Accreditation of F-Standard process safety programmes
A guide for education providers and assessors

Based on learning outcomes
Preface

IChemE advances chemical engineering’s contribution worldwide for the benefit of society. Through its conduct of higher education programme accreditation, IChemE aims to recognise and share good practice in the education of process safety engineers. At the same time, it seeks to promote development of the profession by encouraging innovation in process safety engineering programme design and delivery. Recognising that practicing process safety engineers come from a variety of academic backgrounds, specialist education in process safety is often through a postgraduate MSc or equivalent degree, which IChemE accredits as a stand-alone programme.

IChemE’s accreditation guidelines derive from long experience in accrediting degree and diploma programmes across the world, against discipline-based criteria. Accreditation serves two purposes: (i) recognition of programmes against IChemE standards; and (ii) linkage to IChemE’s suite of professional engineering registrations.

This guide, issued in October 2021, is the first aimed specifically at meeting the educational requirements to become a Professional Process Safety Engineer. It is based upon the expectations of the Fourth Edition of the Engineering Council’s Accreditation of Higher Education Programmes (AHEP), released in August 2020, within the context of the Process Safety discipline.

The accreditation process involves scrutiny of evidence provided by the higher education institution and a visit to ensure that the programmes comply with the guidelines in this document. We would like to extend our sincere appreciation to the many people from industry and academia who have assisted in its worldwide accreditation activities, and who have helped in preparing this revision of the guidelines.

Application and supporting documents

All application and supporting documentation can be found at www.icheme.org/uni-accreditation-docs including: assessment questionnaires/report forms; credit analysis tool; safety, health and environment (SH&E) covering notes; SH&E checklist; assessor code of conduct; appeals procedure; accreditation cost recovery.

Document control

<table>
<thead>
<tr>
<th>Version no.</th>
<th>Date issued</th>
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<tr>
<td>V1.1</td>
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</tr>
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Please note: when printed this becomes an uncontrolled document. See www.icheme.org/university-accreditation-guidance for the latest version.
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1. Introduction

Knowledge and understanding of process safety are important components of professional competence for the Professional Process Safety Engineer. Formal education is the desirable way of demonstrating the necessary underpinning formation of knowledge and understanding. IChemE has specified the desirable content and level of learning outcomes from a comprehensive formal programme of studies in process safety.

Our aim, to recruit the brightest and most innovative people into the discipline of process safety engineering, challenges us to provide them with an education that will stimulate and develop their talents. Higher education degree and diploma programmes must communicate the relevance and excitement of our profession. We respond to this challenge with our accreditation activity, through which educators benefit from our knowledge of excellent global practice in process safety engineering education. We concentrate upon assessment of learning outcomes (i.e., what is learned by students) rather than programme content (i.e., what is taught to students).

These guidelines summarise what we require of an accredited degree programme, with the intention of leaving it to the university to determine how the requirement is met.

1.1 The value of IChemE accreditation

Fundamentally, IChemE accreditation provides benchmarking of academic programmes against high, internationally recognised standards. This is of increasing importance as the globalisation of engineering products and services demands greater confidence by employers in the skills and professionalism of the engineers they recruit.

A department with a successfully accredited process safety programme:

- benefits from intensive professional consultation on the programme;
- has demonstrated that their programme is academically sound and industrially relevant;
- will be able to promote the accreditation status of its degree programme publicly;
- benefits from academic exchange within the IChemE community of universities having accredited programmes;
- gains access to an international process safety engineering community with opportunities for sharing good practice and progressing challenging issues.

Graduates themselves strongly benefit from attending accredited programmes as accreditation links closely to professional qualification with IChemE (see Section 2.2). Our aim is to help process safety engineers who acquire sufficient knowledge, understanding and skills to enable them to seek recognition as a Professional Process Safety Engineer (MIChemE), the highest international qualification for professional process safety engineers.

1.2 The IChemE accreditation process

IChemE accreditation is a high value, confidential, discipline-specific peer review by a small panel of experienced professional process safety engineers drawn from industry and academia. It is a joint enterprise in which the IChemE panel and the university department seek understanding through mutually respectful discussion of the available evidence. The process is intended to benefit the university, students, employers, IChemE and the wider public.

The appointed assessment panel undertakes an in-depth review of process safety engineering programmes against the criteria published in these guidelines. The panel reviews documentary material relating to the programmes and visits the department for discussions with staff and students. The assessors produce a confidential and written report. We will treat the report as confidential and shall not distribute it for any other purpose. The report is made available to the department. Individual comments will be non-attributable in the report. We evaluate the report to decide the accreditation status of the programmes reviewed.

IChemE’s accreditation process has many unique strengths which departments value:

- it is a rigorous process that uses panels of three experienced and trained chemical/process safety engineering professionals from industry and academia to assess programmes. This provides greater depth and penetration of the teaching programmes than can be achieved by typical alternative pan-engineering accreditation processes;
it is international in outlook and practice;

- it is recognised and respected worldwide. We have accredited programmes across the world for over 50 years and currently accredit over 200 programmes across 15 countries;

- it assesses programmes against the learning outcomes achieved by students, regardless of programme title and programme duration;

- it is grounded in a philosophy of continuous improvement. We expect diversity of provision and seek to stimulate improvement in process safety engineering education by encouraging new and innovative approaches.

IChemE accreditation requirements and outcome standards are explained in Sections 2-4 of these guidelines. Full details of the accreditation process are given in Sections 5-9.

1.3 The international perspective

IChemE has an international perspective on process safety engineering education and we hold a deep understanding of the different types of degree and diploma available to students in many countries.

On an international level, the nomenclature for awards and degree names can be especially confusing. The following highlights some of the issues and defines our approach for dealing with this.

Around the world, the terms ‘bachelor’s’, ‘master’s’ and ‘diploma’ are commonly used for degree award names. We appreciate that different countries may define these degrees in differing ways.

We will therefore, in our assessments, focus on the learning outcomes achieved through study for a qualification and the taught content delivered.

To categorise our accreditation decisions we pay no attention to programme name, title or duration but adopt a simple convention of M-, B-, F- and D-Standard accreditations. These map, respectively, to programmes providing integrated master’s, bachelor’s, postgraduate master’s and diploma level outcomes. The relevant accreditation for process safety engineering MSc programmes (or their equivalent) is therefore at the F-standard as detailed in Section 2.

We completely respect the need for national-level accreditation systems and welcome the fact that agreements, such as the International Engineering Alliance’s Washington Accord, provide confidence in the quality of university accreditation processes. The process safety engineering outcomes described in this guidance outline the standards for accreditation that directly link to professional registration with IChemE. It may be that some degree programmes meeting generic attributes under the Washington Accord will not fully meet our discipline-specific requirements.

1.4 Equality, diversity and inclusion

IChemE is strongly committed to the principles of equality, diversity and inclusion. The future success of the profession and our organisation is critically dependent on our ability to ensure that process safety engineers come from all walks of life and that our membership is representative of broader society. In the UK, we are a signatory to the Science Council declaration on diversity, equality and inclusion and the Royal Academy of Engineering diversity concordat, which “seeks to ensure that the profession properly reflects the society it serves and takes action to attract engineers from increasingly diverse backgrounds into professional membership and registration. In this way the profession can capitalise on their diversity of thought, innovation and creativity”.

One route into professional membership and registration is through attainment of an accredited degree in process safety engineering. Therefore, we expect universities with accredited degrees to respect the principles of equality, diversity, and to be inclusive in developing equal opportunities for students from different backgrounds to enter their programmes, to succeed in their degree courses and to seek gainful employment.
2. Accreditation F-Standard and the link to professional registration

2.1 F-Standard accreditation award

IChemE accredits academic process safety programmes to F-Standard. The Standard is defined in terms of:

- a set of learning outcomes (Section 3);
- the level at which these learning outcomes are achieved (Appendix C).

The F-Standard is defined and linked to IChemE membership requirements as follows:

‘F-Standard’ (Process Safety)

A second cycle degree under the Bologna process.

- recognising postgraduate degrees, such as MSc, of the highest international standards that provide advanced process safety engineering knowledge and skills at IChemE outcome Level F.

An IChemE-accredited qualification at F-Standard (Process Safety) meets in part the academic requirements for Professional Process Safety Engineer.

When combined with an IChemE-accredited (or accepted equivalent) qualification at B-Standard* the academic requirements for Professional Process Safety Engineer will be met in full.

2.2 Professional recognition as a Professional Process Safety Engineer

The Professional Process Safety Engineer registration is aimed at senior professionals and recognises people who have responsibility for process safety and can demonstrate relevant experience and application of knowledge across a range of competencies.

Responsibility for process safety covers those individuals that are engaged in an operating facility and/or are involved in the delivery of training or consulting services that cover process safety. The competencies include: principles and aspects of process safety; influencing process safety culture; hazard identification; consequence assessment; control of hazards; risk assessment; application of regulations; protecting the public and environment; incident investigation and lessons learned; emergency planning; process safety management.

The academic formation underpinning eligibility for Professional Process Safety Engineer can be met in the following ways:

Meets educational base requirements for Professional Process Safety Engineer

This pathway is for applicants with a qualification accredited by IChemE at M-Standard or equivalent in process safety engineering (PSE), or a qualification accredited at B-Standard by any professional engineering institution plus an F-Standard PSE qualification accredited by IChemE.

Individual Case Procedure (ICP)

This pathway is for those who do not hold IChemE recognised exempting qualifications. Application requires submission of details and proof of academic qualifications or equivalents, which will be assessed against B-Standard and F-Standard accreditation requirements. These will include the learning outcomes listed in Appendix B.

All applicants will be required to demonstrate professional competence

Graduates will also be required to demonstrate that they have acquired professional competency following a required and sufficient period of relevant training and experience (initial professional development) post-graduation.

* For details of B-Standard accreditation see www.icheme.org/accreditation-guide.
3. An accreditation philosophy based on learning outcomes

3.1 Introduction

IChemE’s accreditation decision results from an evidence-based assessment of the learning outcomes delivered by the degree programme and the levels at which these are achieved.

We consider that the quality of a degree or diploma programme is fundamentally dependent on students having a high-quality learning experience which facilitates excellent attainment. This can only be evaluated through review of evidence of student achievement. We therefore believe that measurement of time spent (credit hours) on individual programme or module elements, while providing guidance regarding extent of taught content, is not a definitive measure of learning delivery. Likewise, we believe it can reasonably be expected that cohorts of high entry-standard may, given a stretching curriculum and a demanding, well-resourced teaching environment, be more likely to achieve higher levels of learning outcomes.

IChemE’s accreditation philosophy therefore takes into account all factors that influence delivery of learning outcomes.

3.2 About learning outcomes

Learning outcomes define the capabilities of individuals obtaining a qualification. Programme designers typically express them in the form of outcome statements.

A high-level outcome statement might be:

“Professional engineers operating in the field of process safety are characterised by their ability to identify and assess potential hazards and risks and develop or identify effective process safety solutions to manage those risks for new and existing operations, using relevant techniques that address the technical as well as human factors issues”.

Such an outcome statement can be supported by a cascade of lower-level statements specifying appropriate intellectual abilities, practical skills, general transferable skills etc. This approach provides an effective framework giving both guidance and flexibility to programme designers.

The learning outcomes of a process safety engineering programme will represent the important qualities that we expect the programme to develop in a student who will go on to practise as a process safety engineer. The high-level outcome statements inform the definition of individual module/programme objectives within the degree. More guidance on this is given later in this section to help those designing or accrediting programmes.

3.3 Scope of process safety engineering degree programmes

The learning outcomes specified in this guidance comprise a package which is distinctive to process safety engineering, and which can be regarded as a minimum necessary requirement for IChemE accreditation.

It is not practical for any one programme to achieve all the learning outcomes that every process safety engineer might conceivably need. However, an acceptable academic formation must prepare graduates for a range of employment roles.

Many degree programmes will broaden and deepen beyond the minimum requirements in many ways. These could be from within the process safety engineering discipline or through further studies in science or engineering, management, economics, languages or law, etc. The quantity of such study will depend on the interests and previous education of the students, as well as the length of the programme. Non-process safety engineering content is referred to as ‘complementary subject material’.

Continuously evolving technology and industrial practices mean that higher education programmes cannot equip graduates with all the skills they will need to deploy over an entire career. There will thus always remain a need for continuing professional development (CPD) throughout an engineer’s career. Degree programmes should lay the foundations on which further education, training and professional development can build.

3.4 Entry standards

High quality process safety engineering degree programmes are demanding on students. While the IChemE accreditation process places greatest emphasis on the outcomes of a programme of study, input standards to the programme invariably remain an important factor. We expect programme providers to maintain appropriate entry standards.
We will therefore assess entry standards against defined international norms and will expect the standards for entry to accredited process safety engineering programmes to be at an appropriately high level. For all second degrees, we expect prospective students to hold an appropriate first degree. Departments need to provide evidence that all students meet the overall programme outcomes, regardless of their entry route.

Details of the entry standards that IChemE expects programme providers to maintain are given in Appendix A.

3.5 General learning outcomes

Students graduating from an accredited programme in process safety engineering must have the general abilities listed below:

Knowledge and understanding

They must be able to demonstrate their knowledge and understanding of technical process safety to practical engineering situations and to demonstrate appropriate theoretical and practical methods to the analysis and solution of process safety problems. They must be able to handle the wider implications of process safety and its social, economic and human consequences when not applied or upheld and also, to provide effective process safety leadership and communication. They must show an understanding of individual, societal and environmental risk and the application of criteria to demonstrate that these risks are tolerable. They should be able to demonstrate they understand the hierarchy of control measures. They should be conversant with the significant case studies that have led to the advances in the understanding and application of process safety.

Intellectual abilities

They must be able to select and apply science and engineering tools to the analysis of problems, appropriate to the specific issue and risk presented. They must be able to demonstrate creative and innovative ability in the synthesis of solutions and in critically reviewing designs. They must be able to comprehend the ‘broad picture’ and thus work with an appropriate level of detail. They must be able to propose acceptable (safe, effective, ethical) solutions even when information is lacking.

Practical skills

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

General transferable skills

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

3.6 Learning outcomes in a process safety engineering context

The Engineering Council sets the overall requirements for the Accreditation of Higher Education Programmes (AHEP) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC). The general learning outcomes listed above will be met through a combination of learning outcomes in each of the following broad areas of learning, as defined in AHEP:

2. Engineering analysis.
3. Design and innovation.
4. The engineer and society.
5. Engineering practice.

Programmes seeking IChemE accreditation must clearly deliver learning outcomes in each of these broad areas of learning at the appropriate outcome level (Appendix C):

Full details of the learning outcomes in each category are given in Appendix B. The relationship between these learning areas, outcome levels and accreditation standards is shown in Table 1 on page 9.
3.7 Interpretation of terms

Within each broad area of learning, it is expected that students will have achieved a number of specific outcomes in terms of 'knowledge', 'understanding', 'skills' and 'awareness'. Advanced outcomes may be indicated by descriptors such as 'complex' or 'complexity'.

Consistency in the interpretation of these terms by both assessors and departments will be assisted by the following definitions:

- **Awareness** is a general familiarity;
- **Knowledge** is information that can be recalled;
- **Understanding** is the capacity to use concepts creatively, for example: in problem solving, in design, in explanations, and in diagnosis;
- **Skills** are acquired and learned attributes that can be applied almost automatically;
- **Broadly-defined problems** involve a variety of factors which may impose conflicting constraints, but can be solved by the application of engineering science and well-proven analysis techniques;
- **Complex problems** have no obvious solution and may involve wide-ranging or conflicting technical issues and/or user needs that can be addressed through creativity and the resourceful application of engineering science.

3.8 Outcome levels

IChemE defines descriptors for each outcome level in terms of ‘knowledge’, ‘understanding’, ‘skills and competence’, as shown in Appendix C. Each of the broad outcomes in Section 3.6 should be achieved at the level appropriate to the accreditation standard of programme, as shown in Table 1 opposite.

<table>
<thead>
<tr>
<th>Area of learning</th>
<th>Learning outcomes (Appendix A)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Outcome</td>
</tr>
<tr>
<td>Science and mathematics</td>
<td>Level B</td>
</tr>
<tr>
<td>Engineering analysis</td>
<td>Level F</td>
</tr>
<tr>
<td>Design and innovation</td>
<td></td>
</tr>
<tr>
<td>The engineer and society</td>
<td></td>
</tr>
<tr>
<td>Engineering practice</td>
<td></td>
</tr>
</tbody>
</table>

3.9 Complementary learning

IChemE expects students to also gain the benefits of a rounded education and allows programme designers to have the flexibility to allow students to follow additional beneficial programmes such as languages, management and policy related studies, history and culture.

These complementary studies are not formally assessed by IChemE, but rigour in their teaching and assessment is expected.

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1 As in *The Accreditation of Higher Education Programmes (AHEP) 4th Ed 2020.*
4. Design and assessment of programmes for accreditation

4.1 Guidance on duration and content of process safety engineering programmes

4.1.1 Introduction

Decisions on whether a programme is accredited, and at what level, will be taken solely on the basis of evidence of achievement of learning outcomes against defined standards. Accredited programmes may have various titles, content or duration (depending, for example on entry level qualifications) and could be delivered in a wide variety of learning environments and formats (eg full-time, part-time, industry-based, distance learning, etc).

Although we seek to avoid prescription in these aspects, some broad guidance on content is useful for both departments and assessors. However, it should be stressed that the metrics on duration and content given within this section are for guidance. A significant difference from these metrics would not in itself preclude accreditation, but in such cases the department would be expected to justify the differences and provide compelling evidence that the required learning outcomes have been met.

In order to provide a common measure of content, and on the assumption that most programmes have a modular credit-based structure, it has been assumed that a typical year of full-time study comprises the equivalent of 60 credits. It is expected that departments will be able to convert their own measures of programme content to the IChemE credit basis*. As a guide, one IChemE credit is equivalent to approximately 20 hours of student workload (combined teacher-led and independent study). In cases where there are difficulties in interpretation we will provide guidance.

We consider the incorporation of professional process safety engineering approaches and attitudes, through direct contact between educators and students, to be a key component of an effective engineering education. The balance between direct contact and other study activities will vary according to the nature of the module and to local teaching and learning practices.

4.1.2 Minimum programme duration

An indication of the duration and academic credit is shown in Table 2 opposite. The indicated ‘years of study’ apply to full-time study and for degree entrants meeting our baseline entry standards for underpinning mathematics and science (see Section 3.4). For part-time or other modes of study, the values should be adjusted in proportion to the amount of study in each year.

Table 2. Indicative programme duration and credit for full-time study

<table>
<thead>
<tr>
<th>Programme type</th>
<th>IChemE credits</th>
<th>Typical length of full-time study</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-Standard</td>
<td>120</td>
<td>two years</td>
</tr>
<tr>
<td>B-Standard</td>
<td>180</td>
<td>three years</td>
</tr>
<tr>
<td>M-Standard</td>
<td>240</td>
<td>four years</td>
</tr>
<tr>
<td>F-Standard</td>
<td>90</td>
<td>one–two years</td>
</tr>
</tbody>
</table>

* The IChemE credit value is equivalent to the European Credit Transfer System (ECTS) credit value.

4.1.3 Minimum programme content

IChemE specifies that learning outcomes must be delivered across the broad areas of learning defined in Section 3.6 and the supporting Appendix B.

In order to ensure that the learning outcomes are met adequately across the broad areas, we provide guidance on the minimum expected content for each area and for the programme as a whole. This content is specified in terms of minimum credits, as shown in Table 3.

Frequently, programmes or suites of programmes include various routes and options. These can take a wide variety of forms. We will look to ensure that the minimum is met for all possible variants which a student might select.
4.1.4 Allocation of programme content to specific areas

When assessing whether the minimum content has been met for each area of process safety engineering, we will take a holistic and balanced view of the content rather than individually ‘ticking-off’ each and every learning outcome statement.

The allocation of the content of a degree programme to specific areas is, for some topics, a matter of judgement. For example, we are generally content to leave this judgement to departments, subject only to clarity with respect to describing which specific areas are included within which headings. The use of minimum total content alongside specified minima for each category provides some latitude for allocation.

The credit analysis tool is available in the application documents at www.icheme.org/uni-accreditation-docs

Table 3. Level F learning outcome areas: minimum credit allocation guidance

<table>
<thead>
<tr>
<th>Accreditation standard</th>
<th>Minimum credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and mathematics</td>
<td>&gt;10 (60)</td>
</tr>
<tr>
<td>Engineering analysis</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Design and innovation</td>
<td>&gt;10</td>
</tr>
<tr>
<td>The engineer and society</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Engineering practice</td>
<td>&gt;10</td>
</tr>
<tr>
<td>Embedded learning‡</td>
<td>Sufficient</td>
</tr>
<tr>
<td>Total minimum specified content</td>
<td>60</td>
</tr>
<tr>
<td>Complementary topics§</td>
<td>Balance</td>
</tr>
</tbody>
</table>

Important notes:

1. Allocation: All credit counts are on an exclusive basis. Therefore total content of whole programmes or modules cannot be accounted for twice nor appear under two categories of learning. If departments consider that it is appropriate for content of modules to be divided across categories of learning, this is acceptable, provided full explanation of rationale is provided to IChemE in the questionnaire (see supplementary documents at www.icheme.org/uni-accreditation-docs).

2. Embedded learning: – It is expected that modules throughout a programme include, illustrate and reinforce aspects of sustainability, safety, health and environment and, where possible ethics, along with general transferable skills, as set out in Appendix B5. It is expected that a wide variety of delivery methods are used throughout so that students acquire the range of interpersonal and management skills etc to equip them to the modern engineering workplace. No credits should be allocated to the embedded learning section.

3. Multiple options: Where a choice is available to students, the ‘worst’ case should be evaluated (see Section 4.1.3)

4. Complementary topics: These are not included in the credit assessment (see Section 3.9).

4.2 Distinguishing features of F-Standard accredited programmes

F-Standard programmes (second cycle degrees, typically MSc) in process safety engineering should provide a deep understanding of process safety engineering. To be accredited as F-Standard, the programme must clearly demonstrate delivery of Level F advanced learning outcomes as detailed in Appendix B. In addition, there may be study of complementary subjects – including other science/technology, or other non-process safety engineering subjects such as business or languages.
4.3 Taught delivery methods and departmental practice for student assessment

4.3.1 Delivery methods

Various methods can be used to deliver a programme satisfying the learning outcomes, depending on the style of teaching appropriate to the university and the students, the number of students taught and the varied nature of content. We encourage the use of diverse methods and innovation in teaching.

The choice of methods is at the discretion of the university. The methods used could include lectures; tutorials; laboratory and workshop sessions; problem-centred learning; distance learning; and computer-aided learning. In addition, programmes may incorporate industrial placements, or study at other universities at home or abroad.

Whilst much of the teaching will be done by university staff, the use of external lecturers and supervisors, is encouraged, where these can supply knowledge and experience not otherwise readily available. Examples might be in the supervision of workshops, the presentation of case studies, or in the lecturing of special topics.

4.3.2 Assessment

The purpose of assessment by a university is to confirm that individual students have attained the necessary learning outcomes, and that this attainment is at the appropriate level for the degree being awarded. How individual modules are assessed is for the university to decide but, within a programme, a variety of assessment forms is expected and may include on-line quizzing and other innovative forms. For some parts of the programme, an assessment of a student’s oral presentation may be required.

It is expected that the university 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 procedures should include safeguards against academic dishonesty (eg plagiarism and other forms of cheating).

4.4 Evidence of achievement of learning outcomes

IChemE will look for evidence that students have attained the learning outcomes in each of the areas outlined in Section 3.

Typical examples of direct evidence include:

- examination papers and assignments, together with model answers and marked scripts;
- project reports;
- industrial placement reports;
- research dissertations;
- development of documented risk assessments.

Typical examples of indirect evidence include:

- external examiners reports;
- internal and external audits;
- quality assurance reports external to the department.

4.5 Learning periods away from the home university

Some programmes contain an assessed period of learning away from the home university – either in industry or at another university.

In cases where the assessed period away from the home university contributes to the overall degree award, and hence to the learning outcomes relevant to accreditation, we will look for strong, clear evidence of:

- defined learning outcomes for the period away;
- suitability of the placement organisation;
- rigorous standards of supervision;
- rigorous assessment of the outcomes achieved by the student; and
- quality assurance of the overall system of student placements.
Where the assessed period away is spent in an industrial environment, examples of evidence might include:

- project work or dissertations;
- presentations and posters;
- academic programmes/modules undertaken during the period away (distance learning);
- continuing professional development programmes.

Where the assessed period away is spent at another university, examples of evidence might include:

- programme of studies completed when at the partner university;
- examples of assessed project work and/or examination papers.

In each case it is expected that the students would re-enter the degree programme at a more advanced stage than when the period away began.

4.6 Compensation strategy

It must not be possible for any student to graduate without having successfully completed (in each of the IChemE learning outcomes categories) the minimum credits stipulated as the threshold for the level of accreditation awarded.

Full details can be found in Appendix F.

4.7 Resources, including professional membership

It is expected that appropriate human and physical resources will be in place to support the delivery of the programme.

A department running an accredited degree must employ a sufficient number of full-time academic staff, including Chartered Chemical Engineers with process safety experience (ideally including an accredited Professional Process Safety Engineer), for students to have reasonable access to them for instruction and guidance.

We hold the view that academic staff have a hugely important role in exemplifying professional behaviours to students. It therefore expects that at least 50% of senior faculty (e.g., professors, associate professors, senior lecturers) hold professional level registration, or are engaged in the application process, with a recognised professional engineering body.

The IChemE questionnaire for process safety accreditation seeks details of staff resources, information and learning facilities. These will include the full-time equivalent (FTE) staff involved in the teaching programme and information on typical sizes of lecture audience and workshop groups. An opportunity to meet staff and to view the facilities is included in the timetable for all accreditation visits.

See GDPR statement in Section 10.2.

4.8 Safety, health and environment culture and practice

In addition to formally taught process safety (Appendix B), we insist that students on accredited degree programmes must be instilled with appropriate attitudes to safety, health and the environment (SHE). The demonstration or otherwise of an adequate safety culture within a department will form part of the accreditation assessment.

It is expected that students’ learning and teaching will be undertaken in an environment where there is an obviously strong and effective safety culture and where the students will learn by example. Thus, students graduating from an accredited programme will understand that SHE culture includes:

- leadership – Head of Department and senior management take an active part in SHE;
- visibility – clear and relevant signage and information; good standards of housekeeping;
- behaviour – staff, students and visitors behave in a careful, risk-averse manner; Personal Protective Equipment is available and usage is enforced where relevant; there are systems for incident reporting, follow-up, feedback and improvement;
- legislative compliance – there is a sound understanding of, and compliance with, applicable SHE legislation;
4.9 Ethics culture

We recognise that modern engineering degrees need to include ethics as an integral component of the curriculum. Codes of conduct, an important part of engineering ethics, are the framework for professional behaviour. We, like other professional engineering institutions, have a code of conduct specific to the process safety engineering profession which its members are required to follow; comparable codes exist in other countries (eg Australia and Ireland), though these are usually more general to the engineering profession as a whole. We recognise that different codes of conduct have many common features and expects all accredited 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.

5. Overview of the accreditation process

5.1 Accreditation ethos

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

5.1.1 Confidentiality and document ownership

The accreditation process is confidential between IChemE and the university department. We will retain ownership of all reports produced but will make these available to departments in confidence and where appropriate.

See GDPR statement in Section 10.2.

5.2 Principal stages of accreditation

The IChemE accreditation process has the following principal stages:

- initial contact between the university department and IChemE;
- preparation by the department and submission to IChemE;
- appointment of assessors by IChemE;
- preparation and visit by the panel of assessors;
- report by the assessors to IChemE;
- decision by IChemE’s Education Subcommittee;
- implementation of follow-up actions by the department.

A timeline for the process is given in Table 4 opposite, with further details in the sections which follow.

### Table 4. Indicative timeline for accreditation

<table>
<thead>
<tr>
<th>Time from visit</th>
<th>University department</th>
<th>IChemE assessors</th>
</tr>
</thead>
<tbody>
<tr>
<td>By -36</td>
<td>New programmes etc - initial contact with IChemE*</td>
<td>(Re)training.</td>
</tr>
<tr>
<td>By -24</td>
<td>New/revised programmes - design and implementation.</td>
<td></td>
</tr>
<tr>
<td>-24 to -3</td>
<td>Collect supporting documents. Contacted by IChemE re visit dates.</td>
<td>Contacted by IChemE re visit dates.</td>
</tr>
<tr>
<td>-3</td>
<td>Submit IChemE questionnaire and supporting documents.</td>
<td>Receive questionnaire and supporting documents.</td>
</tr>
<tr>
<td>-3 to 0</td>
<td>Prepare for visit.</td>
<td>Study re-visit documents Pre-visit clarifications with department.</td>
</tr>
<tr>
<td>+3</td>
<td>Prepare and agree report.</td>
<td></td>
</tr>
<tr>
<td>+5</td>
<td>Comment on draft report.</td>
<td>Lead assessor presents report for subcommittee desion.</td>
</tr>
<tr>
<td>By +12</td>
<td>IChemE informs department of outcome.</td>
<td></td>
</tr>
<tr>
<td>+12 onwards</td>
<td>Follow-up if required (meet conditions etc).</td>
<td>If required, review follow-up report etc.</td>
</tr>
</tbody>
</table>

*ICChemE contact details are given at the end of this document.
5.3 Multiple campuses
In accordance with our Engineering Council Licence*, when a university offers multiple versions of a programme in different locations, we must visit each location for which programme accreditation is sought, even where the programme is identical. An annual accreditation subscription will be applied, as in Section 5.9, for each campus visited.

Universities with multiple campuses should contact us in good time to discuss the arrangements for the accreditation process. As a guiding principle, the procedures set out in this document apply individually and separately to each campus concerned.

5.4 Initial contact - new programmes
We will work with departments new to IChemE accreditation, to explore the best approach to accredited status. Where appropriate, this could include a preliminary ‘benchmarking’ assessment and/or the appointment of a mentor to help the department develop to meet the accreditation requirements.

All departments planning to introduce new programmes for accreditation are recommended to contact us at an early stage.

5.5 Initial contact - existing programmes
Where a programme is already accredited, we will contact the department in the penultimate year of accreditation with a view to arranging a visit during the last accredited year, in order to maintain continuity of accreditation. Where a department has several accredited programmes, we will do our best to align the periods of accreditation.

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

5.6 Preparation by the department
The department will need to make available documents of various kinds for review by the assessors. Since this includes work done by students, preparation of these documents needs to be considered a long time (up to three years) ahead of the visit. Closer to the visit, the department will be asked to submit a completed questionnaire and other relevant documents.

See the GDPR statement in Section 10.2. Further details are given in Section 6.

5.7 IChemE assessors and the visit
IChemE maintains a pool of trained assessors. A panel of three assessors comprising at least one academic and at least one industrial person will be selected from the pool. Where feasible, the panel will include members from outside the country of the department visited and with an understanding of the local education system. One member of the panel will be appointed as Lead Assessor. Occasionally, an observer may accompany the panel – often a potential addition to the pool or an IChemE staff member.

The assessor panel will receive the documents provided by the department to help them prepare the visit. The visit to the department will normally occupy two working days and, during the visit, assessors will wish to meet staff, representative students, recent graduates and, where feasible, industrial partners such as employers and advisory panel members.

Following the visit, the assessors will report their findings to us. The report, excluding the recommendations of the assessors, will be sent to the department for comment on any factual inaccuracies.

Further information on the appointment and role of the assessors is given in Section 7.

5.8 The accreditation decision and subsequent actions
The completed accreditation report will be considered by IChemE’s Education Subcommittee and a decision on whether to accredit will be made. The subcommittee will usually work through Virtual Accreditation Panels which usually meet monthly for this purpose. The department will be notified of the outcome at the earliest opportunity.

Following a successful accreditation, the department will receive a certificate of accreditation. Any conditions set by the Education Subcommittee must be met by the given date.

Further information on the decision and follow-up are given in Section 8.

5.9 Accreditation costs and cost sharing

The costs of accreditation include the cost of administration and some of the direct costs of travel and subsistence for the accreditation assessors. We seek to share the direct costs with the universities undergoing assessment.

The international standard of IChemE accreditation is maintained through our use of a global pool of trained assessors. All assessors are volunteer members of IChemE, working on a pro bono basis, so no fees are payable. All assessment visits aim to include at least one assessor from outside of the region. Hence, the travel and subsistence costs incurred by the assessors undertaking a visit vary substantially, depending on both the geographic region and where the assessors are travelling from.

In order to provide a fair system of recovery of some direct costs of accreditation, IChemE has a fixed subscription for university accreditation. The annual subscription is payable by each department that has accreditation and will cover all programmes accredited in one accreditation visit. There will only be an additional charge for the assessors' travel and accommodation if more than one accreditation visit is required within the normal cycle.

In order to meet full accreditation for programmes which are delivered at more than one campus, all campuses are required to have a separate accreditation visit. A separate annual accreditation subscription will be invoiced to each campus visited.

IChemE provides a benchmarking service for those institutions seeking accreditation for the first time see www.icheme.org/education/universities-accredit-your-degree/how-to-apply

For further information on costs, refer to www.icheme.org/uni-accreditation-fees
6. Preparation for accreditation

6.1 Preparing the submission documentation

Once contact has been established between IChemE and the department regarding possible accreditation, the department 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 visit. Early on, a provisional visit period will be agreed, and the visit date itself will be finalised somewhat later in the process, as set out in Section 7.1.

In good time before a visit is to take place, the department should ensure that the necessary evidential documents are available. Since these will include examples of work completed by students (such as examination scripts and assignments), some of this preparation needs to be made in previous academic years. Examples of a range of performance (high, middle, threshold pass) need to be provided, together with a clear indication of the marking of such pieces of work. As an example (and where this is not already the practice), departments should consider requiring students to submit digital copies of major project reports, in order that these can be made available to accreditation assessors before the visit.

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 provided in digital form. The department will be sent a link to an IChemE folder where document submissions can be uploaded.

Various digital forms are acceptable, provided that they are well-structured, easily navigable, readily usable and can be accessed on commonly-used digital platforms. Whatever form is chosen, it must be convenient for assessors to download or transfer material so that they have access offline (eg whilst travelling).

The submission comprises a completed degree programme questionnaire and supporting documentation, as detailed in Table 5 below. The complete set of documents should be sent to IChemE three months before the visit.

We will copy or otherwise make the documents available to the assessor panel. After the assessors have received the advance documents, and prior to the visit, they may identify a need for further information. In such cases we will give the department as much notice as possible to provide this or, alternatively, make arrangements for this to be available for review during the assessors’ visit.
Table 5. Documentation required from department three months before the visit

<table>
<thead>
<tr>
<th>Category</th>
<th>Items required/description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree or diploma programme questionnaire</td>
<td>The degree questionnaire is a critical document and provides a structure for the department to collate all essential descriptive information on the degree programme(s) comprehensively for advance assessment by IChemE.</td>
<td>Refer to IChemE’s separately available application documents* for the degree and diploma questionnaires.</td>
</tr>
<tr>
<td>Curriculum details</td>
<td>Programme structure – eg list of modules, showing year of delivery, credit value, options etc.</td>
<td>Where available, the programme handbook supplied to students may supply these details in a convenient form.</td>
</tr>
<tr>
<td></td>
<td>Descriptors of all modules, showing learning outcomes, teaching methods (eg lectures, practicals, projects), methods of assessment, etc.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Briefs for major research/design projects including scope, assessment criteria (individual/group) and marking schedules.</td>
<td></td>
</tr>
<tr>
<td>Staff details</td>
<td>Brief CVs of academic staff including qualifications, professional associations.</td>
<td></td>
</tr>
<tr>
<td>Evidence of the learning outcomes actually achieved by students</td>
<td>Complete sets of examination question papers with marking schemes (past two years).</td>
<td>Evidence should be a representative cross-section (high, middle, threshold pass) and drawn from all parts of the degree programme. Evidence must include, in all cases, markers’ comments and marks.</td>
</tr>
<tr>
<td></td>
<td>Research and/or other (as appropriate) Level F project reports (three examples each).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Optional, as appropriate) External assessment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Optional, as appropriate) Industrial project reports.</td>
<td></td>
</tr>
</tbody>
</table>

Important: in preparing the above documents, the department must ensure that it is clear to IChemE which programmes are being assessed and, where there are several programmes, indicate details of multiple/parallel content. Details of each accredited award (degree name, title and mode of study) will be recorded on the UK Engineering Council database and will be used in assessing future applications from graduates for Chartered membership and employment. Hence, it is essential that the university documentation is consistent with the details as used on degree certificates.

*www.icheme.org/uni-accreditation-docs
6.2 Preparing the department for the visit

It is good practice for senior university staff to be briefed ahead of the visit. Likewise, department staff, representative recent graduates and students should also be briefed adequately to include the purpose, aims and possible outcomes from the assessment.

During the visit, key staff are expected to be readily available to meet the assessors. This includes programme leaders, advisors, laboratory managers (where relevant), safety managers and others (eg senior management, library, QA or ICT staff) as deemed appropriate by the department.

6.3 Supporting the assessors’ visit

The department should expect to provide additional supporting documentation for the assessors to examine in support of their assessment. Such material should be made available during the visit and must include:

- additional student materials to demonstrate learning outcomes achieved, such as marked examination scripts, laboratory reports (where relevant), project reports;
- evidence of academic quality assurance – eg external audit, academic review reports, External Examiner reports.

Further information might also include:

- management structure;
- industry involvement;
- how sustainable development, ethics, safety etc are embedded in the programme.

A serviced meeting room should be prepared and made available to the assessors for their private reviews and deliberations. This room must have Wi-Fi and contain all supporting documentation provided to the assessors for their perusal.
7. IChemE assessors and the visit

7.1 Visit planning

Accreditation visits will include both a pre-meeting of the assessors on the evening before the visit and normally two full days at the university (see Appendix D), though visits to universities seeking first accreditation may possibly take longer.

Forward planning of the IChemE visit calendar is important in order to ensure that assessors and resources are available. At least 18 months before the visit is due, IChemE staff will negotiate with the department a target three-month period during which the visit will take place. Nearer the time, where possible at least one year ahead, IChemE will liaise with the department to agree the month of the visit. Following this, the assessor panel will be identified. At least six to nine months before the visit, we will liaise with the department to finalise a mutually convenient date for the visit during term-time, with due regard to academic calendars and assessor availability. At this point they will also agree the structure of the visit, and initiate logistical arrangements such as timings, accommodation, travel etc.

This process allows the department time to prepare a comprehensive submission and to plan its own arrangements (Section 6). The preliminary documentation (Section 6.1) must be made available to us at least three months before the visit date.

IChemE staff will distribute the documentation supplied by the department to the assessors for review in advance of the visit and will liaise regarding any further materials or arrangements required prior to the visit.

Refer to Appendix D for a typical visit schedule.

7.2 Selection of assessors

IChemE maintains a pool of trained assessors who are all Chartered Chemical Engineers or Professional Process Safety Engineers. The pool comprises both academics and industrialists who have current knowledge of the accreditation process and requirements. Assessors are appointed to the pool by nomination to, and decision of, the Education Subcommittee.

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

- all assessors will have received IChemE training;
- no more than one assessor should be without previous visit experience;
- panels will include assessors from our worldwide assessor pool with, where possible, one from outside the country of the university and one with understanding of the local education system;
- panels will always comprise at least one academic and at least one industrialist;
- panels will, if possible, include members with specialist expertise appropriate to the programmes being considered (e.g. process safety engineering).

For re-accreditation visits we will, if appropriate and possible, strive to ensure that one assessor should have been a member of the panel for the previous visit.

Departments 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 possible opportunity to the senior IChemE staff member responsible for accreditation and the Chair of the Education Subcommittee.

7.3 The role of IChemE’s assessors

Assessors act in a voluntary capacity on our behalf. They are required to work within the code of conduct for volunteer members on IChemE activities (see IChemE supporting documents and GDPR statement in Section 10.2).

The assessors’ primary role is to seek evidence to verify that the target learning outcomes are being achieved by assessing the scope and depth of the examinations, projects, laboratory work (where relevant) and other learning activities completed by the students. The accreditation visit allows for time to view the resources that support this learning.

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

- are the entry qualification profiles of students satisfactory?
- are the learning outcomes clearly defined and are they appropriate?
- is the programme structure and content appropriate to deliver the learning outcomes?
are the resources to support the delivery of the learning outcomes adequate?

are the learning outcomes achieved to an appropriate level?

Assessors frequently request to see additional materials during their visit. Departments are respectfully requested to be prepared for, and accommodating of, reasonable requests.

At the end of the visit, assessors will give feedback on their principal findings, including recommendations for improvement. They are, however, instructed not to tell the department their recommendation on the accreditation outcome. The decision will be taken at the Education Subcommittee meeting at which the assessors’ report (see Section 7.4 below) is discussed and moderated. While assessors are required to make recommendations to the subcommittee about the decision, these may be overridden on examination to maintain consistency with IChemE criteria and with other accreditation decisions.

7.4 The assessors’ report

The assessors prepare a written report to IChemE’s Education Subcommittee. The report is expected to be submitted to us within three weeks of the visit.

7.4.1 Purpose of the report

The primary purpose of the assessors’ report is to inform the Education Subcommittee of their findings and how learning outcomes have been met. The assessors’ report includes a summary of general aspects of the visit, such as resources, safety culture and discussions with staff and students, which impact upon the delivery of those learning outcomes.

In addition, the assessors will:

- identify and commend strengths and good features within the programme(s);
- identify areas where there may be scope to improve the programme(s);
- propose recommendations to the subcommittee on the future accreditation status of the programme(s) reviewed.

7.4.2 Checking factual accuracy

We will send the assessors’ report, excluding the assessors’ accreditation recommendation, to the department for comments on its factual accuracy prior to final decision by the subcommittee.

7.4.3 Confidentiality and ownership

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

See GDPR statement in Section 10.2.
8. Accreditation outcomes

8.1 Accreditation decision process

The Education Subcommittee exists to maintain standards and consistency of decision-making for IChemE accreditation. The subcommittee usually meets four times per year and is comprised of experienced IChemE assessors who are collectively responsible for all decisions on accreditation. Potential conflicts of interest are declared at the start of each meeting and those concerned are normally required to leave the meeting during the relevant discussion.

The subcommittee will formally review the assessors’ report, together with the accreditation recommendation of the assessor panel for final decision. They appoint from its membership a rapporteur for each accreditation visit. The rapporteur will raise (eg by email) and resolve as many issues as possible concerning the report with the lead assessor prior to the meeting, so that these can be noted with minimal need for further discussion. The meetings include video/audio links, so that an accreditation panel member (where possible the lead assessor) always be in attendance, in person or virtually, to contribute to the decision-making process. At the meeting, the visit report is introduced by the lead assessor (or other panel member) and the rapporteur clarifies and highlights their findings. The subcommittee resolves any outstanding issues by discussion with the assessor and decides the outcome, usually by consensus.

The Education Subcommittee may ask the lead assessor to amend the report to clarify any ambiguities or other misleading statements. The report will be sent to the department 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 subcommittee. Where such changes may have a material effect on the outcome, further discussion will take place as above.

A Virtual Accreditation Panel, comprising at least five of the subcommittee’s membership, will be appointed to decide accreditation outcomes. These panels meet monthly and operate in the same way as described above but with the additional step of ratification of the their decision by correspondence or otherwise full discussion of the decision at an Education Subcommittee meeting.

Decisions are normally communicated to the department within two weeks of the discussion. Occasionally, further information or clarification may need to be sought before a final accreditation decision is made (normally at the subsequent meeting).

8.2 Accreditation outcomes

Decisions are based foremost on maintaining benchmark standards of academic formation. IChemE will seek to help departments, providing advice and counsel to support continuous improvement of their programmes. We also seek to commend and encourage the sharing of educational good practice amongst the community of accredited departments worldwide.

8.2.1 Available decisions

The Education Subcommittee will make one of the following possible decisions:

- accredit/re-accredit the programme(s) without condition;
- accredit/re-accredit the programme(s) subject to conditions;
  - such accreditations will be dependent upon the department meeting requirements set by IChemE following its review of the assessors’ report. See Section 8.2.2 below.
- to not accredit/re-accredit the programme(s);
  - in this instance IChemE will advise why the programme has failed to be accredited and will, upon request and where appropriate, advise the department on available assistance.

Refer to Appendix E for an indication of how accreditation decisions are reached.

8.2.2 Conditions

We may make accreditations subject to conditions. These are binding on the department and must be resolved within the indicated timeframe for accreditation to be maintained and valid.

Any conditions will be programme specific. Examples have included further report submissions, changes to programme modules, demonstration of stronger safety culture etc.
Fulfilling the conditions is the responsibility of the department. Reports on fulfillment must be made formally in writing for the Education Subcommittee’s consideration and accreditation decision.

Reports on condition fulfilment may be sent to the original assessors for comment to advise the subcommittee. In some cases, a visit by an assessor may be required to confirm the action taken by the department.

8.2.3 Period of accreditation

Accreditation may be granted for a period up to a maximum of five years. New accreditations will not normally exceed three years.

Accreditation is effective from the date of entry of the first student cohort following the academic year that we visit. It is normally not possible for an accreditation award to be retrospective. However, accreditation may be back-dated to allow cohorts already on the programme at the time it is accredited to benefit from the decision, provided that the work of that cohort of students has been reviewed as part of the accreditation exercise.

The period of accreditation may be reduced by the amount for any extension (see Section 5.5) granted to the previous accreditation.

Where conditions are made, the accreditation certificate will be to the end of the period set for them to be resolved. This is to allow the certificate to be displayed publicly without showing any conditions. Once the conditions have been met, a new certificate will be issued to reflect the full period of accreditation.

8.2.4 Recommendations to the department

In the majority of cases we seek to make recommendations to the department. These are not mandatory. However, they are offered in the spirit of providing help and sharing of good practice in process safety engineering education. Adoption by the department of these recommendations is encouraged and generally expected.

8.3 After the accreditation decision

Following an accreditation award, the department will be sent a decision letter and, separately, a certificate to formally acknowledge the accredited status of the programme(s).

There will be ongoing contact between IChemE and the department in terms of accreditation policy developments during the period of accreditation. Our qualifications department will liaise with the university department regarding policy changes, student services, membership and related activities.

8.4 Obligations and duties of departments

It is a general condition of accreditation that departments must inform us in a timely fashion of significant changes to the curriculum or resources that impact upon the delivery or nature of the accredited programme. Changes which must be notified include:

- changed learning outcomes;
- changed programme title;
- changed programme structure;
- loss of key staff which could affect the integrity of the programme;
- adverse impacts on resources, such as an upsurge in student numbers or the loss of staff or facilities.

Departments often need to make changes to a programme during the period of accreditation and we understand the need for this. Where the change is substantial, an interim accreditation visit may be required.

All departments with accredited programmes are encouraged to contribute to the development and implementation of accreditation policy and to share good practice in process safety engineering education. For example, we seek to identify senior and experienced academic staff from as wide a range of departments as possible, on an international basis, to join the pool of accreditation assessors. In addition, it is considered to be normal practice that the department, with our help, encourages uptake of IChemE student membership amongst the cohort. Further, the IChemE Education Special Interest Group (EdSIG) exists to share good practice and debate current issues in chemical engineering education. All process safety engineering departments are strongly encouraged to engage with EdSIG’s numerous events and activities.
8.5 Endorsement logo

Our endorsement logo enables universities and other organisations to demonstrate IChemE approval. It is only to be used for the category accredited and must be used in compliance with the guidance provided with the logo. This logo will appear as an endorsement and can be used alongside the logo of the university on print and web material.

8.6 Appeals procedure

IChemE maintains an appeals procedure for universities who wish to appeal against irregularities in the process of accreditation. Appeals against accreditation decisions will be considered by a panel appointed by the IChemE Qualifications Committee. For further information, refer to the supporting documents found at www.icheme.org/uni-accreditation-docs
9. Working with other accrediting bodies

9.1 Introduction
We will normally agree to conduct an accreditation or benchmarking study by invitation of a university. Such invitations usually arise because of recognition of the distinct value of discipline-specific, in-depth peer review of process safety engineering teaching that we provide.

We completely respect the need for national-level accreditation systems and welcome the fact that agreements, such as the International Engineering Alliance’s Washington Accord, provide confidence in the quality of university accreditation processes.

It is possible to combine an accreditation visit to coincide with another accrediting body. We have experience of visits to complement those of other national accrediting bodies either through joint visits or visits closely following the schedules of the national body. Examples include coordination with Engineers Australia, UK Engineering Accreditation Board and Institution of Professional Engineers New Zealand.

For further specific information on what is required from the university for a joint accreditation visit, please contact accreditation@icheme.org.

9.2 Operational arrangements
Joint accreditation is at our discretion. It is essential that any department contemplating joint visits should discuss the options with us at the earliest possible opportunity to allow ample time for coordination between the organisations concerned.

IChemE staff and the Lead Assessor will liaise with representatives of the partner organisation(s) to optimise the arrangements, especially requirements for and use of documentation. The two organisations will similarly liaise over the visit schedule to ensure that each is able to satisfy its requirements, whilst minimising the need for separate meetings and events.

9.3 Decision-making for joint accreditations
We reserve the right to decide accreditation outcomes independently against the standards set out in these guidelines. However, for joint accreditations, the Lead Assessor will liaise with their counterpart(s) in the partner organisation(s) to align as far as possible the judgements made. Inevitably, there will be occasions where opinions cannot be aligned and details of these will be brought to the attention of the Education Subcommittee through the assessors’ report.
10. Further information about application

10.1 Applying for accreditation

Departments seeking new accreditation(s) can request this from us at any time. We will provide help and guidance at any stage and, in particular, encourage departments to seek informal advice and guidance at an early stage.

Departments that currently have accredited programmes will automatically receive a reminder from us well before the expiry date of the existing accreditation period, inviting the department to submit their programme(s) for re-accreditation.

10.2 Data protection (GDPR)

All documents submitted by the university are used for the purpose of accreditation and will not be distributed further, however, student’s name, date of birth and address should not be on any of the documents submitted. Where this is unavoidable it is the university’s responsibility that the subjects concerned have given approval.

The IChemE degree programme questionnaire seeks details of staff resources and laboratory, information and learning facilities. These will include the full-time equivalent (FTE) staff involved in the teaching programme and information on typical sizes of laboratory and design groups. We will not use, process, store or distribute the data obtained for the purpose of accreditation for any other purpose. Where staff and/or student names have to be included then it is the responsibility of the university to ensure that permission to include this information is given by the subject. It is the university’s responsibility that the subjects concerned have given approval.

Encryption will be used where necessary to guarantee confidentiality and processing or distribution of reports for purposes other than accreditation is not permitted.

The assessors produce a confidential and anonymised written report. We will treat the report as confidential and shall not distribute it for any other purpose. The report is made available to the department. Individual comments will be non-attributable in the report.

Assessor confidentiality obligations include agreement to:

- only access data on password protected or encrypted devices;
- keep the confidential information secret and confidential by using a reasonable degree of care, and not less than the degree of care used by you in safeguarding your own confidential information;
- not use or exploit the confidential information in any way except for the purpose for which it was disclosed to you and only to the extent expressly permitted by IChemE;
- not disclose or make available any confidential information in whole or in part to any person; and
- acknowledge that all confidential information which belongs to IChemE remains the property of IChemE.

Documents will be retained for seven years. Assessors will delete records after the accreditation outcome has been notified to the university and any conditions placed on programmes have been met. We will send notification of when deletion must take place and assessors must confirm in writing that they have done this.
Appendix A: Entry standards

A.1 Introduction

Students’ knowledge and understanding of theoretical and practical process safety engineering disciplines should be of appropriate level to underpin their process safety education, to enable appreciation of its scientific and engineering context, and to support their understanding of future development. It is expected that students will enter with background knowledge obtained from their previous first cycle degree or industrial experience that will include the following underpinning material.

A.2 Underpinning theoretical and practical process safety engineering entry standards

We expect programme providers to maintain appropriate underpinning theoretical and practical process safety engineering entry standards,

Students entering the accredited programme will:

- have a degree or equivalent in a relevant engineering or science subject (ideally chemical engineering);
- have a knowledge and understanding of the inherent nature of safety and loss prevention and the principal hazard sources in chemical and related processes – including flammability, explosivity and toxicity (including biological hazards);
- have knowledge and understanding of the principles of risk assessment and of safety management, and be able to apply techniques for the assessment and abatement of process hazards;
- have knowledge and understanding of the methods of identifying process hazards (eg HAZOP), and of assessing environmental impact;
- be aware of specialist aspects of safety and environmental issues, such as hazardous area classification, relief and blowdown, fault tree analysis;
- be aware of the steps involved in the risk management process and be able to define the main concepts related to risk management including hazards, failed protection layers, threats, consequences and effects.
Appendix B: Learning outcomes

B1 Introduction

Students graduating from an F-Standard accredited programme will:

- have the ability to handle uncertainty and complexity;
- have the ability to familiarise themselves with the new and unknown;
- have the ability to develop innovative approaches;
- have the ability to communicate and influence process safety culture;
- have an understanding of the limits of available methodologies and of the potential of new and emerging methods;
- have a broader understanding of related subjects.

The Engineering Council sets the overall requirements for the Accreditation of Higher Education Programmes (AHEP) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC). The overall learning outcomes listed above will be met through a combination of learning outcomes in each of the following broad areas of learning, as defined in AHEP:

2. Engineering analysis.
3. Design and innovation.
4. The engineer and society.
5. Engineering practice.

B2 Science and mathematics

B2.1 Introduction

The study of engineering requires a substantial grounding in engineering principles, science and mathematics commensurate with the level of study. Graduates from an F-Standard accredited programme will be able to apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of process safety engineering and be informed by a critical awareness of new developments and the wider context of engineering.

Learning outcomes in this area are, effectively, the core of process safety engineering and will usually be characterised as building on and deepening the knowledge, understanding and skills already obtained from a first cycle degree or professional experience. Students will develop skills associated with the application of the technical tools used to identify and assess process safety hazards, and with their strengths and weaknesses, and common errors in their use. Graduates from the programme will have a more detailed knowledge of the more technical aspects such as gas dispersion, probability estimation and consequence assessment. They will also be familiar with the development and use of risk criteria and be able to develop a logical demonstration of compliance.

B2.2 Tools to identify and assess process safety hazards

Students graduating from an accredited programme should also:

- have the ability to identify and assess process hazards;
- have the ability to determine what, if any, additional information is required to enable a potential hazard to be adequately assessed;
- have a knowledge of possible risk reduction measures (and hierarchy) in terms of both process design (inherent safety, minimisation etc.) and what prevention, control and mitigation techniques are available and applicable;
- be able to understand and evaluate the methodologies and data used to determine probabilities and consequences;
- be familiar with common hazard identification methods and tools such as HAZID, HAZOP, SWIFT, FMEA, and their limitations;
- be familiar with common hazard analysis and risk assessment methods and tools such as FTA, LOPA, CFD and consequence modelling and their limitations.
B2.3 Incident investigation
Students graduating from an accredited programme should also:
- understand the basic principles of incident investigation and how to
- have the ability to gather and analysis effective evidence using appropriate techniques;
- be skilled in the techniques to carry out basic interviews;
- have the ability to implement corrective measures to prevent reoccurrence.

B3 Engineering analysis

B3.1 Introduction
Engineering analysis involves the application of engineering concepts and tools to analyse, model and solve problems. At higher levels of study engineers will work with information that may be uncertain or incomplete. Graduates from an F-Standard accredited programme will be able to:
- formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed;
- select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed;
- select and critically evaluate technical literature and other sources of information to solve complex problems.

B3.2 Understanding and application of relevant regulations
Students graduating from an accredited programme should also:
- understand the role of process safety regulations, national and international standards, guidance and industry best practice;
- have some knowledge of legislative frameworks (local and global) in relation to process safety;
- appreciate the different regulatory regimes in use around the world;
- be aware of how the legislative framework is applied to the management of safety, health and environment in the workplace, from the perspectives of all involved, including operators, designers, contractors, visitors and the public.

B3.3 Process safety management (PSM)
Students graduating from an accredited programme should also:
- understand and be able to describe the main elements of a PSM system;
- understand the benefits of planning and preparation for PSM audits;
- be aware of the different PSM audit types, protocols and techniques that can be employed;
- understand the limitations and appropriate application of the different Process Safety Key Performance Indicators and be able to describe the role of auditing and assurance in PSM.

B4 Design and innovation

B4.1 Introduction
Design is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges commensurate with the level of study. Graduates from an F-Standard accredited programme will be able to design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.
Students must display competence in process safety engineering aspects of design, including an ability to evaluate or assess hazards that have occurred or could potentially occur. They must understand the concept of ‘fitness for purpose’ and the importance of delivery. In order to meet the learning outcomes, the student should, for example, carry out hazard evaluation studies throughout a project life cycle, addressing the complexity issues arising from the interaction and integration of the different parts of a process or system.

Students graduating from an accredited programme will:

- understand the concepts of inherent safety, typical approaches to inherently safer process design and understand why a particular approach leads to an inherently safer process;
- understand the benefits of multiple barriers and be able to list typical barrier types for various process excursions;
- understand different approaches such as risk based and code/standard based design;
- be able to identify and compare the advantages and disadvantages of risk based versus code/standard-based design.

### B4.2 Emergency planning

Students graduating from an accredited programme should also:

- understand the different roles and responsibilities for on-site and off-site emergency planning;
- understand how to define emergency actions for hazards identified;
- have the ability to manage the key aspects of emergency planning including procedures, training and testing;
- understand the regulatory requirements pertaining to the protection of people during major accidents;
- understand the requirement for emergency response planning and communications and be able to apply their understanding.

### B5 The engineer and society

#### B5.1 Introduction

Engineering activity can have a significant societal impact and engineers must operate in a responsible and ethical manner, recognise the importance of diversity, and help ensure that the benefits of innovation and progress are shared equitably and do not compromise the natural environment or deplete natural resources to the detriment of future generations. In relation to sustainability, graduates from an F-Standard accredited programme will be able to evaluate the environmental and societal impact of solutions to complex problems (to include the entire life-cycle of a product or process) and minimise adverse impacts.

#### B5.2 Protection of society and the environment

Students graduating from an accredited programme should also:

- understand and be able to apply process safety principles in order to reduce societal risk;
- understand and be able to apply process safety principles in order to reduce the risk to the environment.

#### B5.3 Human factors

Students graduating from an accredited programme should also:

- understand the key human factors concepts within risk assessment;
- have the knowledge to manage organisational change, safety culture and safety-critical communications;
- have the knowledge to proactively manage human errors and analyse human failures contributing to incidents;
- understand the key human factors principles to address at the design stage, and how to develop effective procedures, process plant and control rooms.
B5.4 Safety culture
Students graduating from an accredited programme should also:
- understand what is meant by safety culture and how important it is;
- have the ability to assess safety culture;
- have the knowledge to change/improve safety culture.

B5.5 Leadership
Students graduating from an accredited programme should also:
- understand the role of leadership in promoting and sustaining good process safety management;
- understand the essential elements of an organisation that require leadership to provide assurance that process safety risks are being correctly managed.

B6 Engineering practice
The practical application of engineering concepts and tools, engineering and project management, teamwork and communication skills. Engineers also require a sound grasp of the commercial context of their work, specifically the ways an organisation creates, delivers and captures value in economic, social, cultural or other contexts. Graduates from an F-Standard accredited programme will be able to function effectively as an individual, and as a member or leader of a team, to evaluate the effectiveness of their own and their team’s performance. They will also be able to communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.

Accredited programmes should include a substantial open-ended activity which stretches and develops students’ problem solving and creative thinking capacities. This would normally be in the form of a major project or dissertation.

Process safety engineering practice is the practical application of process safety engineering skills, combining theory and experience, together with the use of other relevant knowledge and skills. Process safety management is the part of the overall management system which ensures that the potential hazards from the processes are identified and assessed for both their probability and potential consequences to the on-site and off-site populations and to the environment. This then allows where possible an inherently safer process to be adopted, or the necessary controls and mitigation measures to be implemented to reduce the risks arising from the process to meet the criteria set by regulators, the company and society. The management system will also ensure that these controls and mitigation measures are maintained and tested to ensure they remain effective.

Graduates of accredited programmes must understand the ways in which process safety engineering knowledge can be applied in practice, such as in: operations and management; projects; providing services or consultancy; developing new technology.

Typical learning outcomes include an in depth understanding of the identification, assessment, elimination, minimisation, prevention control and mitigation of potential process hazards.

Departments should demonstrate high standards of appreciation and practice of safety, health and environment (SHE) in their teaching and operations within laboratories, pilot plants and project work.

Students graduating from an accredited programme will:
- have developed an integrated approach to process safety and environmental protection;
- understand typical factors that contribute to barrier effectiveness and the role of critical activities;
- have the ability to critically analyse incidents and the causes of and consequences from specific example incidents including identification of recommendations to prevent future incidents;
- be able to create a management system to ensure potential hazards can be adequately controlled and managed;
- have undertaken significant project work that provides opportunities for: application of process safety management methods; originality and experience in dealing with uncertainty and new concepts and/or applications;
have communicated the outcomes of the project work in a professional manner that may include, thesis; publication; poster; presentation.

B7 Embedded learning

B7.1 Introduction

Process safety engineers must have general skills that will be of value in a wide range of business situations. These include abilities within problem solving, communication, effective working with others, effective use of IT, persuasive report writing, information retrieval, presentation skills, project planning, self-learning, performance improvement, awareness of the benefits of continuing professional development etc.

IChemE expects F-Standard degree programmes to be designed so that the opportunity to further develop these skills, in different ways and at different levels, is embedded throughout the programme. In order to encourage the embedding and integration of these skills throughout the programme, a minimum credit count is not specified. However, IChemE expects that evidence will be provided to demonstrate where and how the learning outcomes are met.

B7.2 Learning outcomes

Students graduating from an accredited programme will:

- have enhanced their problem-solving skills;
- have enhanced their communication skills including written reports and presentations;
- recognise the importance of working effectively with others and have acquired a range of experience in achieving this;
- recognise the importance of leadership skills and have had some opportunity to acquire these;
- be effective users of IT;
- recognise the importance of planning and time management and have acquired a range of experience in achieving these;
- be able to reflect on their own work, draw conclusions, make recommendations and implement strategies for personal improvement and professional development;
- be aware of the benefits of continuing professional development and of personal development planning.

B8 Complementary subjects

Accredited degree programmes may contain other subjects that are not directly related to process safety engineering, such as project management, engineering decision making etc. We recognise the benefits of a rounded education in effectively preparing graduates for their careers. Complementary subjects are not formally assessed for programme accreditation, but rigour in their teaching and assessment is expected.
Appendix C: IChemE outcome level descriptors for Level F

IChemE defines Level F outcomes based on European Qualifications Framework level 7*. These are defined by a set of descriptors for Knowledge, Understanding and Skills, and Competence to be applied to the learning outcomes at that level.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>IChemE Level</th>
<th>Level F (EQF level 7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical and/or factual knowledge</td>
<td></td>
<td>Highly specialised knowledge, some of which is at the forefront of knowledge in process safety engineering, as the basis for original thinking and/or research. Critical awareness of knowledge issues in chemical engineering and its interface with different fields.</td>
</tr>
</tbody>
</table>

Understanding and Skills

In this context, skill is described as:
- cognitive (involving the use of logical, intuitive and creative thinking), and
- practical (involving manual dexterity and the use of methods, materials, tools and instruments)

Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields.

Competence

In this context, competence is described in terms of responsibility and autonomy.

Manage and transform study or work contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice.

* See https://ec.europa.eu/ploteus/en/contentDescriptors-page
Appendix D: Typical schedule for an assessment visit

Day one
10:30  Assessors arrive at the hotel.
      Private meeting of assessors and review of materials either at hotel or
      university.
12:00  Welcome to the department – introductions, orientation.
      Meet with senior staff (as appropriate: Dean, Head of Department, Programme
      Directors etc) to discuss programme philosophy and future plans.
13:00  Working lunch with academic staff.
14:00  Meet with programme directors to discuss the degree programme
      questionnaire - entry standards and programme structure, curriculum, learning
      outcomes.
15:00  Continued discussion of degree programme curriculum and areas of learning
      outcome as outlined in Engineering Council’s Accreditation of Higher
      Education Programmes V4 (AHEP 4) - Science and mathematics, Engineering
      analysis.
15:45  Coffee break - private panel discussion.
16:15  Discuss Level F (advanced) outcomes, major projects and areas of of learning
      outcomes as outlined in AHEP4 - Design and innovation, The engineer and
      society, Engineering practice.
17:00  Review day one with programme directors (an opportunity to guide the
      programme and materials required for day two).
17:30  Meet a representative group of students - including (if possible) some recent
      graduates – (no staff to be present).
18:15  Close of day one.

Day two
09:00  Visit laboratories (where appropriate), computing facilities and other resources,
      eg library, project rooms etc.
10:00  Discuss achievement of embedded learning outcomes.
10:45  Informal coffee break, possibly including technical and support staff.
11:15  Discuss industrial/professional training aspects.
12:00  Discuss assessment and quality assurance aspects.
13:00  Private panel lunch - final discussion.
14:00  Final review and discussion with head of department and programme directors.
15:00  Close.
Appendix E: Indicative criteria for accreditation decisions

For use by the Education Subcommittee

<table>
<thead>
<tr>
<th>Present status</th>
<th>How are IChemE requirements met?</th>
<th>Indicative decision*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programme not accredited by IChemE</td>
<td>Fully met, or Substantially met with only insignificant or very minor deficiencies.</td>
<td>Accredit for up to three years.</td>
</tr>
<tr>
<td></td>
<td>Substantially met but with relatively minor deficiencies which are anticipated as straightforward to remedy.</td>
<td>Accredit with mandatory conditions and a time limit for these to be remedied (typically one or two years).</td>
</tr>
<tr>
<td></td>
<td>Not met due to significant** and important deviations from IChemE requirements.</td>
<td>Cannot be accredited in its present form.</td>
</tr>
<tr>
<td>Programme accredited by IChemE and presented for re-accreditation</td>
<td>Fully met, or Substantially met with only insignificant or very minor deficiencies.</td>
<td>Accredit for up to five years.</td>
</tr>
<tr>
<td></td>
<td>Substantially met but with relatively minor deficiencies which are anticipated as straightforward to remedy.</td>
<td>Accredit for up to five years with recommendations. The expectation is that these will usually be addressed within that timescale and reviewed at the next accreditation visit.</td>
</tr>
<tr>
<td></td>
<td>Not met due to significant** and important deviations from IChemE requirements.</td>
<td>Where the problems were not previously evident, accredit with conditions and a time limit for these to be remedied (typically one or two years). Or, where these are historic problems, highlighted in previous IChemE reports or conditions, the accredited standard may be reduced or accreditation may be withdrawn until the problems have been remedied. Or, in exceptional cases, where problems are so great as to cast severe doubt on the capabilities of the graduates or otherwise to pose reputational risk to IChemE, immediate withdrawal of accreditation or other sanctions may be appropriate.</td>
</tr>
</tbody>
</table>

*NB In all cases: indefinite conditions may also be imposed for issues which cannot be addressed by modification to the programme or its delivery, eg a particular pathway within a programme.

IChemE may recommend non-mandatory actions referred to as recommendations. The expectation is that these will usually be addressed within the accreditation period and reviewed at the next accreditation visit.

**Definition of ‘significant’ - examples include: shortfalls in health and safety culture; some learning outcomes below IChemE-defined standards; some learning outcomes a little below IChemE credit requirements.
Appendix F: Compensation and condonement

Many universities’ examination board rules include some allowance for compensation or condonement of limited failure in one or more modules, where this is compensated by a stronger performance across the programme as a whole. Paragraph 23 of the Registration Code of Practice requires accrediting institutions to consider the awarding institution’s regulations regarding progression. They may impose constraints on an accreditation decision as a result of this.

The Engineering Council defines compensation as: “The practice of allowing marginal failure (ie not more than 10% below the nominal pass mark) of one or more modules and awarding credit for them, often on the basis of good overall academic performance.”

The Engineering Council defines condonement as: “The practice of allowing students to fail and not receive credit for one or more modules within a degree programme, yet still qualify for the award of the degree.”

In the consideration of the accreditation of postgraduate (Level F) engineering degree programmes:

1. Evidence that all AHEP learning outcomes are met by all variants of each programme must be provided before accreditation can be granted.
2. No condonement of modules delivering AHEP learning outcomes is allowed.
3. A maximum of 20 credits (ten IChemE credits) in a Level F degree can be compensated.
4. Major individual and group-based project modules must not be compensated.
5. The minimum module mark for which compensation is allowed is 10% below the nominal module pass mark (or equivalent if a grade-based marking scheme is used).

The key consideration in the rules above is to ensure that graduates of accredited engineering degree programmes have met all the programme learning outcomes specified in the Engineering Council’s Accreditation of Higher Education Programmes (AHEP) specification (see Appendix B).

Phased implementation schedule

These requirements will apply to all students joining the first year of an accredited degree programme from September 2022. There is no requirement or expectation that assessment regulations will be changed for students who enrolled on an accredited degree programme before this date. A phased implementation will be allowed whereby new accreditations must comply from the 2022 implementation date, but existing accreditations will be allowed to continue as they were but must align from the point of reaccreditation. For accreditation visits from September 2019 until September 2022 universities will have the option to either change their regulations to conform with the current guidance (below) and then change them again to conform to the new rules by September 2022, or to change their regulations straight away to comply with the new rules in advance of their enforcement.

IChemE’s current compensation strategy

It must not be possible for any student to graduate without having successfully completed (in each of the IChemE learning outcomes categories) the minimum credits stipulated as the threshold for the level of accreditation awarded.

In some assessment schemes it is possible for students to compensate for poor performance in one module by achieving better marks in other modules. For example, a student scoring just below the pass mark in a particular module might be excused the failure if their average performance for all modules in the same semester or year was above a particular level, such as >10% above the normal pass mark. Because practices vary from university to university, it is necessary to detail such compensation strategies at the appropriate point within the questionnaire submission. The department must supply evidence that the learning outcomes have been met elsewhere in the programme by students compensated in this way. Programmes allowing compensation may only be accredited if there is a maximum ten IChemE credit compensation in the final year.

All accreditation visits from now until September 2022 will require universities to provide a plan of how they propose to meet the new Engineering Council compensation and condonement rules which come into effect from 2022.

It should be noted that the IChemE credit value is equivalent to the European Credit Transfer System (ECTS) credit value. The Engineering Council guidance refers to the UK credit values. For information 2 UK credits = 1ECTS.

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1 There are no consistent definitions of the terms ‘compensation’ and ‘condonement’ across universities, and they are often confused. The Engineering Council therefore adopts a similar definition to that used by QAA and HEA, and, for the avoidance of doubt, includes this definition in this statement.

2 Engineering Council guidance on Compensation and Condonement can be found at www.engc.org.uk/compensation
Appendix G: Glossary

See cross-referenced sections for further details.
Where relevant - definitions have been adopted from the Engineering Council’s *Accreditation of Higher Education Programmes*.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic formation</td>
<td>The educational process of obtaining the qualifications necessary for IChemE membership.</td>
<td>2.2</td>
</tr>
<tr>
<td>Accreditation</td>
<td>The process of peer review of an academic programme against IChemE’s published learning outcomes, as described in these guidelines.</td>
<td></td>
</tr>
<tr>
<td>Assessor</td>
<td>A person appointed by IChemE who is trained in assessing the suitability of a programme for accreditation.</td>
<td>7.2</td>
</tr>
<tr>
<td>Awareness</td>
<td>Learning outcome descriptor for general familiarity (with the subject material)</td>
<td>3.7</td>
</tr>
<tr>
<td>B-Standard</td>
<td>Accreditation level for first cycle degrees that provide a solid academic foundation in chemical engineering knowledge and skills at IChemE outcome Level B.</td>
<td></td>
</tr>
<tr>
<td>Bologna process</td>
<td>A non-statutory inter-governmental agreement, creating a coherent and cohesive European Higher Education Area (EHEA) and a Framework for Qualifications of the European Higher Education Area (FQ-EHEA) comprising first, second and third cycle degrees. The EHEA is a means of promoting mutual recognition of qualifications, demonstrating transparency of systems and easing the mobility of staff and students across higher education in Europe. <a href="http://www.ehea.info">www.ehea.info</a>. The UK has verified that its national frameworks for higher education qualifications in England, Wales and Northern Ireland and in Scotland are compatible with the FQ-EHEA: bachelor’s and bachelor’s (hons) degrees as first cycle, the Integrated MEng and master’s degree as second cycle. Other jurisdictions have also adopted or recognise the general principles of the Bologna process. <a href="http://www.engc.org.uk/international-activity/european-recognition/the-bologna-declaration/">www.engc.org.uk/international-activity/european-recognition/the-bologna-declaration/</a></td>
<td></td>
</tr>
<tr>
<td>Compensation</td>
<td>The system by which, in some assessment schemes, it is possible for students to compensate for poor performance in one module by achieving better marks in other modules.</td>
<td>4.6</td>
</tr>
<tr>
<td>Complementary learning</td>
<td>Substantial topics in a programme which are additional to the IChemE accreditation learning outcomes.</td>
<td>3.9</td>
</tr>
<tr>
<td>Complex</td>
<td>Learning outcome descriptor for engineering problems, processes or equipment which involve dealing simultaneously with a sizeable number of factors which interact and require deep understanding, including knowledge at the forefront of the discipline.</td>
<td>3.7</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
<td>Section</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Condition (of accreditation)</td>
<td>Where continued accreditation is dependent upon the department meeting requirements set by IChemE. Conditions are binding on the department and must be resolved within the indicated timeframe for accreditation to be maintained and valid.</td>
<td>8.2.2</td>
</tr>
<tr>
<td>Content</td>
<td>The material taught in a programme, as opposed to the learning outcomes achieved. In order to ensure that all required learning outcomes are met, IChemE provides guidance on the minimum expected content for each area and for the programme as a whole, specified in terms of minimum credits.</td>
<td>4.1</td>
</tr>
<tr>
<td>Credit</td>
<td>A measure of the content of a programme. One credit is equivalent to approximately 20 hours student workload (combined tutor-led and independent study).</td>
<td>4.1</td>
</tr>
<tr>
<td>Department</td>
<td>The term ‘department’ is used for convenience throughout these guidelines for the academic unit (ie department, school, faculty etc) responsible for delivering the programmes under review.</td>
<td>4.1</td>
</tr>
<tr>
<td>D-Standard</td>
<td>Accreditation level for sub-degree programmes that provide a solid academic foundation in chemical engineering knowledge and skills with learning outcomes at IChemE Level D.</td>
<td></td>
</tr>
<tr>
<td>Education Subcommittee</td>
<td>IChemE’s committee with delegated decision-making authority for all matters relating to the accreditation of university programmes.</td>
<td></td>
</tr>
<tr>
<td>Embedded learning</td>
<td>Learning which is developed in the context of other activities (eg ethics and safety culture developed in the context of general practical working).</td>
<td>B6</td>
</tr>
<tr>
<td>Evidence</td>
<td>Auditable material supporting the accreditation application, for example samples of marked student work, information on programme structure, academic quality review reports etc.</td>
<td>6.1</td>
</tr>
<tr>
<td>First cycle</td>
<td>A programme at level 6 in the European Qualifications Framework (EQF) – see <a href="https://ec.europa.eu/ploteus/content/descriptors-page">https://ec.europa.eu/ploteus/content/descriptors-page</a></td>
<td></td>
</tr>
<tr>
<td>F-Standard</td>
<td>Accreditation level for postgraduate degrees of the highest international standards that provide advanced chemical engineering knowledge and skills at IChemE outcome Level F.</td>
<td>2.1</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Learning outcome descriptor for information that can be recalled.</td>
<td>3.7</td>
</tr>
<tr>
<td>Learning outcome</td>
<td>Also known as programme outcomes or programme learning outcomes. A statement of achievement expected of a graduate from an accredited programme.</td>
<td>3</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
<td>Section</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Programme</td>
<td>A set of courses of study that leads to the award of a degree or other higher education qualification.</td>
<td></td>
</tr>
<tr>
<td>Qualification</td>
<td>The award made as a result of successful completion of a programme of study.</td>
<td>2.1</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>The proforma used by IChemE to collect data about programmes to be assessed for accreditation.</td>
<td></td>
</tr>
<tr>
<td>Resources</td>
<td>The staff, facilities, and learning materials supporting a programme of study.</td>
<td>4.7</td>
</tr>
<tr>
<td>Second cycle</td>
<td>A programme at level 7 in the European Qualifications Framework (EQF) – see <a href="https://ec.europa.eu/ploteus/content/descriptors-page">https://ec.europa.eu/ploteus/content/descriptors-page</a></td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>Learning outcome descriptor for acquired and learned attributes that can be applied almost automatically.</td>
<td>3.7</td>
</tr>
<tr>
<td>Understanding</td>
<td>Learning outcome descriptor for the capacity to use concepts creatively, for example: in problem solving; in design; in explanations and in diagnosis.</td>
<td>3.7</td>
</tr>
<tr>
<td>University</td>
<td>The term ‘university’ is used for convenience throughout these guidelines to represent all kinds of higher educational establishment including universities, polytechnics and colleges.</td>
<td></td>
</tr>
</tbody>
</table>
Getting help

IChemE specialist staff will be happy to offer advice on any aspect of the accreditation process.

We recognise that each application is unique and will be pleased to help departments achieve ambitions for recognition of their degree programmes. Questions on accreditation are best directed by email to accreditation@icheme.org