

AUT

A FUTURE IN
**ARCHITECTURAL
& 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 the Auckland housing shortage, the Christchurch rebuild and fall out from the 'leaky homes' issue. The Ministry of Business, Innovation and Employment (MBIE) is predicting 'strong growth' for construction sector jobs in 2016 and beyond.

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, and this will 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 received first-hand instruction regarding the new regulations and therefore will gain a key opportunity in both architectural and construction engineering.

She'll be right – 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.

The Christchurch rebuild – the Christchurch rebuild places particular demands on engineers capable of developing building designs and improving construction systems. Almost \$4 billion was spent on construction in 2014, a 38% jump from 2013 (Source: The Press). Four out of five employers are finding recruiting skilled professional engineers a "significant hurdle" in the Christchurch construction sector (Source: www.newzealandnow.govt.nz).

Legislation – the 2004 rewrite of the Building Act substantially increased the formal engineering component in design and construction of commercial and residential buildings. This in turn created a rapidly expanding demand for engineers capable of designing, detailing and specifying materials and systems for construction projects. More recently, this demand has further increased with the Licensed Building Practitioner (LBP) scheme. Graduate architectural and construction engineers are eligible to gain certification as chartered professional engineers (CPEng) in the construction domain, and are therefore deemed to be LBPs. More are needed to ensure buildings meet compliance standards.

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

The Construction Engineering and Architectural Engineering are majors within the Bachelor of Engineering Honours [BE (Hons)] programme. As such they are four-year Washington Accord (IPENZ-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. Such a graduate would also be substantially involved in the development and design of the systems of construction used in the delivery of this type of infrastructure.

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.

Technical skills

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

Construction engineering specific skills

- Construction systems
- Knowledge of structures and materials
- Construction logistics
- Project planning and management

Architectural engineering specific skills

- 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
- Time management

PERSONAL QUALITIES

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

SALARY GUIDE

	Salary
New engineering graduates	salaries rise rapidly with experience: \$50,000 - \$70,000

Salary range is indicative of the New Zealand job market at the time of publication (2015) and should only be used as a guideline.

FURTHER STUDY OPTIONS

Further study options at AUT could include the Master of Construction Management (MCM), Masters 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

THE AUT APPROACH

The AUT Architectural Engineering and Construction Engineering majors have been 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, but it needs to be stated that it is not a structural engineering programme – this would require further study and professional development.



INDUSTRY COMMENT

"I was really pleased to see that AUT is taking the initiative in developing a wider selection of construction-related programmes. These are tremendous initiatives, and overdue to be honest.

The demand in the construction market is growing year on year for these types of engineers. Overall the two new programmes coming from AUT are ideal for engineers to my mind.

Architectural engineers emphasising systems and services integration is extremely important in the highly serviced buildings we expect in the future.

Similarly construction engineers, oriented to the delivery of highly efficient commercial and residential structures, are equally as essential to improvements in the industry. Both specialisations will enhance our productivity and capability in the construction industry in the future."

Greg Pritchard
General Manager, Building + Interiors
The Fletcher Construction Company Ltd

USEFUL WEBSITES

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

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

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

FUTURE STUDENTS


Contact the Future Student Advisory team for more information: www.aut.ac.nz/enquire
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For other Future Career Sheets visit:
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For employability and career support, AUT students can book an appointment through
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The information contained in this career sheet is correct at time of printing, August 2019.

