

AUT



A FUTURE IN
**MECHANICAL
ENGINEERING**

WHAT IS MECHANICAL ENGINEERING?

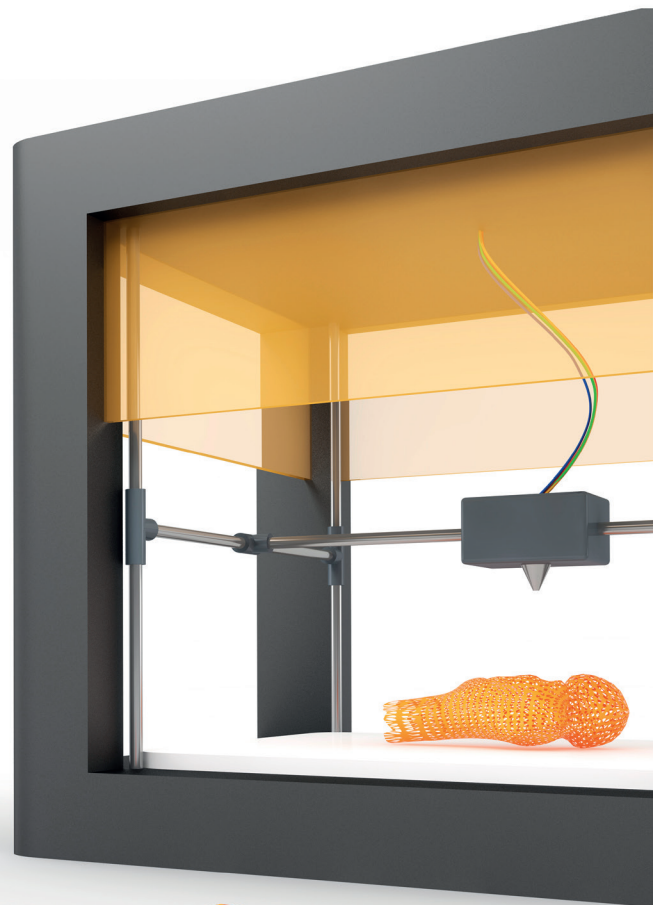
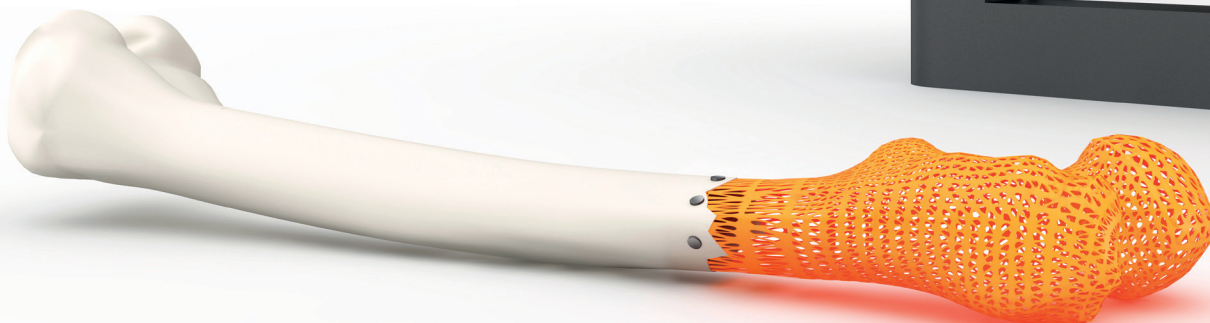
“Scientists dream about doing great things. Engineers do them.” – James A. Michener

Mechanical engineers create, build and maintain the mechanical devices that we use on a daily basis. They apply the fundamentals of science and mathematics to create practical, useful solutions for the increasingly complex problems of the modern world. Their scope can range from research and development to design and manufacture, installation and final commissioning.

You could be involved in activities such as:

- Producing equipment to help purify water, utilise solar energy or reduce pollution
- Designing innovative medical equipment that reduces pain or saves lives
- Developing cars, ships, planes and trains that are stronger and safer and have less impact on the environment
- Developing manufacturing processes that use less energy and are more productive

Are you curious about how things work and the world around you? Do you love challenges and solving complex problems? Are you strong at maths, physics and/or chemistry and a creative, innovative, practical person? If so, mechanical engineering could be the career for you.



OUTLOOK AND TRENDS

The outlook is bright for those entering mechanical engineering careers, both at professional and technologist levels. Although manufacturing activity has fluctuated in New Zealand, construction is driving demand for building services engineers and operations engineers are required in growth industries such as dairy processing.

According to the Occupational Outlook 2021 projections, employment for engineering professionals (all fields of engineering) will increase at over 2.3% through to 2028. Mechanical engineers are in demand, appearing on Immigration New Zealand's long term skill shortage list; a strong indication of a high need for those skills. However, many employers are looking for experienced professionals, so students must ensure that they gain as much practical experience as possible while completing their studies.

Globally, emerging fields like biotechnology, materials science, nano-technology and sustainable design are expected to create new job opportunities for mechanical engineers. In particular, medical biotechnology is starting to provide opportunities for mechanical engineers who specialise in design mechanics.

Sources: Kelly Services Salary Guide, Futureintech, Ministry of Business, Innovation & Employment's Occupational Outlook, www.worldwidelearn.com, Immigration New Zealand.

As experience is gained over a number of years, mechanical engineers may move into consultancy, project management or senior/managerial roles.

Work environments range from offices and business premises to factories, workshops and construction sites. Depending on the nature of the work and the type of role, it may be necessary to travel locally or overseas. Hours of work are generally in line with standard business hours, though evening or weekend work may be required as project deadlines approach.

CAREER ROLE EXAMPLES

Mechanical Engineer – Building Services

Works in a collaborative team environment with engineers and architects creating designs for mechanical services and working closely with clients, contractors and suppliers for building projects. The role may include designing HVAC (heating, ventilation and air conditioning) systems and water services systems/hydraulics for building projects.

Mechanical Design Engineer

Develops new products or components such as domestic appliances, medical devices or mining equipment. Takes conceptual ideas and develops them into production machines for the marketplace. The work may involve proof of concept testing, improving the design of existing products for performance and manufacturing purposes, and the creation of manufacturing drawings for component parts and assemblies.

Production Engineer

Responsible for making sure the machinery in large-scale manufacturing operations runs smoothly. Diagnoses and repairs faults on production machinery. Modifies existing machinery, develops new processes and commissions new machinery. May organise other staff and liaise with tradesmen and suppliers.

Non-technical careers in the engineering sector

A number of larger employers run graduate schemes in areas such as finance and management. Engineering graduates can also work in areas, including supply chain or technical sales. Some graduates start off in an engineering role, then progress into a more business-focused career.

PROFESSIONAL REGISTRATION

Registration with the Institution of Professional Engineers New Zealand (IPENZ) is either required or strongly recommended for people working in the industry. IPENZ operates national registers that recognise engineers in three broad groups – Professional Engineers, Engineering Technologists and Engineering Technicians (www.ipenz.org.nz).

WORK SETTINGS

Mechanical engineering is a broad discipline, providing opportunities in a wide range of sectors such as agriculture, manufacturing, power/energy, building and construction, transport, medical, and aviation and boat building. The majority of employers are private companies or consultancies.

Options are diverse, even within industries. For example, at Beca, mechanical engineering graduates may work in heavy industrial, food and beverage, water and wastes, or building services.

Specialisations and advancement

Most mechanical engineers develop expertise and skills in specific areas, including:

- Manufacturing
- Energy generation
- Robotics
- Biomedical devices and equipment
- Building services: heating, ventilation and air-conditioning, lighting, power supply, lifts and security systems for commercial buildings
- Acoustics: controlling unwanted noise and design spaces such as concert halls and lecture theatres

SKILLS AND KNOWLEDGE

- Project management, including:
 - Ongoing liaison between project teams and clients
 - Inquiry follow-up and distribution of duties
 - Writing and submission of proposals and project reports
 - Co-ordination of project activities with all project staff
 - Conducting project reviews and providing status updates to management
- Teamwork and leadership strengths
- Excellent communication skills, both written and oral
- High level analytical and problem-solving skills
- Strong planning, organisational and time management capabilities
- Computer skills, including the ability to use computer-aided design (CAD) and mathematical modelling software

Knowledge:

- Statics, dynamics and strength of materials
- Mechanical processes and engineering operations
- Properties and behaviour of gases and liquids
- Fluids, thermodynamics and heat transfer
- Safety regulations and quality standards
- Design and management
- Relevant legislation such as the Resource Management Act, the NZ Building Code, local by-laws and town planning regulations

PERSONAL QUALITIES

- Creative, innovative, practical and curious about how things work
- Have the desire to help people and improve the world around you
- Enjoy learning how to make things work more efficiently
- Highly organised, logical thinker with an eye for detail
- Responsible, adaptable, practical, accurate and methodical
- Confident decision-maker who can remain calm in stressful situations and when meeting deadlines

SALARY GUIDE

Mechanical engineering technicians	Salary (per year)
Graduate roles	\$45,000-\$50,000
With 4 to 6 years' experience	\$65,000-\$85,000
Senior management roles	\$90,000-\$140,000

Mechanical engineers (professional)	Salary (per year)
Graduate/starting salary	\$50,000-\$65,000 (median after 1 year: \$52,000)
Experienced	\$85,000-\$125,000
Experienced working in a position of responsibility	\$120,000-\$180,000

Sources: Futureintech, IPENZ, Careers NZ

Salary range is indicative of the New Zealand job market at the time of publication and should only be used as a guideline.

THE AUT ADVANTAGE

AUT graduates enter the employment market with knowledge and skills that have been tested in practical situations like industrial projects and the Engineers Without Borders international design challenge (www.ewb.org.nz).

All engineering/engineering technology graduates complete a final-year project that provides, in many cases, industry experience in areas such as research, production processes, management techniques and design.

FURTHER STUDY OPTIONS

Further study in mechanical engineering is available at postgraduate level, including the Postgraduate Certificate in Engineering, Postgraduate Diploma in Engineering, Master of Engineering, Master of Construction Management, Master of Engineering Project Management, Master of Philosophy and Doctor of Philosophy. Research areas include biomedical, therapeutic and diagnostic technologies, new advancement in technologies such as ultrasound and nanomaterials, system modelling, robotics and control, materials and manufacturing processes, and renewable energy systems.



SREENIDHI ROSHINKUMAR

Graduate Hydraulic & Fire Protection Engineer
at Mesh Consulting
Bachelor of Engineering (Honours) in Mechanical
Engineering

"I started working in the building services design sector in January 2020 when I joined Mesh Consulting, a multi-disciplinary building services design and consulting company.

My role involves the design and documentation of hydraulic (storm water, sanitary drainage and domestic hot and cold water) and fire protection (sprinklers, fire alarm and building hydrant) services for schools, warehouses, apartment buildings etc. An average week for me includes calculations, report writing, utilising software such as AutoCAD, Revit and Bluebeam to model and document designs, design meetings with external consultants, and site visits.

In the early stages of design, I develop an overall strategy for water supply, drainage disposal and fire protection of a building. I make sure that the design is up to code and relay this information to the wider team. As the project progress into detailed design stage, I generally work on Revit to model the services in a 3D environment producing more accurate drawings. This involves a lot of co-ordination with civil engineers, structural engineers, architects, as well as other consultants such as the fire engineer and acoustic engineer. At construction stage, I go on site to inspect pipes/equipment are being installed as per our design.

As a consulting engineer, I enjoy the collaboration required to find bespoke solutions. It also allows me a good balance between office and field work. With consulting, juggling multiple projects simultaneously and working with many external stakeholders with different objectives can be challenging, but standing inside a building that is a physical realisation of my design is extremely rewarding."

EMPLOYER COMMENT

"We look for graduates who are problem solvers, not problem presenters. We want all our team to have a proactive and pragmatic approach in all they do. Given that our staff represent our business, we also expect that our team embody our principles of respect and collaboration.

Nidhi is one of the most outstanding graduates we have ever worked with. She brings to the role everything we expect and more. She operates in a manner and maturity beyond her years and if she doesn't know the answer to a problem she will doggedly seek the solution.

My advice to graduates looking for work is that your approach and attitude is everything. You can be taught technical and academic knowledge but it's very hard to change your approach or attitude."

James Donald
Director, Mesh Consulting

USEFUL WEBSITES

Engineering New Zealand

www.engineeringnz.org



Maintenance Engineering Society of New Zealand

www.mesnz.org.nz



Beca New Zealand

www.beca.com/join-our-team

Fisher and Paykel Healthcare

www.fphcare.com/nz/our-company/careers/graduates/

Rocket Lab


www.rocketlabusa.com/careers

FURTHER INFORMATION

For the most up-to-date information on mechanical engineering study, visit our website:
<https://www.aut.ac.nz/mechanical-eng>

FUTURE STUDENTS

Contact the Future Student Advisory team for more information: www.aut.ac.nz/enquire
futurestudents@aut.ac.nz

 @AUTFutureStudents

EMPLOYABILITY & CAREERS

For other Future Career Sheets visit:
www.aut.ac.nz/careersheets


For employability and career support, AUT students can book an appointment through
<https://elab.aut.ac.nz/>

CURRENT AUT STUDENTS

Contact the Student Hub Advisors team for more information: 0800 AUT UNI (0800 288 864)

www.aut.ac.nz/enquire


studenthub@aut.ac.nz

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The information contained in this career sheet is correct at time of printing, mid-2021.

