

What can I do with a degree in Mechanical Engineering?

Mechanical Engineering.



What is Mechanical Engineering?

Mechanical engineers design and develop things that move or have moving parts – from aeroplanes to wind turbines to dishwashers, from the macroscopic (large) to the nanoscopic (very small). Mechanical engineers are systematic thinkers with a sense of social responsibility that leads them to constantly seek better ways of doing things.

Many mechanical engineers specialise in areas such as materials, dynamics and controls, product design, manufacturing, energy and thermodynamics, and mechanics. Others cross over into other disciplines, working on everything from artificial organs in bioengineering to enhancing the field of nanotechnology.

Mechanical engineers may design a component, a machine, a system or a process, and ensure the product functions safely and efficiently, and can be manufactured economically.

Learn more

It is important to do some research when planning a future career. Speak with, ask questions of, and follow relevant professional bodies, organisations, companies, thought leaders and industry professionals to learn more about:

- Career opportunities, work environments and salary information
- Education and training requirements.

Examples of professional bodies

- Engineering New Zealand
www.engineeringnz.org
- The Association of Consulting Engineers New Zealand Inc. www.acenz.org.nz
- New Zealand Heavy Engineering Research Association www.hera.org.nz
- American Society of Mechanical Engineers
www.asme.org

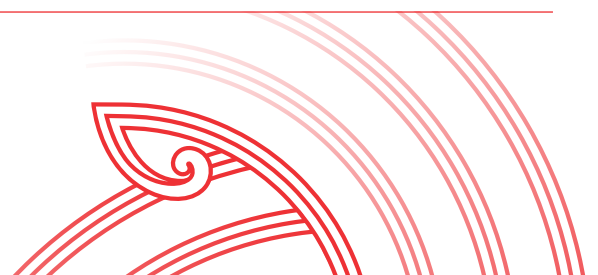
Career and study information

Some study pathways and degrees have a recommended school background, and some careers may require further study beyond a first degree or additional experience.

Gather helpful information from:

- Subject-specific content at
www.canterbury.ac.nz/beng-honours
- Job profiles on career websites like
www.careers.govt.nz
- Job adverts/vacancy descriptions
- Industry professional bodies.

This resource is part of a set of brochures focused on subject majors; many can also be studied as minors.





Career and study information continued

UC students can choose to complete a minor alongside Mechanical Engineering in either:

- Aerospace Engineering
- Biomedical Engineering

For more information, visit:

📄 www.canterbury.ac.nz/study/academic-study/subjects/mechanical-engineering

What skills can graduates gain?

Through studying a degree in Mechanical Engineering, graduates develop a valuable set of skills that are transferable to a range of careers within and outside of engineering. These skills can include:

- Practical application of engineering technology and science
- Coding real life observations into mathematical expressions to be able to predict performance/behaviour
- Mechanical and computing abilities
- Analytical and critical thinking
- Logical and quantitative thinking
- Problem solving and attention to detail
- Self-management, resilience and adaptability
- Teamwork and leadership
- Creativity and innovation.

Applied learning

Students undertake 800 hours of work experience as part of this engineering degree, providing them with a good understanding of the industry and the confidence to apply their skills in a workplace setting. This experience can deepen students' skillset, awareness of others, working knowledge and employability.

What do employers look for?

Many employers look for generic skills such as communication, client/customer-focus, bicultural competence, cultural awareness, teamwork and initiative.

With technology, globalisation, and other drivers changing society, skills such as resilience, problem solving, and adaptability are important.

Skills that are likely to grow in importance include analytical and creative thinking, systems thinking and technological literacy.*

*World Economic Forum: www.weforum.org/agenda/2023/05/future-of-jobs-2023-skills

How can these skills be developed?

- Some skills are gained through studying
- Extra-curricular activities can help, such as getting involved in clubs, mentoring, cultural groups, part-time work or volunteering
- Be open to professional and personal development opportunities, whether it is undertaking work experience, overseas exchange, skills seminar, or joining an industry group.

Where have graduates been employed?

Mechanical engineers may work in areas such as product design, power generation, transport vehicles, medical technology, building services, manufacturing, controls, and materials.

Graduates have been employed in:

- Manufacturing e.g. Fisher & Paykel Healthcare, Talbot Technologies, Ravensdown Fertiliser, Springfree New Zealand, Fonterra
- Consulting e.g. Beca, Opus International Consultants, WorleyParsons, AECOM, Aurecon
- Acoustics e.g. Marshall Day Acoustics, BKL Consultants
- Construction e.g. Leighton Contractors, Fletcher
- Infrastructure e.g. Westnet Rail, Kiwirail
- Technology e.g. Schlumberger, Seagate, Syft Technologies
- Natural resources e.g. Halliburton, Woodside Petroleum, Altona Refinery
- Aviation, aeronautics and defence e.g. ICON Aircraft, Sailing Yacht Gliss, Royal New Zealand Air Force, Air BP, Flight Structures Ltd, Airways New Zealand, Lockheed Martin Space Systems, Rocket Lab
- Electricity and energy services e.g. Transpower, TFN Energy Ltd, EDF Energy, Energy NZ
- Research and development e.g. Dow AgroSciences, Callaghan Innovation
- Product design e.g. InFact Limited, Motovated, Mechanix Design Solutions, DESIGNSense.

What jobs and activities might graduates do?

Graduates with this degree are employed in a range of jobs — see some examples below.

Note: This list is not exhaustive, and some jobs may require further study, training or experience. It is recommended to start with the section 'How can I gain a sense of career direction?'

Mechanical engineer

- Investigate and optimise the use of energy, machinery and materials for specific applications
- Design products and manufacturing processes
- Advise on the design, fabrication and repair of equipment, products and services

Aeronautical and aircraft maintenance engineer

- Ensure safe flight performance of aircraft
- Investigate aircraft faults and defects and approve maintenance and repair processes
- Oversee aircraft design and/or modification
- Test aircraft parts and systems
- Check that regulations and requirements are met

Design engineer, product development engineer

- Use software to develop new product ideas
- Advise clients on plans and budgets
- Liaise with suppliers and manufacturers
- Design and test prototypes

Process engineer

- Plan, manage and implement the control of a manufacturing process which turns raw materials into an end product
- Ensure the company creates goods efficiently, cost-effectively and to a precise standard
- Set budgets, timeframes, and supervise staff

Operations and fabrications engineer

- Develop, install and restore products
- Deal with fabrication processes
- Ensure quality of product/production according to standards, specifications and tolerances

Software engineer

- Analyse customer needs, evaluate computer software and research new technologies
- Identify solutions and develop software programs for new products or enhancements

Instrumentation and controls engineer

- Design a range of robotics, sensors, actuators and smart products for varied application e.g. medicine, electronics, farming
- Set up and monitor dynamic systems
- Conduct experiments in product design and safety

Energy / Thermodynamics engineer

- Design and develop energy-efficient processes
- Effectively analyse and resolve thermo-technical issues of facilities

Consultant engineer

- Plan, manage and supervise projects
- Conduct feasibility studies, prepare estimated costs, and help secure patents
- Find solutions to problems
- Ensure legal obligations are met

Quality engineer, test engineer

- Design tests to check software/systems/processes/products
- Identify issues, defects or bugs, and fix them

Project engineer, project manager

- Manage project plans, timelines, costs, compliance
- Manage procurement, purchasing, contracts
- Liaise with project staff and clients

Tertiary lecturer / tutor

- Prepare and give lectures and tutorials
- Set and mark assignments and exams
- Conduct research, write and publish articles

Examples of other job titles and careers include:

- Research engineer
- Acoustic Engineer
- Chief technology officer
- Heavy vehicle engineer
- Industrial engineer
- Intellectual property engineer
- Maintenance engineer
- Marine engineering officer
- Materials engineer
- Propulsion Engineer.

Further study options

Further study options for Mechanical Engineering are available from postgraduate certificate to master's and PhD levels. Expertise can also be developed in areas such as product design, manufacturing, building services, power generation, transportation, and medical technologies.

Further study may facilitate career benefits such as specialist skills, entry into a specific occupation, higher starting salary, faster progression rate, and advanced research capability.

It is important to determine which, if any, further study options align with future career aspirations.

For further UC study options visit:

www.canterbury.ac.nz/study/academic-study

How can I gain a sense of career direction?

Understanding yourself and others is important to gain a sense of direction. This grows with experience; therefore, trying new things and reflecting on an ongoing basis is important.

Career planning checklist

Discover and reflect on:

- Your values, interests, strengths, abilities, and aspirations
- Your connection to whānau, people, and places
- Lifestyle preferences and location
- The skills you want to gain, use, or enhance

Engage in a variety of experiences to learn about:

- How you want to contribute to society, the environment, and global challenges
- The tasks, responsibilities and work environments you prefer
- Your work values, priorities and interests

Learn more and gather career and study information (refer to page one of this resource)

- Speak with people working in careers that interest you; check the realities of a job/career
- Gather information from various sources

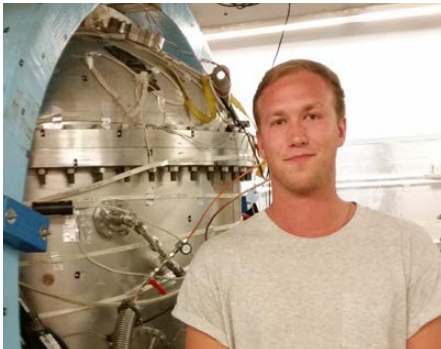
Identify your next steps

- Talking to a career consultant can help you to identify your next steps. Visit: www.canterbury.ac.nz/life/jobs-and-careers

What have other students and graduates done?

Explore career stories of students' university experiences and UC alumni who make a difference globally in varied ways.

Visit: www.canterbury.ac.nz/about-uc/why-uc/our-students/student-stories



George

Venture Fellow, WME Ventures,
New York, USA

Master of Science in Plasma Physics,
Columbia University, New York, USA

Bachelor of Engineering with Honours in
Mechanical Engineering

What did you enjoy about studying at UC?

The Mechanical Engineering department is strong at UC with a wealth of talented and friendly staff. I enjoyed working with my lecturers and the department technicians — I am extremely appreciative of their guidance as it has served me well since leaving university.

How was the experience in your first graduate job?

I worked on an engineering project team for the construction of a new \$200m Granodiorite mine in New South Wales, Australia which was an amazing first job. I worked with an impressive engineering team from all over the world.

How did your degree prepare you for your chosen field?

Mechanical engineering is definitely the most wide-ranging engineering discipline and it has prepared me well. It has given me the ability to work a number of different capacities, many of which would be considered outside the domain of mechanical engineering.

There was a huge emphasis on the hands-on side of engineering. We were often reminded of the importance of critical thinking, problem solving and creativity, which are the real tools for success as an engineer.

How did you get overseas and what did you do in the US?

I was awarded a Fulbright Scholarship to attend Columbia School of Engineering and Applied Science in New York, where I completed my Master of Science degree in Plasma Physics.

I spent most of my time at Columbia working on the experimental tokamak HBT-EP. Energy experts believe that tokamak technology is the holy grail of modern electricity. Ultimately, I want to be involved in the development of new forms of sustainable and renewable energy.

Where are you now?

WME Ventures targets investment opportunities in early stage, high growth technology companies. At WME, I am honing my analytical skills and gaining business knowledge of the technology sector in the US. Employment at a technology-focused venture capital fund is providing me with first-hand exposure to novel ideas while allowing me to create great contacts at the companies we are interacting with.

Career guidance

Career services are available for future and current students, and recent graduates. To learn more, contact:

Te Rōpū Rapuara | Careers

T: +64 3 369 0303

E: careers@canterbury.ac.nz

www.canterbury.ac.nz/life/jobs-and-careers

Helpful career insights

- Speaking with employers is key to finding opportunities; not all jobs are advertised
- Developing an online presence is useful as employers can search for future employees online
- Learning about recruitment patterns and where to find opportunities is important.

Study advice

Student Advisors at UC help with questions focused on starting, planning and changing studies. To connect with Student Advisors, visit:

www.canterbury.ac.nz/study/study-support-info/study-support

Future students – contact:

The Future Students team

T: 0800 VARSITY (0800 827 748)

E: futurestudents@canterbury.ac.nz

First year students – contact:

Kaitoko | First Year Student Advisors

T: +64 3 369 0409

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www.canterbury.ac.nz/study/academic-study/engineering

