Membership guidance for engineering academics

As an engineering academic, you play a critical role in the engineering profession. Whether your primary focus is on *engineering research* that supports the development of new products, technologies or methods; *educating* future generations of the profession; or *academic leadership* at a programme, department or faculty level, we encourage you to engage with the profession as a Member of Engineering New Zealand and gain professional recognition of your engineering competence through Chartered Membership.

# General membership options

Our membership pathway offers a range of membership options for engineering academics no matter what stage you are at in your career.



# Emerging Professional or Member Class

Early career membership options include the membership classes of *Emerging Professional* or *Member*. Eligibility is based on your engineering qualification and evidence of work experience and/or appropriate early career professional formation.

For graduates practicing in industry, professional formation will involve continuing professional development (CPD) activities aligned with our Emerging Professionals Development Programme. However, early career engineering academics are typically working to complete post-graduate study and gain formal qualifications in tertiary teaching and this can be credited towards the work experience /professional formation requirements for the Member class, as follows:

|  |  |
| --- | --- |
| Professional formation activities | Credit towards experience requirements for Member class |
| Completion of a certificate in postgraduate teaching, of at least 60 credits/points | 1 yr. |
| Postgraduate study in engineering (PG Diploma, Masters, PhD) | 1 yr. per FTE |
| Completion of a peer reviewed journal paper or published report | 6 mths (max 1 year) |
| Academic employment (teaching or research) in engineering | 1 yr. per FTE |

## Criteria for Membership

### Emerging Professional Class

Emerging Professional members have a recognized engineering or engineering geology qualification and less than 5 years’ work experience.

In completing the application form, you are required to commit to the Engineering New Zealand Rules and Regulations, including the Code of Ethical Conduct and Continuing Professional Development (CPD) Policy. Your completed application form will need to be accompanied by:

* a copy of your academic qualification(s) and
* academic transcripts (if your undergraduate qualification is not recognized under the Washington/Sydney or Dublin Accords).

### Member Class

Membershave a recognized engineering or engineering geology qualification (or have demonstrated equivalent knowledge) and 5+ years’ work experience, or evidence of appropriate early career professional formation.

In completing the application form, you are required to commit to the Engineering New Zealand Rules and Regulations, including the Code of Ethical Conduct and CPD Policy. Your completed application form will need to be accompanied by:

* a copy of your academic qualification (s)
* Academic transcripts (if your undergraduate qualification is not recognized under the Washington/Sydney or Dublin Accords.)
* CPD records and/or CV evidencing work experience/early career formation

## Assessing your engineering qualifications

NZ engineering academics are drawn from a diverse range of backgrounds and may not have an undergraduate engineering qualification that is formally recognised under the Washington, Sydney or Dublin Accord[[1]](#footnote-1). Indeed, in many cases (particularly in emerging engineering disciplines) the academic’s undergraduate degree may not be directly in engineering, but in a related discipline such as science, information technology, computer science, mathematics or physics. This is likely to be supplemented by postgraduate qualifications in engineering or applied science. This combination of qualifications is likely to satisfy both the academic qualification requirement for membership generally and the engineering knowledge requirement for chartered membership (see below). If your undergraduate engineering qualification is not recognised under an Accord, simply submit copies of academic transcripts relating to your qualifications as part of your initial membership application so that an initial assessment of the equivalence of your qualifications can be made to confirm your situation in relation to any future application for Chartered Membership.

If you have any questions about eligibility for membership based on your academic qualifications, please contact hello@engineeringnz.org

# Chartered Membership

Chartered members have a recognised engineering qualification and have been able to demonstrate their engineering competence in the context of the work they do against a standard that is recognised both in NZ and overseas. Chartered Members also commit to the Engineering New Zealand Rules and Regulations, including the Code of Ethics and CPD Policy.

## Recognition via Mutual recognition

If you already hold professional membership/registration or licensure through an overseas jurisdiction that applies equivalent standards and processes, you can gain Chartered Membership without any further assessment. Examples of equivalent assessments include:

* Registration as an International Professional Engineer (IntPE) or APEC Engineer
* Chartered status through Engineers Australia, Engineers Ireland or the Engineering Council (UK)
* PEng registration in the United States or Canada

If you think you qualify under our mutual recognition provisions, please contact us hello@engineeringnz.org

## Recognition via competence assessment

As part of the standard competence assessment process, you will need to demonstrate that you meet the minimum standard of competence and can practice competently in your practice area to the standard of a reasonable Professional Engineer/Engineering Technologist/ Engineering Technician or Engineering Geologist.

In your application, you will need to include:

* A description of the practice area in which you wish to be assessed and the fields of engineering within which the practice area lies
* Evidence of your academic and other relevant qualifications, current registration on any other engineering registers and results from other assessments of your competence, if not already provided.
* Evidence of continuing professional development (CPD) activities from the last three years
* A record of your work history
* The names of two independent referees
* A statement of self-review against the competence standard
* Work samples evidencing your competence

Guidance on the key elements of your application is provided below.

Your application will be reviewed by an Assessment Panel. The Panel will make a recommendation to the Competency Assessment Board, who make the final decision on your application.

Compiling your competence assessment **application.**

# Work History record

You should submit a full Academic CV outlining career progression and significant engineering activities, including such things as:

* Positions held in industry and academia
* Key publications
* Grants gained
* Thesis/research projects supervised
* Courses taught
* Key research areas
* Administrative/service duties performed
* Consulting/standard setting/expert witness activities

# CPD records

Continuing professional development is fundamental to an engineering academic’s work.

In a research context, it will likely be evident from:

* Your research record and evidence of research progression
* Published work, typically journal publications
* Supervision of postgraduates

You could submit elements of your PBRF portfolio as evidence of the above.

In a teaching and learning context, significant professional development is likely to be associated with:

* New course development
* Review and development of existing courses to reflect evolving practices/knowledge/technologies.
* Industry engagement to maintain currency of engineering practice knowledge
* Contribution to academic quality processes at your institution
* Contribution to accreditation processes
* Completion of a certificate or diploma in teaching

The Assessment Panel will be looking for assurance that you are taking appropriate steps to maintain the currency of your engineering knowledge and skills. While you may record discrete CPD that has been activities as Learning Records in the Members area of our website, you are free to supplement this with reference to your academic CV by summarising the CPD associated with key research or teaching outputs.

# Referees

We require the names of two independent referees who can provide statements in support of your application. Referees might be members of Engineering New Zealand or an equivalent engineering body.

# Competence self-review and supporting work samples

In making a holistic assessment of your competence against the relevant standard, the Assessment Panel will consider the extent to which you are able to demonstrate 12 competencies.

In your application, you are required to provide a self-review that addresses these 12 competencies in four logical groupings as follows:

1. Engineering knowledge
2. Developing technical solutions
3. Managing engineering work
4. Professional acumen

In support of the competency claims that you make in your general self-review statements, you need to submit [typically] 2-4 work samples that demonstrate the full range of competencies in practice.

* Two work samples need to demonstrate the development of technical solutions (Competency Grouping 2).
* Two work samples (which may be the same samples you use to demonstrate your technical competence) need to demonstrate your management of engineering work and the application of engineering judgement (Competency Grouping 3)
* These work samples (although you can submit additional work samples if needed) should also demonstrate:
	+ the application of your engineering knowledge (Competency Grouping 1), for example:
		- The engineering principles that you had to apply
		- The appropriate application of local codes, standards or regulations
		- Specific research undertaken and/or the application of new knowledge, practices or technologies.
	+ your professional acumen (Competency Grouping 4), including:
		- An ethical dilemma you encountered and how this was addressed
		- How you took account of social, cultural or environmental factors
		- Examples of the application of your communication skills

Each work sample (which may be made up of separate uploaded files), should be supplemented by a work sample statement or annotations (500-1500 words). This is essentially a summary justification of the reasons you have chosen this piece of work for inclusion in your application and should include:

* A general description of the work, your role in it, and the outcome that was achieved
* The complexities or challenges that you faced and how these were resolved
* A description of aspects of the work that evidence competencies. This should include clear cross-referencing to where this is evidenced in the uploaded file document(s). Essentially

In a teaching and learning context, work samples could be based around a course you teach or have academic responsibility for. If so, your general description should set the course in the context of the overall qualification and summarise such things as your:

* contribution in the development of the course or to programme renewal;
* processes for developing curriculum and learning outcomes and validating that the material is still relevant to the profession;
* pedagogic approach; and
* learning and assessment strategy

In doing so, you should describe how the work evidences groups of competencies (see below for further guidance).

In a research context, work samples could be around your research themes/platforms. In which case, your general introduction to the work should include:

* Overall objectives of the research programme
* Funding obtained
* How the research informs engineering practice or education
* Management responsibility
* Outcomes in the form of papers and other publications

You can build on this to describe how the work evidences groupings of competences (see below for further guidance).

Many academics will have both teaching and research roles, and hence are encouraged to use evidence portfolios for both.

The following sections provide guidance to assist you to develop your self-review and select work samples that demonstrate your competence in each area.

## Competency grouping one: engineering knowledge

Specific competencies covered here relate to:

* **Engineering principles (general)–** knowledge of accepted principles supporting good practice for engineering;
* **Engineering principles (jurisdiction-specific) -** knowledge of accepted principles supporting good practice in the jurisdiction in which you practice (New Zealand if applying for CPEng);
* **Currency of knowledge** - maintaining the currency of engineering knowledge and skills

Engineering knowledge is a fundamental requirement for engineering academics, who are typically required to demonstrate a breadth and/or depth of knowledge that extends beyond the exemplifying academic qualification for entry to the engineering profession - an undergraduate degree/diploma recognised under an Accord.

Your self-review should provide a summary of the structured programme of knowledge and skills development that has prepared you to practice as an engineer in your practice area and your approach to ongoing professional development.

Your self-review statement should also include a summary of the engineering knowledge demands of your work generally and your understanding of the principles, practices, standards, codes regulations – underpinning good practice in New Zealand.

The work samples you submit should support the general claims in your self-review statement and highlight actual examples of the application of:

* General engineering principles

*In an academic context, the application of general engineering knowledge and principles is likely to be evident in much of the work that you do, and evident in your outputs. These outputs will include delivery material and programme design for the teaching practice area, and research papers and reports for the research practice area.*

* NZ specific principles, practices, standards, codes regulations to the extent that this is required in the work that you do

*The extent to which you engage with NZ standards, codes and regulations will vary depending on the nature of your work. There is likely to be a stronger requirement in this area if you are engaged in consultancy type work, but it may be less relevant in a research context. Equally, a level of awareness or understanding of codes and standards will be required in the context of your teaching activities, with a deeper understanding likely to be necessary if you are teaching more applied courses or programmes.*

* The development and or application of new knowledge

## Competency grouping two: developing technical solutions

Specific competencies covered here relate to:

* defining, investigating, and analysing *engineering problems*; and
* designing or developing solutions to *engineering problems*.

Engineers engineer a better world. The application of engineering principles to develop technical products or solutions that benefit society is a central defining characteristic of the engineer. There are a range of tasks or activities that contribute to the development of a product or outcome, including: researching, planning, investigating, scoping, modelling, designing, composing, constructing, supervising, (project) managing, leading, reviewing, or teaching/educating. This is reflected in the fact that engineers fill a wide range of engineering roles, including: research and development, design, product development, project management, asset management/maintenance, contract management, construction management, production management, technical leadership, business leadership, governance, teaching and learning.

The competence standard and assessment process are inclusive of engineers working in any of these roles.

Safety, sustainability and quality are elements that must be considered throughout the development of any technical solution and this applies equally in an academic context. Irrespective of the nature of the engineering role you have or activities you undertake, it is important that your self -review shows how consideration of these factors is integral to your work.

### *Engineering problems and complexity*

*Engineering problems can be defined as those which will typically require the application of engineering principles and which contribute to the development of an overall technical product or solution. Engineering problems are encountered in any of the engineering activities that contribute to the overall engineering outcome or solution and will typically require the engineer to adopt a structured design or problem-solving approach.*

*A key differentiator between engineering occupational roles is problem complexity. The following sets of characteristics can be used to differentiate between complex, broadly defined and well-defined engineering problems.*

***Professional Engineers*** *deal with* ***complex*** *engineering problems and activities, requiring the application of specialist knowledge and work from first principles.*

***Engineering Technologists*** *deal with* ***broadly-defined*** *engineering problems and activities, requiring the application of specialist knowledge and work from first principles.*

***Engineering Technicians*** *deal with* ***well-defined*** *engineering problems and activities, requiring the knowledge and use of established analytical techniques and procedures.*

***Engineering Geologists*** *manage complex engineering geological problems and activities, requiring in-depth engineering geological knowledge.*

***Complex engineering problems*** *have some or all of the following characteristics:*

*(a) Involve wide-ranging or conflicting technical, engineering, and other issues;*

*(b) Have no obvious solution and require originality in analysis;*

*(c) Involve infrequently encountered issues;*

*(d) Are outside problems encompassed by standards and codes of practice for professional engineering;*

*(e) Involve diverse groups of stakeholders with widely varying needs;*

*(f) Have significant consequences in a range of contexts;*

*(g) Cannot be resolved without in-depth engineering knowledge.*

Your self-review statement should briefly summarise the sorts of [complex] engineering problems you encounter (from a research, consultancy and/or teaching and learning perspective), and the approaches that you take to analysing and resolving them.

The work samples you submit should provide actual examples that support the general claims in your self-review statement.

Research based activities are likely to include:

* Specific nominated research outputs drawn from your latest PBRF portfolio
* Other more industry facing research or consultancy work, which might not have been prioritised as part of a PBRF portfolio. Examples of this might include:
	+ Involvement with standards committees
	+ Technical seminars in industry
	+ Industry based consultancy work
	+ Expert witness work

In a teaching and learning context you might include:

* evidence of the development/delivery or leadership of elements of an Engineering New Zealand accredited engineering programme including a clear statement of the pedagogical rationale and learning outcomes
* coherent design and delivery of teaching and assessment programmes at a course or programme level. Examples of complex educational course or programme design are likely to include evidence of:
	+ Constructive alignment with overall programme outcomes
	+ Adapting to changes in student capability/student profiles
	+ Incorporation of blended learning approaches
	+ Incorporation of advancing technical knowledge
* Final year project and/or thesis supervision

## Competency grouping three: managing engineering work

Specific competence elements covered here include;

* **Decision making** – be responsible for making decisions on (part or all of) *engineering activities*
* **Management** – manage (part or all of) *engineering activities* in accordance with good engineering management practice
* **Judgement** – exercise sound (professional) engineering judgement
* **Risk management** – identify, assess and manage engineering risk

### *Engineering activities and complexity*

*As noted above, engineers engage in a range of activities that contribute to the development of an engineering outcome or solution.*

*A key differentiator between occupational roles is the complexity of the engineering activity. Noting the engineering activities may include any of the activities listed above, the following sets of characteristics can be used to differentiate between complex, broadly defined and well-defined engineering activities.*

***Professional Engineers*** *deal with* ***complex*** *engineering problems and activities, requiring the application of specialist knowledge and work from first principles.*

***Engineering Technologists*** *deal with* ***broadly-defined*** *engineering problems and activities, requiring the application of specialist knowledge and work from first principles.*

***Engineering Technicians*** *deal with* ***well-defined*** *engineering problems and activities, requiring the knowledge and use of established analytical techniques and procedures.*

***Complex engineering activities*** *are those activities or projects that have some or all of the following characteristics:*

*(a) Involve the use of diverse resources (and, for this purpose, resources**include people, money, equipment, materials and technologies);*

*(b) Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering and other issues;*

*(c) Have significant consequences in a range of contexts;*

*(d) Involve the use of new materials, techniques, or processes or the use of existing materials, techniques, or processes in innovative ways.*

Your self-review statement should provide a clear and concise statement that explains the engineering management and decision-making responsibilities that you have, the sorts of [complex] engineering activities that you encounter and the approaches that you take to making sound engineering judgement in these situations.

You should include a summary of the approaches that you take to managing engineering risk, with particular attention to your approach to safety, sustainability and quality management. The work samples you submit will need to provide actual examples that support the general claims in your self-review statement.

While not all engineers will be responsible for managing people or projects, all engineers are required to assume a level of responsibility for managing aspects of engineering work and for associated judgement and decision-making. This is as true for engineering academics as it is for engineers working in other sectors.

For some engineering academics, these ‘managing’ competencies assume greater significance and can be demonstrated in examples of work that they undertake to manage activities in relation to an academic department, faculty, programme, research group, or substantial group research project. For other engineering academics, the focus is likely to involve:

* Managing their own teaching contribution (the ongoing development, alignment and quality of the academic course(s) they are responsible for) in the context of the wider, and constantly evolving, academic programme and environment
* Managing complex (albeit individual or small group) research or consultancy proposals, projects or activities.
* Managing students at undergraduate or postgraduate level.

## Competency grouping four: professional acumen

Specific competence elements covered here include:

* **Ethics -** conducting professional engineering activities to an ethical standard at least equivalent to the code of ethical conduct
* **Social cultural and environmental impacts** - recognising the reasonably foreseeable social, cultural, and environmental effects of (professional) engineering activities generally
* **Communication** - communicating clearly to engineers and others

Your self-review statement should demonstrate your understanding of your ethical obligations and how this influences the way that you conduct your engineering activities. You should also summarise your general understanding of the potential social, cultural and environmental impacts of your work and the approaches that you take to optimising societal outcomes. The work samples you submit will need to provide actual examples that support the general claims in your self-review statement. Examples of work that you might draw on could include:

* Involvement in programme level initiatives to address the delivery and assessment of professional practice attributes
* Delivery of courses, or substantive course components, that directly address professional practice competencies and/ or examples of the integration of professional practice competencies into technical courses or project work
* Examples where you have addressed ethical or other professional practice matters as part of your own research, or the supervision of substantive e student research activities.
* Research funding proposals addressing cultural, ethical or other professional practice issues
* Competencies in communication would be demonstrated by dissemination of research through a combination of papers and presentations at national and international conferences
1. International agreements setting standards for engineering qualifications that prepare graduates to practice in the engineering profession as professional engineers, engineering technologists or engineering technicians. See <http://www.ieagreements.org/accords/washington/signatories/> [↑](#footnote-ref-1)