University of Sheffield

Programme Specification

This specification provides a summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided.

The content of our courses is reviewed annually to make sure it's up-to-date and relevant. Individual modules are occasionally updated or withdrawn. This is in response to discoveries through our world-leading research; funding changes; professional accreditation requirements; student or employer feedback; outcomes of reviews; and variations in staff or student numbers. In the event of any change we will inform students and take reasonable steps to minimise disruption.

Programme Details

1. Programme title	Chemical Engineering		
2. Award type	Bachelor of Engineering		
3. Programme details	**FHEQ Level:** 6	**Mode of Study:** Full time Full time	**Duration:** 3 years 4 years (Foundation)
4. Faculty	Faculty of Engineering		
5. School	**Owning:** School of Chemical, Materials and Biological Engineering		
6. Accrediting Professional or Statutory Body	Institution of Chemical Engineers (IChemE)		
7. HECoS code *Select between one and three codes from the HECoS vocabulary.*	**Code:** 100143 **Percentage:** 100	**Code:** **Percentage:**	**Code:** **Percentage:**
Programme code (internal use)	CMBU006 (Full time) CMBU015 (Foundation)		

9. Programme aims

The programme aims to:	
A1	Provide access to an engineering degree to students from a range of academic and social backgrounds.
A2	Deliver a coherent curriculum embedded in design and practice with an emphasis on critical thinking, problem solving, professionalism, ethics and sustainability.
A3	Offer flexible learning environments and pathways to facilitate deep engagement.
A4	Promote and facilitate industry involvement by focusing on both process and product engineering to develop industry ready practical graduates with hands-on experience.
A5	Produce graduates who are integrators, change agents and self-directed learners to lead multidisciplinary teams, and be at the forefront of innovation.
A6	Provide exposure to niche research areas built on a strong core in engineering fundamentals.
A7	Produce graduates capable of Engineering from molecules by applying systems level thinking at many length scales.
A8	Foster safe and good laboratory practice.
A9	Encourage students to think for themselves and develop a social awareness of the impact of chemical engineering on society.

10. Programme learning outcomes

Knowledge and understanding (K) On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:	
K1	Fundamental principles of engineering science relevant to chemical and biological engineering. A1, A2.
K2	Mathematics necessary to apply engineering science to chemical and biological engineering. A6, A7, A10.
K3	Analytical and design methods used in chemical and biological engineering. A6, A7, A10.
K4	Use of information technology for analysis, design and management. A4, A11, A3.
K5	Operation of the chemical and biological engineering industry, including business practice and project management. A12, A4, A5, A8.
K6	Professional responsibility of chemical engineers and the influence of social, environmental, ethical, economic and commercial considerations on their activities. A8, A9, A11, A12.
Skills and other attributes (S) *When considering the skills and attributes developed in this programme, please refer to the Sheffield Graduate attributes (SGAs). SGAs can be found here* On successful completion of the programme, students will be able to:	

S1	Use engineering science, mathematics and digital technology to analyse engineering problems.
S2	Design and conduct experimental laboratory work using relevant test and measurement equipment to generate experimental data.
S3	Analyse and interpret experimental and other numerical data.
S4	Produce designs of systems, components or processes in a professional manner, taking account of social, environmental, ethical and commercial considerations.
S5	Carry out a health and safety risk assessment and devise a safe system of working.
S6	Exercise independent thought, critical thinking, sound judgement, creativity and innovation in solving unfamiliar problems.
S7	Prepare technical reports and presentations to communicate effectively, orally and in writing, to a range of audiences.
S8	Undertake the safe handling of chemical materials, taking into account their physical and chemical properties, including a risk assessment of any specific hazards associated with their use.
S9	Develop employability skills including time management, teamworking, leadership and collaboration by working with others in teams.

11. Learning and teaching methods *(this should include a summary of methods used throughout the programme, including any unique features and should be written with a student focus as this information will display to current students and applicants i.e. prospectus)*

The main teaching methods used to deliver the programme learning outcome are shown below. In most cases a combination of methods is used. Emphasis is on 'learning by doing', in particular for developing self-directed learners. Knowledge and understanding are gained through a combination of lectures, tutorials, example classes, design classes, laboratory experience, open-ended problem solving and coursework assignments. Skills are acquired mainly through coursework, laboratory classes and individual and group projects. The teaching will be delivered by a team of highly skilled academics with specific background in subjects relevant to chemical engineering. Guest lectures from industry/practitioners will be included. Learning and teaching materials are shared via Blackboard.

Lectures – used to transmit information, explain theories and concepts, and illustrate methods of analysis or design. For most lecture courses tutorial sheets are provided to enable students to develop their understanding during private study.

Practical activities – students undertake laboratory experiments, open-ended problem solving and computing tasks to gain practical skills.

Tutorials and example classes – run for small groups or a whole class to help students with their understanding and to resolve open-ended problems in their programme materials.

Research project – individual project contributing to novel research in chemical and biological engineering (MEng students only).

Research seminars – there is a regular schedule of School research seminars during the teaching session. Fourth year (MEng) students are encouraged to attend.

The approach to teaching design encourages students to take a wide perspective on problems and to develop their powers of synthesis, analysis, creativity and judgement as well as clarity of thinking. Students are provided with the context and framework for the application of the scientific, technical and other

knowledge which is taught elsewhere in the programme through the methods described above. The principal methods for design teaching are:

Design classes – students work to solve design problems related to real chemical and biological engineering situations in order to learn design methods and to practice associated analytical techniques.

Design projects – teams typically of 6-7 students tackle a chemical engineering problem by working through conceptual and complex design stages.

In addition to planned teaching and learning activities, students are also expected to learn through the preparation of coursework assignments and other assessment activities which generally require students to seek additional information and work on their own, or in small groups, to develop further understanding of the subject matter.

12. Assessment and feedback methods *(this should include the range of types of methods used and should be written with a student focus as this information will display to current students and applicants i.e. prospectus)*

Opportunities to demonstrate achievement of the learning outcomes are provided through a variety of assessment methods. Knowledge and understanding are primarily assessed in written examinations. However, in the later years further knowledge and understanding is gained through project work and assessed in written reports and oral presentations. A range of methods will be employed to provide formative feedback, in particular, during tutorials, projects, coursework and class tests.

Written examinations – unseen examinations.

Coursework submission – designed to test knowledge and communication skills; these include design studies, computing assignments and laboratory reports. **Class tests and online tests** – tests conducted in a lecture theatre or on the virtual learning portal during the main teaching periods to assess progress.

Oral presentations – most group projects include an oral presentation in which each group member plays a part.

Poster presentations - communication of engineering ideas in visual and brief written format , supported by spoken defence.

Individual and group project reports – these include intermediate and final reports for the Design Project and Research Project.

We will use a range of feedback mechanisms that we have designed and successfully utilised in the School. They include written and verbal, group and individual feedback from tutors; peer to peer feedback, self-reflection via keeping a skills journal, concept-check online quizzes and academic tutorials. For each module, a ‘Module Assessment and Feedback’ Form is provided at the beginning of the term on Blackboard, which clearly outlines the module assessments and details of how and when feedback will be made available for each assessment component.

Version Number:	**Purpose / Change:**	**Cohort affected: (academic year and level)**	**Date change approved:**
1			March 2023

2	Programme Simplification	25/26 - Foundation 26/27 - Year 1	June 2025

END OF DOCUMENT