

# Welcome to Engineering 2017

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## **Foundation Programmes**

**NZ Certificate in Study and Career Preparation Level 3**

**NZ Certificate in Study and Career Preparation Level 4**

## **NZ Diploma in Engineering**

**Civil, Electrical and Mechanical**

## **Bachelor of Engineering Technology**

**Civil, Electrical and Mechanical**

## **Graduate Diploma in Engineering**

**Mechatronics, Structures and Water and Waste**

Welcome to the School of Engineering Technology, we hope you enjoy the time you are here studying with us. The below people are experts in their field and are looking forward to sharing their knowledge with you.

## Engineering Staff

Graham Carson

Head of School

Malcolm Fair

Associate Head of School

<b>Tutor</b>	<b>Qualifications</b>	<b>Position</b>	<b>Subject Expertise</b>
<u>Bill Barclay</u>	BE (Civil), BTP, MIPENZ, MNZPI, PEng,	Contract Tutor	Civil
<u>Frank Beinersdorf</u>	Dipl-Ing (Mechatronics)	Tutor	Electrical Mechatronics
<u>Trevor Brown</u>	NZCE, AdvTC	Tutor	Electrical
<u>Marius Cilliers</u>	M.Tech	Tutor	Civil
<u>Frank Cook</u>	MSc, BE, PGDip Higher Education	Tutor	Mechanical
<u>Penelope De Boer</u>	BSc, DipTchg	Tutor	Mathematics
<u>Adrian Ferguson</u>	BE, NZCE, GDipBusAdmin	Tutor	Mechanical
<u>Gelacio Franco</u>	BSc Physics and Electronics	Tutor	Mechatronics
<u>Gareth Gretton</u>	PhD (Eng)	Tutor	Mechanical
<u>Leigh Grinlinton</u>	BSurv	Tutor	Civil
<u>Fred Harris</u>	MSc, DipTchg, MNZIP, MNZGS	Tutor	Civil
<u>Ruwan Jayasooriya</u>	PhD (Eng)	Tutor	Civil
<u>Andrew Kopnoff</u>	BE, NC Auto Electrical	Tutor	Electrical
<u>James MacKay</u>	PhD	Tutor	Mechanical
<u>Milad Naghibi</u>	M.Sc (Civil Engineering)	Tutor	Civil
<u>Sunethra Pitawala</u>	BSc (Hons)	Tutor	Mechanical
<u>David Stevens</u>	NZCS	Tutor	Electrical
<u>Frans Weehuizen</u>	PhD (Eng)	Tutor	Electrical Mechatronics
<u>Induka Werellagama</u>	PhD (Eng)	Tutor	Mechanical
<u>Eric Wilby</u>	BSc, NCAEd	Tutor	Electrical
<u>John Wray</u>	NZDE, Adv TC	Tutor	Electrical
<u>Rudi Zettler</u>	MEng Sc	Tutor	Mechanical

Please note: This document is a living document, which means that it will be updated as information is changed.

If you have any questions or comments about this Welcome booklet please email [admin.team@weltec.ac.nz](mailto:admin.team@weltec.ac.nz)

## Information for Engineering Programmes

### Important Dates

Start Semester One: 27 February 2017

Study Break: 16 April to 30 April

Finish Semester One: 7 July 2017

Start Semester Two: 24 July 2017

Study Break: 2 October to 15 October

Finish Semester Two: 1 December 2017

Exams are held in the last two weeks of each semester. See your course outline for the assessment dates that you need to meet.

### Timetable

It is likely that you will have classes in a number of different rooms throughout the year. The **timetable** for your classes will be available closer to the start date of your course. If you are still unsure, please contact your **tutor**.

### Attendance

Classes are not repeated.

Your ability to be in class on time is vitally important. Missing the first 10, 15 or 40 minutes etc of your class makes it harder on you to succeed. Being fashionably late is not a skill you get marks for and is not a good habit to form.

While there is no official attendance requirement, we know that attending all your timetabled classes greatly improves your chances of successfully completing your qualification. Below is some important attendance information to be mindful of during your studies here:

- If you are receiving a student allowance you must attend classes and show academic progress; if you don't, your allowance may be stopped. It's worth noting that we can reinstate your allowance if you show significant improvement.
- We are tasked by the government to make you 'work ready'. To achieve this goal we expect you to:
  - a) Attend all your classes
  - b) Notify us if you are going to be absent
  - c) Provide a medical certificate if you are sick for longer than three days.

In the real world those are the expected behaviours of employees, so we ask that you also meet these expectations whilst at WelTec.

- If you are sick at the time of an assessment/test or when an assignment is due you must provide a medical certificate to be eligible for a resit/resubmission or extension.
- If you are an International student Immigration NZ insists on 100% attendance, unless sick and able to provide a medical certificate as proof.

## Transferring & Withdrawing

If in the first two weeks of your programme you realise your courses aren't correct, or you are advised by your tutor that you should be doing a different course, then you need to fill in the **transfer form** and drop it off to the SET Team located in the student hub, or visit the SET Team in person to arrange your transfer.

If you discover that the qualification you are enrolled in is just not floating your boat in the first two weeks, then you need to fill in the **withdraw form** and take it to the SET Office. Completing this process in the two week time frame will ensure you are not left with a debt for no reward. The SET Team can chat to you about this and other options going forward.

## Health and Safety

WelTec works hard to ensure that you are safe while on our campuses. Your job, as a student, is to follow instructions when asked by staff who are looking after your safety. Please also ensure that any medical issues have been declared on your enrolment form.

If part of your course requires you to attend practical classes, you must wear the prescribed protective clothing and footwear during these classes. Failure to do so will get you excluded from the class.

Random Drug Testing does occur. If you are involved in an accident you will be drug tested. If you are going on work placement you will be drug tested. If you refuse you will be stood down.

For more information about Health and Safety around campus click on the links below:

[Safety Procedures](#)

[Smoke Free, Drugs and Alcohol Free Campus](#)

[Healthcare](#)

[Counselling Service](#)

## Student ICT Services and Student Login

WelTec provides you with computers, printers/photocopiers, and software on our campuses to support your study. You can bring own device (smart phone, laptop, tablet) and connect to our wireless network on most campuses.

You can login at any time after you have received your Enrolment Confirmation letter, which has your login ID and password in it. You can login at any campus in the Learning Commons. Your first login will need to be at one of our campuses.

More information about ICT Services and your student login can be found [here](#).

## Moodle

**Moodle** is an online learning space that your tutors may use to post course information or communicate with you. It also contains lots of other useful information, so it pays to become familiar with it. Your Moodle login and password is your WelTec login and password (see [login information](#) above). If you require help with Moodle please email [learningcommons@weltec.ac.nz](mailto:learningcommons@weltec.ac.nz) or call 0800 141 121

## Results

You can log into [results.weltec.ac.nz](https://results.weltec.ac.nz) to access your provisional results. If you have any questions about these results please talk to your Tutor. While you are logged in, please check and update your address and contact details, so that the final results are mailed to the correct address. Finalising results can take up to six weeks after the official finish date of your programme.

## Further assessment

In order to be eligible for reassessment, you must have achieved less than 50% overall in the course, and you must have attempted each of the assessments contained in a course.

If eligible, you may have one reassessment per course. The School will negotiate with you a new date for the reassessment upon receipt of the **resit application form**. An administration fee will be charged.

Any reassessment will receive a maximum of 50% of the available marks for that assessment.

## Late submission of work

In the case of illness, injury or exceptional circumstances an extension no later than the course end date may be granted by the course tutor. You will need to complete an **Extension before course ends form**. A new date will be negotiated with the tutor at this time.

Extensions beyond the course end date may be granted as outlined in the Academic Statute. To start the process you need to complete an **Extension after course ends form**.

## Support Services

WelTec offers a range of services and support to students. Whatever kind of challenge you are facing, whether it's with your studies or your personal life — there's someone to help.

Our staff are dedicated to ensuring that you have access to the information and resources you need to be successful in your studies. Click on this [link](#) to learn more about the services we offer. These are all free to you as an enrolled WelTec student so make sure you use them when you need to.

## Student Forms and Other Important Information

Click the links below for the appropriate information/form.

- [Aegrotat](#)
- [Assessment cover sheet](#)
- [Automatic payment](#)
- [Complaint](#)
- [Exam/assessment re-sit](#)
- [Exceptional circumstances](#)
- [Extension after course ends](#)
- [Extension before course ends](#)
- [Feedback](#)
- [Privacy consent form](#)
- [Credit recognition](#)
- [Replacement certificate/ academic record](#)
- [Special assessment conditions](#)
- [Student support fund](#)
- [Transfer/ change enrolment](#)
- [Withdrawal](#)
- [Plagiarism and Academic Dishonesty](#)
- [Student Code of Conduct](#)

## Tips for Success

Keep in touch if you are struggling! Your tutor wants you to succeed, so please don't be afraid to ask for help if you need it.

Ask questions, there are no "dumb" questions. Rest assured there will be at least three other people in your class thinking "good question" when you ask it, but don't wait for them to pluck up the courage, take the lead.

Attendance matters. History shows us that the chance of you passing is much higher if you come to all your classes.

## What You Need

Laptop with the following specifications for the Degree and Diploma:

- Operating Systems: On request, we can provide suggestions on where to look for detailed guidance on hardware requirements to run CAD drawing packages. There is lots of information on the internet about suitable minimum specification hardware to run various CAD packages. Two common CAD packages extensively used in the WelTec engineering school are;
  - [SolidWorks](#)
  - [AutoCAD](#)

To some extent the minimum specification depends on the engineering major being studied.

- Please note that Windows systems must have 64-bit operating system.
  - CPU: 64-bit processor with at least 4 cores
  - RAM: 8 GB
  - Hard Drive: 5 GB free space – with an additional 10 GB space per project
  - Display: 1440 x 900 resolution is recommended
  - Video Card: Open GL 2.0 compatible graphics card with on-board memory of 1024 MB. A list can be found [here](#).
  - Mouse: a mouse with a central wheel
- Course Textbook find them [here](#)
  - Usual assortment of Pens, Pencil, Paper
  - A way to get to Classes
  - Brain switched on
  - Ability to ask questions
- PPE (Personal Protective Equipment)**
- Closed in Leather Shoes for Labs
  - Steel Cap Boots for the Mechanical Workshop
  - Safety glasses
  - Dust Coat or Overalls (preferably cotton)

## Programme Information

For specific information about your chosen programme please click on the appropriate link below:

### **Foundation Programmes**

[NZ Certificate in Study and Career Preparation Level 3](#)

[NZ Certificate in Study and Career Preparation Level 4](#)

### **Diploma Programme**

[NZ Diploma in Engineering - Civil, Electrical and Mechanical](#)

### **Degree Programme**

[Bachelor of Engineering Technology - Civil, Electrical and Mechanical](#)

### **Post Graduate Programme**

[Graduate Diploma in Engineering - Mechatronics, Structures and Water and Waste](#)

You will be given more information by your tutor when they present your course outlines to you.



## New Zealand Certificate in Study and Career Preparation Level 3

### Aims

This programme leads to the award of the New Zealand Certificate in Study and Career Preparation (Level 3). It provides an initial pathway for students entering tertiary study in preparation for further study or training at Level 4. It also provides a foundation of skills and knowledge which students take through their academic life. This qualification builds on the broad qualifications at NZQF Levels 1 and/or 2, including the National Certificate of Educational Achievement (NCEA) Levels 1 and/or 2.

### Graduate Profile

Graduates of this qualification will be able to:

- Identify and apply knowledge obtained from a variety of specialised sources relevant to their chosen field(s)
- Manage own learning and work effectively as an individual and as a team-member to achieve relevant goals
- Solve problems and communicate clearly using a range of appropriate media
- Evaluate opportunities and develop plans for study and career pathways relevant to their chosen field(s)
- Will be able to progress to further study or training at Level 4 and Level 5/6 diploma courses related to the context of their programme.
- May have enhanced employment opportunities in industries and professions associated with the context of programme of study.

### Course Structure

This 60 credit Level 3 certificate is offered as a full time 17 week (one semester) programme comprising four 15 credit courses.

A student must successfully complete four 15 credit courses, THREE compulsory course and ONE course in their chosen field to be awarded the New Zealand Certificate in Study and Career Preparation (Level 3).

<b>Engineering Pathway</b>				
<b>Code</b>	<b>Course Title</b>	<b>Level</b>	<b>Credits</b>	<b>Compulsory or Optional</b>
SCP3202	Skills for Tertiary Study	3	15	C
FS2100	Foundation Mathematics for Engineering Study	2	15	C
FS3130	Foundation Physics for Engineering	3	15	C
FS3131	Engineering Workshop Practice 1	3	15	O
FS3132	Foundation Electrical Engineering	3	15	O
FS3133	Fundamentals for the Construction and Civil Environment	3	15	O
			<b>60</b>	

## Course Content

### ***Skills for Tertiary Study***

This course develops the student's skills and knowledge in digital technologies, te Tiriti o Waitangi and problem solving. It also allows the student to explore their personal developments and specific career pathway.

### ***Foundation Mathematics for Engineering Study***

This course prepares students for further engineering study by developing their mathematics skills within an engineering context.

### ***Foundation Physics for Engineering***

This course prepares students for further engineering study by developing their physics skills.

### ***Engineering Workshop Practice 1***

This course develops an understanding of the skills involved in safely using engineering workshop machines and equipment and to develop an awareness of common manufacturing processes.

### ***Foundation Electrical Engineering***

This course prepares students for further tertiary study by developing their knowledge and skills in electrical engineering.

### ***Fundamentals for Construction and Civil Environment***

This course prepares students for further tertiary study within the built environment and civil engineering programmes.

## New Zealand Certificate in Study and Career Preparation Level 4

### Aims

This programme leads to the award of the New Zealand Certificate in Study and Career Preparation (Level 4). It provides an initial pathway for students entering tertiary study in preparation for further qualification at levels 5–7 (diplomas and degrees). It also provides a foundation of skills and knowledge which students take through their academic life. This qualification builds on the broad qualifications at NZQF Levels 1 and/or 2, including the National Certificate of Educational Achievement (NCEA) Levels 1 and/or 2, while also providing a stepping stone into higher levels of academic study for those with practical qualifications from NZQF Levels 3 and 4.

### Graduate Profile

Graduates of this qualification will be able to:

- Locate, select and analyse relevant information from a variety of sources and apply to context-relevant tasks and purposes
- Work independently and collaboratively on context-relevant academic tasks and problems
- Construct a reasoned and researched argument, communicated using a range of appropriate media
- Develop and critique a study and career plan that identifies specific long-term career goals

### Course Structure

This 60 credit Level 4 certificate is offered as a full time 17 week (one semester) programme comprising four 15 credit courses.

A student must successfully complete four 15 credit courses, THREE compulsory course and ONE course in their chosen field to be awarded the New Zealand Certificate in Study and Career Preparation (Level 4).

<b>Engineering Pathway</b>				
<b>Code</b>	<b>Course Title</b>	<b>Level</b>	<b>Credits</b>	<b>Compulsory or Optional</b>
SCP4201	Academic Communication	4	15	C
FS3128	Mathematics for Engineers	3	15	C
FS4130	Science for Engineers	4	15	C
FS4131	Engineering Workshop Practice 2	4	15	O
FS4132	Introduction to Electrical Engineering	4	15	O
FS4133	Introduction to Civil and Built Environment	4	15	O
FS4134	Unspecified credits*	4	15	E
* Unspecified credit recognition encompassing knowledge and skills that do not directly match the learning outcomes within the Engineering Pathway but are consistent with the graduate profile				

## Course Content

### ***Academic Communication***

This course further develops the skills students require for successful academic communication in tertiary study.

### ***Mathematics for Engineers***

This course prepares students for further engineering study by developing their mathematics skills.

### ***Science for Engineers***

This course prepares students for further engineering study by developing their understanding of the scientific principles involved in engineering.

### ***Engineering Workshop Practice 2***

This course prepares students for further engineering study by developing their knowledge and skills using engineering equipment.

### ***Introduction to Electrical Engineering***

This course prepares students for further engineering study by developing their knowledge and skills in electrical engineering.

### ***Introduction to Civil and Built Environment***

This course prepares students for further engineering study by developing their understanding of the construction environment through the investigating the concepts and practice used in construction and civil engineering.

## New Zealand Diploma in Engineering

### Aims

The aim of the New Zealand Diploma in Engineering is to provide skilled and competent engineering technicians specialised in mechanical, civil, electrical or electronic engineering for the New Zealand engineering sector.

Graduates will be capable of operating at a technician level scope of practice as outlined by the Dublin Accord (International Engineering Alliance, 2002).

The aim of the Programme of Study is to achieve the qualification outcomes of the New Zealand Diploma in Engineering endorsed in a specialised strand of mechanical, civil, electrical or electronics.

### Graduate Profile

#### **Graduates of this qualification will be able to:**

- competently perform technical operations to the standards, ethical and professional responsibilities required by the engineering profession, as per the Dublin Accord 2002.
- work collaboratively within team environments to provide a comprehensive engineering service in the relevant specialist area
- apply the principles of the Treaty of Waitangi, the Resource Management Act and Health & Safety in Employment Act while carrying out engineering activities

#### **Civil Engineering strand graduates** will also be able to:

- apply engineering theory to practice working within *well-defined\* engineering problems* relevant to their specialist field of civil engineering
- use their engineering knowledge to make informed problem solving decisions in civil engineering and to implement these decisions
- identify, evaluate and manage risks within *well-defined\** engineering problems relevant to the field of civil engineering

#### **Electrical Engineering strand graduates** will also be able to:

- apply engineering theory to practice working within *well-defined\* engineering problems* relevant to their specialist field of electrical engineering
- use their engineering knowledge to make informed problem solving decisions in electrical engineering and to implement these decisions
- identify, evaluate and manage risks within *well-defined\** engineering problems relevant to the field of electrical engineering

#### **Mechanical Engineering strand graduates** will also be able to:

- apply engineering theory to practice working within *well-defined\*engineering problems* relevant to their specialist field of mechanical engineering
- use their engineering knowledge to make informed problem solving decisions in mechanical engineering and to implement these decisions
- identify, evaluate and manage risks within *well-defined\** engineering problems relevant to their field of mechanical engineering

\*Well-defined engineering problems can be solved in standardised ways, are frequently encountered and hence familiar to most practitioners in the specialist area, have consequences that are locally important but not far-reaching and can be resolved using limited theoretical knowledge but normally require extensive practical knowledge.

Graduates of the New Zealand Diploma in Engineering will be able to gain employment as engineering technicians in workplaces that have a technical/engineering basis relevant to their specialist engineering strand (mechanical, civil, electrical and electronics).

For the civil engineering strand roles include working on roads, buildings and utilities; for the electrical engineering strand roles include working in power and building services infrastructure; for electronic engineering strand roles include working in telecommunications and electronics manufacturing; for the mechanical engineering strand roles include the design, manufacture and maintenance of tools, engines, machines and systems.

Graduates of the New Zealand Diploma in Engineering will be able to study towards a technologist degree such as Bachelor of Engineering Technology, or a professional engineering qualification such as Bachelor of Engineering.

## Course Structure

**Common compulsory courses** have to be taken in order to meet the requirements of the NZDE. The common compulsory courses are the same for all strands of the qualification.

**Strand compulsory courses** have to be taken in order to meet the requirements of the NZDE (strand). There are different strand compulsories for each strand (civil, electrical or mechanical). Within some strands, there are specialisations which also have different compulsories.

**Electives** are chosen from the relevant strand elective list. Electives need to have a coherent relationship with the strand subject. Electives can be chosen from outside of the strand, with the approval of the Head of School. In exceptional circumstances, an elective from outside the engineering discipline may be selected with the approval of the Programme Committee/Head of School but this will be limited to one 15 credit paper.

**New Zealand Diploma in Engineering (Civil)**

<b>Course Code</b>	<b>Course Title</b>	<b>Level</b>	<b>Recommended Co- and Pre-requisites</b>
<b>Common Compulsory</b>			
DE4101	Engineering Fundamentals	4	
DE4102	Engineering Mathematics 1	4	
DE4103	Technical Literacy	4	
DE6101	Engineering Management	6	
DE6102	Engineering Project	6	DE4103 Min of 45 credits at Level 5
<b>Civil Discipline Compulsory</b>			
DE4201	Materials (Civil)	4	
DE4202	Land Surveying 1	4	
DE5201	Structures 1	5	DE4101
DE5202	Civil and Structural Drawing	5	DE4103
DE5203	Hydraulics (Civil)	5	DE4101 (Co-) DE4102 (Co-)
DE5204	Highway Engineering 1	5	
DE5207	Geotechnical Engineering 1	5	
<b>Electives – Four to be selected of which at least three must be at level 6</b>			
DE5205	Engineering Surveying	5	DE4202
DE5206	Structures 2	5	DE5201, DE4102 (Co-)
DE6201	Geotechnical Engineering 2	6	DE5207
DE6202	Highway Engineering 2	6	DE5204
DE6203	Traffic Engineering	6	DE4102 (Co-)
DE6204	Structures 3	6	DE5206
DE6205	Water and Wastewater	6	DE5203
DE6206	Water and Waste Management	6	
DE6207	Land Surveying 2	6	DE4202

## New Zealand Diploma in Engineering (Electrical)

Course Code	Course Title	Level	Recommended Co- and Pre-requisites
<b>Common Compulsory</b>			
DE4101	Engineering Fundamentals	4	
DE4102	Engineering Mathematics 1	4	
DE4103	Technical Literacy	4	
DE6101	Engineering Management	6	
DE6102	Engineering Project	6	DE4103 Min of 45 credits at Level 5
<b>Electrical Discipline Compulsory</b>			
DE4401	Electrical Principles	4	
DE5403	Electronic Principles	5	
DE4402	Electrical and Electronic	4	DE4401, DE5403 (Co-)
DE5408	Introduction to Networks	5	
<b>Specialisation Compulsory</b>			
DE5401	Power Engineering	5	DE4401, DE5403 (Co-)
DE5404	Electrical Machines	5	DE4401, DE5403, DE4102
DE5402	PLC Programming 1	5	

## Power Specialisation Electives

Course Code	Course Title	Level	Recommended Co- and Pre-requisites
<b>Power Specialisation (compulsory)</b>			
DE6401	Power Systems 1	6	DE4401, DE4102
<b>Recommended Power Electives – three to be selected, minimum of two must be at level 6</b>			
DE6411	PLC Programming 2	6	DE5402
DE6420	Protection	6	DE4401, DE4102
DE6421	Sustainable Energy and Power Electronics	6	DE4401, DE5403, DE4102
DE6409	Electrical Building Services	6	DE5401, DE5404
DE5418	Engineering Mathematics 2	5	DE4102



## New Zealand Diploma in Engineering (Mechanical)

Course Code	Course Title	Level	Recommended Co- and Pre-requisites
<b>Common Compulsory</b>			
DE4101	Engineering Fundamentals	4	
DE4102	Engineering Mathematics 1	4	
DE4103	Technical Literacy	4	
DE6101	Engineering Management	6	
DE6102	Engineering Project	6	Minimum of 45 credits Level 5
<b>Mechanical Discipline Compulsory</b>			
DE3301	Engineering Practice	3	
DE4301	Engineering CAD	4	DE4103
DE4302	Mechanics	4	DE4101, DE4102, DE4103
DE4303	Material Properties	4	
DE5301	Thermodynamics and Heat Transfer	5	DE4101, DE4102, DE4103
DE6301	Fluid Mechanics	6	DE4101, DE4102, DE4302

### Mechanical Specialisation

Course Code	Course Title	Level	Recommended Co- and Pre-requisites
<b>Mechanical Specialisation Compulsory</b>			
DE5302	Strength of Materials 1	5	DE4302
DE5303	Manufacturing Processes	5	DE4303
DE5304	Electrical Fundamentals	5	DE4101, DE4102, DE4103
<b>Mechanical Specialisation Electives - Two to be selected</b>			
DE6302	Mechanics of Machines	6	DE5302
DE6308	Strength of Materials 2	6	DE5302
DE6309	Advanced Thermodynamics	6	DE5301
DE6315	Fluid Power	6	
DE6419	Maintenance Engineering Management*	6	

## Award of Qualification

To be awarded the **New Zealand Diploma in Engineering (Civil)**, a student must successfully complete the required 240 credits and meet the following requirements:

- All common compulsory courses must be passed
- All civil discipline compulsory courses must be passed
- The remainder credits are taken from civil elective courses but must include 45 credits at level 6

To be awarded the **New Zealand Diploma in Engineering (Electrical)**, a student must successfully complete the required 240 credits and meet the following requirements:

- All common compulsory courses must be passed
- All electrical discipline compulsory courses must be passed
- Compulsory courses and electives (where relevant) for **one** specialisation must be passed
- The remainder credits are taken from the electives courses that align with chosen specialisation

To be awarded the **New Zealand Diploma in Engineering (Mechanical)**, a student must successfully complete the required 240 credits and meet the following requirements:

- All common compulsory courses must be passed
- All mechanical discipline compulsory courses must be passed
- Compulsory courses for one specialisation must be passed
- The remainder credits are taken from the electives courses that align with chosen specialisation

The maximum completion time will be ten (10) years from date of first enrolment

Graduation forms can be found [here](#).

## Bachelor Engineering Technology

### Aims

The programme aims to develop graduates exhibiting intellectual independence and capability, meeting the requirements for award of the Bachelor of Engineering Technology, and satisfying the Institution of Professional Engineers New Zealand requirements for entry to engineering practice leading to professional recognition in the civil, electrical and mechanical engineering disciplines.

### Graduate Profile

The Graduate Attributes below are consistent with the exemplar developed by the International Engineering alliance and adopted by each of the Washington, Sydney and Dublin Accord respectively. See Appendix 2 or Requirements for Accreditation or Recognition of Engineering Education Programmes ACC 02 including knowledge profiles and the range of problem solving descriptors.

1. Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in SK1 to SK4 respectively to defined and applied engineering procedures, processes, systems or methodologies.
2. Identify, formulate, research literature and analyse broadly defined engineering problems reaching substantiated conclusions using analytical tools appropriate to the discipline or areas of specialization (SK1- SK4)
3. Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations SK5.
4. Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, databases and literature (SK8), design and conduct experiments to provide valid conclusions.
5. Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations.(SK6).
6. Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly defined engineering problems.(SK7)
7. Understand and evaluate the sustainability and impact of engineering technology work in the solution of broadly defined engineering problems in societal and engineering contexts. (SK7).
8. Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7).
9. Function effectively as an individual, and as a member or leader in diverse teams.
10. Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to manage projects in multidisciplinary environments.
12. Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

Graduates of the Bachelor of Engineering Technology are internationally employable in one of the pathways of Engineering practice. Graduates may also follow a number of paths in research and development, technical support and application, education and communication, sales, quality and general management, or technocratic roles in local authorities and government. They will be employed for their ability to assess, select and apply generic and specific engineering technology in their practice area, and for ability to work in multidisciplinary teams.

Graduates from the Bachelor of Engineering Technology could progress to the four year Bachelor of Engineering or other relevant level 7 qualifications such as graduate diplomas, and to post graduate study in Engineering and related areas.

## Programme Structure

<b>Component:</b>	<b>Civil Major</b>	<b>Electrical Major</b>	<b>Mechanical Major</b>
<b>Common Compulsory</b>	Courses specified for all learners 135 credits		
<b>Major Compulsory</b> Learners choose one Major	Courses specified for all learners in the Civil Major 120 credits	Courses specified for all learners in the Electrical Major 45 credits	Courses specified for all learners in the Mechanical Major 135 credits
<b>Pathways</b> (credits vary depending on the pathway)	Courses recommended for each of the pathways: Structural, Water and Water Waste, Roading -Transportation, Geotechnical, Environmental 45-60 credits	Courses specified for each of the pathways: Power, Electronic, Computer, Computer Network, Mechatronics, Telecommunications 120-150 credits	No pathways nil
<b>Other Electives:</b>	45-60 credits depending on pathway	30-60 credits depending on pathway	90 credits Courses specified for the Mechanical major
See Academic Regulations for more detail about electives.			

<b>All Majors - Common Compulsory Courses</b>			
<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
MG5001 Engineering Computing	15	5	Nil
MG5002 Engineering Mechanics	15	5	Nil
MG5003 Engineering Communication	15	5	Nil
MG5004 Engineering Mathematics 1	15	5	Nil
MG5005 Engineering Design and Drawing	15	5	Nil
MG6103 Engineering Management Principles	15	6	MG5003
MG7101 Engineering Development Project	30	7	45 credits at L6
MG7121 Professional Engineering Practice	15	7	MG5003

<b>All Majors Common Electives</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
3	MG7025 Project Management	15	7	MG6103
3	MG7026 Risk Management	15	7	MG6103
	MG5090 Heritage, Culture and Sustainability in Engineering	15	5	Nil
	MG6048 Special Topic	15	6	Nil
	MG7047 Special Topic	15	7	Nil
	MG6190 Mathematics 2	15	5	MG5004

<b>Civil Major Compulsory Courses</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
1	MG5107 Civil Materials	15	5	Nil
1	MG5009 Engineering Site Investigation	15	5	Nil
2	MG5006 Land Surveying	15	5	Nil
2	MG5032 Basic Structures	15	5	MG5002
2	MG5008 Fluid Mechanics (Civil)	15	5	MG5002
2	MG5012 Highway Engineering	15	5	Nil
2	MG6005 Civil Engineering Detailing and Modelling	15	6	MG5005
2	MG6106 Civil Engineering Construction Practices	15	6	Ni

<b>Structural Pathway</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
2	MG6046 Structural Principles	15	6	MG5032 MG5107
3	MG6007 Structural Steel and Timber	15	6	MG6046
3	MG6008 Structural Concrete	15	6	MG6046
3	MG7004 Design of Structures	15	7	MG6007 MG6008

<b>Water and Water Waste Pathway</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
2	MG6109 Water and Waste Engineering	15	6	MG5008 (CoReq)
3	MG6110 Water and Waste Treatment	15	6	Nil
3	MG6011 Hydrology and Erosion Management	15	6	Nil
3	MG7005 Urban Drainage Systems	15	7	MG6109

<b>Electrical Major Compulsory Courses</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
1	MG5034 Electrical Principles and MG5035 Electronic Principles	15 15	5 5	Nil Nil
1	MG5014 Electrical and Electronic Principles 1 MG5015 and Electrical and Electronic Principles 2	15 15	5 5	Nil Nil
2	MG6136 Design	15	6	MG5005

<b>Power Pathway</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
2	MG5016 Elements of Power Engineering	15	5	MG5015 or MG5034
2	MG5017 Electrical Machines	15	5	MG5015 or MG5034
2	MG5018 PLC Programming 1	15	5	MG5001 MG5014 or MG5034
2	MG5021 Electronics Manufacturing 1	15	5	MG5015 or MG5035
2	MG6117 Power Distribution	15	6	MG5016
2	MG6118 Sustainable Energy and Power Electronics	15	6	MG5004 MG5014 or MG5034 MG5015 or MG5035
2	MG6019 PLC Programming 2	15	6	MG5018
2	MG6190 Mathematics 2	15	6	MG5004
3	MG6020 Automation	15	6	MG6019
3	MG7110 Power Systems	15	7	MG5016
3	MG7011 Electrical Machine Dynamics	15	7	MG5017

<b>Mechatronics Pathway</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
2	MG5018 PLC Programming 1	15	5	MG5001, MG5014 or MG5034
2	MG5021 Electronics Manufacturing 1	15	5	MG5015 or MG5035
2	MG5026 Instrumentation and Control 1	15	5	MG5014 or MG5034
2	MG6019 PLC Programming 2	15	6	MG5018
2	MG6031 Instrumentation and Control 2	15	6	MG5004 MG5026,
2	MG6032 Fluid Mechanics (Mech)	15	6	MG5002, MG5004
2	MG6033 Mechanics of Machines	15	6	MG5002, MG5004
2	MG6190 Mathematics 2	15	6	MG5004
3	MG6020 Automation	15	6	MG6019
3	MG7017 Robotics	15	7	MG6019, MG6033
3	MG7018 Systems and Control	15	7	MG6031

<b>Mechanical Major Compulsory Courses</b>				
<b>Year</b>	<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
1	MG5033 Electrical Fundamentals OR MG5034 Electrical Principles	15	5	Nil
1	MG5028 Materials Science	15	5	Nil
2	MG5029 Strength of Materials 1	15	5	MG5002 MG5004
2	MG6032 Fluid Mechanics (Mech)	15	6	MG5002 MG5004
2	MG5030 Thermodynamics & Heat Transfer	15	5	MG5004
2	MG6038 Strength of Materials 2	15	6	MG5029
2	MG6033 Mechanics of Machines	15	6	MG5002 MG5004
2	MG6037 Advanced Thermodynamics	15	6	MG5030
2	MG6136 Design	15	6	MG5005

<b>Mechanical Major Elective Courses</b>			
<b>Course Name</b>	<b>Credits</b>	<b>Level</b>	<b>Pre-requisites</b>
MG6039 Applied Computational Modelling	15	6	MG6032 MG6038
MG6040 Product Design Engineering	15	6	MG5002 MG5005
MG6041 Quality and Reliability	15	6	MG5002 MG5004
MG6044 Manufacturing Processes and Production	15	6	MG5028
MG6190 Mathematics 2	15	6	MG5004
MG7030 Air Handling Systems	15	7	MG5030
MG7020 Mechanical Design 2	15	7	MG6136
MG7023 Vibration and Seismic Design for Mechanical Plant	15	7	MG6136 MG6038
MG7022 Energy Engineering	15	7	MG6037
MG7028 Engineering Systems Analysis	15	7	MG5004 MG5005 MG6032
MG7024 Fluids Power & Advanced Fluid Mechanics	15	7	MG6032

## Award of Qualification

To be awarded the Bachelor of Engineering Technology, you must have successfully completed 360 credits which must include a minimum of 75 credits at level 7, and comprising

- common compulsory courses - 135 credits, and
- compulsory courses for major –
  - Civil major 120 credits
  - Electrical major 195 credits
  - Mechanical major 135 credits.
- the balance of credits from elective courses.

*A maximum of 30 elective credits from outside the Bachelor of Engineering Technology are permitted, refer to the Associate Head of School*

### Award titles

Bachelor of Engineering Technology (Civil)

Bachelor of Engineering Technology (Electrical)

Bachelor of Engineering Technology (Mechanical)

Graduation forms can be found [here](#).



## Graduate Diploma in Engineering

### Aims

The aim of the Graduate Diploma in Engineering is to create multi-disciplinary technology professionals who have the ability to undertake high-level design, specification and project management within a specific selection of subject areas.

In addition, the Graduate Diploma provides technology professionals with multi-disciplinary skills and knowledge from strands including Mechatronics, Water and Wastewater, and Structures. This enables graduates to provide optimal design solutions and apply the technical skills to specify and manage projects by comparing and evaluating differing alternatives provided within the discipline strand.

### Graduate Profile

On successful completion of the Graduate Diploma in Engineering, you will have the ability to:

- Apply specialised technical knowledge and skills to a specific engineering field
- Apply skills in an organised approach to problem solving
- Display well-developed critical thinking capabilities, including analysing, evaluating and critically reflecting on information, decisions and behaviour to enable strategic thinking and adaptability in a constantly changing global environment
- Recognise, adopt and where necessary, instil in others ethical dimensions inherent in business decision making having particular regard for issues of social responsibility and sustainable practice
- Exercise self-direction and adopt independent working practices, and an ability to foster these in others
- Accept responsibility for the quality of their own work outcomes, and, where applicable, for the quality of others' work outcomes
- Apply independent learning skills that encourage the regular accessing of new knowledge and information
- Use effective written communication and well-developed inter-personal skills
- Use technology and communication systems effectively.

#### **In completing the Mechatronics Strand you will also be able to:**

- Design, specify, plan, organise, and implement a mechatronic system
- Manage and work effectively with a team of domain specialists in the core technologies of Mechanical Systems, Power Systems, Control Systems and Automation Systems
- Integrate and test multi-disciplinary mechatronic projects
- Compare, contrast and evaluate alternative approaches to mechatronic system designs
- Effectively plan the extension and upgrading of existing implementations.

#### **In completing the Water and Waste Engineering Strand you will also be able to:**

- Analyse and generate solutions for water and waste problems
- Design, specify and plan implementation of water and waste systems
- Effectively plan the extension and upgrading of existing implementations
- Recognise and consider social, political and environment impacts on water and waste management.

**In completing the Structures Strand you will also be able to:**

- Investigate the behavior of structural systems and elements
- Design structures using timber, masonry, steel, and concrete
- Articulate understanding of real-world open-ended design issues.

As a graduate you will also have the appropriate skills and knowledge to pursue further study and professional development opportunities.

**Programme Structure**

The Graduate Diploma is designed so that you can complete the programme in one year's full time study or be able to study part time while in employment. The part time option will enable engineering professionals to undertake further study to broaden their knowledge and currency. The programme must be completed within a 3 year time frame

You must complete 120 credits at Levels 6 and 7 with a minimum of 75 credits at Level 7.

Each strand has compulsory and elective requirements which are detailed below.

All strands have a compulsory 30 credit core compulsory course being either **MG7101 Engineering Development Project** or **WW7103 Applied Research**. You choose either the Project or Applied Research course in consultation with teaching staff.

Course Code	Course Name	Level	Credits	Compulsory /Elective
<b>Mechatronics Strand</b>				
MG7101	Engineering Development Project	7	30	C
<b>OR</b>				
WW7103	Applied Research	7	30	C
MG7017	Robotics	7	15	C
MG7018	Systems and Control	7	15	C
MG6020	Automation	6	15	C
MG6033	Mechanics of Machines	6	15	C
MG7013	Embedded Systems	7	15	C
<b>OR</b>				
MG7024	Fluids Power and Advanced Fluids Mechanics	7	15	C
<b>Choose ONE</b>				
MG6032	Fluid Mechanics	6	15	E
MG6031	Instrumentation and Control 2	6	15	E
MG6019	PLC Programming 2	6	15	E

Course Code	Course Name	Level	Credits	Compulsory /Elective
<b>Water and Waste Engineering Strand</b>				
MG7101	Engineering Development Project	7	30	C
<b>OR</b>				
WW7103	Applied Research	7	30	C
MG7005	Urban Drainage Systems	7	15	C
WW7100	Advanced Water Systems Engineering	7	15	C
WW7101	Water Resources Engineering	7	15	C
<b>OR</b>				
WW7102	Alternative Waste Treatment Engineering	7	15	C
MG6109	Water and Waste Engineering	6	15	C
MG6110	Water and Waste Systems	6	15	C
<b>Choose ONE</b>				
MG6011	Hydrology and Erosion Management	6	15	E
WW7101	Water Resources Engineering	7	15	E
WW7102	Alternative Waste Treatment Engineering	7	15	E

Course Code	Course Name	Level	Credits	Compulsory /Elective
<b>Structures Strand</b>				
MG7101	Engineering Development Project	7	30	C
MG7004	Design of Structures	7	15	C
SE7300	Dynamics of Structures	7	15	C
MG7025	Project Management	7	15	C
<b>OR</b>				
MG7023	Vibration and Seismic Design for Mechanical Plant	7	15	C
MG6007	Structural Steel and Timber	6	15	C
MG6008	Structural Concrete	6	15	C
MG6046	Structural Principles	6	15	C

## Award of Qualification

To be awarded the Graduate Diploma in Engineering (Mechatronics) or the Graduate Diploma in Engineering (Water and Waste Engineering), or the Graduate Diploma in Engineering (Structures), you must successfully complete all requirements for the appropriate strand detailed above, including a minimum of 75 credits at Level 7.

Graduation forms can be found [here](#).