



THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Engineering

Postgraduate Prospectus 2021



No 1
New Zealand
University*



No 1
Global
Reputation**



No 1
In New Zealand
for Employability***

Gain knowledge to contribute to a better world

Engineering is increasingly ubiquitous – both in its variety and visibility. Our postgraduate programmes are designed to develop your abilities to solve problems, innovate and create positive change in our ever-evolving technological landscape.



We all approach postgraduate study for different reasons, but are united in the challenges and thought-provoking questions that we share. As a faculty, we're willing to satisfy intellectual curiosities, contribute to the ongoing developments in our fields and potentially create new knowledge. We welcome you to join us on our ongoing journey.

Te Herenga Mātai Pūkaha/the Faculty of Engineering's research output spans diverse areas, many of them with tangible impact on our regular lives. This means you'll get the chance to learn from globally-recognised experts whose influence extends to decisions outside the classroom. We boast strong collaborations with industry and other research organisations, and work in increasingly cross-disciplinary fields – all these ensure that we're creating knowledge pathways towards the intellectual independence, practical skills, and empathy to understand our world.

Engineering is becoming as diverse as those who pursue it. This is valuable to our potential to address tomorrow's global challenges – from environmental sustainability and structural safety, to the design of software and advanced medical systems. To realise this potential, we are committed to fostering collaborative environments for all our students, regardless of their professional and research backgrounds.

Congratulations on taking a step towards becoming part of our outstanding whanau. We look forward to seeing you apply your passions to better academia, industry and society.

PROFESSOR GERARD ROWE
Acting Dean of Engineering
The University of Auckland



LEADING THE WAY

NEW ZEALAND'S HIGHEST RANKING
UNIVERSITY AND ENGINEERING FACULTY

TOP UNIVERSITY IN NEW ZEALAND FOR **EMPLOYABILITY**

According to the Times Higher Education World University Rankings 2020, QS World University Rankings 2020 and QS Graduate Employability Rankings 2019.

FIRST IN NEW ZEALAND IN



Chemical
Engineering



Electrical
Engineering



Civil and Structural
Engineering



Mechanical
Engineering

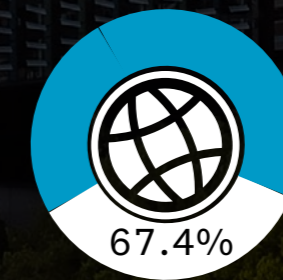
According to the QS World University Rankings by Subject 2020.

IN GOOD COMPANY

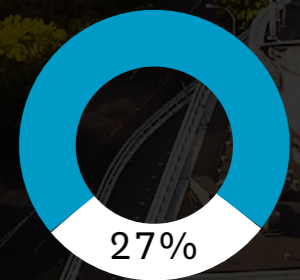
MORE THAN **1,400** POSTGRADUATE STUDENTS ENROLLED IN 2019



student clubs, associations
and networks



international students
from 69 countries



postgraduate women in
engineering

Cover attributions: *QS World University Rankings 2020 | **QS World Rankings Academic and Employer Reputation 2020 | ***QS Graduate Employability Rankings 2019
Disclaimer: Although every reasonable effort is made to ensure accuracy, the information in this document is provided as a general guide only and is subject to alteration. All students enrolling at the University of Auckland must consult its official document, the current Calendar of the University of Auckland, to ensure that they are aware of and comply with all regulations, requirements and policies. Publication date: May 2020.

BUILT FOR RESEARCH

We are proud to be a recognisable force – both in New Zealand and internationally – in the development of a broad range of research, from fundamental to applied, with demonstrable positive impacts on society and industry.

Te Herenga Mātai Pūkaha's research collaborations extend beyond our immediate physical spaces; we're seen working alongside private industries, government organisations and other research institutions, and encourage cross-disciplinary projects in emerging fields with global demand. As a postgraduate student, you'll have access to the best subject matter experts, research centres, facilities and equipment that we can offer.

3 CAMPUSES
CITY, NEWMARKET AND GRAFTON
 AND A BRAND NEW BUILDING WITH 50 SPECIALIST LABS – ALL HUBS FOR MULTIDISCIPLINARY ACTIVITY, HOUSING A TOTAL OF OVER 3,000 PIECES OF PURPOSE-BUILT EQUIPMENT LOCATED ON CITY-ADJACENT GROUNDS WITH PLENTY OF ACCESS TO PUBLIC TRANSPORT, SO YOU CAN CONVENIENTLY ENJOY WHAT AUCKLAND OFFERS OUTSIDE OF STUDY




“Doctoral study was a time-efficient way to reach the pinnacle of educational achievement and embark on an interesting career path. The lab facilities here allowed me to conduct world-class structural and seismic testing, and the novel outcomes enabled me to undertake subsidised travel to present at international conferences, which I benefitted from and enjoyed a lot.

“My research involved the development of a cement-stabilised, flax-fibre reinforced, rammed earth housing solution for rural Māori communities. It involved all stages of a project: finding a community to work with, identifying and characterising local sources of materials, structural and seismic testing, facilitating Mauri Model decision-making workshops with all stakeholders, designing the structure, obtaining building consent for the dwelling, training local individuals, project managing the construction and commissioning the dwelling.

“Not every research project is as open or as unorthodox as the one I had, but I liked it. I enjoyed learning about Māori culture and indigenous knowledge, using them to inform my methodology and applying them to a real-world housing solution. I've made meaningful connections and close friendships with individuals in the Māori community from Ahipara and Rotoiti, where my research work was based.

“Following my PhD, I took up an R&D position, which drew on a lot of my technical knowledge, and my current role benefits from my experience engaging with many different stakeholders. This now includes local councils and Iwi, facilitating decision-making processes and applying engineering skills to large-scale projects, including a roading improvement project in Auckland, the design and implementation of a 5-star residential development and a regional conference centre in New Zealand.”

JOHN CHEAH
 Graduate: PhD in Civil Engineering
 Current: Project Managing Consultant,
 Synergine Group Limited



The Acoustics Research Centre is a collaborative effort between experts from Mechanical Engineering, Audiology, Architecture, and Music, focusing on research, teaching and the delivery of professional services.

The Boundary Layer Wind Tunnel is New Zealand's largest wind tunnel. It contains instrumentation for many aerodynamics studies, such as investigating pedestrian flows around buildings, aerodynamic drag and the power of elite cyclists, and pressures on model racing cars.

The Centre for Advanced Composite Materials blends expertise from engineering, science and medicine to conduct fundamental, applied and industry-focused research on synthetic and bio-based composite materials, and their processes, design and performance.

The Creative Design and Additive Manufacturing Lab focuses on technologies, design methods, and ways to develop AM materials with a goal to see the processes surrounding these evolve from prototyping methods to a high-value manufacturing reality.

The Civil Structures Hall holds Australasia's largest 'strong wall' at 9m high, a 200m² strong floor and a shake table to develop full-scale projects, including earthquake testing.

The Complex Fluid Dynamics Laboratory contains high-speed lasers, stereo-scopic particle image velocimetry and rheometry used to investigate the properties and behaviours of a wide variety of fluids.

The Geothermal Institute is one of the world's first research and training centres for the field. As home to the world's largest group of geothermal researchers, they also offer consulting services to support the planning, development and management of projects around the globe.

The Human Aspects in Software Engineering Lab supports projects focused on improving software practices and processes, particularly where the field relates to human behaviour and needs.

Investigating language development, pronunciation recognition and vocal health by applying signal processing techniques

ASSOCIATE PROFESSOR CATHERINE WATSON



Leading the way in structural steel innovations for earthquake-proofing and improved fire safety

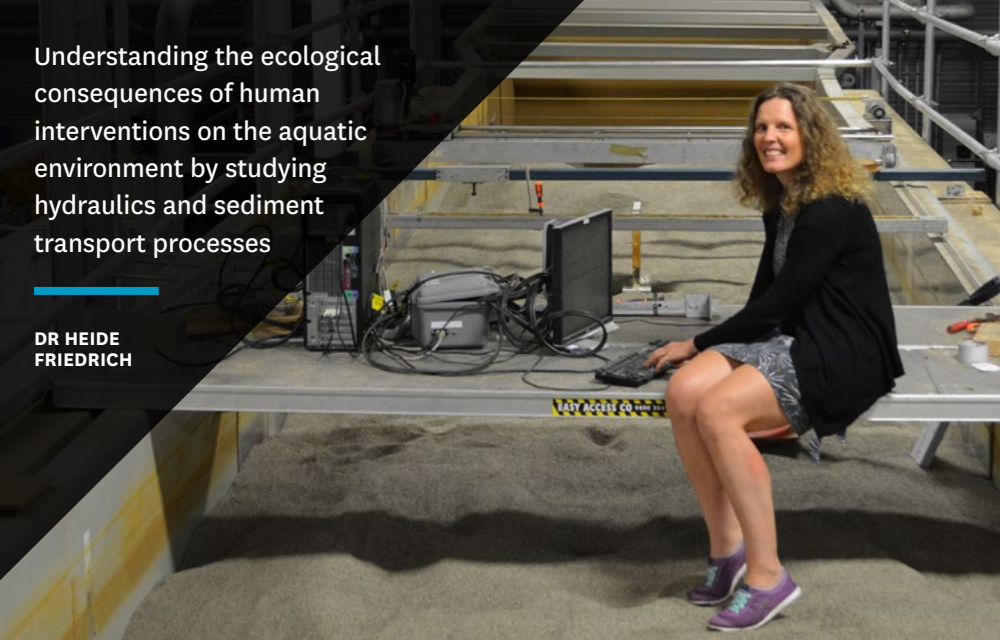
ASSOCIATE PROFESSOR CHARLES CLIFTON



Operations Research applied to resource utilisation planning and generating efficient healthcare services

DR MIKE O'SULLIVAN JR and ASSOCIATE PROFESSOR CAMERON WALKER





Understanding the ecological consequences of human interventions on the aquatic environment by studying hydraulics and sediment transport processes

DR HEIDE FRIEDRICH



The Hydraulic Engineering Laboratory

has a 45m-long flume – New Zealand’s largest – capable of pumping sediment and water, and is used to simulate conditions in rivers, such as flow and erosion in river beds, and at hydraulic structures.

The Laboratory for Industry 4.0 engages with essential industries to develop and test new concepts for the control of distributed automation systems within the context of the Industrial Internet of Things and Cloud Computing.

The Nanomechanical Research Laboratory

is unique in its ability to test both traditional and hydrated biological materials. It specialises in measuring the properties of small-scale materials and thin films using advanced equipment including the Hysitron TribolIndenter, MTS XP and Activelife Biodent.

The Light Metals Research Centre

has a dozen academics and over 20 professional and doctoral researchers dedicated to research development, technical support, training and maintaining long-standing industry relationships in this specialised field.

The Robotics and Intelligent Systems Laboratory

provides expertise in robot programming, human interaction and intelligent systems including machine learning, artificial intelligence and speech communication, with applications in healthcare and agriculture.

Te Pūnaha Ātea/the Space Institute

is a multidisciplinary centre of expertise capable of executing space missions and developing applications, with a goal to further New Zealand’s involvement in space.

The Transportation Research Centre

collaborates with local government, industry and international research institutes to cover a broad range of research, from road construction materials and infrastructure asset management to traffic studies and public transport.

For a list of available postgraduate research opportunities, visit:
www.engineering.auckland.ac.nz/researchprojects
www.findathesis.auckland.ac.nz

“A conversation with an old lecturer planted the idea to return to uni. I was in my early career and looking for a new challenge, though I had initially anticipated that it would be through a new job rather than heading back to study. I thought about how I enjoyed my research experience throughout the fourth year of my undergraduate degree and knew that it was something that I was good at.

“My PhD research involves an in-depth look at cartilage – the smooth covering over the ends of bones – to see the interactions between individual collagen fibres that make up the tissue. We are trying to understand how this changes over time, so we can learn more about how diseases like osteoarthritis progress, and how we might replace these natural materials with high-quality substitute materials in the event of replacement surgery.

“Research may seem a lot more individual, but you still need to work well with others. You need to be brave enough to put your thoughts and ideas forward and in doing so, ensure that you are creating a safe working environment where others feel that they can do the same. These skills aren’t unique to one particular industry – they are skills for life. Being in industry made me feel confident in my ability to manage my time, make independent decisions and ask for help.

“I am interested in staying in research for a period of time, but I am also aware of a growing conversation highlighting a lack of diversity – particularly a lack of Māori and Pasifika representation – in STEM careers. Further to my research I would want to use my skills and experience gained to get involved in initiatives which help to enable and empower other young Māori and Pasifika, preparing them for a career in engineering, whether that be in industry or in academia.”

EMMA TE TUMANAKO BROWN
Ngāpuhi, Ngāi Te Rangī, Ngāti Maru
Current PhD candidate and Professional Teaching Fellow in Chemical and Materials Engineering



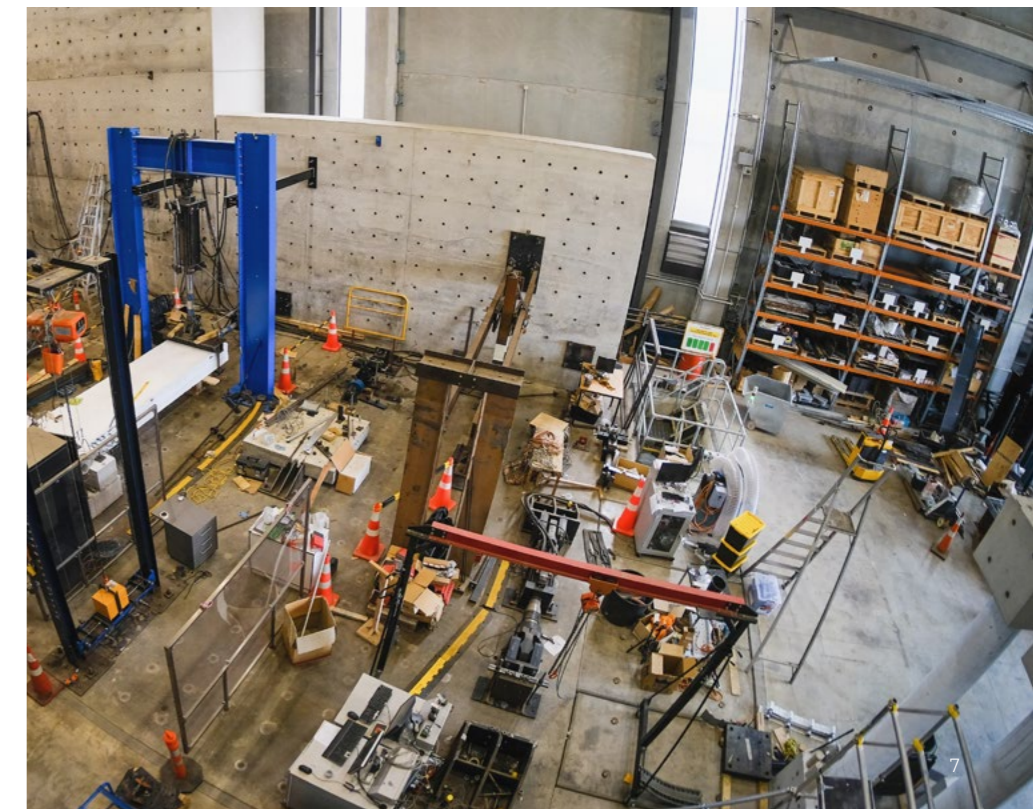
Making advancements in fundamental research for smarter regulation of stem cells to improve cancer treatment

DR JENNY MALMSTROM



Pioneers in Inductive Power Transfer, the basis of wireless power technologies of the future

EMERITUS PROFESSOR JOHN BOYS and PROFESSOR GRANT COVIC



Our programmes

Our variety of postgraduate programmes reflects the diversity of our faculty and the ever-evolving engineering industry. Choose from over 20 specialist areas, study full-time or while working, pursue in-depth research by writing a thesis, or expand your practical skills with a coursework-based qualification.

Postgraduate Certificate in Engineering (PGCertEng)

Taught (60 points)

Full-time (6 months) or part-time (2 years)

This certificate provides graduate engineers with advanced technical or management foundations and new industrial perspectives, expanding their employability in their sector of choice. A Plastics specialisation is available for those wishing to pursue further career opportunities in materials and processing in this field, and can be completed by distance learning.

www.engineering.auckland.ac.nz/pgcerteng

Postgraduate Certificate in Geothermal Energy Technology (PGCertGeothermTech)

Taught (60 points)

Full-time (6 months) or part-time (2 years)

This world-recognised programme gives engineers and scientists practical and applied skills in the geothermal energy industry, equipping them to pursue diverse roles in this sector. It includes two week-long field trips and a block structure to fit in with work commitments.

www.engineering.auckland.ac.nz/pgcertgeothermtech

Postgraduate Certificate in Light Metals Reduction Technology (PGCertLMRTech)

Taught (60 points)

Full-time (6 months)

A prestigious and globally respected certificate that equips engineers with highly valuable and lucrative skills to run light metal smelters across the world. It includes a stimulating three-week residential course at a working smelter, along with distance learning carried out at home to minimise disruption to your career.

www.engineering.auckland.ac.nz/pgcertlmrttech

"I am a third-culture kid from the Philippines, where I worked in a non-profit organisation that collaborated with the private sector towards building disaster-resilient communities. Climate change is going to continue to happen on a global scale whether we like it or not, and I aim to help empower others to adapt to inevitable environmental changes through my work."

"New Zealand was definitely a factor in my decision to study here. Despite being exposed to natural hazards, New Zealand remains a rapidly growing first-world economy, with disaster management in the forefront of the government's policies. This is what motivated me to choose to study here – to not only learn directly from world-recognised research and best practices, but to experience first-hand how this country continues to develop resilience within its cities and communities."

"It is also considered one of the safest and most beautiful countries in the world and having lived here for over a year, I can attest to its beauty and safety. You also meet so many people from all walks of life! I've made long-lasting friendships, and have received plenty of support as an international student, making it easy to adjust to the academic lifestyle here."

"My home country is one of the most disaster-prone places in the world – at third place, according to the 2018 World Risk Index. It's imperative to be able to adapt to a variety of challenges, build resilience, and prepare for a climate-defined future. One of my career goals is to become a disaster resilience specialist, and my programme is helping me to do that through multidisciplinary knowledge and skills. I want to become an active promulgator of change and development towards building a disaster resilient Philippines."

MIGEL ESTOQUE

Graduate: Master of Disaster Management

"For my thesis, I am investigating the use of high-level approaches for designing hardware to be used in the Square Kilometre Array (SKA) for processing signals from stars. This involves working with international collaborators who provide the necessary radio astronomy algorithms, while I get them to meet the real-time performance requirements set by the SKA."

"I love being able to learn more about radio astronomy, a completely different field to what I've previously experienced, and see how our work will be used to perform science on extremely large data sets. I also really enjoy the opportunity to teach the next generation of students."

"As someone who identifies as transgender and non-binary, being a part of groups such as Rainbow Engineering and Trans on Campus has proved to be quite important in finding likeminded individuals able to support me and allow me to become who I really am. I have since become a leader for Rainbow Engineering as well as the Rainbow Representative for the University's Postgraduate Student Association. This has provided me a platform to advocate for LGBTQIA+ students and be involved with the University's decision-making processes."

"A large part of my reasoning for continuing study here was the people. Even outside of the Rainbow community, I have met a wide range of people who have been open to and accepting of who I am. PhD students who tutored me as an undergraduate later became incredible role models for me in both teaching and research. My supervisor has proven to be incredibly supportive through my transition. While large institutions can be slow to change, there are people working very hard to make positive changes happen."

KRYSTINE DAWN SHERWIN

Current: PhD in Computer Systems Engineering

Postgraduate Diploma in Engineering (PGDipEng)

Taught (120 points)

Full-time (1 year) or part-time (4 years)

This qualification gives students with a three-year engineering bachelors degree an opportunity to build on their previous skills, resulting in a well-rounded knowledge of the principles, concepts and ideas that underpin a chosen specialisation. It is designed to provide a pathway to further study in a masters programme.

www.engineering.auckland.ac.nz/pgdipeng

Postgraduate Diploma in Operations Research (PGDipOR)

Taught (120 points)

Full-time (1 year) or part-time (4 years)

The PGDipOR is offered alongside the Faculty of Science to equip engineers with problem-solving skills in the design and management of large or complex systems in business, industry and government. It is of particular interest to those pursuing roles in predictive or prescriptive analytics in a broad selection of industries.

www.engineering.auckland.ac.nz/pgdipor

Master of Disaster Management (MDisMgt)

Taught (120 or 180 points)

Full-time (1 year or 18 months) or part-time (2 or 3 years)

Draw from expertise throughout the University – Engineering, Development Studies, Science, Population Health, Environmental Law, and Architecture and Planning – to prepare for leadership roles in disaster risk reduction, response, recovery and resilience.

www.engineering.auckland.ac.nz/mdismgt

Master of Earthquake Engineering (MEqEng)

Taught (120 or 180 points)

Full-time (1 year) or part-time (3 or 4 years)

A coursework-based programme that fulfils increasing industry needs for the next generation of leaders, drawing from our internationally-recognised expertise in geotechnical and structural engineering.

www.engineering.auckland.ac.nz/meqeng

Master of Energy (MEnergy)

Taught or research (120 or 180 points)

Full-time (1 year) or part-time (2 or 4 years)

This programme is ideal for engineering, science or commerce graduates who want to develop their technical, business or policy-related expertise, leading to global, sustainable career pathways, including positions such as energy consultants, project managers, or energy modelling analysts.

www.engineering.auckland.ac.nz/menergy

Master of Engineering (ME)

Research (120 or 180 points)

Full-time (1 year or 18 months) or part-time (2 or 3 years)

Write a thesis under supervision by leading academics and researchers in your chosen specialisation. You will undertake a stimulating mix of theoretical and experimental research to solve real-world problems at the cutting edge of engineering advancement, equipping you for a career in industry or opening up the potential for further study.

www.engineering.auckland.ac.nz/me



Master of Engineering Project Management (MEPM)

Taught (120 or 180 points)

Full-time (1 year or 18 months) or part-time (4 or 6 years)

A career-focused qualification that capitalises on New Zealand's position as a cultural force in the world of successful start-ups. The MEPM provides key management practices as you study towards an industry-recognised professional certification.

www.engineering.auckland.ac.nz/mepm

Master of Engineering Management (MEMgt)

Taught (120 points)

Full-time (1 year) or part-time (4 years)

This prestigious programme offered by the Faculty of Engineering and the University of Auckland Business School is viewed as 'an MBA for engineers', and provides you with the technical foundations, project management skills and business acumen needed to pursue leadership roles in technologically-driven companies.

www.engineering.auckland.ac.nz/memgt

Master of Engineering Studies (MEngSt)

Taught or research (120 or 180 points)

Full-time (1 year or 18 months) or part-time (4 or 6 years)

A primarily taught masters with diverse specialisations, allowing you to tailor your study towards your professional goals and interests. Gain applied knowledge to pursue roles with regulatory, management or product development scopes. A research option is available for the Food Engineering, and Medical Devices and Technologies specialisations.

www.engineering.auckland.ac.nz/mengst

Master of Operations Research (MOR)

Research (120 points)

Full-time (1 year) or part-time (2 years)

The MOR gives students from a variety of backgrounds – including arts, commerce, engineering or science – skills in network design simulations and dynamic programming to perform rigorous intellectual analysis, as well as solve complex industry problems in healthcare, transport, finance, energy, telecommunications, government and manufacturing.

www.engineering.auckland.ac.nz/mor

Doctor of Philosophy (PhD)

Doctoral research

Full-time (3–4 years); a part-time option is available to domestic students only

The PhD involves undertaking advanced, independent and original research. You will be able to pursue a specialisation of your choice under the supervision of – and by collaborating with – our world-class academics, and gain the advanced knowledge needed for specialised industry or consulting positions, or teaching or academia.

www.auckland.ac.nz/phd

Subject	PGCert	PGDip	Taught masters	Research masters	Doctorate
Biomedical Engineering				r	r
Chemical and Materials Engineering	✓	✓	✓	✓	✓
Civil Engineering	✓	✓	✓	✓	✓
Computer Systems Engineering	✓	✓	✓	✓	✓
Construction Management	✓	✓	✓	r	r
Disaster Management			✓	r	r
Earthquake Engineering			✓	r	r
Electrical and Electronic Engineering	✓	✓	✓	✓	✓
Energy ¹	✓	✓	✓	✓	r
Engineering Management ²			✓		r
Engineering Science	✓	✓	✓	✓	✓
Environmental Engineering	✓	✓	✓	✓	r
Food Engineering	✓	✓	✓	✓	r
Geotechnical Engineering	✓		✓	r	r
Geothermal Energy Technology	✓			r	r
Light Metals Reduction Technology	✓			r	r
Mechanical Engineering	✓	✓	✓	✓	✓
Mechatronics Engineering	✓	✓	✓	✓	✓
Medical Devices and Technologies	✓		✓	✓	r
Operations Research ³		✓		✓	✓
Polymer Engineering	✓		✓	r	r
Project Management	✓		✓		
Software Engineering	✓	✓	✓	✓	✓
Transportation Engineering	✓	✓	✓	r	r

¹ Interfaculty with Science and Business. ² Interfaculty with Business. ³ Interfaculty with Science.
r Available as a research area in the associated department

FUNDING YOUR STUDY

\$40 MILLION

in postgraduate scholarships are offered by the University of Auckland each year

NEARLY
400
POSTGRADUATE
SCHOLARSHIPS
OFFERED ACROSS THE
UNIVERSITY

FIND ONE THAT SUITS YOU AT www.engineering.auckland.ac.nz/scholarships

Guaranteed scholarships are available to domestic research students and PhD applicants with a qualifying programme from a New Zealand university who meet GPA requirements: www.auckland.ac.nz/makethegrade

Summer Research Scholarships give you a \$6,000 tax-free stipend to enhance your CV and gain research experience: www.summer.ac.nz

Doctoral students receive an annual stipend paid into their PRess accounts for up to four years to cover direct research costs, such as overseas conferences: www.auckland.ac.nz/press-accounts

Admission and application

This is a general guide. Please refer to www.auckland.ac.nz/pg-entry-reqs for detailed information.

Admission to postgraduate programmes

• **Admissions for 2021 close** on 8 December 2020 (Semester One) and 4 July 2021 (Semester Two) **with the following exceptions:**

• Postgraduate Certificate candidates should refer to the programme websites for up-to-date information on admission deadlines.

• Eligible candidates can apply for a PhD throughout the year.

• Information on your fees is available on www.auckland.ac.nz/fees; this is based on your subject choices and workload.

• **English language requirements:** We require an overall IELTS academic score of 6.5, with no bands below 6.0. See www.auckland.ac.nz/pg-english-reqs for approved alternatives to IELTS.

• **Grades from previous study:** Grades or marks achieved at the University of Auckland are given a grade point average (GPA). Grades obtained at other institutions are converted to grade point equivalent (GPE) on our scale. See www.gpecalculator.auckland.ac.nz for more information.

Entry requirements

Postgraduate certificates or postgraduate diplomas

You must have completed an undergraduate degree at a recognised tertiary institution, in a field relevant to your specialisation. Visit our website for GPA or GPE requirements.

Masters degrees

You will need a GPA, or GPE of 4.0 for the Master of Engineering Studies or Master of Engineering Project Management. For all other masters programmes, a GPA or GPE of 5.0 is required. If you don't meet this criteria, you may begin your pathway into a masters programme by undertaking our one-year Postgraduate Diploma in Engineering.

• **120-point programme:** a four-year bachelors degree in engineering where the final year consists of postgraduate-level study relevant to your chosen specialisation

• **180-point programme:** an undergraduate degree in engineering at a university (or similar institution) in a field relevant to your chosen specialisation

Doctoral degrees

You must be able to carry out independent research and have completed a significant research project, dissertation or thesis, at university. Acceptance into our doctoral programme is dependent on the availability of supervision and facilities.

• **Applicants with New Zealand qualifications** must have completed a postgraduate bachelors (honours) degree with first class or second class (division 1) honours, or a masters degree with first class or second class (division 1) honours, in a field related to your doctoral studies.

• **Applicants with overseas qualifications** must have completed a masters-level qualification in a field related to your doctoral studies with a GPE of at least 5.5.

How to apply

Applying for a non-doctoral programme

• Follow the step-by-step guide at www.auckland.ac.nz/pg-admission.

• The Application for Admission is available at www.apply.auckland.ac.nz, where you can also check your application status and see what supporting documents you will need to provide.

• If you applied for an intake in the following semester, a decision will be made within four weeks. Delays may occur for future semester intakes, during peak admission periods, or if documents take longer to process.

Applying for a PhD programme

• Make sure you meet all entry requirements and have decided on an area of interest or potential research topic.

• Apply at www.auckland.ac.nz/applydoctorate.

• Assessment of your doctoral application can take eight weeks or longer. You can check your application status online and see what supporting documents are required.

International students

A copy of your offer of place from the University is required to supplement your visa application. We recommend starting your University application as soon as possible and contacting an overseas representative for help at www.auckland.ac.nz/overseasrep.

**Contact**

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Auckland, New Zealand

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or 923 1969 (within Auckland)
or +64 9 923 1969 (International)

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