Accreditation FAQs

IChemE's Education and Accreditation Forum (EAF) have prepared this document to address common questions that arise during university accreditation visits. This document should be read in conjunction with the current accreditation guidance at www.icheme.org/education.

1. Why don't first year science and maths modules contribute to core chemical engineering? They cover topics such as thermodynamics and kinetics in chemistry, fluid flow and heat transfer in physics, or mathematical modelling in maths.

   There is no rule against them contributing, but it is the department's responsibility to show how the material delivered contributes to core chemical engineering learning outcomes.

   In many cases, these modules are delivered by science or maths departments and chemical engineering students are commonly enrolled with students from other disciplines. There is often a lack of chemical engineering context (eg examples in class, assessment examples, projects, etc) which may mean that the relevant learning outcomes are not achieved. While many of these modules cover the scientific fundamentals well, they do not cover the type of practical issues that are faced in the chemical engineering context eg the implications of thermodynamics and kinetics for practical design, operation or troubleshooting, the need to apply design parameters to scientific fundamentals, etc.

   In some cases, departments may be able to demonstrate that a specific learning outcome is partially met within a science or maths module, while remaining aspects of the learning outcome are met by a different chemical engineering module delivered later in the programme.

2. Why don't modules in commerce or arts contribute to core chemical engineering? These modules cover topics such as economics, sustainability or ethics.

   Like question one, it all depends on whether chemical engineering learning outcomes are met, and a lack of chemical engineering context can often contribute to shortcomings. If the department can show that some of the material meets specific and relevant learning outcomes, then part of the module might contribute to core or advanced chemical engineering.

   Economics is a good example. Students may be given basic economic equations, but rarely in the context of the engineering factors needed to estimate and provide insights into the options for real world design and operation. Furthermore, engineering uncertainties leading into economic evaluation are usually overlooked.

3. Why don't higher level science modules contribute to advanced chemical engineering breadth? An advanced science module can look remarkably similar to an advanced chemical engineering elective module taught within the department.

   It's true that the difference can be subtle, but as with the previous questions, the variance is around chemical engineering context and rigour. The responsibility is on the department to show (through examples of

assessment or project work) that the module has relevant chemical engineering content, delivered with the rigour expected of an advanced chemical engineering module. Students need to show that they have had to incorporate uncertainties, incomplete and conflicting data, choices between different development, design and operating possibilities, interactions between unit operations and so on.

4. Why are the credit totals so important? Can't IChemE just look at the programme as a whole and decide on the level of accreditation?

The EAF does not use the credit totals as an absolute rule but as a guideline that contributes to the decision. Sometimes we see programmes that are over the credit count but still need to add or change something. Conversely, there needs to be a minimum level of achievement and if there isn't enough chemical engineering content to achieve the desired accreditation standard, then content needs to be added/modified.

Departments should aim to provide a high-level categorisation of each module rather than dissect the content in great detail. Evidence supporting the allocation is also required, eg reference to which learning outcome and assessment contributed to which credit allocation. The onus is on the department to provide this material clearly, it is not the responsibility for assessors to search for the connections.

5. What separates an advanced chemical engineering depth module from a core chemical engineering module?

Appendix A of our accreditation guidelines outlines the details. The assessors look for evidence that an advanced depth module clearly builds on the learning outcomes from a core chemical engineering module, and that the focus is at a higher technical level and goes deeper into the fundamentals. If a module has no prerequisites containing chemical engineering content, it is unlikely that the whole module could contribute to advanced learning outcomes.

6. What separates an advanced chemical engineering depth module from an advanced chemical engineering breadth module?

As above, the details are outlined in Appendix A of the accreditation guidelines. For advanced breadth modules, the content may not build directly on a core module, but the material is often related to core material and is delivered in an engineering context at a higher level.

For example, a second-year science module is unlikely to meet advanced breadth status. However, a third-year science module may achieve advanced breadth in a fraction of the module. One question to ask is, would the material be equally at home in a non-introductory chemical engineering module? Again, it is the department's responsibility to show how learning outcomes and assessment support the designation of advanced breadth.

7. Why doesn't a research module/project count towards advanced chemical engineering depth?

Projects cover a wide breadth of topics including some with a primary focus in advanced design or advanced chemical engineering breadth. For a research project to achieve advanced chemical engineering depth credits, the department must have a mechanism in place to ensure that every project has a depth component, not just most of them.

The research project is usually credited as advanced practice as it is the best description of the learning outcomes all students gain, barring a formal structure that ensures advanced depth in all projects. (The requirement for advanced practice is: *Have undertaken research and/or development project work that provides opportunities for: application of research methods; originality and experience in dealing with uncertainty and new concepts and/or applications.*)

Depending on the learning outcomes of the research project, it may be appropriate to attribute credits to advanced chemical engineering breadth when the department has a clear mechanism in place to ensure every project has a breadth component

8. Most of our students take a particular group of electives. Why shouldn't we use those electives in the worksheet?

The accreditation process ensures that all students meet all specified threshold learning outcomes. Some students may look for the path of least resistance through the electives, whereas others have interests that pull them away from chemical engineering. The group of elective options that give the least number of chemical engineering credits are the ones that must be selected in the worksheet to ensure that all students receive the same level of accreditation.

To overcome this issue, but still allow students to pursue a wide variety of options, many departments create schedules that require students to choose from a subset of electives, which ensures the degree has enough advanced depth and/or breadth.

9. The programme is now accredited at B-Standard, but was previously M-Standard and we didn't change anything – why?

The accreditation process is guided, but not bound, by the previous visit. Reasons for the change could be:

a. Better supporting documents may have been provided the previous time.
b. Perhaps your staff were delivering content and setting assignments and projects last time that demanded a greater level of chemical engineering depth. This may arise when a change in personnel results in new staff without a strong chemical engineering background, or less understanding of the context required for chemical engineering material (ie as above, they may be delivering excellent science-based modules but with limited chemical engineering content and context).
c. The assessment process is constantly evolving, including occasional changes to the evidence and learning outcome requirements. You can ask for the spreadsheets that support the decision process but the EAF will not litigate a module-by-module review of the credit splits.
d. Other changes to the assessment process include better training of assessors. Therefore, the evidence requirements have increased over time.
e. An accreditation decision may have been more lenient in the past than for other similar cases. However, IChemE adopted an internal review process in 2017 (the Virtual Accreditation Panel) which means each accreditation report is reviewed thoroughly by a small, experienced group before being formally ratified by the EAF. This has resulted in improved consistency and rigor.

10. Why are some degrees accredited at M-Standard and others are not? It's unclear why these decisions are made.

All degrees need to have sufficient chemical engineering content to be accredited. Some programme routes, joint or double degrees have modules which cannot be described as chemical engineering and have little or no other engineering content.

Although the content of a module may be of interest or relevance to a chemical engineer, a module must have some chemical engineering content to be included in the chemical engineering credits. Modules such as arts, medicine, genetics or business may have no chemical engineering content if delivered outside of the chemical engineering department.

11. Our double degree students are our best students. How can their degree be accredited at a lower level than our standard four-year degree?

The level of accreditation is based solely on the chemical engineering learning outcomes that have been achieved, not the average academic ability of the graduates or average top-level academic learning outcomes achieved.

Many double/conjoint degrees are compromises with other disciplines to fit two degrees into a shorter time period than would otherwise be required. Therefore, chemical engineering content is normally removed, making it difficult to achieve sufficient learning outcomes to meet the M-Standard accreditation threshold.

For example, some five-year double degrees in Australia have achieved M-Standard when they showed sufficient evidence that some of the additional material was advanced chemical engineering. However, many five-year programmes offer a wide assortment of classes in other disciplines. Demonstrating that all graduates of the double degree achieve enough advanced chemical engineering learning outcomes can therefore be very challenging.

12. What's the difference for our graduates if the degree is accredited at B-Standard instead of M-Standard?

A B-Standard accredited degree does not prevent practising chemical engineers from becoming Chartered Chemical Engineers. However, the Engineering Council have set the requirement for graduates to achieve M-Standard learning outcomes in order to become Chartered. Therefore graduates with B-Standard degrees will need to demonstrate further learning either from an F-Standard accredited degree or from formal evidence of on-the-job learning (see www.icheme.org/knowledge-and-understanding).

Final comments: The assessors are not expected or required to search for information. The onus is on the department to provide clear information to allow the assessors to determine, and ultimately support, the desired level of accreditation.

Further guidance can be found at www.icheme.org/uni-accreditation-docs or contact accreditation@icheme.org with any questions or to arrange an accreditation or benchmarking visit.