

AUT

A FUTURE IN
**ARCHITECTURAL
OR CONSTRUCTION
ENGINEERING**



WHAT IS ARCHITECTURAL &/OR CONSTRUCTION ENGINEERING?

The specialised skills of two new fields of engineering are becoming highly sought after in the 21st century with the demand for environmentally sustainable, efficient and secure buildings.

Architectural and construction engineers are qualified engineers that engage in the development of constructed infrastructure to meet those requirements.

There is a significant shortage of architectural engineers and construction engineers in New Zealand, but also globally, thus providing travel opportunities for trained professionals in these fields.

Both architectural engineering and construction engineering specialisations differ from traditional architecture. Architects emphasise the aesthetic aspects of construction, while architectural engineers are responsible for designing building system integration (such as heating, ventilation, air conditioning, fenestration, cladding and facades), and work with structural engineers to make buildings that 'work'.

Construction engineers, by contrast, are involved in the development of structural designs in collaboration with structural engineering specialists, as well as site engineering and construction logistics. Experts in both specialisations are expected to have opportunities – if they choose to do so – to transition into project management roles in the later phases of their careers.

The built environment encompasses everything from high-density housing, to commercial construction or civil infrastructure. Architectural and construction engineers primarily find work in the former two domains. Consequently they can be involved in extremely diverse projects ranging from individual and multi-unit housing through to high-rise commercial property. They are in contact with a wide range of people on a daily basis to ensure these projects are delivered in the most cost-effective and efficient way possible.

Are you a practical problem-solver with a passion for the building industry? Can you think in three dimensions while imagining design solutions? Do you want to be involved in the infrastructure development in your city or town? If so, a career in architectural or construction engineering could be the direction for you.

OUTLOOK AND TRENDS

There is particularly strong demand for construction-related professional engineers in New Zealand due to both an Auckland and national housing shortage and fall out from the 'leaky homes' issue. The Ministry of Business, Innovation and Employment (MBIE) is predicting 'strong growth' for construction sector jobs. The 2021 budget saw the government commit \$57.3bn to infrastructure spending between 2021 and 2025.

Auckland Unitary Plan – the Auckland Unitary Plan will ensure that Auckland can meet its economic and housing needs over the next 20 years by determining what can be built and where. The aim is to create a higher quality and more compact city. One major concern for Aucklanders has been the proposed increase in small to medium-rise apartments and quality controls around design of these buildings. In response, new regulations have been drafted regarding the interpretation of building heights and Terrace Housing and Apartment Buildings (THAB) development integration with existing lower density residential areas. These new building requirements will have a major impact on the construction industry. Newly-qualified graduates will have up-to-date knowledge of the new regulations and therefore will gain a key opportunity in both architectural and construction engineering.

Improving quality – the traditional 'she'll be right' approach of New Zealand construction industry, including retrospective approval of building extensions and modifications, has had a significant effect on the long term quality of the built environment in New Zealand. This has particularly been the case in the residential sector, with poor quality homes and substandard construction techniques evident in some areas, with the most prominent example being leaky homes. Specialist construction and architectural professional engineering knowledge is needed to rectify previous faults.

Impact of legislation – from August 2022, following the passing of the Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021, significant changes will occur in how future housing will be consented. Increasingly it will be possible to 'densify' current urban settings in our cities, allowing substantially more housing in previously low-density suburbs. This will significantly increase the demand for engineers who can help developers deliver on more urban density. The skills emphasised in the Bachelor of Engineering (Honours), Construction Engineering and Architectural Engineering majors were designed with this capability front of mind. Graduates of these programmes will be very well placed to harness the benefit of the changes and provide future career directions to follow.

WORK SETTINGS

Both architectural and construction engineers divide their time between on-site duties and office-based design development. Hours of work are generally in line with standard business hours, though evening and weekend work may sometimes be required as project deadlines approach.

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

PROFESSIONAL REGISTRATION

Construction Engineering and Architectural Engineering are majors within the Bachelor of Engineering Honours [BE (Hons)] programme. As such they are four-year Washington Accord (Engineering NZ – Te Ao Rangahau accredited) programmes that will permit graduates to achieve Chartered Professional Engineer (CPEng) status after an appropriate period of experience and professional development.

CAREER ROLE EXAMPLES

Construction engineers

Construction engineers are directly involved in the development of the engineering design for new built infrastructure – especially in the commercial construction arena. They oversee the development, design and planning of the systems of construction used in the delivery of this type of infrastructure. They ensure projects are scheduled and built according to the plans and specifications. Can also assist in maintaining infrastructure systems, such as roads, dams, water supply systems and buildings.

Architectural engineers

Architectural engineers are associated with integrating complex systems and technologies required in highly serviced buildings into the aesthetic design created by architects. They work on the design of building systems such as heating, ventilation and air conditioning (HVAC), plumbing, fire protection, electrical, lighting, architectural acoustics and structural systems. Architectural engineers usually have to use various design and management software programmes for diverse design/construction practices.



RANGE OF SKILLS

Architectural engineers and construction engineers require well-developed technical skills in construction, such as design methodology, solid mechanics and quantity surveying, but they also need soft skills such as communication, teamwork and time management. The combination of these skill sets calls for well-rounded individuals that are at ease in front of technicians and building contractors, as well as with prospective clients.

Overall technical skills

- Strong mathematical ability
- A solid grasp of physics
- Ability with three-dimensional conceptual skills
- Adept at technical drawing
- Competent at computer modelling
- Familiar with using specialised BIM software such as 3D Max, AutoCAD LT, Buzzsaw, Revit and more

Construction engineering specific skills and knowledge of:

- Construction systems
- Structures and materials
- Construction logistics
- Project planning and management

Architectural engineering specific skills and knowledge of:

- Project management
- Building Information Modelling (BIM) design development
- Building systems integration
- Building operations
- Sustainability in design

General skills

- Good analytical and problem-solving skills
- Excellent oral and written communication skills
- Strong collaboration skills
- The ability to liaise well with professionals from other disciplines
- Excellent time management abilities

PERSONAL QUALITIES

- Creative
- Practical
- Patient
- Analytical
- Accurate, with an eye for detail
- Able to work well under pressure

SALARY GUIDE

	Approximate salary range
New engineering graduates	\$60,000-\$75,000
3 years+ experience	\$90,000+

Sources: Careers NZ, Glassdoor, ERI
Salary range is indicative of the New Zealand job market at the time of publication (mid-2022) and should only be used as a guideline.

THE AUT APPROACH

AUT's two majors – Architectural Engineering and Construction Engineering – were established in response to high demand from the construction sector.

AUT is the only university in New Zealand to offer programmes in these specialist fields. They are not structural engineering programmes – this would require further study and professional development.

FURTHER STUDY OPTIONS

Further study options at AUT could include the Master of Construction Management (MCM), Master of Engineering Project Management (MEPM), Master of Engineering (ME) or Master of Philosophy (MPhil) and PhD options depending on the desired career direction.

Research specialisations include:

- Construction procurement systems
- Corporate social responsibility in the construction industry
- Skill shortages and women in the construction industry
- Energy efficient building, green building development, green roofs

MARWA SAAD

Project Engineer, Piritahi

Bachelor of Engineering (Honours) in Architectural Engineering (First Class)

"After working at CPB Contractors as an intern to complete my 800 practical hours, I graduated and was offered a graduate engineer job that gave me tendering experience that led to work on the Waikeria Prison development and an Auckland airport project. In 2020 I got a job with Fletcher Construction as a site engineer on the NX2 – Puhoi to Warkworth project. I'm now a project engineer at Piritahi where we are working on removing 7,000 old state houses and upgrading land and infrastructure to make way for 25,000 new homes for Aucklanders.

As a project engineer I work alongside a large team of designers and subcontractors to deliver a project on time, within budget, and at an acceptable quality. My week usually consists of cost forecasting and planning upcoming works with the site management team and subcontractors, ordering materials required, reviewing subcontractor monthly payment claims and dealing with any site issues that arise.

A typical day usually starts with a site team meeting that outlines the day's activities, including any health and safety concerns. I spend most of my day on site, completing relevant testing, foreseeing any design issues and ensuring the work is completed as per the design and to the required quality.

The main skills I use are problem solving, people management, cost management and pre-planning. I need to show confidence in my decision making, good leadership and be open to learning from others.

I love the small wins in this role, like successfully completing a project that will benefit the community we live in. I enjoy the ongoing experience and knowledge I gain from each project and individual I work with. I also find the constant challenges and variety of work keeps me motivated. New innovations and methods mean it is a constantly changing industry that is extremely broad. There are many opportunities if you're open to trying things outside your comfort zone.

Construction can be a tough industry with long working hours and high pressure work load. You learn a lot on your feet and can gain a large amount of exposure and experience in a short stretch of time. I've learned I have to be persistent sometimes to get my concerns and innovations heard."

EMPLOYER COMMENT

"Attitude is of utmost importance. We look for project engineers who are proactive problem solvers and solution focused with a great attitude (the rest can be learnt with site / office experience).

Construction is an industry where you need to expect things will not always work out in the 2D world that it is drawn in. Issues will come up – but with experience and knowledge – you will learn how to solve them.

We also deal with multiple different types of people who have different ways of communicating so it is important you can adapt to the situation you are in.

Marwa brings all the above to the role. She has technical background experience which is great for the infrastructure detailed projects and ensures programme / financial controls are in place.

To graduates I say, give everything a go. Apply for roles – you have nothing to lose."

Kusay Bearakat

Construction Manager, Piritahi



USEFUL WEBSITES

New Zealand Institute of Architects (NZIA)
www.nzia.co.nz

Association of Consulting Engineers of NZ (ACENZ)
www.acenz.org.nz

Futureintech – Whenua Kura
www.whenuakura.co.nz/futureintech

Connexis
www.connexis.org.nz

Engineering New Zealand
www.engineeringnz.org


FURTHER INFORMATION

For the most up-to-date information about the study of architectural engineering and/or construction engineering please visit our websites:
www.aut.ac.nz/construction-eng
www.aut.ac.nz/architectural-eng


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/>

FUTURE STUDENTS

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





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
 @AUTEmployabilityandCareers

CITY CAMPUS

55 Wellesley Street East, Auckland Central

CONNECT WITH US NOW

 @autuni  @AUTuni
 AUTUniversity  @autuni

The information contained in this career sheet is correct at time of printing, mid-2022.

