Approval of an EngTech training programme, qualification or apprenticeship at level 3

A guide for programme providers and assessors

Led by members, supporting members, serving society
Preface

IChemE’s mission is to advance chemical engineering for societal benefit, worldwide. Through its conduct of programme approval, IChemE aims to recognise and share good practice in the education and development of the individuals who are working in the chemical engineering field and are proficient in the relevant skills and techniques, with a relatively practical understanding of the theoretical chemical engineering principles.

Approval serves two purposes: (i) recognition of programmes against IChemE standards; and (ii) linkage to IChemE’s suite of professional engineering registrations.

Through the strengths of its standards and quality of its process, IChemE is licenced by the UK Engineering Council, a Signatory of the International Engineering Alliance, to approve EngTech programmes, apprenticeships and qualifications against defined criteria set out in UK-SPEC*.

Application and Supporting documents

Application documents available at www.icheme.org/engtech-approval include: Assessment questionnaires/report forms; SH&E covering notes.

The supplementary documents available at the above link include: Assessor Code of Conduct; Appeals procedure.


See also the “Approval of Qualifications and Apprenticeships Handbook” available from www.engc.org.uk/education-skills/approval-of-qualifications-and-apprenticeship-programmes
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1. Introduction

All those participating in engineering education and training deserve provision that is world-class and that helps them to develop industry-relevant skills and behaviours. Such skills and behaviours are defined in the Engineering Council’s standards of competence and commitment that individuals must demonstrate in order to achieve professional registration, and which are set out in the document below:

The UK Standard for Professional Engineering Competence (UK-SPEC)

Training programmes, Apprenticeships (see Appendix A) and Qualifications (see Appendix B) that meet the high standards set by the Engineering Council may be “approved”. These guidelines relate to the approval of qualifications, training programmes and apprenticeships for the purposes of professional registration as an Engineering Technician (EngTech). It sets out the learning outcomes that must be met, the requirements for approval and the evidence that IChemE is seeking in order to confer approved status.

1.1 What is approval?

The approval process is essentially one of peer review. It is applied to qualifications and apprenticeships, and to other integrated training programmes.

According to the Engineering Council’s Registration Code of Practice, approval attests to overall design, the depth and range of coverage, and the validity and reliability of the assessment. It does not necessarily assure that every candidate completing it has the required underpinning knowledge and understanding, unless the approval process included confirmation that the educational requirement for registration had been met.

1.2 Why approve?

Approval by IChemE is a mark of assurance that the provision meets the standards set by the UK engineering profession. It provides clear and transparent evidence to government, funders and others of real engagement with the engineering profession.

The approval provides a structured mechanism by which IChemE assess, evaluate and improve the quality of provision through an independent peer review process, and offers IChemE the opportunity for continuing dialogue between providers and the profession.

The qualification, training programme or apprenticeship will count towards professional registration, attracting prospective trainees and employers.

Approval is accepted as a rigorous process by several international accords, allowing international recognition of approved qualifications, training programmes and apprenticeships.

1.3 What does the approval mean to an individual?

Individuals successfully completing an approved qualification, training programme or apprenticeship will find the process for the EngTech registration more straightforward. This is referred to as a “standard route” professional registration. (see 2.7)
To become registered as an Engineering Technician (EngTech) through IChemE, an individual must be a member of IChemE. Their competence and commitment are assessed by IChemE.

EngTech is the international professional title awarded by IChemE and it gives you:

- the letters EngTech after the name, as a registered Engineering Technician through Engineering Council
- independent validation of your expertise
- enhanced status and influence in the workplace
- better career prospects, including the option to work towards engineer level

2. Approval standards and the link to Professional registration

2.1 Introduction

Chemical Engineering profession emphasis on outcomes rather than inputs enables the development of a variety of diverse and innovation provision, without losing sight of the required skills, knowledge and understanding that tomorrow’s engineers and technicians will need.

In the UK, these qualifications may focus on:

- education ie the underpinning knowledge and understanding;
- the development of competence; or
- both of these

IChemE may consider for approval nationally available apprenticeships and qualifications, as well as that operated through a company training programme.

Approved apprenticeships include knowledge, understanding and the development of competence and a range of behaviours. Apprenticeships and training programmes may or may not include some formal qualifications. Regardless of which of these types it is, approved provision must contribute to the development of an individual to undertake EngTech roles.

A qualification, training programme or apprenticeship that demonstrates the knowledge, understanding and skills to meet or partly meet the requirements for registration in a particular category, is known as an exemplifying qualification or apprenticeship.

2.2 Approval pathways

IChemE can approve the following three programmes:

- training programmes or Apprenticeships that map their programme against the UK-SPEC (EngTech) competence statements and the trainees either enter the scheme having an approved qualification (at level 3 or above or Dublin Accord) or they gain the approved qualification during the time they are on the scheme;
- training programmes or apprenticeships that map their programme against the UK-SPEC (EngTech) competence statements and also against the appropriate Learning Outcomes (experiential learning);
- qualifications that meet in full the academic requirements for Engineering Technician.

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Educational Base</th>
<th>Initial Professional Development</th>
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<tbody>
<tr>
<td>1</td>
<td>Approved qualifications (level 3 or above) or Dublin Accord (not part of the training programme)</td>
<td>Approve development of competencies (Approved Training Schemes)</td>
</tr>
<tr>
<td>2</td>
<td>Approve work-based (experiential learning)</td>
<td>Approve development of competencies (Approved Training Schemes)</td>
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<tr>
<td>3</td>
<td>Approve Qualifications (level 3 or above)</td>
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### 2.3 General learning outcomes

Trainees graduating from an approved programme must have the general abilities listed below:

Knowledge and understanding: They must be able to demonstrate their knowledge and understanding of essential facts, concepts, theories and principles of chemical engineering and its underpinning mathematics and sciences. They must have an appreciation of the wider engineering context. They must appreciate the social, environmental, legal, safety, economic and commercial considerations affecting the exercise of their engineering judgement.

Practical skills: They must possess relevant practical skills acquired through laboratory work, individual and group project work, in design, and use of software resources. Evidence of group working and of participation in a project is required.

General transferable skills. They must have developed and demonstrate ability to integrate transferable skills (such as communications, time management, team working, inter-personal, effective use of IT) that will be of value in a wide range of situations

Awareness: They must have general familiarity bounded by the needs of chemical engineering.

### 2.4 Learning outcomes in a chemical engineering context

The threshold at which IChemE requires outputs to be delivered at or above, are

- Level 3 of the Regulated Qualifications Framework (RQF) in England and Northern Ireland; or
- Level 6 of the Scottish Credit and Qualifications Framework (SCQF); or
- Level 3 of the Credit and Qualification Framework for Wales (CQFW).

This list in not exhaustive and if you feel your programme meets the requirements then please contact IChemE.
You can find and compare national Qualifications Frameworks by using the links below:

www.naric.org.uk/naric/Individuals/Compare%20Qualifications/default.aspx

See Appendix B for more information.

For qualifications and apprenticeships, the six key areas of learning are as follows:

A. Science and mathematics
B. Engineering analysis
C. Design
D. Economic, legal, social, ethical and environmental context
E. Engineering practice
F. Additional general skills

See Appendix C for more information.

2.5 What does the approval involve?

The approval process is essentially one of peer review. IChemE ensures that:

- the provision under consideration meets and exceeds the learning outcomes threshold standard set by the Engineering Council (Appendix C);
- the provision under consideration meets or exceeds the threshold level in the UK’s frameworks for qualifications and credit, or if it lies outside these frameworks, is demonstrably at a comparable level;
- there are clearly defined outcomes;
- the technical content is appropriate, which is demonstrated by mapping to the Engineering Council’s output standards for technician qualifications and apprenticeships, IChemE competence and commitment statements, or both (Appendix D);
- the quality assurance arrangements are satisfactory.

2.6 What evidence should be sought?

A submission for the approval of a qualification or an apprenticeship will include:

- name, and where available, unique identifier for the qualification or apprenticeship
- general objectives of the programme
- the level is placed on the appropriate qualifications framework
- the learning outcomes of the qualification or apprenticeship standard
- evidence to support appropriate technical depth and range of coverage
- evidence of mapping to appropriate learning outcomes (Appendix C)
- for apprenticeships, evidence of mapping to appropriate UK-SPEC output standards (Appendix D)
- roles and responsibilities of all parties involved
- the assessment employed
- quality assurance arrangements, such as third-party accreditation and regulations
IChemE may request an initial brief submission covering basic details that it will use to determine if the provision being put forward is likely to meet its requirements for approval. Once satisfied of this IChemE will appoint an assessor panel.

2.7 “Standard Route” professional registration

Candidates applying for professional registration as an Engineering Technician (EngTech) need to provide evidence of competency, through the application of knowledge and understanding, and adequate demonstration of professional experience.

Individuals successfully completing an approved qualification, training programme or apprenticeship will find the process for registration more straightforward. This is referred to as a “standard route” professional registration.

Approved training programmes or apprenticeships are expected to provide to their trainees the required knowledge and understanding and all the opportunities to develop their professional experience. When the trainees are ready to graduate from an approved programme, they should be able to fully complete their competence and commitment report and apply for the Engineering Technician registration. IChemE recognises the benefit of someone having the competence and commitment report completed while he/she is still in the programme, therefore as part of the approval process it is required all the trainees to have their competence and commitment report complete before the programme’s final assessment. All the trainees who will successfully pass the final assessment and graduate the programme, if they wish, they will be able to submit their application for the EngTech registration to IChemE immediately after their graduation. A successful graduation from the programme though, does not guarantee a successful application for the EngTech registration.

Also, applicants for the EngTech registration who have graduated from an approved programme won’t be required to go through the peer review interview process. (See Appendix F).

3. Design and assessment of programmes for approval

3.2 Introduction

Decisions on whether a qualification, training programme or apprenticeship is approved will be taken solely on the basis of evidence of achievement of learning outcomes against defined standards and against the UK-SPEC output standards. Approved programmes may have various titles, content or duration and could be delivered in a wide range of learning environments and formats (e.g. full-time, part-time, industry-based, etc).

IChemE specifies that learning outcomes must be delivered across the broad areas of learning defined in Section 2.4 and the supporting Appendix C. The UK-SPEC output standards are defined in Appendix D.

3.3 Taught delivery methods

Various methods can be used to deliver a programme satisfying the learning outcomes, depending on the style of teaching appropriate to the organisation and the trainees, the number of trainees taught and the varied nature of content.
The methods used could include lectures; laboratory and workshop sessions; problem-centred learning; distance learning; computer-aided learning or on-job training.

3.4 Trainees assessment

The purpose of assessment is to confirm that individual trainees have attained the necessary learning outcomes and at the appropriate level and/or that they have developed the required competencies. How the assessment is conducted is for the organisation to decide.

It is expected that the organisation will have its own formal procedures for assessment and maintain a robust quality assurance process to ensure that outcome standards are consistent and fair. The procedure should include safeguards against academic dishonesty (e.g. plagiarism and other forms of cheating).

3.5 Evidence of achievement of learning outcomes

IChemE will look for evidence that trainees have attained the learning outcomes in each of the areas outlined in Section 2.4 (also see Appendix C).

Typical examples of direct evidence include:

- examination papers, together with model answers and marked scripts
- project reports
- laboratory reports
- design project reports
- industrial placement reports

Typical examples of indirect evidence include:

- external examiner’s reports
- internal and external audits
- quality assurance reports external to the department

3.6 Evidence of development of the competence and commitment requirements

IChemE will look for evidence that trainees have developed their competencies in each of the areas outlined in the appendix D.

Typical examples of evidence include:

- activities undertaken
- training courses attended
- planned assignments of suitable length for trainees to acquire experience and competencies in technical and “soft” skills
- on-the-job training
- reports and oral presentations
3.7 Safety, health & environment culture and practice

In addition to formally taught process safety, IChemE insists that students on approved programmes must be instilled with appropriate attitudes to safety, health and environment (SH&E). Although IChemE recognises the difficulty of assessing process safety remotely, the demonstration or otherwise of an effective safety culture within the programme will form part of the IChemE assessment.

Evidence of effective SH&E culture includes:

- leadership – senior management take an active part in SH&E;
- legislative compliance – there is a sound understanding of, and compliance with, applicable SH&E legislation. Regular audits of the programme provider’s health and safety conducted by an external auditor;
- risk assessment and management – risk assessment and permit to work systems are in place; those who use them are fully conversant with their roles and responsibilities;
- accident reporting and actions taken following an accident;
- Process safety training – training provided to the staff members or trainees (this is not teaching process safety as part of the curriculum);
- visible evidence of a financial investment in health and safety

3.8 Ethics culture

Codes of conduct, an important part of engineering ethics, are the framework for professional behaviour. IChemE, like other professional engineering institutions, has a code of conduct specific to the chemical engineering profession which its members are required to follow; comparable codes exist in other countries (e.g. Australia and Ireland), though these are usually more general to the engineering profession as a whole. IChemE recognises that different codes of conduct have many common features and expects all approved programmes to develop a strong ethos of professional behaviour and its implications.

Ethics learning outcomes should be related to the four basic principles outlined by the Engineering Council and the Royal Academy of Engineering:

- accuracy and rigour (eg act with competence presenting and reviewing engineering competence; identify and evaluate possible risks);
- honesty and integrity (eg be aware of how own behaviour can affect others; prevent corrupt practices and professional misconduct; declare conflict of interest);
- respect for life, law and public good (eg take account of limited availability of human and natural resources; hold paramount the health and safety of others);
- responsible leadership (eg be aware of the issues that engineering raises for society; promote the public awareness of engineering benefits and impact).

Awareness of engineering ethics guides students in preparation for their professional lives and helps them to identify ethical issues and the practice in which they arise. Ethics also helps students to develop wider skills in communication, reasoning and reflection and the professional attitude to carry forward into their working life.
4. Overview of the approval process

4.1 Approval ethos

IChemE’s approval process is a cooperative activity intended to be a benefit to both the approved organisation and IChemE. Besides the approval assessment by IChemE, organisations benefit from an intensive professional consultation on their programmes and gain access to an international chemical engineering teaching community with opportunities for sharing good practice and progressing challenging issues. IChemE approval is a joint enterprise in which both parties seek the truth through mutually respectful discussion of the available evidence.

The approval process is confidential between IChemE and the organisation seeking approval. IChemE will retain ownership of all reports produced but will make these available where appropriate.

4.2 Principal stages of approval

The IChemE approval process has the following principal stages:

- initial contact between the organisation seeking approval and IChemE
- preparation by the organisation and submission to IChemE
- appointment of assessors by IChemE
- preparation and virtual meeting with the panel of assessors
- report by the assessors to IChemE
- decision by IChemE’s Approval Panel
- implementation of follow-up actions by the organisation

4.3 Initial contact – new programmes

IChemE will work with organisations new to IChemE approval, to explore the best approach to approval status. Where appropriate, this could include the appointment of a mentor to help the organisation develop to meet the approval requirements.

4.4 Initial contact – existing programmes

Where a programme is already approved, IChemE will contact the organisation to penultimate year of approval with a view to maintain continuity of approval.

In exceptional circumstances (e.g., major disruptive event), an organisation can apply in writing to extend the approval for a short period.

4.5 Preparation by the department

The organisation will need to make available documents of various kinds for review by the assessors. Preparation of these documents need to be considered a long time ahead of the virtual meeting with the assessors. Closer to the meeting, the department will be asked to submit a completed questionnaire and other relevant documents to IChemE
4.6 IChemE assessors and the assessment

At EngTech level, the underpinning knowledge and understanding required can be satisfied by nationally specified qualifications or apprenticeships at the levels described in section 2.4. These are subject to other independent external validation; therefore the range of evidence considered in narrower in scope than that required for accreditation of a Higher Education programme, and a visit by IChemE is not required.

IChemE maintains a pool of trained assessors. A virtual panel of three assessors will be selected from the pool. One of the panel will be appointed as Lead Assessor. Occasionally, an observer may join the virtual panel – often a potential addition to the pool or a member of IChemE staff.

The assessor virtual panel will receive the documents at least two months before the virtual meeting. The meeting will normally last no more than 2 hours and the assessors will have the opportunity to ask any questions they might have after reviewing the documents.

Following the meeting, the assessors will report their findings to IChemE. The report, excluding the recommendations of the assessors, will be sent to the organisation for comment on any factual inaccuracies.

4.7 The approval decision and subsequent actions

The completed approval report will be considered by IChemE’s Approval Panel and a decision on whether to approval will be made. The programme provider will be notified of the outcome at the earliest opportunity.

Following a successful approval, the programme provider will receive a certificate of approval.

All such approved qualifications and apprenticeships will be entered on the Engineering Council’s public searchable database of approved qualifications and apprenticeships by IChemE.

Providers of these qualifications and apprenticeships are eligible to use the Engineering Council’s approved qualifications and apprenticeships logos with the associated statement.

Approval is for a fixed period of not more than five years, with the re-approval to the required standards. New approval will not normally exceed three years.

4.8 Approval costs and cost sharing

The costs of approval only include the cost of administration since a physical visit won’t be required by the assessors.

The international standard of IChemE approval is maintained through our use of global pool of trained assessors. All assessors are volunteer members of IChemE, working on a pro bono basis, so no fees are payable.

In order the process to be sustainable there will be an annual fee of £1000 to cover the administrative costs.
5. Preparation for approval

5.1 Preparing the submission documentation

Once contact has been established between IChemE and the programme provider regarding possible approval, the programme provider should in good time appoint a member of staff to be responsible for the whole process including the timely and comprehensive submission of documentation ahead of the virtual meeting with the assessors. Early on, a provisional meeting period will be agreed, and the actual date will be finalised somewhat later in the process.

In good time before the virtual meeting will take place, the organisation should ensure that the necessary evidential documents are available.

Document preparation needs to be rigorous and it is advised that sufficient time is made available for this activity. IChemE requires that document submissions are sent in digital form. Various digital forms are acceptable, provided that they are well-structured, easily navigable, readily usable and can be assessed on commonly-used platforms. Whatever form is chosen, it must be convenient for assessors to download or transfer material so that they have access offline.

The submission comprises a completed programme questionnaire and supporting documentation. The complete set of documents should be sent to IChemE two months before the virtual meeting.

IChemE will copy or otherwise make available the documents to the assessor panel. After the assessors have received the advance documents, and prior to the virtual meeting, they may identify a need for further information. In such cases IChemE will give the organisation as much notice as possible to provide this or, alternatively, make arrangements for this to be available for review during the virtual meeting.

6. IChemE assessors and the virtual meeting

6.1 Virtual meeting

A virtual meeting with the assessors is not expected to last more than two hours. The purpose of the meeting will be the assessors to ask for any clarifications or for additional information regarding the documents that have been provided as part of the application process.

Forward planning of the virtual meeting is important in order to ensure that assessors and resources are available. At least six months ahead, IChemE will liaise with the organisation to agree the month of the virtual meeting. Following this, the assessor panel will be identified. At least three months before the virtual meeting, IChemE staff will liaise with the organisation to finalise a mutually convenient date.

This process allows the organisation to prepare a comprehensive submission (Section 5). The preliminary documentation must be made available to IChemE at least two months before the virtual meeting.

IChemE staff will distribute the documentation supplied by the organisation to the assessors for review in advance of the meeting and will liaise regarding any further materials required prior to the meeting.
6.2 Selection of assessors

IChemE maintains a pool of trained assessors. The pool comprises of both academics and industrials who have current knowledge of the approval process and requirements. Assessors are appointed to the pool by nomination to and decision of the Approval Panel.

Assessment panels, each comprising three assessors including the lead assessor, are approved by processes set by the Approval Panel using the following criteria:

- all assessors have received IChemE training
- no more than one assessor should be without previous approval experience

Organisations do not have the right to select or approve the membership of the assessor panel. Should there be exceptional circumstances that concern the department (for example a perceived conflict of interest with an assessor) then these concerns should be communicated in writing at the earliest opportunity to the senior IChemE staff responsible for approval and the Chair of the Approval Panel.

6.3 The role of IChemE’s assessors

Assessors act in a voluntary capacity on behalf of IChemE. They are required to work within IChemE’s code of conduct for volunteer members on IChemE activities (see IChemE Supporting Documents).

For qualifications and programmes that deliver the learning outcomes through the experiential learning the assessor’s primary role is to seek evidence that the target learning outcomes are being achieved by assessing the scope of the examinations, projects, laboratory work and other learning activities by the trainees. For training programmes the assessor’s primary role is to seek evidence that all the trainees are provided with the opportunity during the programme to develop all the required competencies described in IChemE’s Competence and Commitment form.

The general questions that underpin the work of the assessors include:

- is it at the appropriate level in the Regulated Qualifications Framework or the Scottish Credit and Qualifications Framework, or if it lies outside these frameworks, is demonstrably at a comparable level?
- does it have clearly defined outcomes and is it of an appropriate technical nature?
- does it have satisfactory quality assurance arrangements?
- is the scheme satisfactory assessed?
- are the resources to support the delivery of the learning outcomes adequate?
- how does the progress of the trainees is monitored?
- does the scheme provide mentoring support?

Assessors might request to see additional material before or after the virtual meeting. Organisations are respectfully requested to be accommodating of reasonable requests.

At the end of the virtual meeting, assessors will give feedback on their principal findings, including recommendations for improvement. They are however, instructed not to tell the organisation their recommendation on the approval outcome. The decision will be taken to the Approval Panel.
6.4 The assessors’ report

The assessors prepare a written report to IChemE’s Approval Panel. The report is expected to be submitted to IChemE within three weeks of the virtual meeting.

The primary purpose of the assessors’ report is to inform the Approval Panel of their findings and how the learning outcomes have been met and the required competencies have been developed.

In addition, the assessors will:

- identify and commend strengths and good features within the programme;
- identify areas where there may be scoping to improve the programme;
- propose recommendations to the Approval Panel on the future approval status of the programme reviewed.

At all stages, the assessors’ report will remain confidential to and the property of IChemE. The report is made available in confidence to organisations for their information.

7. Approval outcomes

7.1 Approval decision process

The Approval Panel will formally review the assessors’ report, together with the approval recommendation of the assessor panel for final decision.

The Approval Panel may ask the lead assessor to amend the report to clarify any ambiguities or other misleading statements. The report will be sent to the organisation for comment on any factual inaccuracies. Any significant changes arising from this and accepted by the assessors will be brought to the attention of the Approval Panel. Where such changes may have a material effect on the outcome, further discussion will take place as above.

7.2 Approval outcome

Approval Panel will make one of the following decisions:

- approve/re-approve the programme
- approve/re-approve the programme subject to conditions
- to not approve/re-approve the programme

In this instance IChemE will advise why the programme has failed to be approved and will upon request and where appropriate, advise the department on available assistance.

IChemE may make approval subject to conditions. These are binding on the programme provider and must be resolved within the indicated timeframe for approval to be maintained and be valid.

Fulfilling the conditions is the responsibility of the programme provider. Reports on fulfilment must be made formally in writing for the Approval Panel consideration and approval decision.
Approval may be granted for a period up to maximum of five years. New approval will not normally exceed three years.

In the majority of cases IChemE seeks to make recommendations to the programme provider. These are not mandatory. However, they are offered in the spirit of providing help and sharing of good practice in chemical engineering education and application. Adoption by the programme provider of these recommendations is encouraged and generally expected.

7.3 After the approval decision

Following an approval award, the programme provider will be sent a decision letter and separately, a certificate to formally acknowledge the approval status of the programme.

There will be ongoing contact between IChemE and the programme provider in terms of approval policy developments during the period of approval. IChemE’s qualifications department will liaise with the programme provider regarding policy changes, trainee services, membership and related activities.

7.4 Obligations and duties on departments

It is general condition of approval that programme providers must inform IChemE in a timely fashion of significant changes that impact upon the delivery or nature of the approved programme, apprenticeship or training programme.

7.5 Endorsement logos

Our endorsement logos enable external organisations to demonstrate IChemE approval. They are to be used in compliance with IChemE guidance with the logo. These logos will appear as an endorsement and can be used alongside the logo of the organisation on print and web material. All the logos should be used together with the relevant Engineering Council’s logos.
Appendix A

Apprenticeships

Apprenticeships offer learners a way of gaining nationally recognized competence, typically through the successful award of qualifications, whilst working and earning a wage. Off the job training is normally provided through day release to a college or training provider, with the job specific skills being gained through working and training alongside experienced staff on a day-to-day basis.

Apprenticeships deliver a combination of knowledge, understanding and skills, usually through qualifications, including:

- knowledge and understanding through vocationally related qualifications or technical Certificates (England, Wales and Northern Ireland only)
- work-based competence through a National/Scottish Vocational Qualifications (N/SVQs)

Many apprenticeships also deliver other skills such as Maths and English, communication, Information technology, and personal learning and thinking skills, as well as employment rights and responsibilities.

In England, Trailblazers apprenticeship Standards were introduced from 2014, and are required to meet professional standards where available. As such, they offer a range knowledge, skills and behaviours, support a commitment to professional standards and ongoing professional development. More information can be found at: www.gov.uk/government/publications/how-to-develop-an-apprenticeship-standard-guide-for-trailblazers
Appendix B

Qualifications

Qualifications have undergone a range of changes in recent years as the Government requirements for public funding have developed. More information on national frameworks can be found at: www.gov.uk/what-different-qualification-levels-mean and more information on regulated qualifications at: Ofqual (England and Northern Ireland), Scottish Qualifications Authority and Qualifications Wales.

In 2013, the department for Education (DfE) introduced a range in England, separating vocational qualifications into “Applied General” and “tech Levels”, with the aim to simplifying the vocational qualification system. A descriptor of these qualifications and the criteria for public funding is now included. More information can be found at: www.gov.uk/government/publications/14-to-19-technical-and-applied-qualifications-technical-guidance

**Applied General**

These are rigorous advanced (level 3) qualifications that equip students with transferable knowledge and skills. They are for post-16 students wanting to continue their education through applied learning. They fulfil entry requirements for a range of higher education courses, either by meeting entry requirements in their own right or being accepted alongside and adding value to other qualifications at the same level.

Applied General qualifications must be at least 150 GLH and be recognised by a number of Higher Education Institutions (HEIs).

**Tech Level**

These are rigorous advanced (level 3) technical qualifications, on a par with A levels and recognised by employers. They are for post-16 students wishing to specialise in a specific industry, occupation or occupational group. They equip a student with specialist knowledge and skills, enabling entry to an apprenticeship or other employment, or progression to a related higher education course. In some cases, these qualifications provide a “licence to practice” or exemption from professional exams. Tech Levels are one of three components of the new Technical Baccalaureate (TechBacc) performance table measure. Tech Levels must be at least 300 GLH and be recognised by 5 or more employers, a recognised professional or trade bodies, or a national licenced professional registration scheme.

IChemE may also approve a range of other qualifications that are currently in delivery across the UK (or abroad). These include:

**Vocationally Related Qualifications (VRQ)**

VRQs are predominantly taught programmes delivered in a classroom or workshop setting. These qualifications are based on National Occupational Standards and provide the underpinning knowledge to help learners achieve a related NVQ. VRQs prepare learners for further learning and the workplace by offering the practical and academic knowledge and skills required in a particular job. Assessment often combines internal written or practical assignments with external written or onscreen tests.
Technical Certificates

Technical Certificates are VRQs or knowledge qualifications that are recognised within apprenticeship frameworks in England, Wales and Northern Ireland. They are closely linked to National Occupational Standards and give learners the underpinning knowledge and understanding that are required to complete an NVQ. Technical Certificates are not currently recognised in Scotland.

National Vocational Qualifications (NVQ)

NVQs are competence qualifications and are delivered through on-the-job training. NVQs are assessed through a learner’s portfolio of evidence which proves their knowledge and ability to perform specific tasks, plus one-to-ones where an assessor watches the learner perform work-related tasks. NVQs are based directly on the National Occupational Standards defined by Sector Skills Councils and industry employers. Available in England, Wales and Northern Ireland as standalone qualifications, NVQs are also key components of apprenticeships frameworks. Many competence qualifications accredited on the Regulated Qualifications Framework (RQF) include “NVQ” in the title.

Scottish Vocational Qualifications (SVQ)

SVQs are competence qualifications which are recognised in Scotland. Like NVQs, there are also based directly on National Occupational Standards set by Sector Skills Councils and employers. SVQs are assessed through a learner’s portfolio of work-based evidence. EAL’s SCQs are currently being updated for the new Scottish Credit and Qualifications Framework (SCQF)

Other Types of Qualifications:

Key Skills: Key Skills qualifications remain available for apprentices in England to gain transferable skills in application of number, communication, and information and communication technology. Wider Key Skills are open to learners across England, Wales and Northern Ireland. These cover improving own learning and performance, problem solving, and working with others. The qualifications are assessed through a combination of multiple-choice exams and evidence gathered in a portfolio.

Functional Skills: Functional Skills qualifications cover the fundamental practical skills in English, Mathematics and Information and Communication Technology (ICT) for learners and apprentices in England. The qualifications focus on applying these skills in real life situations, and feature assessments with task-based questions.

Essential Skills Wales: These qualifications show the ability to master the skills needed in education, training, work and life in general. The suite covers application of number, communication, and information and communication technology (ICT) for learners and apprentices in Wales. As these qualifications are a method of demonstrating competence, it is recommended that they are embedded in everyday workplace activities or other programmes of learning.

Basic Skills: Basic skills qualifications cover adult literacy and adult numeracy for learners involved in a wide range of programmes both in and out of the workplace. Their purpose is to improve confidence in these areas, giving learners the ability to progress in education, training and work as well as using these skills effectively in their personal lives.
Appendix C

Learning outcomes at Level 3

C1 Science and mathematics

Chemical engineering is underpinned by science and mathematics. Technicians graduating from an approved programme will need:

- a descriptive, formula based-knowledge and understanding of the scientific chemical engineering principles underpinning relevant current technologies;
- knowledge and understanding of relevant mathematics, including numerical and data analysis, that is necessary to support the application of technical and practical skills.

C2 Chemical Engineering analysis

Chemical Engineering analysis involves the application of engineering concepts and tools to the solution of engineering problems. Technicians graduating from an approved programme will need:

- to understand the limitations of standard tests and measurements relevant to their field of activity;
- know-how to use the results of chemical engineering analysis for the purpose of developing solutions to well-defined engineering problems;
- to apply appropriate solutions to well-defined engineering problems using methods specific to their field of activity.

C3 Design

Design at this level involves the awareness of an economically viable product, process or system to meet a defined need. Technicians graduating from an approved programme will need:

- awareness of business, customer and user needs;
- awareness of constraints on the design process including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards;
- knowledge that supports design for the purpose of developing solutions to well-defined engineering problems;
- know-how to contribute to the design and/or the design process;
- know-how to communicate their work to technical and non-technical audiences.

C4 Economic, legal, social, ethical and environmental context

Engineering activity can have impacts on the environment, on commerce, on society and on individuals. Technicians therefore need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including:

- understanding the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct;
- knowledge of the commercial, economic and social context of the chemical engineering processes;
- understanding the requirements for chemical engineering activities to promote sustainable development;
- awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contacts, intellectual property rights, product safety and liability issues;
- awareness of risk issues, including health & safety and environmental risk.

C5 Engineering practice

This is the practical application of chemical engineering. This can include:

- know-how to use relevant materials, equipment, tools, processes, or products;
- knowledge of procedures and practices for industry standard operations and processes;
- know-how to use and apply information from technical literature;
- know-how to use appropriate codes of practice and industry standards;
- awareness of quality issues and the potential for continuous improvement;
- awareness of team roles and the ability to work as a member of an engineering team.

C6 Additional general skills

Technicians must have developed transferable skills, additional to those set out in the other learning outcomes, and that will be of value in a wide range of situations, including the ability to:

- apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities;
- plan self-learning and improve performance, as the foundation for lifelong learning/CPD;
- plan and carry out a personal programme of work;
- exercise personal responsibility, as an individual or as a team member.
Appendix D

UK-SPEC (EngTech) competence statements

A) Use process related knowledge and understanding to apply technical and practical skills.

   A1) Ability to review, select and use appropriate technical techniques, procedures and methods to undertake (Chemical, biochemical or process engineering) tasks.

   A2) Ability to use appropriate scientific, technical, chemical, biochemical or process engineering principles.

B) Contribute to one or more of the following: (de)commissioning, design/development, modification / refurbishment, manufacture, construction, operation / maintenance of products, quality assurance, cleanout, environmental / waste management of processes, systems, equipment or devices.

   B1) Ability to identify problems, apply appropriate methods to identify causes, achieve (a) technical solution(s) and evaluate the result.

   B2) Ability to identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety, security and environmental impact.

C) Accept and exercise personal responsibility

   C1) Ability to work reliably and effectively, without close supervision.

   C2) Ability to accept responsibility for your work or that of others.

   C3) ability to accept, allocate and supervise technical and other tasks.

D) Use effective communication and interpersonal skills

D1) Ability to communicate technical ideas, information and plans by means of written, electronic and oral presentation.

D2) Ability to work effectively with colleagues, clients, suppliers or the public, and show awareness of the needs and concerns of others, especially where related to diversity and equality.

E) Make a personal commitment to appropriate codes of professional conduct; recognising obligations to society, the profession and the environment.

   E1) Commitment to uphold IChemE’s Code of Professional Conduct.

   E2) Ability to manage and apply safe systems of work.

   E3) Ability to operate and act responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously.

   E4) Carry out and record CPD necessary to maintain and enhance competence in own area of practice.

   E5) Ability to exercise responsibilities in an ethical manner.
Appendix E

Glossary of terms used in the guidelines

Where relevant, definitions have been adopted from the Engineering Council AQAH (Approval of Qualifications and Apprenticeship Handbook).

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apprenticeship Standard or Framework</td>
<td>An apprenticeship standard of framework is a definition of requirements for an apprenticeship programme. It is used by training providers, colleges, and employers to ensure that all apprenticeship programmes are delivered consistently and to agreed standards. Each standard or framework includes details of the knowledge, skills and competence needed to be demonstrated by the end of the apprenticeship, and may include formal qualifications, behaviours, key skills, and any other requirements of the apprenticeship. Each standard or framework may also include information on job roles, entry routes, length of the apprenticeships and career paths available upon completion.</td>
</tr>
<tr>
<td>Approval</td>
<td>A process of peer review of a technician programme against published learning outcomes. This involves a review of a qualification or an apprenticeship programme by a number of professionally registered engineers.</td>
</tr>
<tr>
<td>Assessor</td>
<td>A person appointed by IChemE who is trained in assessing the suitability of a programme for approval.</td>
</tr>
<tr>
<td>Approval of Qualifications and Apprenticeships Handbook (AQA)</td>
<td>Qualifications and apprenticeships that are approved for the purpose of technician registration (EngTech) must meet the technician output standards and learning outcomes defined by the Engineering Council. These are set out in the “Approval of Qualifications and Apprenticeships Handbook” (AQA) and may be interpreted by professional engineering institutions for their own sector or discipline.</td>
</tr>
<tr>
<td>Awarding Organisation (AO)</td>
<td>Awarding Organisations develop and award qualifications to meet the needs of learners, employers and other stakeholders. In the UK, they are “recognised” and regulated by Ofqual, Scottish Qualifications Authority (SQA) and Qualifications Wales. Awarding Organisations focus on:</td>
</tr>
<tr>
<td></td>
<td>▪ developing high quality qualifications that meet the needs of employers and learners</td>
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<td></td>
<td>▪ approving centres and working with them to ensure high quality delivery of qualifications</td>
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<tr>
<td></td>
<td>▪ carrying out activity designed to assure the quality of the qualifications awarded</td>
</tr>
<tr>
<td></td>
<td>▪ developing products and services to support their centres and learners</td>
</tr>
<tr>
<td><strong>Chartered Engineer (CEng)</strong></td>
<td>One of the professional titles available to individuals who meet the required standard of competence and commitment. <a href="http://www.iche.org/ceng">www.iche.org/ceng</a></td>
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<tr>
<td><strong>Competence</strong></td>
<td>The ability to carry out a task to an effective standard. Its achievement required the right level of knowledge, understanding and skill, as well as a professional attitude. It is part of the requirement (along with commitment) that must be demonstrated in order for an individual to be admitted to the Engineering Council’s Register at the relevant level.</td>
</tr>
<tr>
<td><strong>Condition (of accreditation)</strong></td>
<td>Where continued approval is dependent upon the programme provider meeting requirements set by IChemE. Conditions are binding on the programme provider and must be resolved within the indicated timeframe for approval to be maintained and valid.</td>
</tr>
<tr>
<td><strong>Continuing Professional Development (CPD)</strong></td>
<td>The systematic acquisition of knowledge and skills, and the development of personal qualities, to maintain and enhance professional competence. All members of IChemE have an obligation to undertake CPD, and to support the learning of others. <a href="http://www.iche.org/career/cpd">www.iche.org/career/cpd</a></td>
</tr>
<tr>
<td><strong>Credit and Qualification Framework for Wales</strong></td>
<td>Credit and Qualifications Framework for Wales (<a href="http://www.iche.org/career/cpd">CQFW</a>) covers learning from the very initial stages (Entry, 1, 2, &amp; 3) to the most advanced (Level 8). It is managed by a strategic operational partnership comprising of the Welsh Government, Higher Education Funding Council for Wales (HEFCW) and Qualifications Wales.</td>
</tr>
<tr>
<td><strong>Dublin Accord</strong></td>
<td>The Dublin Accord is an agreement for the international recognition of Engineering Technician educational base. More information can be found at: <a href="http://www.ieagreements.org/accords/dublin/">www.ieagreements.org/accords/dublin/</a></td>
</tr>
<tr>
<td><strong>Engineering Council</strong></td>
<td>The UK regulatory body for the engineering profession that sets and maintains internationally recognised standards of professional competence and ethics, and holds the UK register of professional engineers and technicians <a href="http://www.engc.org.uk/">www.engc.org.uk/</a></td>
</tr>
<tr>
<td><strong>Engineering Technician (EngTech)</strong></td>
<td>One of the professional titles available to individuals who meet the required standard of competence and commitment. <a href="http://www.engc.org.uk/engtech">www.engc.org.uk/engtech</a></td>
</tr>
<tr>
<td><strong>Evidence</strong></td>
<td>Auditable material supporting the approval application, for example the quality review reports etc.</td>
</tr>
<tr>
<td><strong>Exemplifying qualification</strong></td>
<td>An educational or vocational qualification that demonstrates the knowledge, understanding and skills to meet or partly meet the requirement for registration in a particular category. Other qualifications may be permitted if they achieve (or exceed) the same level.</td>
</tr>
<tr>
<td><strong>Further education (FE)</strong></td>
<td>In the UK, this refers to education that is post-school and defined on the regulated Qualifications Framework (<a href="http://www.iche.org/career/cpd">RQF</a>) as being at level 3 upwards in England and Northern Ireland, at level 3 upwards on the Credit and Qualifications Framework Wales</td>
</tr>
<tr>
<td><strong>Guided Learning Hours (GLH)</strong></td>
<td>The number of tutor-led contact hours required to support learner achievement of a unit/module or qualification. Guided learning hours (GLH) include:</td>
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<tr>
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<tr>
<td></td>
<td>- induction specific to the programme</td>
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<tr>
<td></td>
<td>- one to one or group tutorials</td>
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<tr>
<td></td>
<td>- teaching sessions</td>
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<tr>
<td></td>
<td>- facilitated workshops</td>
</tr>
<tr>
<td></td>
<td>- assessment of learner achievements where the learner is present eg when assessing an individual in the workplace or assessing a skills activity in a classroom environment</td>
</tr>
<tr>
<td><strong>Guided learning hours (GLH)</strong> do not include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- time spent by tutors preparing teaching sessions and learning materials</td>
</tr>
<tr>
<td></td>
<td>- time spent by tutors marking assessments where the learner is not present</td>
</tr>
<tr>
<td></td>
<td>- study undertaken by the learner in their own time</td>
</tr>
</tbody>
</table>

Learner support that is not specific to the content of the programme eg study skills

<table>
<thead>
<tr>
<th><strong>Incorporated Engineer (IEng)</strong></th>
<th>One of the professional titles available to individuals who meet the required standard of competence and commitment <a href="http://www.engc.org.uk/ieng">www.engc.org.uk/ieng</a></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>International Engineering Alliance (IEA)</strong></td>
<td>Partnership of international organisations and responsible for the governance of the international accords such as Dublin, Sydney and Washington Accords.</td>
</tr>
<tr>
<td><strong>Learning outcome</strong></td>
<td>A statement of achievement expected of an individual from an approved qualification or apprenticeship.</td>
</tr>
<tr>
<td><strong>Modern Apprenticeship (MA)</strong></td>
<td>Modern apprenticeships, available in Scotland, are apprenticeship standards/frameworks which are approved by the Modern Apprenticeship Group (MAG). They set out the minimum requirements which must be included in any recognised Scottish apprenticeship framework. Frameworks and their criteria can be found at: <a href="http://www.skillsdevelopmentscotland.co.uk/what-we-do/apprenticeships/modern-apprenticeships/">www.skillsdevelopmentscotland.co.uk/what-we-do/apprenticeships/modern-apprenticeships/</a></td>
</tr>
<tr>
<td><strong>MAG</strong></td>
<td>The Modern apprenticeship Group (MAG) is an independent group which draws its authority from the Scottish Government. The group is responsible for the approval and de-approval of all the Scottish frameworks and encourages Sector Skills Councils</td>
</tr>
</tbody>
</table>
(SSCs) to develop robust frameworks with high participation and completion rates, which can respond to the needs of their sector in changing economic circumstances and priorities.

<table>
<thead>
<tr>
<th><strong>NOS</strong></th>
<th>National Occupational Standard(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ofsted</strong></td>
<td>Ofsted is the Office for Standards in Education, Children’s Services and Skills. Ofsted inspects and regulates services that care for children and young people, and services providing education and skills for learners of all ages.</td>
</tr>
<tr>
<td><strong>Output standard</strong></td>
<td>The overall standard that a programme which comprises of a level of qualification and a set of associated learning outcomes, must meet in order to secure approval status.</td>
</tr>
<tr>
<td><strong>Professional Engineering Institution (PEI)</strong></td>
<td>Membership organisation which is licenced by the Engineering Council to assess candidates for professional registration.</td>
</tr>
<tr>
<td><strong>PEI Own Qualification</strong></td>
<td>This is a qualification developed by, and where the professional engineering institution is itself the awarding body.</td>
</tr>
<tr>
<td><strong>Professional registration</strong></td>
<td>The process whereby an individual is admitted to the Engineering Council’s register based on the individual demonstrating via a peer review process by a licenced professional engineering institution that he/she has met the profession’s standards of commitment and competence.</td>
</tr>
<tr>
<td><strong>Programme provider</strong></td>
<td>The term “Programme provider” is used for convenience throughout these guidelines for the Academic unit or organisation responsible for delivering the programmes under review.</td>
</tr>
<tr>
<td><strong>Regulated Qualifications Framework (RQF)</strong></td>
<td>The Regulated Qualifications Framework (formerly the Qualifications and Credit Framework) is a framework that applies to qualifications, diplomas, certificates and other academic awards granted by an education provider in England and vocational qualifications in Northern Ireland.</td>
</tr>
<tr>
<td><strong>Royal Charter</strong></td>
<td>A formal document issued by the monarch granting rights and powers to an individual or an organisation.</td>
</tr>
<tr>
<td><strong>SASE/W</strong></td>
<td>Specification of Apprenticeship Standards for England (SASE) or Wales (SASW), All frameworks can be found at <a href="http://www.afo.sscalliance.org/frameworkslibrary/">www.afo.sscalliance.org/frameworkslibrary/</a></td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<td>------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Scottish Credit and Qualifications Framework (SCQF)</td>
<td>Scottish Credit and Qualifications Framework: a framework that applies to qualifications and other academic awards in Scotland. For reference points see <a href="https://scqf.org.uk/">https://scqf.org.uk/</a></td>
</tr>
<tr>
<td>Sydney Accord</td>
<td>Similar to the Dublin Accord, for Incorporated Engineers (in the UK) or Engineering Technologists <a href="http://www.ieagreements.org/accords/sydney/">www.ieagreements.org/accords/sydney/</a></td>
</tr>
<tr>
<td>Threshold</td>
<td>The minimum standard that a qualification or apprenticeship must meet.</td>
</tr>
<tr>
<td>Total Qualification Time (TQT)</td>
<td>Total Qualification Time (TQT) is an indication of how long a typical learner might take to study a qualification, including the time spent on their individual study and on assessment. It includes Guided Learning Hours (GLH), which is the amount of time spent actually being taught or any other form of education or training.</td>
</tr>
<tr>
<td>UK-SPEC: the UK Standard for Professional Engineering Competence</td>
<td>The UK standard which sets out the competence and commitment requirements for registration with the Engineering Council as an Engineering Technician, Incorporated Engineer or Chartered Engineer. <a href="http://www.engc.org.uk/ukspec">www.engc.org.uk/ukspec</a></td>
</tr>
<tr>
<td>Unique Identifier</td>
<td>All UK regulated qualifications possess a unique identifier (typically an alphanumeric code) by which they are identified on the Ofqual or SCQF register.</td>
</tr>
</tbody>
</table>
## Appendix F

### Application process to become EngTech registered

What applicants need to complete/upload online when they are submitting their application. Refer to section 2.2 for the different available routes.

<table>
<thead>
<tr>
<th>Route</th>
<th>Evidence required</th>
<th>Interview</th>
</tr>
</thead>
</table>
| 1. Applicant with an approved qualification and graduated from an approved training programme | - personal details  
- experience  
- sponsors  
- upload qualifications certificate  
- supporting documents  
  o C&C report  
  o CV  
  o training programme certificate  
  o photo ID | No |
| 2. Applicant with an approved training programme that covers the learning outcomes through experiential learning | - personal details  
- experience  
- sponsors  
- supporting material  
  o C&C report  
  o CV  
  o training programme certificate  
  o photo ID  
- non-compulsory: qualifications certificate | No |
| 3. Applicant with an approved qualification | - personal details  
- experience  
- sponsors  
- qualifications certificate  
- supporting material  
  o C&C report  
  o CV  
  o photo ID | Only if required |
| 4. Applicant with no approved qualification neither graduated from an approved training programme | - personal details  
- experience  
- sponsors  
- supporting documents  
  o C&C report  
  o CV  
  o photo ID  
- non-compulsory: qualifications certificate | Yes, unless deemed unnecessary |
Led by members, supporting members, serving society

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