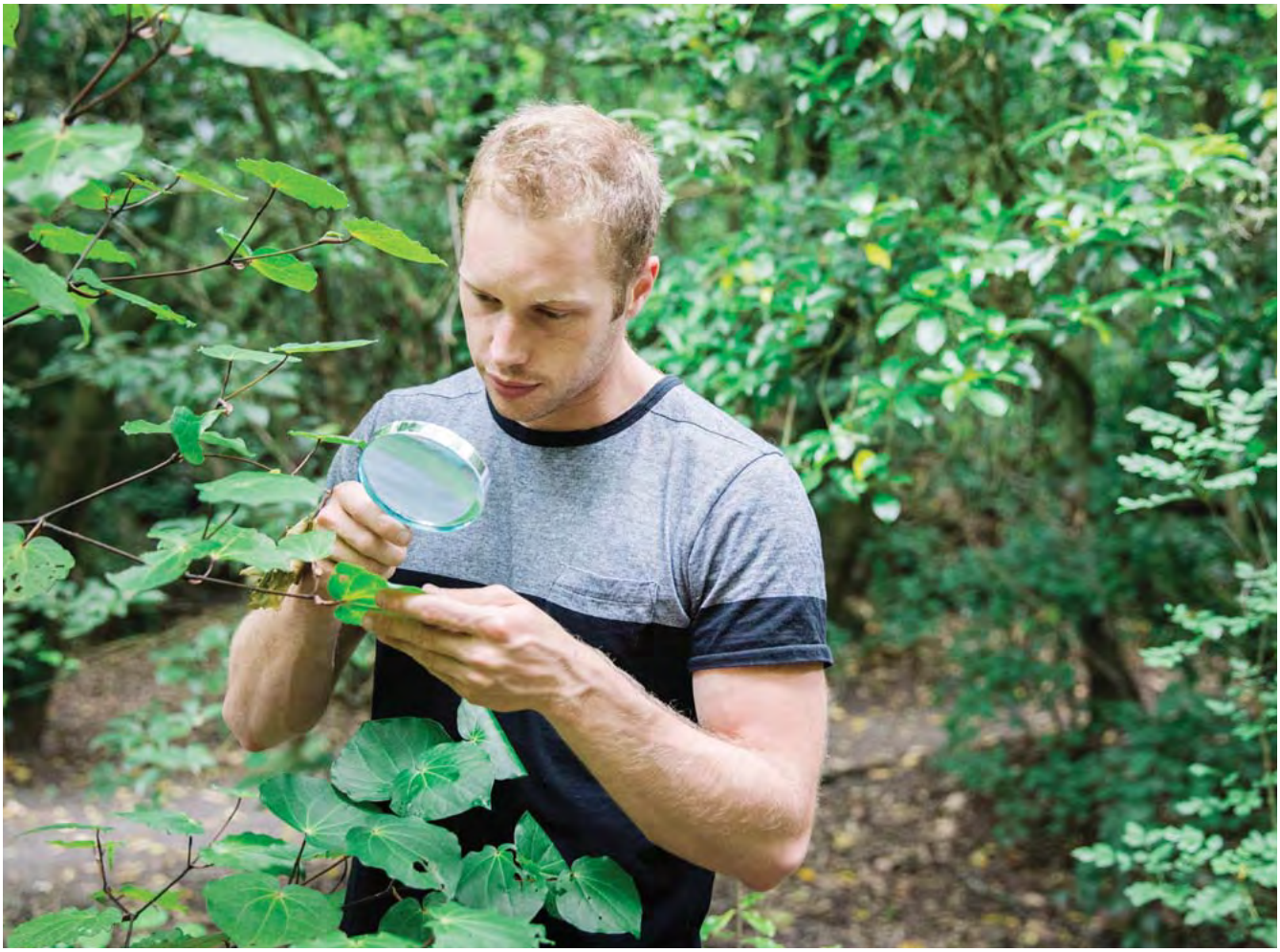
"I really love science and asking questions that have never been asked before."

Today he is the only English speaker among a team of 12 international researchers at the University of Geneva's Department of Cellular Biology. He is investigating the behaviour of cervical cancer cells to better understand the disease mechanisms.

TYPICAL PATTERN FOR A BSC DEGREE WITH A DOUBLE MAJOR

Year 1	Year 2	Year 3
Communication 15 credits	200-level 15 credits	300-level 15 credits
Mathematics or Statistics 15 credits	200-level 15 credits	300-level 15 credits
First major paper 15 credits	200-level 15 credits	300-level 15 credits
First major paper 15 credits	200-level 15 credits	15 credits
First major paper 15 credits	200-level 15 credits	300-level 15 credits
Second major paper 15 credits	200-level 15 credits	300-level 15 credits
Second major paper 15 credits	200-level 15 credits	300-level 15 credits
Second major paper 15 credits	200-level 15 credits	15 credits
120 credits	120 credits	120 credits

Compulsory	1st major	2nd major



MAJORS

	DESIRABLE NCEA SUBJECTS					MAJOR AVAILABLE			
	Biology#	Chemistry#	Geography	Mathematics	Physics#	Albany	Manawatū	Distance	Page
Agricultural Science	✔	✔		✔			✔	O	60
Animal Science	✔	✔		✔		O	✔	O	62
Biochemistry	✔	✔				O	✔		64
Biological Sciences	✔	✔		✔		✔	✔	O	66
Chemistry	✔	✔		✔	✔	✔	✔	O	68
Computer Science				✔		✔	✔	O	70
Earth Science		✔		✔			✔	✔ *	72
Ecology	✔	✔		✔		✔	✔	O	74
Environmental Sci	✔	✔		✔			✔	✔ *	76
Exercise & Sport Sci	✔	✔		✔	✔	✔	✔		78
Genetics	✔	✔				✔	✔		79
Geography			✔				✔	✔	80
Human Nutrition	✔	✔		✔		✔	✔		82
Logistics and Supply Chain Mgmt				✔		✔	O	O	84
Marine Ecology	✔	✔		✔		✔			85
Mathematics				✔		✔	✔	✔	86
Microbiology	✔	✔		✔		O	✔		88
Nanoscience	✔	✔		✔	✔	O	✔		90
Physics				✔	✔	O	✔		91
Physiology	✔	✔		✔	✔	✔	✔		92
Plant Science	✔	✔		✔		O	✔	O	94
Psychology	✔			✔		✔	✔	✔	96
Statistics				✔		✔	✔	✔	97
Zoology	✔	✔		✔		✔	✔		98

If you missed out on any of these subjects, you can take papers during Massey's Summer School or Semester Two. These are: 123.103 Introductory Chemistry; 162.103 Introductory Biology; 124.100 Introductory Physics. See page 03 for more information.

KEY: ✔ Major available
O Some papers available
* Can be completed in distance mode, though some papers are only available every second year

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

AGRICULTURAL SCIENCE

A major of the BSc

Do you want to help improve agricultural systems? A BSc (Agricultural Science) will help you gain the skills to improve productivity and sustainability of agricultural systems, in New Zealand and around the world.

WHAT'S IT LIKE?

The BSc (Agricultural Science) will help you understand modern farming, and give you a sound foundation in agriculture for careers in the primary product sector.
You'll gain the knowledge and the analytical and management skills to help you improve productivity and sustainability of agricultural systems, in New Zealand, and around the world.

CAREER OPPORTUNITIES

Graduates are in demand in New Zealand and overseas. The diversity in New Zealand's thriving primary production sector provides a wide range of employment opportunities such as

- Farm consulting
- Farm management
- Agricultural sales and servicing
- Scientists
- Policy analysts
- Farmer
- Technical advisor
- Extension officer.

WHY MASSEY?

WORLD LEADING AGRICULTURE UNIVERSITY

Massey is New Zealand's number one university in agriculture and ranked 19th out of the thousands of universities offering agriculture globally.
Our proud record dates back to 1927 when we offered New Zealand's first degrees in agriculture and horticulture.

JOB-READY

Employers want students with real-world experience and the knowledge to help solve the big problems in the agriculture industry.
As part of your study you'll spend 20 weeks gaining industry experience working with an agricultural, horticultural or equine company. Your assignments will also involve conducting projects and research across our 2000ha of farmland and Massey's Agricultural Experiment Station.

EVERYTHING ON OFFER

From soils and pastures to beef, sheep and dairy farming, sustainable production, resource management, animal health and more, we are New Zealand's only all-inclusive world-leading agri-food university.
So whether you want to work on farm, in a technical advisory role or for research institutes you'll graduate from New Zealand's No.1 University in agriculture and begin your working life as one of the best in the world.

CONNECTED TO INDUSTRY

Massey is leading the way in New Zealand's agriculture and food industry. Our teaching is research-led and based on the newest developments.
As a student you'll get to engage with some of New Zealand's leading agri-based businesses and research centres like Fonterra, AgResearch, Landcare Research, Plant and Food Research and Asure Quality – all of which are within 1km of campus.

■ **HAMISH BEST** East Coast Territory Sales Manager, Agricom

I decided to study a BSc in agricultural science for two reasons; I had a passion for agriculture, and I enjoyed the sciences during secondary school.

After my first couple of years I realised I wanted to spend some time building a career in the agriculture support industry. In my second year of study I developed an interest in plant science and pasture production, which lead to a third year focusing particularly on agronomy-based papers and an honours year studying agronomy and animal production papers.

In the last couple of years at Massey I realised an agronomist role would be perfect for me as it combines the science of growing crops with the farmer/customer interaction side of things.

After graduating I started working for Agricom – one of New Zealand's top seed companies. I interact with rural supplies companies, farmers, researchers and consultants.

My role is sales-based, and it involves a lot of after-sales service and advice. I use the research techniques and technical information from my degree on a daily basis.

FUTURE STUDY TOPICS

Some of the topics taught in agricultural science papers include:

- Animal production
- Agricultural systems
- Land, soil and water
- Seed science
- Weed control
- Animal nutrition
- Genetics for livestock improvement
- Meat and fibre production
- Dairy production
- Pasture and crop agronomy
- Sheep production
- Soil fertility and fertilisers
- Pasture management
- Plant protection.

I USE THE RESEARCH TECHNIQUES AND TECHNICAL INFORMATION FROM MY DEGREE ON A DAILY BASIS.

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

ANIMAL SCIENCE
A major of the BSc

A major in animal science from Massey you give you the skills to build a sustainable, healthy future for New Zealand

WHAT'S IT LIKE?

Animal science is not concerned solely with livestock production. It includes companion and recreational animals, along with the health, welfare, and nutrition of major animal species. Challenges include:

- Health of production and companion animals
- Overcoming problems of drug resistance in disease organisms
- Controlling animals that threaten the environment
- New biotechnologies for reproduction, breeding
- The production of pharmaceutical products.

WHY MASSEY?

ONLY ANIMAL SCIENCE PROGRAMME IN NEW ZEALAND

Massey is the only place where you can complete a full degree in animal science in New Zealand.

WORLD LEADING AGRICULTURE UNIVERSITY

Massey is New Zealand's number one university in agriculture and ranked 19th out of the thousands of universities offering agriculture globally. Our animal science and veterinary science lecturers are among the best in the world.

JOB-READY

At Massey you are right in the middle of a world-leading animal and agricultural science hub. We work with industry to ensure what you learn will be relevant to your future job and you'll graduate with the skills and knowledge to work with a range of production and companion animals. From day one you'll have access to:

- Dairy sheep and beef farms
- New Zealand's only veterinary science facilities including:
  - 24-hour pet hospital
  - Wildbase hospital which treats native New Zealand animals.

HANDS-ON LEARNING

Your assignments will involve research-led projects such as developing feed budgets on beef sites, working with reproductive technologies or engaging in a fully replicated commercial trial to test the nutrient absorption in chickens.

CAREER OPPORTUNITIES

You'll get the knowledge and skills to choose from this growing range of exciting careers in a field that provides New Zealand with much of its economic wealth.

Animals have been inextricably linked with humanity throughout the centuries. We rely on animals for companionship, sport and recreation, draught power, fuel and fertiliser, food, clothing, and by-products to aid in health and wellbeing.

Animal scientists have been involved in diverse activities such as devising breeding programmes for guide dogs, investigating the nutritive value of foods using pigs as a model for humans, investigating biological control mechanisms for possums and other pests, and formulating better diets for cats, dogs and horses.

Animal scientists are also increasingly researching animal welfare issues and alternative production methods, such as organic farm systems.

There is an increasing demand for:

- Managers of large production operations
- Technical positions in areas such as nutrition, animal breeding, and animal health are also available in commercial companies.

In addition, teaching and research positions in universities, research institutes and private industry require animal scientists with postgraduate training. Opportunities exist in areas such as:

- Primary production
- Consultancy
- Livestock trading and exporting companies
- Producer boards
- Feed companies
- Development and marketing of animal health and performance-enhancing products
- International agriculture
- Research and teaching in secondary and tertiary institutions.

FUTURE STUDY TOPICS

Some of the topics taught in Animal Science papers include:

- Animal health, behaviour and welfare
- Animal nutrition
- Animal physiology
- Animal production: dairy, sheep, beef cattle, deer, intensive livestock
- Animal reproduction and lactation
- Companion animal science
- Genetics for livestock improvement
- Metabolic biochemistry.

■ **ANNA TAYLOR** AgResearch (Lincoln) Limited

Completing the animal science major under the BSc degree at Massey University was not only enjoyable, but gave me a wide knowledge base of animal physiology, nutrition, reproduction, behaviour and production. The animal science major opened the door for my employment at AgResearch as a research technician where I initially worked in nutrition and ruminant greenhouse gas research and currently work in the Farm Systems team. The great thing about the animal science major is that you are able to study areas of individual interest while still establishing a great foundation to allow choice of various career paths.

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

BIOCHEMISTRY
A major of the BSc

WHAT'S IT LIKE?
Biochemistry is the chemistry of life. It is an exciting, dynamic industry, that is changing rapidly.
When you study the Bachelor of Science (Biochemistry) at Massey, you'll learn about the chemical components, chemical reactions, and physiological processes that occur in living systems, which are essential for life.

AN ESSENTIAL PART OF BIOLOGICAL RESEARCH
You'll learn how nucleic acids, proteins, enzymes, lipids and carbohydrates function in living cells and organisms. The availability of the total genome DNA sequence for an increasing number of organisms, combined with the rapidly developing subject of bioinformatics (analysis of nucleic acid and protein sequences using computers), provides an enormous resource for future biochemists. Studying biochemistry at Massey will give you a skill-set encompassing both traditional and modern biological disciplines, including the tools of bioinformatics and biotechnology that are essential for modern biological research.

WHY MASSEY?
FULL BREADTH OF BIOCHEMISTRY
Develop skills in both traditional and modern biological disciplines, including the tools of bioinformatics and biotechnology essential for research. You'll study all kingdoms and gain knowledge relevant to genetics, microbiology, animal and plant physiology, biotechnology, ecology, as well as the medical, agricultural, and veterinary sciences. You can also take papers in chemistry and physiology, without compromise, to gain added skills of value to your future employers.

GET CONNECTED
Our Manawatū campus puts you in the best location as a biochemistry student. We have strong connections with research and development agencies including Fonterra, Lazra, AgResearch, Plant and Food Research – all of which are right across the road. We also have guest lecturers from these institutes, giving you the opportunity to learn from, and engage with, leading industry professionals.

CAREER OPPORTUNITIES
As a graduate in biochemistry you'll have a wide range of career opportunities. These include pure and applied research, quality control, product development, and work in medical, forensic, and analytical laboratories.
You could also work in information services such as libraries and scientific publishing organisations. Biochemistry graduates also have jobs in sales and marketing, especially of scientific equipment, chemicals, and reagents for biological research and drugs. Jobs in these areas can lead to high-level careers in management and administration in science and health-related fields.
Potential employers include:
- Crown Research Institutes (AgResearch, HortResearch, Plant and Food Research)
- Industry-based research institutes (Dairy, Meat, Wool, Wheat, Forestry, Leather)
- Wineries, breweries, food and animal feedstuff industries
- Pharmaceutical manufacturing and scientific supply companies
- Secondary and tertiary educational institutions
- Biotechnology companies
- Scientific publishers
- District health Boards
- Banks and finance companies.

For those students who continue their studies to a higher degree (BSc(Hons), MSc, and PhD) there are careers in scientific research, tertiary teaching and higher level management.
A degree in biochemistry provides graduates with internationally-marketable skills. Many of our graduates spend a period of time outside New Zealand, either working or furthering their studies.

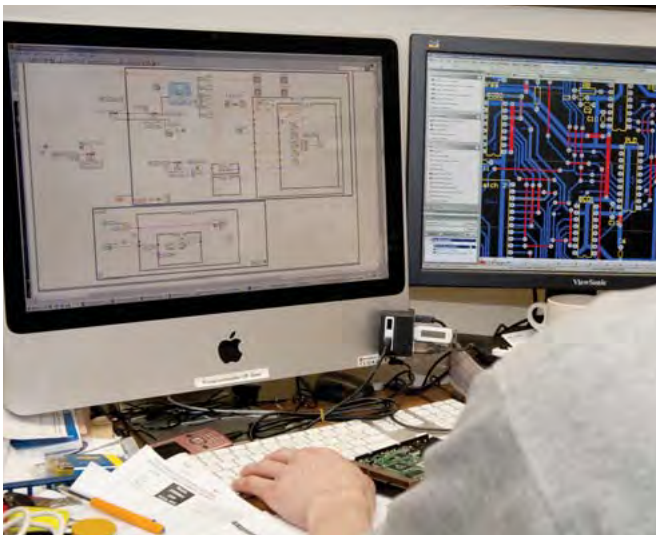
■ **RHYS SANSON** Compliance Officer, Manawatu District Council
My degree gave me the fundamental scientific knowledge and confidence required to understand, research, analyse, think laterally and adapt quickly to many situations that arise in a fast-paced laboratory environment. After working for several years as a biotechnician at Arotec Diagnostics Ltd, Petone directly applying the skills and knowledge acquired in his biochemistry major Rhys completed a Massey Graduate Diploma in Environmental Health via distance learning. He is now a compliance, environmental health, and liquor licensing officer for the Manawatū District Council.

FUTURE STUDY TOPICS

Some of the topics taught in Biochemistry papers include:

- Cell Signalling
- Chromatin structure and function
- DNA technology
- Enzymology
- Introductory bioinformatics
- Metabolic biochemistry
- Molecular immunology
- Nucleic acid biochemistry
- Protein structure and function
- Regulation of gene expression.

MY DEGREE GAVE ME THE FUNDAMENTAL SCIENTIFIC KNOWLEDGE AND CONFIDENCE REQUIRED...



DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY
MANAWATŪ

BIOLOGICAL SCIENCES

A major of the BSc

Learn first-hand from our world-renowned biological sciences staff of biologists, microbiologists and ecologists.

WHAT'S IT LIKE?

From genes to entire ecosystems, the study of biological sciences covers the whole spectrum of life.
You'll gain an understanding of everything from human genetics to the conservation of the planet's species, and ultimately to the management of micro and macro ecosystems.

HAVE AN IMPACT ON THE WORLD

Biological sciences is having an impact in all sorts of areas of global significance, such as

- Human health
- Unravelling the human genome
- Novel pharmaceutical products derived from plants and animals
- The problems of conserving very rare species (biodiversity)
- Finding out who is related to who in the natural world (with spin-offs to forensic science)
- Managing ecosystem services – which supply us with fresh water, clean air, and fertile soil.

WHY MASSEY?

WORLD LEADING EXPERTS

Learn first-hand from our world-renowned biological sciences staff of biologists, microbiologists and ecologists. They are researching in many areas of biology from the applied sciences in agriculture and animal science and food technology, to the latest theories about the origins of life and the processes of molecular evolution. A major in biological sciences at Massey will give you an in-depth and comprehensive understanding in a number of biological disciplines – and beyond. That is a great advantage when you are looking for a job.

CATERS TO DIVERSE INTERESTS

You can choose from our extensive range of disciplines to combine all your varied interests in ecology, zoology, environmental science, marine ecology, microbiology and more into one overarching major.

CAREER OPPORTUNITIES

Your biological sciences major will help you find a career in a wide variety of situations and industries. Employers such as regional and district councils are always looking for people with a broad-based degree with a specialisation, with environmental science and ecology being two good examples.
Processing industries associated with primary production (such as dairy companies) employ similarly broad-based graduates with a specialisation in the molecular aspects of biological science. Crown Research Institutes and universities also seek out programme graduates at the technical level. In both areas, if you continue to postgraduate study you could move on to a career as a professional scientist. A biological sciences major is also very appropriate for a career as a secondary teacher.

FUTURE STUDY TOPICS

Some of the topics to be taught in biological sciences include:

- Ecology and conservation
- Applied ecology and resource management
- Flora and fauna of New Zealand.
- Some of the topics to be taught in biological sciences at Albany include:
- Behavioural ecology
- Biodiversity
- Biology and genetics of micro-organisms
- DNA technology
- Ecology and conservation
- Genes and gene expression
- Human genetics
- Marine biology
- Metabolic biochemistry
- Plant biology
- Theory and practice in ecological methods
- Theory and practice in molecular methods.

■ KIRSTY MANN Genetic Counsellor, Melbourne Hospital, Australia

I've always had an interest in biological sciences, so I chose to study a Bachelor of Science at Massey University Albany, specialising in molecular biology. During my second year, I came across the genetic counselling profession and knew straight away this was the career I wanted to pursue. Genetic counsellors combine their knowledge of human genetics with the interpersonal and counselling skills required to explore how a genetic condition impacts on the life of an individual and the family unit.

Upon graduating in Australia with a Masters of Science majoring in genetic counselling, I was qualified to be employed as a genetic counsellor, and was thrilled to be offered a role at the Royal Melbourne Hospital. In the adult hospital setting, I am predominantly meeting with people with an increased chance of developing an adult-onset genetic condition. In a nutshell, this involves providing genetic information to patients that is relevant to their situation and discussing how their genetic condition can best be managed. This process often involves interpreting genetic testing and it relies on my understanding of the intricacies of molecular genetics. I could not do this without the foundational knowledge that I acquired during my learning at Massey.

...I COULD NOT DO THIS WITHOUT THE FOUNDATIONAL KNOWLEDGE THAT I ACQUIRED DURING MY LEARNING AT MASSEY.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

CHEMISTRY
A major of the BSc

A chemistry degree offers excellent marketability now and well into the future.

WHAT'S IT LIKE?

One of the exciting things about chemistry is that you begin to understand the world we live in, what everything is made of, and how their properties can be changed. This could help you get involved in huge scientific breakthroughs, and contribute to public debates on issues of global importance.
For example Teflon, a plastic, can be used to line a frying pan while Gladwrap film, also plastic, will melt if you so much as put it near heat. How are the two plastics composed to allow them to have quite different properties and uses?

WHY MASSEY?

NEW ZEALAND'S ONLY NANOSCIENCE OFFERING

Match your degree with a second major or minor in our unique nanoscience offering to develop a unique blend of skills that will set you apart from the rest.

REAL-WORLD PROBLEM SOLVING

You'll carry out analytical projects applying broad-based chemistry knowledge to solve real-world problems. For example, one of our students tracked nutrients from a farm's centralised nutrient drip to find out it they were getting to the trough they were being pumped to; another tested the caffeine levels in sport drinks.
You'll have the opportunity to work alongside some of our world-recognised researchers on issues of international significance.

GET CONNECTED

From summer internships with Crown Research Institutes (PN), to monthly functions with New Zealand Institute of Chemistry members and employment opportunities with our chemistry department you'll be well placed to gain connections and experience within industry while studying.

UP CLOSE AND PERSONAL WITH EQUIPMENT

You'll interact frequently with a range of instruments and learn techniques for molecular analysis, x-ray crystallography, nuclear magnetic resonance, transmission electron microscopy imaging and more.

CAREER OPPORTUNITIES

As a chemistry graduate from Massey you will be in demand, both in New Zealand and overseas. Your knowledge can be applied to an amazingly wide range of settings including industry, business, research institutes, universities, polytechnics, and schools.
There is a growing role for chemical scientists as we confront major challenges. Chemical scientists, using the principles of green chemistry, will be required to help protect the environment, improve health, provide new energy sources, design new processes, and assist in food production. Over 200 companies in New Zealand employ chemical scientists in product development, quality assurance, marketing, sales, and administration. If you would like to have a career in industry you should consider combining management or occupational health and safety papers with your chemistry major.
You could be employed in the:

- Food industry (dairy, meat, canning)
- Forest products (pulp and paper)
- Chemical processing of wool, textiles, and plastics
- Production of agricultural and horticultural chemicals and pharmaceuticals.

Chemical scientists are increasingly employed in areas concerned with the environment; those looking for such a career should include the environmental science package in their programme or consider the Bachelor of Business Studies/Bachelor of Science conjoint programme. Scientific research is also an important field that you could join. Chemical scientists carry out research in industry, specialist research institutes such as the Fonterra Research Centre and the Forest Research Institute, and at universities.

FUTURE STUDY TOPICS

Some of the topics taught in chemistry papers include:

- Biological chemistry
- Catalysis and bioinorganic chemistry
- Chemical and biochemical analysis
- Chemical energetics
- Chemical spectroscopy
- Materials chemistry and nanoscience
- Organic synthesis.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DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY
MANAWATŪ

COMPUTER SCIENCE
A major of the BSc

Would you like to develop the next computing revolution? Your computer science degree at Massey will help you turn your love of computing into a brilliant career.

WHAT'S IT LIKE?

You already know that computers are part of every aspect of our society, from the stock market to modelling climate change to the huge range of computer games.
It's a hugely varied area that is constantly growing and changing – and those exciting changes are being developed by people like you!

WHAT YOU WILL LEARN

During your study of computer science you will learn about all aspects of computer programming and computer systems, from the theoretical foundations to the very practical aspects of developing the latest software applications. No prior programming skills are required.
The Bachelor of Sciences (Computer Science) degree will give you the knowledge and skills to write software for fields such as artificial intelligence, graphics, web-based systems, networks and operating systems.
You'll learn about traditional and trending topics in computer science such as:

- Artificial intelligence
- Data structures and algorithms
- Object-oriented programming
- Computer graphics and image processing
- Mobile applications
- Logic circuits and low-level programming
- Concurrent programming
- A range of programming languages
- Data communications, networks and web applications
- Computer modelling and simulation.

Most of your undergraduate papers will focus on computer programming – the design and creation of software applications that enable computers to be used in all areas of human endeavour. You'll learn how to write these programs in various programming languages and how to use them in several application areas.
Suggested supporting minor subjects for a major in computer science include information technology, mathematics, physics, or statistics. Computer science can be taken as a supporting subject, and double majors are possible.

Note that you can change your major within the degree up until the end of your first year.
The Bachelor of Science gives you a broad degree, with a strong background in a range of science subjects such as chemistry, physics and mathematics. Massey also offers the Bachelor of Information Sciences, which combines topics from software engineering, information technology and computer science for students who wish to pursue a career as a computing professional.

SOUGHT AFTER BY EMPLOYERS

Our computer science major has a strong focus on industry relevance developing your knowledge and skills to write software for fields such as artificial intelligence, graphics, web-based systems, networks and operating systems. Massey graduates are sought after in the IT profession and employers highly regard their applicable skill-set and hands on experience.
Graduates often have jobs before they finish and some begin their own businesses. There is immense demand in New Zealand and worldwide for qualified computer science graduates.

STUDY YOUR WAY

Choose what you study – Customise your papers to focus on the human and socioeconomic side of IT or software and computer science. Individualise your course by taking on a specialised project that has been research informed by our academics.
Choose where you study – In Albany we have a strong focus on parallel computing and in Palmerston North a strong focus on software development and intelligence systems. Distance and mixed mode allows you to be more flexible and fit your degree around your circumstances.
Choose how you study – Our range of multi-modal teaching practices such as video lectures and YouTube clips mean you can learn at your own pace and are particularly useful for students who speak English as a second language.

ESTABLISHED

Massey has been offering courses in computer science for over 40 years, and was one of the first universities in New Zealand to introduce it. This experience means we know what works and have evolved over time to keep up with changes in technology.

FUTURE STUDY TOPICS

Some of the topics taught in Computer Science papers include:

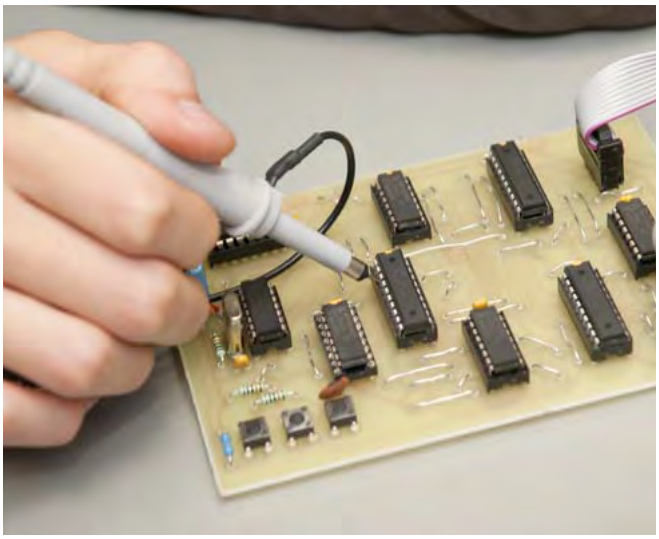
- Programming languages
- Algorithms and data structures
- Declarative programming
- Object-oriented programming
- Software engineering
- Graphics programming
- Web technologies
- Artificial intelligence
- Project implementation
- Human-computer interaction
- Concurrent programming
- Operating systems
- Computer architecture
- Networks.

■ **GRAHAM JENSON** Bachelor of Science in Computer Science
Doctor of Philosophy (PhD) Computer Science and Software Engineering
Senior Developer, Loyalty New Zealand

I made my decision to study at Massey during visiting an Open Day, where I saw the engineering department's relaxed environment and great resources. After studying towards a BSc in Computer Science I wanted to continue and deepen my study. I found an excellent supervisor and decided to further my knowledge by entering working towards a PhD. Massey encouraged and sponsored my integration into the larger post-graduate and research community of New Zealand, allowing me to make many friends and have many valuable experiences around New Zealand. Once finished my PhD, a friend of mine who I had meet at Massey University – Alex Gibson – who I had won the Mix&Mash competition in 2011 with, invited me to come and work with his company. I worked there for a year contracting and consulting for many companies and furthering my knowledge in the software engineering domain.

Now, I am a senior software engineer working for Loyalty New Zealand in Wellington, where I help develop and maintaining many systems that are used by thousands of New Zealanders daily.

What Massey University gave me was the freedom and environment that encouraged my desire to learn and make friends. The skills and people that I came away with have provided a large amount of value to my professional and personal life. It was an amazing experience.



...MASSEY GAVE ME THE FREEDOM AND ENVIRONMENT THAT ENCOURAGED MY DESIRE TO LEARN AND MAKE FRIENDS.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

EARTH SCIENCE
A major of the BSc

Earth scientists try to understand our planet's natural systems and tackle environmental problems. They provide information to society for solving geotechnical and environmental problems. They are discovering hydrocarbon and mineral resources and establishing policy in resource management, environmental protection, public health, safety, and welfare.

WHAT'S IT LIKE?

The study of earth science is dedicated to the science and history of our planet. It's a huge area to cover, and can lead to a fascinating and varied career.

Massey's Bachelor of Science (Earth Science) will take you on a journey of understanding the processes that moulded our planet, our landscapes, geological resources and soils.

UNDERSTAND HOW THE WORLD WORKS

You will develop your appreciation of the immensity of geological time. You'll learn how to visualise the Earth's structures in three dimensions and gain a capability to identify and understand the beginnings of the valued resources of our planet. You'll also learn how to predict where these resources may be found, and develop an eye for understanding the natural processes that shaped our environment.

...A JOURNEY OF UNDERSTANDING THE PROCESSES THAT MOULDED OUR PLANET, OUR LANDSCAPES, GEOLOGICAL RESOURCES AND SOILS.

WHY MASSEY?

WORLD-LEADING IN EARTH AND SOIL SCIENCE

Massey University is one of the few places in the world with a research group that examines the combination of earth and soil science. We are at the forefront in environmental geochemistry and the evolving discipline of hydrology.

This unique blend of research expertise underpins our teaching. We'll take you beyond traditional geology and connect geology, soil science and environment, as well as explore metals and plants, mining and remediation, and ground water hydrology. You'll graduate with cutting-edge skills and the ability to predict future changes in the Earth's surface such as natural disasters, climate change and water contamination.

HANDS-ON LEARNING

Massey has a large focus on finding innovative solutions to environmental issues. You'll engage in practical laboratory work including hands-on experimental projects in all core papers and attend field trips to Limestone Downs, Waima and volcanoes in the Central North Island. You'll graduate ready to take your skills to the world.

LEADING IN VOLCANOLOGY

With the largest number of internationally renowned volcanology experts researching around the world in places like Saudi Arabia and the South Pacific, Massey is the number one place to study earth science if you're interested in volcanoes. You'll get to explore this exciting and life-saving area through field trips to volcanoes in the Central North Island and our unique equipment that mimics volcanic ash flow.

CAREER OPPORTUNITIES

Massey Earth Science graduates are employed in various Crown Research Institutes, by regional councils (land and water resources), as secondary school teachers, in universities, as consultants, and varied positions in industry all around the world. If you are interested in a research career, Massey's BSc will allow you to choose from a wide range of specialist postgraduate programmes throughout New Zealand and overseas.

Graduates are employed as scientists in the petroleum and petrochemical industries, in mining, resource management, hazards research, land rehabilitation, and engineering geology.

Research scientists have specialised in geochemistry, paleomagnetism (the Earth's past magnetic fluctuations), palynology (fossil pollen), volcanology, phytoremediation (using plants to remove pollutants from soils), pedology, soil pollution, and groundwater.

SHARN HAINSWORTH Earth Science Graduate

My Massey earth science degree has given me a thorough understanding of land as a finite resource. It opened doors to a wide variety of employment options, and has enabled me to spend a lot of time in the rural heartlands of New Zealand working as a professional scientist.

I was drawn to earth science at Massey by the observation-based approach that was encouraged by the lecturers. They also presented a culture of researching practical solutions to environmental issues.

Many New Zealand employers working with the Resource Management Act need employees with skills in earth science. Since completing my degree I have been:

- Producing whole farm plans for Horizons Regional Council
- Assessing suitability of soil on flats and erodible hill country for the land-based application of domestic, municipal and industrial wastewater
- Evaluating the inherent properties of soil with respect to the potential for efficient irrigation
- Evaluating what kinds of development are appropriate on the most versatile and productive land.

I think one of the best parts of the degree was its emphasis on fieldwork. Our classes involved numerous trips to interesting out-of-the-way parts of New Zealand. Because of earth science, fieldwork in rural areas has become a big part of my job, in addition to getting that necessary level of professional challenge.

FUTURE STUDY TOPICS

Some of the topics taught in advanced earth science papers include:

- Understanding geological structures
- Understanding New Zealand geology
- Stratigraphy, sedimentology and paleoenvironments
- Volcanology and mineralogy
- Plate tectonics
- Pedology and Quaternary geology
- Geographic information systems
- Remote sensing
- Field work.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

ECOLOGY
A major of the BSc

You'll learn how to make sense of the vast amounts of natural world data relating to the interactions between organisms and how they exist in their environments.

WHAT'S IT LIKE?

From molecules to forests, ecology is a broad discipline that teaches you how to make sense of the scientific interactions between organisms and their environment.
We now have a great deal of information about the natural world available to us; the problem is how to make sense of that information. Ecology attempts to do this.
The Bachelor of Science (Ecology) at Massey offers some of the best papers on ecology in New Zealand – making it the number one choice if you want a broad knowledge in the discipline.

WHY MASSEY?

WORLD LEADING ACADEMICS

Learn about the latest research findings from the cutting-edge research lead by our ecology staff. Take Dr Mike Joy and his research on river water quality or Professor Diane Brunton and her discoveries of male and female bellbird singing dialects.

HANDS-ON EXPERIENCE

During your studies you could work as a volunteer for the Department of Conservation recording native bird populations and helping with recovery programmes, gain a summer internship with one of New Zealand's crown research institutes or work alongside a Massey researcher. This experience will put you a step ahead when finding a job and give you a taste for what your future job may be like.

EXPERIENCED

Our ecology programme is the longest running programme of its kind in New Zealand. It has been running for almost 20 years, supported by years of experience and been consistently developed to remain relevant in today's environment.

CAREER OPPORTUNITIES

Many of our graduates work with the Department of Conservation or the Ministry for the Environment. There are great opportunities for graduates in ecology to work with researchers in the area of managed ecosystems. The interactions between scientists interested in managed and natural ecosystems is a focus at Massey University.
Our graduates also go on to positions with central and local government or their agencies (such as regional and district councils), Crown Research Institutes, environmental or conservation organisations, school teaching, or technical and advisory work.
Other possible career areas include forestry, fisheries, and education, to name a few.

FUTURE STUDY TOPICS

Some of the topics taught in ecology papers include:

- Flora and fauna of New Zealand
- Ecology and conservation
- Biological evolution
- Limnology
- Applied ecology and resource management
- Plant ecology
- Community and ecosystem ecology
- Biodiversity
- Entomology
- Behavioural ecology.

ECOLOGY HAS TAUGHT ME ABOUT HOW EVERYTHING IN THE ENVIRONMENT WORKS TOGETHER...

KATH MORRIS Biodiversity Ranger
Department of Conservation, Franz Josef Glacier

As a conservation worker, I wanted to gain a qualification in the field to back up my knowledge and develop a strong holistic grounding in how ecosystems work.

I completed my degree over eight years fitting study in between full-time work and nights out in the bush. It was tricky and required a lot of determination, but I managed and got there in the end.

In my role as a Biodiversity Ranger for DOC I work mostly with kiwi. It's pretty neat! Part of my job involves monitoring predators out in the bush, trapping and controlling them and doing small mammal indexing.

The other part of my role includes management and husbandry of kiwi chicks. It's a bit of messy job cleaning up after them, but it's well worth it. I monitor their weight, their faeces, their blood and how they're eating. Once the chicks have been artificially hatched at the West Coast Wildlife Centre, they come to us where we look after them so they get used to the weather and outdoors. From there they go to a crèche island, which we monitor to keep it predator free. They then go back out into the bush where the hope is that they will populate.

My work contributes to the BNZ Operation Nest Egg project. The project is all about increasing the population of breeding birds so they start breeding. The work we do increase these chances from 5% to at least 65%. It's incredibly rewarding work.

My studies have complemented what I've learnt out in the field. It has given me a strong grounding, especially for when I want to conduct research. Ecology has taught me about how everything in the environment works together and given me great tools to use when monitoring different species.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

ENVIRONMENTAL SCIENCE

A major of the BSc

Turn your interest in the environment into a career. Studying environmental science at Massey will give you the tools and understanding needed to help create a sustainable path for New Zealand and the world.

WHAT'S IT LIKE?

Environmental science focuses on the connections between humans and their natural environments.

Managing and mitigating human impacts on the environment is crucial for New Zealand, and the world. Our reputation depends on our becoming truly clean and green despite the increased pressure on the environment.

WHY MASSEY?

IMPROVE OUR PLANET

Become involved in Massey's aims to develop a sustainable path for the future by solving real-world issues such as managing natural resources and environmental impacts.

Through lab work and field trips to water treatment plants and a range of managed and mismanaged environments across the North Island, you'll explore processes and investigate interactions between pollutants, soils, water quality and more.

From there you can help to address issues in the food sector, by combining environmental science with a major in agriculture, horticulture, geography or soil science. To take your studies overseas, you can progress on into our postgraduate programme in environmental management. Students in this programme carry out research all over the world offering their knowledge in global contexts. For example, a current international project involves students who are examining environments at complex borders between countries in Africa.

FUTURE STUDY TOPICS

Some of the topics taught in environmental science papers include:

- New Zealand environmental issues
- Global environmental issues
- Ecology and conservation
- Environmental science field work.

CAREER OPPORTUNITIES

There are a number paths open to graduates with a BSc in Environmental Science who want to turn their interest in the environment into a career. Potential employers both in New Zealand and overseas include Central Government, Regional, District and City Councils, private sector consultants, and entrepreneurs. You may also find employment in one of these areas.

- Environmental planning and policy
- Coastal management
- Landscape management
- Soil and water
- Agriculture and forestry
- Geographic information systems
- Tourism and recreation
- Development
- National parks
- Renewable energy
- Biodiversity management.

MILLY FARQUHAR Land Management Officer, BoP Regional Council

Study at Massey really opened my eyes to the many environmental wrong-doings happening in New Zealand and sparked my passion for protecting the environment. I have always loved the outdoors and this degree allowed me to see some really amazing places. I found it challenging at times but it really helped that I was studying something I love.

I'm working as a land management officer at Bay of Plenty Regional Council. My degree prepared me with many of the fundamental skills to carry out the role while also giving me a good base line of technical knowledge.

I spend half my days in the field and the other half in the office. Fieldwork includes providing assistance and advice on sustainable land uses such as a biodiversity protection and riparian management. In the office I draft reports, use GIS mapping software, and do small amounts of financial reporting and reconciliations amongst other things.

Environmental Science is a field that will continue to grow, now and in the future, as the state of our environment continues to decline we are going to need more and more people managing and researching our natural resources.

ENVIRONMENTAL SCIENCE IS A FIELD THAT WILL CONTINUE TO GROW, NOW AND IN THE FUTURE...

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

EXERCISE AND SPORT SCIENCE

A major of the BSc

The Exercise and Sport Science major is ideal for you if you want a broad knowledge base in sport, coupled with practical, applied skills that will make you a sought-after employee in the health and fitness world.

WHAT'S IT LIKE?

EXPAND YOUR SPORTS KNOWLEDGE

With the Exercise and Sport Science major, you'll study a broad range of subjects relating to sport and exercise like biomechanics, exercise physiology and training science. Together, this foundation helps you understand how to enhance sport performance and improve health.

WHY MASSEY?

DO YOUR OWN RESEARCH

Conduct your own sport performance investigation from finding the topic right through to selecting subjects, collecting data, analysing results, reporting and presenting. Students have done projects such as examining how caffeine affects performance, the connection between hydration and attention, and how things like heat and dietary interventions affect performance.

CAREER OPPORTUNITIES

Massey's exercise and sports science graduates have an excellent reputation throughout the sporting industry and are sought after in a wide range of areas including teaching, coaching, sports, fitness and health. Some examples are:

- Providing exercise and health guidelines for clients and patients in fitness centres, medical centres, clinics and hospitals
- Teaching at secondary and tertiary level
- Providing occupational health advice to companies and local bodies
- Sport scientist working with individual athletes, sports teams, sports coaches and regional sporting bodies.

If you take the Bachelor of Business Studies/Bachelor of Science conjoint programme, you will have excellent potential to develop business opportunities in the sports area.

FUTURE STUDY TOPICS

Some of the topics taught in exercise and sport science papers include:

- Biomechanics
- Exercise physiology
- Investigating sports performance.
- Motor control
- Human physiology

■ **JEMMA O'DONNELL** Nutritionist at Sanitarium

As a regional soccer player I thought my nutrition and training schedule was as good as it could be – but it wasn't until I received a lecture in sports nutrition that I realised I could be performing better. This lecture spurred my interest in sports nutrition and now I'm a nutritionist at Sanitarium. The best part about studying at Massey was the flexibility. I finished my Bachelor of Science double majoring in sport and exercise science and human nutrition in 2009. I then went on to complete my Masters in Science majoring in Human Nutrition.

I had a really great experience at Massey, both in Palmerston North and Albany. Massey really looks after their students in every capacity.

As a nutritionist at Sanitarium, my job involves helping customers with product nutritional information and offering general nutrition advice.

A large part of my job is also managing the website content, making sure the website is being regularly updated with new content, and that subscribers are sent regular emails about what is going on. I also get to work on various community projects that Sanitarium runs, and write articles for a number of different magazines and columns.

Massey's programme – throughout undergraduate and postgraduate studies – has definitely provided me with the skill set I need to do this job well. Not only did Massey give me the technical and scientific knowledge, but it also taught me invaluable skills around critical thinking, researching, and the ability to continually learn as information changes.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

GENETICS
A major of the BSc

Learn about the discoveries that are changing how we think about who we are as humans. Genetics is a rapidly-changing and fascinating area of science.

WHAT'S IT LIKE?

Become part of the spectacular advances being made in medicine, agriculture and environmental science through modern genetic analysis and next generation technologies.

Genetics is a hugely relevant area of study to the world today and a discipline that unifies many others. It provides the key to understanding the big questions of life; where did we come from? How are we and our world changing and adapting? How can we create better medicine, create more efficient agriculture and protect ourselves and our environment from disease and destruction?

The field of genetics is expanding dramatically. The explosion of information concerning the dynamic nature of our world comes from so called "next generation DNA sequencing technologies" that are helping us to answer big questions of our time. These discoveries are changing our understanding of the world around us, and what we know about who we are as humans.

WHY MASSEY?

RESEARCH-LED TEACHING

Our genetics lecturers are active researchers across a range of topics from the impacts of climate change to the study of complex human disease. You'll get to learn about the newest developments in genetics and have access to New Zealand Genomics Limited. This service provides scientists from New Zealand and around the world help with interpretation of data generated by "next generation DNA sequencing technology".

JOB-READY

At Massey we incorporate the structure, function and history of genetics in your learning so you gain skills and knowledge of cutting-edge techniques, developments and research all relevant to your future job.

For example, you'll learn about the new era of personal genomics – an area with vast opportunities and equal controversy. By understanding the science and the debate on personal genetic information, corporate access to it and the bioethics you will learn to evaluate and create solutions to meet future needs.

CAREER OPPORTUNITIES

Graduates in genetics from Massey University hold a wide range of positions both in New Zealand and overseas, such as:

- Laboratory research positions
- Scientific sales
- Plant and animal breeding
- Government regulatory agencies
- Teaching
- Molecular diagnostics
- Biological information technology
- Biotechnology industries
- Producer boards
- Scientific journalism.

As a graduate you may also find employment in a variety of industries whose core business involves biological products.

If you continue your studies to the level of either a BSc(Hons) or MSc degree you will be even more marketable for a number of positions in both industry and government-funded institutions.

FUTURE STUDY TOPICS

Some of the topics taught in genetics papers include:

- Biology and genetics of micro-organisms
- Genes and gene expression
- DNA technology
- Genetic analysis
- Human genetics
- Gene regulation
- Practical genetics
- Bioinformatics and genomics
- Cell signalling.

MEGAN SKIFFINGTON (NEE LAING) GENETICS GRADUATE

A Bachelor of Science degree, majoring in genetics plus physiological and molecular plant biology, has opened many doors and accelerated my career. After being lucky enough to work in a leading fungal genetics laboratory and a plant molecular biology unit in two different institutes during my studies, I decided to go towards the business side of science, as opposed to research.

I now manage key accounts for a leader in the scientific supplies field. I deal with people at all levels of the scientific profession, and am able to relate to the goals they are trying to achieve because of my background in science from Massey. My studies gave me a broad scientific knowledge-base to work on, as well as research and communication skills that have proven invaluable in my position. My job is different every day – it gives me independence and keeps me interested.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
MANAWATŪ
DISTANCE LEARNING

GEOGRAPHY
A major of the BSc

Massey's study in geography will take you into the complex world of the Earth's surface, its history and how it works to create our incredible planet.

WHAT'S IT LIKE?

Geography is concerned with the study of the surface of the Earth as people's home. Its study is based on the premise that all activities, both social and natural, are embedded in specific places and interconnected to other places.

UNDERSTAND THE RELATIONSHIP BETWEEN PEOPLE AND THE EARTH

Geography involves the development of a multi-faceted understanding of the local, regional and global processes which shape the changing relationships between people and the Earth.
Physical geography, which is the core of Massey's Bachelor of Science (Geography), is the science of the Earth's natural (as distinct from cultural) features. It is therefore closely related to many other natural sciences, such as geology, pedology, botany, zoology, meteorology, and oceanography.

WHY MASSEY?

WORLD-READY GRADUATES

With young dynamic lecturers, interactive classrooms and cutting-edge equipment you'll be exposed to the most up-to-date geographical practices and research and join our graduates working all over the world. You could be surveying, analysing hazards, defining geographic place names and more. Or you could go on to postgraduate study and have the opportunity to study abroad in Wales, Japan or Italy.

HANDS-ON LEARNING

Experience geography up close and personal through the strong hands-on component woven into all of our papers. You'll attend two dedicated fieldwork courses that involve week-long trips to the Fox Glacier in the South Island and several North Island locations.

CAREER OPPORTUNITIES

With your Massey BSc in geography you are equipped with a broad environmental perspective, especially if you include papers in biology, ecology, earth science, environmental science, or environmental planning. This qualifies graduates for employment within government departments, Crown Research Institutes, and regional, district and city councils, or some consulting firms. Some graduates go into geography and environmental teaching in schools and colleges. A pass with good grades can lead to postgraduate programmes, and from there to a career in research or teaching at a polytechnic or university.
The Geojobs book, available from the Geography Programme Coordinator, gives the career profiles of 20 graduates in geography from New Zealand universities.
Previous Massey graduates have become:

- Coastal researchers
- Environmental advisors
- Editors
- Journalists
- Environment research officers
- Resource consents officers
- A UN Regional Advisor
- A Geographic Information Systems and Remote Sensing Analyst
- Government advisors
- Natural hazards analysts.

FUTURE STUDY TOPICS

Some of the topics taught in geography papers include:

- Quaternary biogeography
- Environmental reconstruction
- Rivers and slopes
- Climate change
- Natural hazards
- Alpine glaciers
- Geopolitics
- Critical human geography.

JACOB WILLIAMS Natural Hazard Analyst

Geography is a great degree, as it teaches you about the Earth's surface processes and landforms. It allows you to understand the formation of different natural features. Studying geography at Massey University was a brilliant choice as the lecturers are great, and the subjects varied enough to be interesting, yet specific enough that you can learn a large amount about a given subject.

After I graduated I immediately found a job as a hydrologist for the Horizons Regional Council. This was a great job and allowed me to practice a certain amount of my degree. I have since taken a position as a Natural Hazard Analyst. This job is pretty much applied geography. I get to study hazards associated with alluvial fans, flooding, seismic events, landslides and storm surge and tsunamis. It requires a good understanding of geomorphology in numerous areas such as the riverine and coastal environments.

...STUDY HAZARDS ASSOCIATED WITH ALLUVIAL FANS, FLOODING, SEISMIC EVENTS, LANDSLIDES AND STORM SURGE AND TSUNAMIS.

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY
MANAWATŪ

HUMAN NUTRITION
A major of the BSc

Nutrition has become one of the key issues facing society. Knowledge about human nutrition and the application of this knowledge are essential elements in maintaining a healthy society.

WHAT'S IT LIKE?

Human nutrition is a progressive, multi-disciplinary science requiring knowledge ranging from nutrient supply and metabolic processing by the body to psychosocial and behavioural factors influencing diet. The human nutrition major is designed to give you a clear understanding of basic nutritional principles. Areas covered include the composition of food, human requirements for nutrients, and how the body processes food and nutrients. The programme also highlights the physiological changes that occur as a result of excesses or deficiencies of various nutrients in the diet, as well as the changes in nutritional needs from conception through birth, growth, adulthood, and ageing. You'll gain an understanding of factors that influence food choice and awareness of practices to promote dietary change.

With a major in human nutrition, you'll develop an integrated understanding of nutrition, biochemistry and physiology. This will give you the basis of knowledge required for enhancing health and fitness in individuals of all ages, and in groups and communities. The major will provide training in practical skills such as dietary assessment and body composition assessment and general skills required for critical thinking, problem-solving, and effective communication. With this knowledge you'll be able to work at promoting good nutritional practices to individuals, communities and industry. In addition to the professional skills you'll gain, the programme provides an excellent general education in how diet contributes to optimal personal health and well-being.

WHY MASSEY?

ONLY OFFERING IN THE NORTH ISLAND

Massey University in Auckland and Palmerston North are the only places where you can study a specialised human nutrition major in the North Island. You'll gain an integrated understanding of nutrition, biochemistry and physiology all related to the human body.

FUTURE PATHWAYS

Take your degree into a number of organisations or progress on to more specialised areas in the Master of Science, including our limited entry nutrition and dietetics programme in Albany.

CAREER OPPORTUNITIES

Qualified human nutritionists contribute to the economic viability of New Zealand as a food producing and exporting nation – they are essential in maintaining the health of our society at minimum cost.

Human nutritionists can work with organisations such as Crown Research Institutes, in the dairy industry, and many other food-related companies. Graduates will also play increasingly important roles in the public health sector as the move towards health promotion continues. Human nutritionists may find jobs in government departments concerned with human health, food regulation, and in sports and recreation centres. In addition, graduates can choose from a range of other careers such as:

- Teaching
- Nutritional consultancy and training work
- Health food promotion and marketing
- Working in nutritional research programmes in universities, medical schools, or industry.

After five years working in a nutrition-related occupation, graduates can apply to the Nutrition Society of New Zealand for professional accreditation as a Registered Nutritionist. If successful, they can append the title RegNut(NZ) after their names.

FUTURE STUDY TOPICS

Some of the topics taught in human nutrition papers include:

- Food chemistry
- Nutrition and metabolism
- Maternal, child and adolescent nutrition
- Food choice
- Adult nutrition
- Human lifecycle physiology
- Sport/performance nutrition.

- **FIONA GREIG** New Zealand Beef and Lamb Marketing Bureau
  My degree has helped me to be critical – to analyse research and data without assuming what I read is accurate. Both the practical and theoretical aspects of the course have allowed me to approach my projects methodically. I have also learnt how to communicate complex scientific information to the general public.

- **VANESSA BANBROOK** Health Promotion Coordinator
  The National Heart Foundation of New Zealand
  Massey University provides a great environment to study, socialise and work. I found more opportunities and facilities available than I ever expected from a university. At Massey University I gained the skills I needed to follow my passion for public health, and now I love working in the real world with the Heart Foundation.

...I LEARNT HOW TO COMMUNICATE COMPLEX SCIENTIFIC INFORMATION TO THE GENERAL PUBLIC.

LOGISTICS AND SUPPLY CHAIN MANAGEMENT

A major of the BSc

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY

The management of supply chain relationships and optimisation of global logistics are crucial to business success.

WHAT'S IT LIKE?

As international business transactions have increased, so has the complications of the logistics of moving materials and products between nations. Logistics is all about coordinating flows from where products are made, all the way through to the end consumer. This is an exciting area that is constantly growing and changing, with new technologies enabling more efficiencies than ever before.

HELP MAXIMISE SATISFACTION AND PROFITS

The BSc (LSCM) will give you the knowledge you need to help firms improve productivity. The flow-on effect is an increase in the country's prosperity – helping wider society as well. You will learn how to help firms work together to maximise customer satisfaction.

WHY MASSEY?

GET CONNECTED

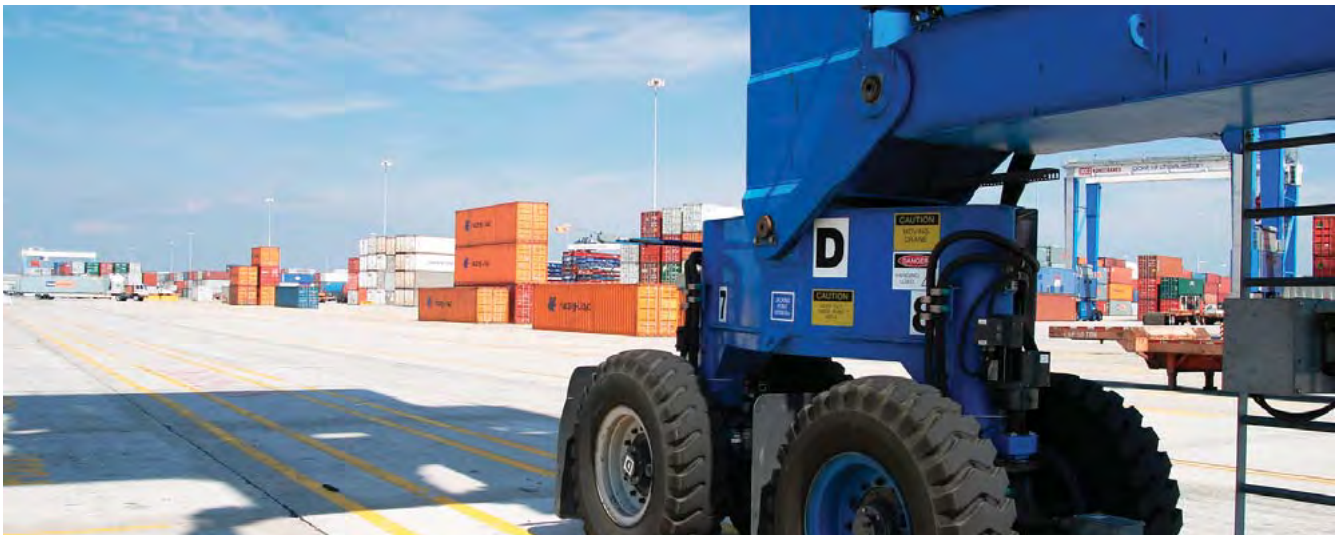
You'll learn from lecturers who have extensive experience in the industry and study alongside working professionals from a wide range of industries including transport, retail and governmental agencies.

SOUGHT-AFTER SKILLS

Massey University is the only place where you can study logistics and supply chain management as part of a science degree.
Employers consistently seek graduates that are left-brain thinkers with strengths in logical order, sequencing and numbers, so broad scientific knowledge is an added value in their eyes.

CAREER OPPORTUNITIES

Graduates may be employed by domestic manufacturing companies, local government bodies, and large domestic corporations. In addition, international firms specialising in logistics and supply chain management often look to Massey University for new employees.
As supply chain professionals, most graduates will be working in a fast-paced commercial environment focussed on delivering high levels of customer service.
Supply chain professionals are responsible for developing collaborative relationships with other firms and are therefore often required to travel overseas.
The role typically requires a broad understanding of the entire firm and interaction with a range of colleagues. This means the supply chain profession is seen by many as a fast track to executive management.



DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
ALBANY

MARINE ECOLOGY
A major of the BSc

You'll learn new things, and make discoveries about the sea and the life within it. You could even help preserve that life for the future.

WHAT'S IT LIKE?
More than 70% of the Earth's surface is covered by seawater – this marine environment plays a crucial role in supporting life on our planet. It is diverse, complex and a valued natural resource.

WAITING FOR YOUR DISCOVERIES
Marine ecology will teach you about the principles and processes underpinning marine ecology, the vastness of life in the seas and coasts. You'll learn that much of the marine environment remains undiscovered.

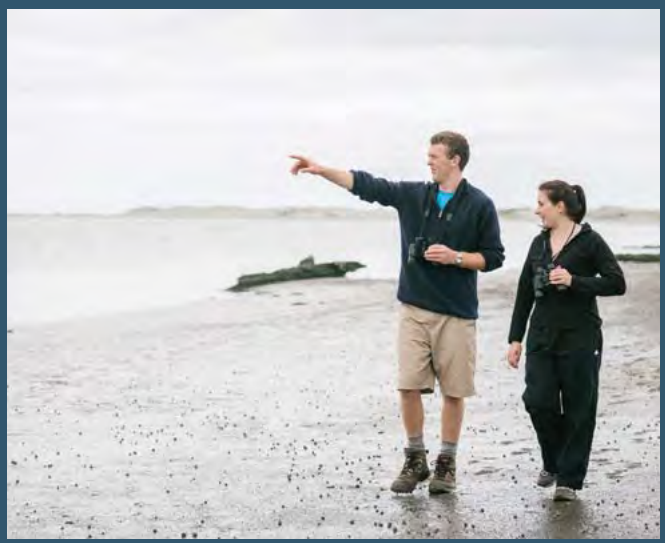
CAREER OPPORTUNITIES
Marine ecology opens the door to an exciting and dynamic career:
> Working in the private sector as an environmental consultant
> Government agencies such as the Ministry of Primary Industries or the Department of Conservation
> Crown research institutes, such as the National Institute of Water and Atmospheric Research, the Institute of Geological and Nuclear Sciences or the Cawthron Institute
> Researching for a university.

WHY MASSEY?
Massey University is the only place in New Zealand where you can study a specialised major in marine ecology.

BE SOUGHT AFTER
Imagine monitoring whale movements and their impact on fish species or providing consultancy on sustainable practices for construction near waterways. As a marine ecologist your unique skills and knowledge, will be in huge demand and lead to a range of jobs working independently or for agencies like DOC, NIWA and the Ministry for Primary Industries.

EXCITING STUDY AREAS
Learn about majestic creatures of the underwater world, gain skills for estimating dolphin populations, investigate an area of marine ecology that interests you through our papers in Quantitative Statistics, Marine Mammalogy and Topics in Marine Ecology.

SCHOLARSHIPS
You can apply for scholarships from NIWA and the Ministry of Primary Industries. Our connections and innovation in marine studies, mean our students are highly regarded among these agencies and are very successful in gaining these scholarships.



DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING

MATHEMATICS
A major of the BSc

Mathematics graduates are in demand in a wide variety of industries.

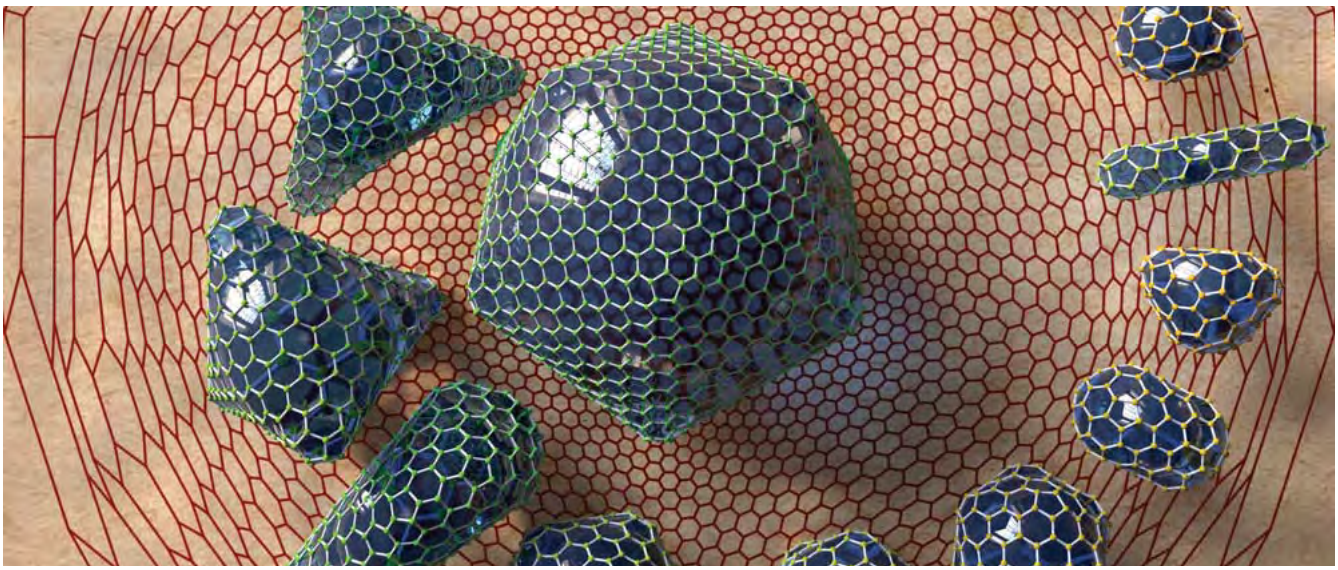
WHAT'S IT LIKE?
From securing sensitive communications using cryptography to calculating the orbits of satellites, mathematics is a product of human ingenuity that allows our modern world to exist. It is fundamental to our lives.

WHY MASSEY?
REAL-WORLD SKILLS
Our strength in applied mathematics means you'll get to combine your learning with other science disciplines to gain extensive experience in a range of applications. You'll use your knowledge it to solve problems in the areas like computer programming, climate modelling and transportation.

HUGE VARIETY
Our mathematics programme is taught by leading researchers encompassing the modelling of geothermal processes, molecular dynamics, epidemiology, cell growth, celestial mechanics, neuroscience, phylogenetics and evolutionary trees, and the optimal decompositions of information systems. This versatility demonstrates the variety of job areas available to mathematically-skilled scientists.

CAREER OPPORTUNITIES
A WIDE VARIETY OF CAREERS
Mathematicians work in industry for manufacturers, insurance companies, finance companies (Wall Street has been hiring mathematicians), banks, market research companies, and as public and private consultants.
Most government departments recruit graduates of mathematics at the bachelor level for general staff, or at honours level for their research sections. Large industries and Crown Research Institutes recruit mathematics graduates with a special interest in applications. The increasing demand for research in the mathematical sciences provides an opportunity for those who enjoy mathematics at an advanced level.
Many mathematicians with advanced degrees seek university teaching positions, but there are also many other exciting and fulfilling positions available with an undergraduate degree in mathematics.
New Zealand organisations which have hired mathematicians in recent years include:

- AgResearch
- Industrial Research Ltd
- New Zealand Treasury
- New Zealand Defence Forces
- Mobil Oil Ltd
- New Zealand Post.
- Westpac
- 3M
- PricewaterhouseCoopers
- MetService
- Compudigm International



■ **JAY TA'ALA** Grade Simulation Specialist, BHP Billiton

BHP Billion mines and ships iron ore around the globe. Their products are defined by the percentages of iron, and other impurities.

"Don't be fooled by the chemical elements," says Jay, "my role is 99% maths!"

In his work, Jay develops simulation models to forecast, quantify, and inform his company on chemical levels (Fe, P, SiO2, Al203, etc) in their shipping products.

The simulation models he develops are generally characterised by two things: complex system dynamics (they're made up of many inter-linked sub-systems) and being highly 'stochastic' (eg levels of ore as it's being mined isn't constant – they need to be represented by random distributions).

Understanding this requires mathematical techniques – mathematical modelling, numerical methods, and statistics from a numerical experimentation point of view.

"I work alongside chemists and metallurgists but maths is what really brings all these disciplines together to allow the business to understand and quantify the system-wide impacts of the decisions they make."

Jay's first job after university was working for the New Zealand Defence Force in Wellington, developing simulations to help predict future operational requirements and any deficiencies that would likely occur in their trade and rank structures. He then moved to Australia and did some work for the Vice Chief of Defence Force Preparedness Group, again in military simulations. Later he moved to the mining industry with BHP Billiton in Perth.

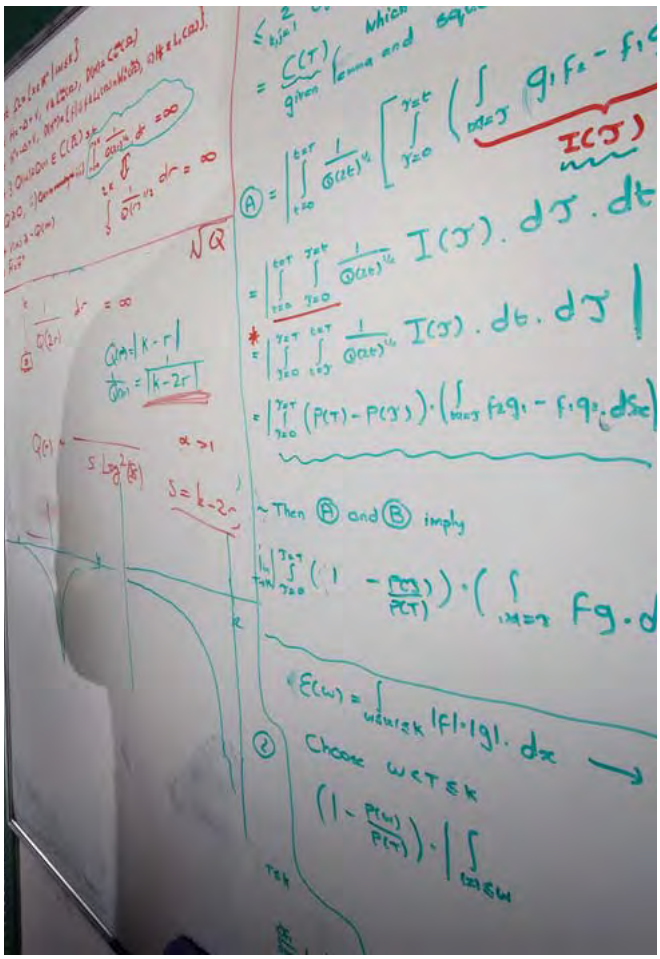
"What's surprising is that although the military and mining industries are vastly different, many of the mathematical modelling and simulation approaches needed to solve business problems are the same."

I LOVE DETAIL AND COMPLEXITY. I LOVE PULLING APART SYSTEMS AND THE UNDERLYING LOGIC TO SEE WHAT REALLY MAKES THEM TICK...

FUTURE STUDY TOPICS

Some of the topics taught in mathematics papers include:

- Differential equations
- Analysis
- Algebra
- Combinatorics
- Mathematical modelling
- History of mathematics
- Discrete mathematics.



DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

MICROBIOLOGY
A major of the BSc

Newly emerging New Zealand export industries, such as wine-making and biotechnology, are increasing the demand for microbiology majors.

WHAT'S IT LIKE?

Micro-organisms are by far the most abundant and widely distributed forms of life on this planet. They are found in such diverse environments as the boiling waters of hot pools, the ocean depths, soil, and air. Humans, animals, and plants exist in intimate association with this microbial world. Without them all animal and plant life on our planet would be rapidly driven to extinction.
Microbiology is the founding science of industrial biotechnology. Microbiologists work with micro-organisms to create cell factories for the production of a variety of compounds. These include food and feed additives, commodity products, biofuel and medical drugs.

WHY MASSEY?

UNIQUE IN NEW ZEALAND

We are one of the only universities in New Zealand where you can study a full course in microbiology, and the breadth of our course is unique. We teach microbiology hand-in-hand with other science areas such as veterinary, animal, and environmental science allowing you to explore microbiological sub-disciplines, including environment/ecology, food and biotechnology.

HEAPS OF LABORATORY EXPERIENCE

Exposure and time in labs is a large component of our course and on par with what is usually only seen in employment. For example, you'll get to do a lab-based simulated research project, such as tracking down the source of an infection outbreak in a hospital.
As a graduate, you'll have personal lab confidence and the unique ability to show potential employers that you can perform given techniques successfully and are skilled in lab-based experiments.

REAL-WORLD EXPERIENCE

Complete research projects as part of a summer studentship with Crown Research Institutes such as AgResearch and gain insight and connections with potential future employers.

CAREER OPPORTUNITIES

There is a large and increasing variety of career opportunities for you as a Massey University microbiology graduate.

IN DEMAND

The growing demand for qualified microbiologists is highlighted by the number of microbiology positions advertised in the scientific journals Science and Nature. Microbiologists are on the Immediate Skill Shortage List as published by the New Zealand Immigration Office.
Areas graduates could work in include:

- Reducing global warming and the production of environmentally-friendly biodegradable materials
- The production of high-value compounds such as antibiotics
- Food production – such as beer, wine and cheese
- Preventing and treating diseases
- Forensics and cleaning up pollution
- Search for life on the bottom of the ocean and on other planets.

The importance of microbes in traditional New Zealand industries means that you will be in high demand by these industries and Crown Research Institutes in quality control and research and development.
Other traditional areas of employment include hospitals, meat and dairy processing, or vaccine production. Newly emerging New Zealand export industries, such as wine-making and biotechnology, are continuing to increase the demand for microbiology majors both in research and development and quality control functions.

FUTURE STUDY TOPICS

Some of the topics taught in microbiology papers include:

- Bioinformatics and genomics
- Biotechnology
- DNA technology
- Environmental microbiology
- Immunology
- Medical microbiology
- Microbial diversity
- Molecular microbiology
- Epidemiology
- Food microbiology.

■ **CYNTHIA WINKWORTH** Microbiology Graduate

The diverse and vibrant learning environment I encountered at Massey University, both theoretical and practical, has enabled me to obtain challenging research positions at prestigious institutions like University of California, Berkeley and Yale University. Science – in particular microbiology – is a fast-paced field that undergoes constant changes due to new and sometimes startling discoveries.

The microbiology degree at Massey constantly evolved to make sure we had the most up-to-date skills and knowledge upon entrance into this exciting workforce.

The flexibility of the microbiology degree enabled the development of strong practical and theoretical skills in related fields, like biochemistry and molecular biology, which in turn have enable me to approach new techniques, experiments and entire projects with confidence. Innovation, made possible by the solid background gained at Massey, is a key advantage I possess and is a skill that does not go unnoticed by potential employers, regardless of the job type.

...HAD THE MOST UP-TO-DATE SKILLS AND KNOWLEDGE UPON ENTRANCE INTO THIS EXCITING WORKFORCE

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

NANOSCIENCE
A major of the BSc

Nanoscience is creating revolutionary new products and processes in a huge range of industries. A career in this fast-moving industry will be exciting and challenging.

WHAT'S IT LIKE?

If you would like to be involved at the cutting edge of physics, chemistry and biology, then the nanoscience major is for you.
A revolution is occurring in science and technology. A tiny revolution based on the recently developed ability to measure, manipulate, and organise matter on the nanoscale: 1 to 100 billionths of a meter. At the nanoscale, physics, chemistry, biology, materials science, and engineering converge toward the same principles and tools. As a result, progress in nanoscience is having a very far-reaching impact.

WHY MASSEY?

UNIQUE IN NEW ZEALAND

Our nanoscience programme is the only one of its kind in New Zealand. It's an inherently cutting edge multidisciplinary programme that sits across chemistry, physics, biology, mathematics and engineering. As a student you'll have close interactions with your lecturers and get to use tools and equipment like atomic force microscopes that most undergraduates wouldn't normally use.

STUDY WHAT YOU WANT

Each nanoscience student has their degree tailor made to suits their interest and goals. For example, you might combine it with an area like agriculture or ecology if you want to work on environmental solutions, or with an area of fundamental science to focus on the chemical and physical properties of modern nanoscience materials.

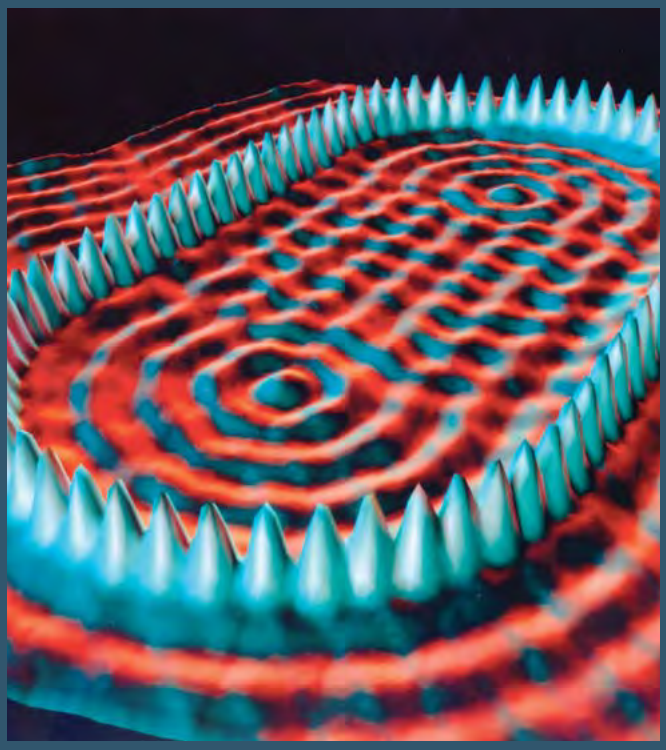
CAREER OPPORTUNITIES

As nanoscience inevitably makes a greater impact in our future society, nanoscience graduates will have an opportunity to be marketplace pioneers.
Law firms, business ventures, startup companies, the media, investment banks, hospitals and government organisations will all need people with expertise in nanoscience. Existing research organisations in New Zealand, and globally, have stated a desire for graduates with interdisciplinary expertise like that gained in the nanoscience major.

Any career opportunities applicable to chemistry, physics, mathematics, and biology are also applicable to you as a graduate in nanoscience.

FUTURE STUDY TOPICS

- New phenomena at the nanoscale
- Characterising nanoscale objects
- Nanochemistry
- Self-assembling nanomaterials
- Nanostructures in biological systems
- Ethical and environmental aspects of nanoscale materials
- Quantum properties of nanoscale systems
- Scanning probe microscopy
- Nanotubes and quantum dots
- Applications: energy storage, lasers, medical diagnostics and cancer treatments.



DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

PHYSICS
A major of the BSc

Massey's physics programme gives you the skills that most employers seek. You will be numerate and analytic, with a well-developed ability to separate the likely from the unlikely.

WHAT'S IT LIKE?

When you choose a physics major, you join an international community seeking to understand the physical universe in the most fundamental way.

UNDERSTAND THE WORLD AND HOW IT WORKS

Physicists try to understand our physical environment with the smallest set of ideas that will provide that understanding.

There is a continuing evolution of physics theory, based on tried and tested ideas from more than 400 years of continuous development. To understand today's interesting and challenging ideas, you must first understand yesterday's great ideas. The Bachelor of Science (Physics) will enable you to do that with a mixture of theoretical and practical study. You will also be able to focus on either experimental physics or theoretical physics.

The ideas of physics and their interactions are most naturally expressed in mathematical form. Studying physics also requires that you study mathematics, and many students complete a double major in mathematics and physics. Physics also has many applications throughout the other sciences, such as chemistry and biology.

WHY MASSEY?

STRENGTH IN BIOPHYSICS

Our strength and reputation across the life sciences feeds into our physics major where we consider DNA as physical object and examine how cells apply force and movement to DNA. You'll engage with NMR imaging (MRI), optical tweezers and use laser beams to extract single strands of DNA and solve biological problems from a mechanical point of view.

We also have strengths in mathematics and particle physics for those interested in more traditional physics studies.

CAREER OPPORTUNITIES

People who major in physics have a driven curiosity about the world around them and how it works, and this is an attribute highly valued by employers. The skills you'll get during your study for a physics degree are in high demand: analytical ability, numeracy, computational skills and an ability to write organised, coherent reports.

As a physics graduate you can find employment in a wide range of occupations, not all of them directly using physics knowledge. One Massey physics graduate is the CEO of a major infrastructure company. Another runs a chemical company. Many have built excellent careers based on their computational skills. Others find their knowledge of modern electronics helpful.

In the world of physics, your BSc will enable you to seek employment at research technician level in Crown Research Institutes, MetService, hospital laboratories, and industry. You could explore a career as an officer in New Zealand's defence forces. There are Massey University physics graduates working in all of these areas.

There is also a continuing shortage of qualified physics teachers, so, with some additional study, secondary school teaching is always another option.

If you want to pursue a career as a professional physicist, you will have to undertake further study. Usually, this means a fourth year of formal course work to obtain a BSc (Hons) Physics followed by three to four years working on PhD research that culminates in the presentation of a thesis.

■ **MARK HUNTER** Research Scientist, Magritek

I decided to study physics at Massey after being involved with the Physics Olympiad run by Professor Tony Signal. He took a team of high school students to Canberra and through my involvement with that I decided to leave school early to begin my physics degree.

My study experience was both enjoyable and challenging. I had great interactions with my lecturers and was supported at every step of the process. I particularly appreciated the availability of my lecturers during the practical lab work – they were always close by to provide assistance when I needed it.

Since graduating I moved on to complete a Master's followed by a PhD. My study prepared me well for my next physics venture, which involved starting up Magritek, a joint venture between Massey and Victoria. The company sells nuclear magnetic instruments to chemistry and physics lab, as well as oil and gas companies. I now work there as a research scientist where I use the skills learnt in my degree and PhD on a daily basis.

FUTURE STUDY TOPICS

Some topics taught in physics papers include:

- Quantum physics
- Physics of waves and vibrations
- Classical mechanics, chaos and fluids
- Analogue electronics
- Digital electronics and communications.
- Advanced experimental physics
- Thermal physics
- Applied electromagnetism
- Microelectronic circuits
- Special relativity and cosmology

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

PHYSIOLOGY
A major of the BSc

Want to know what makes you tick? Physiology is a rapidly advancing and exciting subject area. Just how important is physiology? It's the only biological science for which you can win a Nobel Prize!

WHAT'S IT LIKE?

Physiology explains how normal cells, tissues and organisms function. It provides the foundation on which we build our knowledge about life, so we can recognise problems and develop new treatments. Early on, you'll get a broad understanding of the functions and integration of the major organ systems of the body. Later papers let you delve into specific topics for in-depth learning.

WHY MASSEY?

LEADING IN WHOLE ANIMAL PHYSIOLOGY

If you're interested in working with animals, we have leading experts across a range of animal-based science disciplines, including animal science, zoology and veterinary science. You'll get to work closely with animals and complete papers such as Comparative Physiology, which emphasise how animals and their bodies function and interact with their environment and the challenges in their environment.

RESEARCH-LED

Ever wondered how water changes affect fish stress levels or how climate change impacts penguin's survival abilities? Our academics are at the forefront of research like this and use it in their teaching, so you what you learn is relevant and engaging. As a student you'll also have the opportunity to tap into these types of research projects and gain experience for future employment.

STUDY WHAT YOU WANT

If you're keen on human health, you can delve into cellular physiology and also take on a second major in an area such as biochemistry or human nutrition. Alternatively, if you're keen on animals you can focus on whole animal physiology and pair this with a second major in zoology or ecology.

■ **VANESSA LAI** Bachelor of Science (Physiology), Master of Science, PhD Research Officer at the Riddet Institute

The programme was challenging and exciting – a good mix of animal and human physiology. I have always been interested in how things work, particularly living systems. Physiology was a natural fit because it is so diverse.

My research career began in reproductive physiology investigating how hormones influence reproduction in birds. Now I work in gastrointestinal physiology investigating how food structures affect digestion.

As far as jobs go, physiology occupies a central position among the biological sciences so the skills you develop can be easily applied to other disciplines. Majoring in physiology gives you a solid basis for a career in the biomedical fields. Today I work in research at the Riddet Institute, examining the relationship between food science and nutrition.

My advice to students? Be open to all the opportunities that come your way, even if at first you don't see the connections to the skills you have developed during your studies. The connections will be there and will open doors you may never have considered before.

...PHYSIOLOGY GIVES YOU A SOLID BASIS FOR A CAREER IN THE BIOMEDICAL FIELDS

CAREER OPPORTUNITIES

Physiology is key if you want to work in human or animal health sciences.

PHYSIOLOGY GRADUATES WORK IN MANY FIELDS.

Can you picture yourself conducting vital research in universities, Crown Research Institutes or pharmaceutical or biotech companies? If you really want to go far, you could even be a research physiologist in outer space, discovering how the body adapts to zero gravity.

What about working in one of the world's growth industries – healthcare? You can specialise in nutrition, toxicology, pharmacy, radiography, physiotherapy, nursing, or public and environmental health. How about teaching in schools or hospitals? Or you may fancy a career in the medical, veterinary or food industries, a job in medical writing, or in the active world of sport science, exercise and recreation.

FUTURE STUDY

Some of the topics taught include:

- Applied physiology and animal welfare
- Comparative physiology
- Control of metabolism
- Human lifecycle physiology
- Nerves and the nervous system
- Physiological control systems
- Physiological strategies for survival
- Physiology of mammalian organ systems.

DURATION
3 YEARS FULL-TIME STUDY
AVAILABLE
MANAWATŪ

PLANT SCIENCE
A major of the BSc

The study of plants delves into the crucial biological processes that underpin the very basis of life on Earth – and ultimately our own survival.

WHAT'S IT LIKE?

Nearly all life on this planet is ultimately dependent on photosynthesis – making food from sunlight. The study of plants and this transformational process is a fascinating study of the origins of life, the natural world, and the future of life on Earth.

UNDERSTANDING THE PLANT WORLD

Studying plant science will give you a solid understanding of the fundamental elements of the structure and function of plants. You will learn how plants grow and interact with their environment and also how to apply this knowledge in both natural and managed ecosystems.

INVESTIGATE CONTEMPORARY ISSUES

With this degree you will also develop related skills in contemporary disciplines such as high-throughput gene sequencing and bioinformatics (analysis of nucleic acid and protein sequences using computers). This can assist in understanding evolution and biodiversity. It will make you a vital cog in our body of scientific understanding, from bioconservation issues to understanding the effects of climate change to the increasingly complex technological developments used in the applied plant science industries.

WHY MASSEY?

UNIQUE IN NEW ZEALAND

We have the most diverse range of courses and are the only university in New Zealand where you can study and specialise in the full spectrum of plant science from molecular biology and evolution right through to agriculture and horticulture.

JOB-READY

Our graduates have an exceptionally high success rate of employment. They are praised by employers across a wide range of plant-based industries from agriculture to biosecurity, forestry and conservation for their knowledge of the entire scientific plant process such as understanding how plants grow, how seeds are formed, and what is needed in an environment for plants to grow.

EXPERIENCED

Massey has over 50 years experience in plant-based sciences and has the largest number of plant-based staff of any New Zealand University.

We have years of experience and have been consistently developing our courses over time to remain relevant for today's employment opportunities.

CAREER OPPORTUNITIES

There is a steady demand for plant scientists. As a plant science graduate, you will have a wide range of career opportunities, including both pure and applied work. Students often find employment at research institutes – four crown research institutes employ plant scientists (Plant and Food Research, AgResearch, Forest Research (Scion), and Landcare) as do the Department of Conservation and Regional Authorities.
Related areas of employment include:

- Agriculture/Horticulture
- Grassland science
- Forestry
- Plant breeding
- Plant protection
- Crop research
- Plant conservation
- Re-vegetation.

You may also find employment in plant-based industries, primary and secondary teaching, technical work, business, and in the media. Other careers include science management, administration, and science policy.

■ **ROWAN DICKSON** Bachelor of Science (Plant Science and Genetics) Bachelor of Science honours (Plant Biology)

When I first came to Massey University in 2009 I was passionate about the sciences, particularly biology, but I had no clear direction as to where I was heading. First-year plant biology provided that focus, revealing the fascinating and often overlooked inner workings of the plant kingdom. Through my subsequent studies in the plant science major I developed an excellent foundation in plant physiology, genetics, and evolution, with an emphasis on the molecular biology skills that are highly relevant in modern science.

How do plants work? How do plants interact with the world around them? How have our native plants evolved? These are just some of the exciting questions explored during my time at Massey that are critical to New Zealand's cultural and economic heritage.

Completing my studies in plant science has opened up a wealth of opportunities, both in New Zealand and abroad. I'm now studying to become a secondary school science teacher. We are an agricultural nation with a unique and diverse flora, making the next generation of plant biologists vital for our continuing success.

FUTURE STUDY TOPICS

Some of the topics taught in the plant science major include:

- Bioinformatics and genomics
- Biological evolution
- Ecology and conservation
- Flora of New Zealand
- Horticultural crop production and yield
- Plant biodiversity
- Plant biotechnology
- Plant development
- Plant ecology
- Plant physiology
- Postharvest horticulture.

FIRST-YEAR PLANT BIOLOGY REVEALED THE FASCINATING AND OFTEN OVERLOOKED INNER WORKINGS OF THE PLANT KINGDOM

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING

PSYCHOLOGY
A major of the BSc

Emotions, personality, interaction, learning, memory, thought - psychology covers a broad range of topics, but at its simplest level it is the systematic study of individual behaviour.

WHAT'S IT LIKE?

Psychology is a growing and ever-changing subject which helps us make sense of the human impact on the world in which we live. You'll learn how people perceive, learn, think, develop, behave, and relate to one another. Courses will teach you how the structure of the brain affects our behaviour, what makes people different from one another and how being in groups affects people's behaviour. Finally, you'll learn how factors like culture, gender, poverty, and mental illness affect our health, our thinking, and our behaviour.

WHY MASSEY?

MARKET LEADING IN NEW ZEALAND

We graduate more clinical psychologists than any other university in New Zealand. Our research and teaching is unique and recognised nationally and internationally. This strength and expertise means your learning will be relevant to today's jobs and societies and your degree will have a great reputation.

APPLIED LEARNING

During your degree you can take part in our broad selection of papers across areas including forensic, experimental and community psychology that demonstrate how foundational skills can be applied.

CAREER OPPORTUNITIES

A degree in Psychology may lead to many possible career paths. Virtually any setting where knowledge of human behaviour and interactions is useful may employ someone with knowledge of psychology.
Some areas in which recent graduates have gained employment are:

- Human resource management
- Rehabilitation psychology
- Business psychology
- Teaching
- Scientific research.
- Public health
- Counselling
- Defence psychology
- Special education

After completing the Bachelor's programme, postgraduate study may give you the opportunity to practice as a Registered Psychologist in clinical or organisational settings.

FUTURE STUDY TOPICS

Some of the topics taught in psychology papers include:

- Abnormal and therapeutic psychology
- Bicultural perspectives in psychology
- Brain and behaviour
- Community psychology
- Evolution, learning and culture
- Memory and cognition
- Organisational psychology
- Social psychology.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING

STATISTICS
A major of the BSc

Learn how to make sense of the information that surrounds us.

WHAT'S IT LIKE?

We live in an information-rich age. Vast quantities of data are collected on almost every conceivable subject. We use statistical methods to make sense of this raw data, turning it into knowledge.
The Bachelor of Science (Statistics) from Massey will give you these sorts of skills – skills that are sought-after by employers from many different industries.
If you enjoy working with numbers, you will love studying statistics. It is a broad area of study, that involves much more than the organisation and display of data. Careful analysis of underlying questions and critical examination of the sources of data are part of the art of statistics. Modelling the variability in data to calculate the reliability of answers is part of its science.

WHY MASSEY?

LEADING IN DATA MINING

In an information age, big data plays a crucial role in helping businesses to maximise the sale and reputation of their products and services. Being able to work with large data sets to discover patterns and draw useful conclusions is a sought-after skill for many employers, and an area of expertise at Massey.
As one of New Zealand's first universities to offer courses in data mining, Massey has both the experience and strength to ensure you graduate a step ahead of the rest.

CAREER OPPORTUNITIES

Statistics is set to become an increasingly important discipline over the next 20 years. With a major in statistics you can expect to be highly sought after in the workplace and will rarely have trouble finding a job. Recent graduates have found employment in a remarkably wide variety of areas including:

- Scientific research
- Health services
- Environmental management
- Commerce (particularly finance and marketing).
- Social sciences
- Quality improvement
- Industry
- Teaching.

Employers include government agencies like Statistics New Zealand, Crown Research Institutes, schools, hospitals and medical research institutes, and private companies both large and small. Opportunities for statisticians exist worldwide, with a number of our students taking up overseas positions in places like Hong Kong and the USA shortly after graduation.
Careers for statisticians can be advertised under a wide variety of titles, such as:

- Biostatisticians
- Business systems analyst
- Data analyst
- Health informatics analyst
- Market researcher
- Modeller.
- Quality assurance specialist
- Risk analyst/consultant
- Statistician
- Survey sampling analyst
- Test analyst.

FUTURE STUDY TOPICS

Some of the topics taught in statistics papers include:

- Probability models
- Data analysis
- Statistical models
- Statistical inference
- Biostatistics
- Experiments and surveys
- Multivariate models
- Statistical methods of quality improvement
- Data mining
- Simulation
- Forecasting and time series.

DURATION
3 YEARS FULL-TIME STUDY

AVAILABLE
ALBANY
MANAWATŪ

ZOOLOGY
A major of the BSc

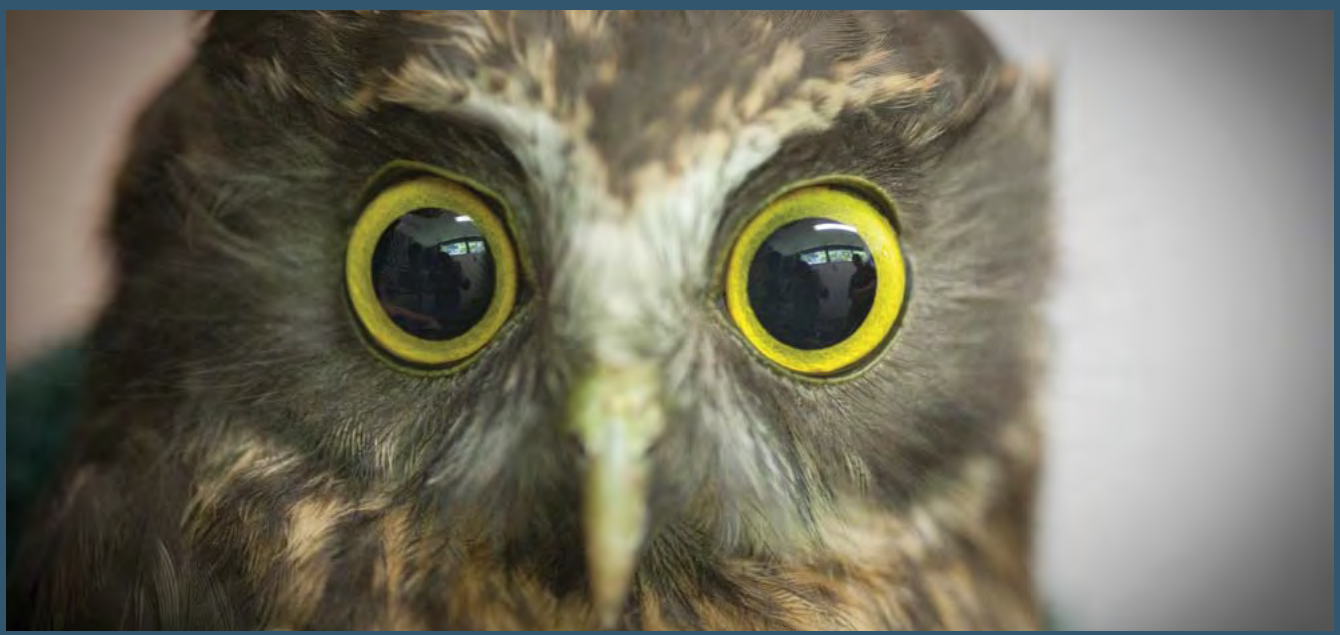
Massey's zoology graduates are in high demand throughout New Zealand.

WHAT'S IT LIKE?
Zoology is the animal science of the natural world. It examines animals on a variety of scales from biological knowledge at the molecular level to animals as components of systems; looks at both vertebrate and invertebrate and their impact on New Zealand plants and animals; and includes the study of animal behaviour.

WHY MASSEY?
UNIQUE IN NEW ZEALAND
As one of the only universities in New Zealand to offer a specialised course in zoology, our programme is unique. You'll learn about land-based animals and environments developing a strong foundation and the latest thinking in genetic and physiological processes, animal development, anatomy and behaviour. You'll also explore freshwater and marine systems, and our wide range of speciality fields including conservation of biodiversity.

WORLD-READY GRADUATES
From mapping animal migrations to driving conservational change in foreign countries, Massey's zoology graduates are in high demand all over the world working in places like Samoa, South Africa, the Netherlands and United States. You'll graduate ready to join them and take the best of your knowledge to the rest of the world.

IGNITE YOUR PASSION
At Massey, our lecturers are passionate about what they do. They have examined bird migration pathways from New Zealand to Alaska and the USA. They have investigated species interactions in the alpine and unlocked knowledge about morphology through examining fossils and lineages in rocks. They bring this knowledge and love for what they do into their teaching to help you uncover what truly inspires you.



CIARAN CAMPBELL

After graduating with a Bachelor of Science, majoring in ecology and zoology, the Department of Conservation offered me a position as a Freshwater Ranger.

I am currently working on the conservation of threatened and endangered freshwater fish in Otago, Southland and Canterbury, restoring whitebait fisheries in the Clutha River and monitoring the growth of didymo. I would not be able to do this without having a fundamental understanding of the ecological science behind conservation, acquired during my tertiary studies at Massey.

CAREER OPPORTUNITIES

Massey Bachelor of Science (Zoology) graduates are employed widely. You could contribute your skills to central and regional government organisations, conservation groups, teaching, private consultancy firms, or through the media (for instance making television documentaries). Places of work include:

- Department of Conservation
- Regional councils
- Crown Research Institutes
- Ministry of Primary Industries
- Biosecurity in New Zealand
- Ministry for the Environment
- Environmental Risk Management Authority
- Fish & Game New Zealand
- SCION (formerly Forest Research Institute)
- Private environmental consultancy firms
- Private conservation initiatives
- Schools teachers
- News media including magazines, newspapers, websites, radio, television and documentary making.

BACHELOR OF VETERINARY SCIENCE BVSc

DURATION
5 YEARS FULL-TIME

AVAILABLE
MANAWATŪ

By studying veterinary science at Massey University you'll join a world-leading veterinary programme that will qualify you to work as a veterinarian in many different areas.

WHAT'S IT LIKE?

You will study core medical sciences (tailored for veterinary students), as well as normal and then abnormal animal structure and function. Then you'll be taught how to "fix" animals, or return them to normal function through clinical studies, medicine, surgery, and health management of companion and agricultural animal species.

Throughout years 1 to 4 there is a focus on professional studies and attributes for veterinarians, and integrative problem-oriented papers. These integrative papers encourage students to apply the information learned in the other individual papers to real life veterinary cases and scenarios designed to develop problem solving and critical thinking.

In your fifth and final year, you get to choose an area of interest (track), and will do lots of work placements while you are studying, giving you invaluable on-the-job experience. This individualised final year curriculum allows you to further explore your area of interest while ensuring wide coverage of the main veterinary species.

During the programme, you will attend lectures, tutorials, practical classes and clinical sessions and undertake farm and veterinary practical work outside of university semester time.

WHY MASSEY?

UNIQUE IN NEW ZEALAND

Massey is the only university in New Zealand that offers a veterinary degree, which is widely recognised internationally. Veterinary science is a key focus for Massey University's Palmerston North campus and we have some of the best facilities in Australasia. The only wildlife hospital at a New Zealand university is on campus, where we treat many of our endangered species. A new 24-hour pet emergency centre and equine hospital opened in 2014 and building will soon be underway on a new wildlife hospital and study block.

CHALLENGE YOURSELF

In line with the international recognition for the degree, you will find that the study of veterinary science is rigorous and challenging. You will need to work hard, and apply yourself, but the result will be an interesting, varied, and rewarding career.

You'll need a good background in the sciences if you want to become a veterinarian.

WORK ALL OVER THE WORLD

The Massey University BVSc programme is fully accredited by the Australasian Veterinary Board Council (AVBC), the American Veterinary Medical Association (AVMA), and the Royal College of Veterinary Surgeons (RCVS). The BVSc is also recognised through reciprocity by the South African Veterinary Association (SAVA).

This means you could work as a veterinarian not only in New Zealand, but also Australia, the United Kingdom, Canada, Singapore, the USA, and many other countries.

Our veterinary school was the first in the Southern Hemisphere to be accredited by the AVMA. This means the Massey University BVSc is recognised by the AVMA as being equivalent to a Doctor of Veterinary Medicine (DVM) degree from an accredited North American university.

CAREER OPPORTUNITIES

VETERINARY PRACTICE

If you work as a clinical veterinarian you'll provide high-quality care for animals, whether they are pets, working animals, farm livestock, or wildlife. You'll use diagnostic and communication skills to promote the health and wellbeing of a range of animals, to make a real difference for both them and their owners.

OTHER POTENTIAL CAREERS

There are many other career opportunities for you with your veterinary qualification, like:

- Animal incursion investigator helping to diagnose new and emerging animal diseases, and working on responses to potential outbreaks
- Food safety veterinarian
- Veterinary researcher contributing to animal health and production
- Protect New Zealand wildlife in the Department of Conservation, or saving bears in China.

DEVELOP SPECIALIST SKILLS

If you have a particular interest, you could become a specialist by completing some further study. There are veterinary specialists in areas like oncology (cancer), ophthalmology (eyes), dermatology (skin), epidemiology and surgery.
You could use your specialist skills to make your mark as a university lecturer, helping to teach and inspire up-and-coming veterinarians.

EMMA CUTTANCE BVSc

Studying at Massey was the best time of my life. I met life-long friends, worked with amazing people and student life was so much fun.
Like most people I wanted to be a vet because of my love for animals. The number of years I had to study to become a vet was never an issue as I came straight from school and didn't know anything other than studying. The vet programme is definitely challenging but the work life is equally complemented by the fun social curriculum – which is tradition for vet students. The skills that you take away from such a challenging degree such as time management, focus and dedication are invaluable.
I tried to get as much work experience as possible. I spent one summer on a dairy farm in Taranaki, one on a sheep and beef farm in Fairlie, one on a goat farm in Morrinsville and another on a dairy farm in Hamilton.
I had a job sorted by Easter in my final year at Veterinary Enterprises as a clinical veterinarian. I have worked there for six years. I'm also the dairy team leader for the North Island clinics.
Massey taught me to work hard, communicate well and look for opportunities. The degree is for animals but is a people-orientated job. You need to work just as hard at these skills as you do the technical skills.

ENTRY REQUIREMENTS

Around 300 domestic students apply for selection into the 84 places in the professional phase every year. Only those who have performed well academically in the pre-selection phase may be offered a place. To give yourself the best chance of success we recommend you complete the following (or their equivalent) before commencing this phase:

- Mathematics to NCEA Level 3
- NCEA Level 2 English to meet the university admission requirements.

If you don't have a background in physics, chemistry, biology, or mathematics, you can take preparatory papers during Massey's Semester Two, Summer School or by distance study at home.

WORK EXPERIENCE

If you'd like to apply for selection into the second semester of the programme you must complete at least 10 days (80 hours) of veterinary work experience. We highly recommend you complete your work experience before the start of the first pre-selection semester.

YOUR FIRST YEAR

In this challenging and dynamic programme you'll work hard in your first semester to gain good marks in the four compulsory papers: Chemistry and Living Systems, Physics for Life Sciences, Biology of Cells and Biology of Animals. If you gain selection you'll begin your veterinary science study in the second semester and study anatomy, physiology, biochemistry, professional studies, and animal behaviour, handling and welfare.

SELECTION

Selection is competitive and judged on:

- Results of the four compulsory papers (or approved alternative papers) in the first semester (80%)
- Results of the Standard Tertiary Admission Test (STAT) (20%). This looks at your ability to understand and interpret written English and numerical information
- Completion of 10 full days (80 hours) veterinary work experience.

Students who pass the first semester papers and are not selected can credit papers passed towards other Massey degrees.

PRACTICAL WORK

Your studies will include practical work with animals on farms and in veterinary practices. This gives you experience in animal management and prepares you for the fifth year of clinical study and work as a veterinarian.

BACHELOR OF VETERINARY TECHNOLOGY

BVetTech

DURATION
3 YEARS FULL-TIME

AVAILABLE
MANAWATŪ

Become a paramedic of the animal world. Vet technologists are to vets, what paramedics are to doctors.

WHAT'S IT LIKE?

Veterinary medicine is steadily advancing with greater use of science and technology to care for animals. As a veterinary paraprofessional, you will be an integral member of the modern animal health care team.
Veterinary technologists make a significant contribution to animal health and welfare along with the economic development of New Zealand.

WHY MASSEY?

A CAREER WITH A FUTURE

As a veterinary technologist you will be relevant and valuable to the future of veterinary and allied animal health professions. Veterinary technology has been identified as one of the top three recession-proof professions internationally.
Massey's Bachelor of Veterinary Technology is a broad veterinary-science-based degree which will expose you to various fields in the veterinary and related animal health professions. You will be taught alongside veterinary science students in an applied clinical environment and work with a variety of animal species.

DO WHAT YOU WANT

In your final year, you can choose an area of interest to gain more knowledge and experience small animals, production animals, equine or business.
You will contribute to the health of individuals and communities by the application of research-led veterinary practice.
The Bachelor of Veterinary Technology will teach you how to be relevant to contemporary vet practice, and work in partnership with other veterinary specialists to help animals experiencing health/illness.

CAREER OPPORTUNITIES

Veterinary technologists complement veterinarians in government agencies and the veterinary industry. A veterinary technology degree will provide you with skill in critical thinking, problem solving, and independent learning; this will prepare you for supervisory and management positions. Examples of career opportunities for veterinary technologists with a BVetTech degree include:

- Clinic staff supervisors or hospital managers
- Animal behaviour advisors
- Specialty practice technologists (examples include dermatology, surgery, internal medicine, and critical case care)
- Biomedical research technologists and laboratory animal managers
- Instructors in veterinary nursing/technology programs and veterinary school hospitals
- Herd health technologists on food animal, poultry, or equine farms
- Pharmaceutical sales and marketing representatives
- Health technologists in zoos, animal control, or humane societies
- Food or livestock inspectors
- Zoo veterinary hospital or wildlife rehabilitation technologists
- Marketing and/or teaching roles in veterinary organisations and practices.

ENTRY REQUIREMENTS

Semester One of the Bachelor of Veterinary Technology is the pre-selection semester and is required for selection to continue in the programme. If you have qualified to attend university you can enrol in the selection semester. To ensure a smooth transition into university it is recommended you have studied NCEA Level 3 in chemistry, biology and mathematics.

WHAT TO EXPECT

SELECTION

Each year there are about 36 places in the Bachelor of Veterinary Technology programme. Selection is competitive and based on: results of the four compulsory (or approved alternatives) first semester papers (50%); results of an essay on 'The Veterinary Industry' (30%); completion of 10 full days' veterinary work experience (20%). Intending applicants for selection into the second semester of the programme must complete at least 10 full days (80 hours) of veterinary work experience, with a minimum of one 40-hour block. It is highly recommended your work experience be completed before the start of the first ('pre-selection') semester.

YOUR FIRST YEAR

In this challenging and dynamic programme you'll work hard in your first semester to gain good marks in the four compulsory papers: Chemistry and Living Systems, Communication in Sciences, Biology of Cells and Biology of Animals. If you gain selection you'll begin your veterinary technology study in the second semester and study anatomy, physiology, animal behaviour and handling and veterinary technology practice.

PRACTICAL WORK

Your studies include practical work with animals on farms and in veterinary practices. This will give you experience in animal management and prepare you for your work as a vet technologist.

PETA ROSSITER BVetTech

The awesome thing about the Bachelor of Veterinary Technology is the vast range of career paths I can now choose from. I am qualified to work hands-on with both small and large animals and have lab skills and a science background that provide a foundation for work in various roles within the animal research sector. Due to my paper choices in my final year I also have a more in-depth knowledge of production animals, genetics and herd health, which could be used in a herd management role. The wide range of employment possibilities from a single degree is astounding.

During my degree I completed some of my practical work experience with VETPlus and really enjoyed my time with them. The skills I gained throughout my degree at Massey resulted in a job offer for a position in the rural branch of VETPlus in Rotorua. My job covers a wide range of areas such as weighing, vaccinating and drenching large animals, assisting with treatments of sick or injured animals, reception in the clinic and completing lab work such as spore counts.

CONJOINT DEGREES

BA/BSc
BBS/BSc

DURATION
4 YEARS FULL-TIME

AVAILABLE
ALBANY
MANAWATŪ
DISTANCE LEARNING

More and more New Zealand employers are seeking graduates with an understanding of science alongside the knowledge and skills of either an arts or business discipline.
Massey's College of Sciences recognises this and offers two conjoint degrees: the Bachelor of Arts/Bachelor of Science, and the Bachelor of Business Studies/Bachelor of Science.
These conjoint degrees meet the needs of employers and students looking for a combination of knowledge and skills to pursue a career and make a contribution as a global citizen, with additional strengths in business or arts.

QUALIFICATION OVERVIEW

The BA/BSc and BBS/BSc conjoint degrees let you graduate with both degrees at the end of four years of full-time study. You must study for both degrees concurrently. To remain in the qualification, you must maintain a Grade Point Average of at least 4.0 (a B- grade) each year.

PLANNING YOUR DEGREE

In your first year, you should include:

- **BA/BSc:** Four BA papers including two core papers and two major papers (or one major paper and one minor paper); four BSc papers including two major papers.
- **BBS/BSc:** Four core BBS papers; four BSc papers including two major papers.

In your second year, you will need to complete nine papers so that you have passed a total of 255 credits by the end of the year. Your credits should be evenly spread across the two components.
In your third and fourth years you will normally take a combination of 200-level and 300-level papers, which will allow you to complete your 300-level requirements in your fourth year. You should normally choose about half your credits for each year from each component.

DEGREE STRUCTURE

- You will need to pass at least 510 credits, made up of at least 255 credits from the BSc schedule (the BSc component) AND at least 255 credits from the BA OR BBS schedules (the BA or BBS component).
- For the BSc component of either programme, you will need to complete the majoring requirements of at least one subject, and 30 credits in a second subject at 200 level.
- For the BA component of the BA/BSc, you will need to complete the five core papers and the majoring requirements for at least one subject (Business Psychology is not available as a major in the conjoint programme) and 30 credits in a second subject at 200-level.
- For the BBS component of the BA/BSc, you will need to complete the eight core papers and the majoring requirements of at least one subject. You must include no more than 135 credits at 100-level and at least 60 credits must be at 300-level in your BBS component.

CAREER OPPORTUNITIES

Employment opportunities are going from strength to strength for students who have developed capacities in enquiry, analysis and communication, as well as an understanding of human behaviour, society and the environment. By combining a BSc with a BBS or BA, you'll enhance your competitive edge in the job market. You'll have a deep understanding of people and the wider national and international communities in which they live, coupled with the knowledge and astuteness necessary for business success, or the analytical and conceptual skills valued in the scientific world.

MAJORING SUBJECTS

BACHELOR OF ARTS

Chinese, classical studies, defence studies, economics, education, educational psychology, English, environmental studies, geography, history, Japanese, linguistics, Māori studies, mathematics, media studies, philosophy, politics, psychology, security studies, social anthropology, social policy, sociology, Spanish, statistics.

BACHELOR OF BUSINESS STUDIES

Accountancy, business information systems, communication, economics, entrepreneurship and small business, finance, human resource management, international business, management, marketing, valuation and property management.

BACHELOR OF SCIENCE

Agricultural science, animal science, biochemistry, biological sciences, biostatistics, chemistry, computer science, earth science, ecology, environmental science, exercise and sport science, genetics, geography, human nutrition, logistics and supply chain management, marine ecology, mathematics, microbiology, nanoscience, physics, physiology, plant science, psychology, statistics, zoology.

- **SIOBHAN WARREN** Manager – Graduate and Scholarship Programmes, PricewaterhouseCoopers

  I manage two national programmes, which can involve anything from dreaming up new and exciting events to checking out new collateral, giving presentations or organising teams of people to help me implement all our ideas. I get to spend my days recognising excellence and giving people their first opportunity to pursue the career of their dreams, either through a scholarship, a summer intern job or their first graduate job.

  I love the fact that when I wake up in the morning I'm excited to go to work! I initially started studying toward a law degree, but decided that really wasn't 'me'. Then I found out Massey had the joint business/psychology option, which was a perfect fit – I transferred across to Massey and never looked back.

  Massey is an amazing university. The academic staff will go out of their way to help you. The other thing about studying at Massey was the enduring friendships I made. It makes a huge difference to have a great group of mates when you are studying, but to be able to watch them achieve success in their careers and be able to celebrate that with them is brilliant.

- **LOGAN BEAUMONT** Business Analyst, Retail Dealer Team BP New Zealand

  Logan graduated in the conjoint programme majoring in marketing and psychology at the Manawatū campus. He now works for BP, having being accepted into their two-year graduate programme, co-ordinating their dealer network.

  "It's a worldwide company which offers a number of exciting roles and each day involves something different. I didn't know exactly what I wanted to study or where I wanted to go, but after sampling the different opportunities I decided on a course of study that I found interesting. The stand-out thing about Massey were the interesting papers offered and the excellent and helpful staff."

DIPLOMA IN SCIENCE AND TECHNOLOGY

DipSciTech

DURATION
1 YEAR FULL-TIME
OR EQUIVALENT PART-TIME

AVAILABLE
ALBANY
MANAWATŪ

The Diploma in Science and Technology is a university-level qualification that's shorter than a three-year Bachelor's degree. You can elect to have papers you pass under this qualification credited to a Bachelor's degree – provided the papers comply with the regulations of the degree in question. If more than 45 credits are to be transferred the diploma must be surrendered to the University.

ENTRY REQUIREMENTS

There are no specific entry requirements beyond those that qualify you for undergraduate admission. For details, see: enrol.massey.ac.nz.
For some specific papers, it is strongly recommended that applicants have a completed NCEA Level 3, or equivalent, in specific subjects. See study.massey.ac.nz for paper information.

QUALIFICATION STRUCTURE

The diploma comprises an approved selection of eight papers (120 credits), no more than five at 100 level, and at least three at 200 level or above from one or more of the subjects listed.
Papers selected from the following subject areas denoted by these prefixes:

- 112 Agribusiness
- 117 Animal Science
- 119 Agriculture and Horticulture
- 120 Plant Biology
- 121 Environmental Science
- 122 Biochemistry
- 123 Chemistry
- 124 Physics
- 145 Geography
- 151 Nutritional Science
- 157 Information Systems
- 158 Information Technology
- 159 Computer Science
- 160 Mathematics
- 161 Statistics
- 162 Biology
- 175 Psychology
- 189 Soil Science
- 194 Physiology
- 196 Ecology
- 199 Zoology
- 203 Genetics
- 214 Health Sciences
- 218 Building and Construction
- 233 Earth Science
- 234 Sport and Exercise Science
- 236 Nanoscience
- 240 Logistics and Supply Chain Management
- 246 Natural Sciences
- 247 College of Sciences
- 250 College of Health
- 283 Agronomy
- 284 Horticulture
- 285 Plant Health
- 286 Equine.

CERTIFICATE IN SCIENCE AND TECHNOLOGY

CertSciTech

DURATION
1 SEMESTER OF FULL-TIME
OR EQUIVALENT PART-TIME

AVAILABLE
ALBANY
MANAWATŪ

FLEXIBLE PROGRAMME

The Certificate in Science and Technology is university-level qualification that's shorter than a three-year bachelor's degree.
You can elect to have papers you pass under this qualification credited to a Bachelor's degree or diploma, provided the papers comply with the regulations of the degree in question. If more than 15 credits are to be transferred, the Certificate must be surrendered to the University.

ENTRY REQUIREMENTS

There are no specific entry requirements for the Certificate in Science and Technology qualification beyond those that qualify you for undergraduate admission. For details, see:
enrol.massey.ac.nz.

QUALIFICATION STRUCTURE

The certificate comprises an approved selection of four papers (60 credits) at 100- or 200-level from the subject areas listed. It can be endorsed in:

- Engineering Preparation
- Engineering Studies
- Veterinary Preparation.

Papers selected from the following prefixes:

- 112 Agribusiness
- 117 Animal Science
- 119 Agriculture and Horticulture
- 120 Plant Biology
- 121 Environmental Science
- 122 Biochemistry
- 123 Chemistry
- 124 Physics
- 145 Geography
- 151 Nutritional Science
- 157 Information Systems
- 158 Information Technology
- 159 Computer Science
- 160 Mathematics
- 161 Statistics
- 162 Biology
- 175 Psychology
- 189 Soil Science
- 194 Physiology
- 196 Ecology
- 199 Zoology
- 203 Genetics
- 214 Health Sciences
- 218 Building and Construction
- 233 Earth Science
- 234 Sport and Exercise Science
- 236 Nanoscience
- 240 Logistics and Supply Chain Management
- 246 Natural Sciences
- 247 College of Sciences
- 250 College of Health
- 275.105 Human Development
- 283 Agronomy
- 284 Horticulture
- 285 Plant Health
- 286 Equine

CONTACT MASSEY FOR MORE INFORMATION

MASSEY.AC.NZ

Our website is full of useful information covering everything you need to know – from what each campus has to offer, their departments and programmes, scholarships, events, accommodation and plenty more.
And don't forget to bookmark the Massey site – it's constantly being updated with the latest information.

ENGINE.AC.NZ

If you're unsure what you'd like to study, head to **engine.ac.nz**. There are stories of inspiring people who have great careers, and have an impact on New Zealand and the world. They might just give you the inspiration you've been looking for! You can find out how to follow in their footsteps, what you'd need to study and what being at university will actually be like. You'll find out how you can join the 'Engine of the new New Zealand' and have a real impact on New Zealand, and the world!

CALL OUR CONTACT CENTRE

If you'd rather speak to a real person feel free to give our friendly contact centre staff a call on **0800 MASSEY**.
Or, if you'd like to actually see a real person, drop in to our campuses in Auckland, Palmerston North or Wellington.

STUDENT ADVISERS

We have heaps of people available to answer any questions you may have about studying with us. We understand it's a big decision. To speak to someone, or to get someone to visit your school or workplace:
Phone: **0800 MASSEY**
Text: **5222**
Email: **academicadvice@massey.ac.nz**

Dedicated international, Māori and Pasifika student advisers are also available.

'YOUR GUIDE TO' BOOKS

We produces a range of 'Your Guide To' books grouped around particular interest areas. They provide details of entry requirements, majors, course structures and career outcomes covering all our programmes.
To obtain copies of 'Your Guide to' books:
Download them at **publications.massey.ac.nz**
Phone: **0800 MASSEY**
Text: **5222**
Email: **contact@massey.ac.nz**

EVENTS

Another great way to see for yourself what life and study is like at Massey is at one of our open days. You'll learn about Massey's programmes, career opportunities, accommodation options, campus facilities, and get to talk to lecturers and current students.
Manawatū Open Day: 5 August 2015
Auckland Open Day: 15 August
Wellington Open Day: 28 August

We also have stands at various career and tertiary education expos held all over New Zealand (and beyond).
If you want to know where you'll see us next, call **0800 MASSEY**, text **5222**, email **contact@massey.ac.nz** or visit **events.massey.ac.nz**

FACEBOOK.COM/MASSEYUNIVERSITY

We have our own Facebook page which you can join to keep up to date with what is happening at Massey before you come to study with us.

TWITTER

You can also follow us on Twitter **@MasseyUni**

INSTAGRAM

And follow us on Instagram **@MasseyUni**

YOUTUBE

There are heaps of videos to check out on our channel. Go to **youtube.com/masseyuniversity**

INTERNATIONAL STUDENTS

We welcome more than 3,800 International Students from 100 countries each year. The International Office is the first point of contact for prospective students. If you are considering studying at Massey we welcome your enquiry and look forward to helping you join us.

FOR MORE INFORMATION

Phone: **+64 6 350 5701**
Email: **international@massey.ac.nz**
Web: **international.massey.ac.nz**

YOUR NEXT STEP

VISIT US ON CAMPUS

13-14 MAY
AUCKLAND CAMPUS INFORMATION EVENINGS

10 JUNE
WELLINGTON CAMPUS INFORMATION EVENING

5 AUGUST
MANAWATŪ OPEN DAY

15 AUGUST
AUCKLAND OPEN DAY

28 AUGUST
WELLINGTON OPEN DAY

21 OCTOBER
WELLINGTON CAMPUS INFORMATION EVENING

0800 MASSEY (627 739)

ENGINE.AC.NZ

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@MASSEYUNI