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 Individual modules are occasionally updated or withdrawn.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	Mechanical Engineering		
2. Award type	Master of Engineering		
3. Programme details	**FHEQ Level:** 7	**Mode of Study:** Full time Full time	**Duration:** 4 years 5 years (Foundation)
4. Faculty	Faculty of Engineering		
5. School	**Owning:** School of Mechanical, Aerospace and Civil Engineering		
6. Accrediting Professional or Statutory Body	Institution of Mechanical Engineers (IMechE)		
7. HECoS code *Select between one and three codes from the HECoS vocabulary.*	**Code:** 100190 **Percentage:** 100	**Code:** **Percentage:**	**Code:** **Percentage:**
Programme code (internal use)	MACU021 (Full time) MACU027 (Foundation)		

9. Programme aims

The programme aims to:	
A1	Provide graduating students with a high-quality accredited qualification that meets all of the academic requirements for (future) Chartered Engineer status, as required by the Engineering Council via the IMechE.
A2	Deliver a coherent curriculum founded on critical thinking, capable engineering analysis, confident problem-solving and personal development to develop graduates who can lead, influence and create value.
A3	Provide a broad knowledge and understanding of mechanical engineering, including the commercial and social context, together with a more detailed and critical understanding of specialised, research-informed areas within the subject.
A4	Develop in students an independence of thought, intellectual curiosity and critical approach to evidence, theories and concepts.
A5	Provide an inclusive learning environment enabling every student to maximise their potential in all aspects of their programme.
A6	Foster safe and competent laboratory, manufacturing and assembly practice.
A7	Nurture in students their powers of creativity and innovation.
A8	Prepare students for professional practice by building in them an awareness of what mechanical engineers do, what their professional and legal responsibilities are, how they can understand and navigate ethical dilemmas, and supporting them to achieve competence in managing their own Continuing Professional Development (CPD).

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	Apply a comprehensive knowledge of natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.
K2	Apply a comprehensive knowledge of mathematics and statistics to the solution of complex problems.
K3	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.
K4	Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed.
K5	Select and apply appropriate materials, equipment, engineering technologies and processes,

	recognising their limitations.
K6	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.
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	Select and critically evaluate technical literature and other sources of information to solve complex problems.
S2	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 & safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards.
S3	Apply an integrated or systems approach to the solution of complex problems.
S4	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.
S5	Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.
S6	Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.
S7	Adopt a holistic and proportionate approach to the mitigation of security risks.
S8	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.
S9	Use practical laboratory and workshop skills to investigate complex problems.
S10	Discuss the role of quality management systems and continuous improvement in the context of complex problems.
S11	Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance.
S12	Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used.
S13	Plan and record self-learning and development as the foundation for lifelong learning/CPD.

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)*

Lectures: These are principal means of transmitting academic material and analysis techniques. Most lecture courses provide tutorial sheets to enable students to develop their understanding during private

study.

Tutorials (and Example Classes): These support students to resolve problems in their understanding of course material with students in appropriate group sizes (from small-groups to full-class).

Practical Activities: These typically take the form of laboratory or workshop classes. Laboratory classes introduce experimental methods and provide an opportunity for students to observe phenomena taught elsewhere in the curriculum, supporting their understanding. They also provide a good opportunity to develop collaboration and communication skills. Workshop classes provide students with an opportunity to apply a broad range of manufacturing processes to fabricate much valued and rewarding artefacts. In-curriculum links with the University's student-led Makerspace (iForge) allow students to take responsibility for their practical work. These positive experiences promote further, optional in- or extra-curriculum learning.

Online Resources: These resources can be the primary method of delivery, or as a 'capture' that offers students the opportunity to revisit topics. They might be dedicated resources developed by academic staff and made available to students through the Virtual Learning Environment (VLE) or a set of carefully curated pre-existing resources (e.g. from the wide range of online expert learning providers that are publicly available or part of the University's subscriptions) that the students are signposted towards. This format builds digital literacy, supports self-paced learning and helps facilitate a more diverse, and therefore inclusive, learning environment.

Design Problems: These problems support students to integrate and develop their knowledge and understanding, intellectual capabilities and practical skills in order to address typical engineering problems that are "open-ended" and often ill-defined. They also provide good opportunities for developing professional capabilities such as collaboration, communication and project management.

Coursework Assignments (including Oral, Video and Poster Presentations): A number of modules have coursework assignments that require students to seek additional information and work on their own, or sometimes in small groups. They are designed to enable students to develop and show their understanding of the content of the module. Oral, video or and poster presentations are often included as part of coursework assignments to provide opportunities for developing essential communication skills.

Integrative Projects: These substantial, carefully designed learning experiences provide a context in which a wide range of programme learning outcomes can be realised and integrated. They provide students with a strong foundation of fundamental knowledge and skills in year 1, on which to build in subsequent years of the programme. They typically consist of multiple phases that require students to work individually and in groups on a broad range of learning and teaching activities such as those outlined above.

Individual Project: This individual research and/or industrial project,-provides students with an opportunity to demonstrate, and experiment with, the knowledge, understanding and skills they have developed throughout the programme and supports them to further develop their project-management, and communication skills. This substantial project is performed under the supervision of an academic member of staff.

MEng Group Design Project: During this capstone project, students will work in groups (typically 4-7 students) to tackle an industry focused design problem by applying knowledge and understanding at the frontiers of mechanical engineering. It provides students with an opportunity to synthesise every aspect of their development during the programme and further develop their project-management, team-working and communication skills.

Preparation for Practice: This is undertaken in Year 4 but builds upon the professional development training that is embedded throughout the programme, starting in year 1. It provides students with space and support to reflect on and synthesise their learning, interrogate their own values and career goals and identify and implement development opportunities to help achieve these goals. It reinforces the importance of Continuing Professional Development, which is integral to professional practice, and supports students in

the transition represented by graduation.

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)*

Written Examinations: Exams are typically 1 - 3 hours in duration, depending on module size and the presence of complementary assessment methods. Some modules use examinations as the only assessment method.

Coursework Assignments (including Oral, Video and Poster Presentations): Coursework assignments are widely used in design modules, computational work, laboratory reports, essays or other work designed to assess the understanding of the module. Assignments are mainly undertaken on an individual basis but are sometimes carried out in small groups. Some assignments use oral, video and/or poster presentations to assess the development of presentation and communication skills. Some modules use coursework assignments as the only method of assessment whilst others have complementary assessments such as a written examination.

Class Test: These are small tests conducted during the main teaching periods to assess progress and understanding. They provide the module leader with a general overview of student progress and allow individual students to gauge their own progress.

Integrative Projects: These substantial, carefully designed learning experiences provide a context in which a wide range of programme learning outcomes are assessed. They typically consist of multiple phases and are continually assessed with students producing a variety of group and individual assessment elements.

Individual Project: This substantial project is assessed via a written thesis, a viva voce to a panel of academic staff and the response to questions from the panel. All assignments are expected to be completed to a professional standard.

MEng Group Design Project: The assessment of this substantial design project requires students to demonstrate their proficiency in communicating complex information via a range of different media common to professional engineers. All assignments are expected to be completed to a professional standard.

Portfolio: A core component of Year 4, the 'Preparation for Practice' module supports students in producing a personal portfolio for professional/employability purposes.

Feedback to students will be given on a regular basis throughout the Programme. It will provide encouragement and will offer suggestions for improvement. Students will be expected to use feedback from staff to improve the quality of their work and enhance their personal development. The feedback can be summative (e.g. written comments on assignments) or formative (e.g. verbally during lectures, tutorials, laboratory, and other teaching and learning sessions).

Feedback from students and the industry sponsors/employers is actively sought in order to monitor the operational delivery of the programme against its educational aims and objectives, as well as industry requirements, and thus assist staff to strive for continuous improvement.

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

1			October 2020
2			March 2021
3			September 2022
4			September 2023
5			September 2024
6	Programme Simplification	25/26 - Foundation 26/27 - Year 1	June 2025

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