



The  
University  
Of  
Sheffield.

## Programme Specification

A statement of the knowledge, understanding and skills that underpin a taught programme of study leading to an award from The University of Sheffield

### Programme Details

1. Programme title	Advanced Manufacturing Technologies
2. Programme code	MACT008
3. QAA FHEQ level	7
4. Faculty	Engineering
5. Department	Mechanical Engineering
6. Other departments providing credit bearing modules for the programme	Core modules: <ul style="list-style-type: none"> <li>English Language Teaching Centre</li> </ul> Optional modules: <ul style="list-style-type: none"> <li>Materials Science and Engineering</li> </ul>
7. Accrediting Professional or Statutory Body	Institution of Mechanical Engineers
8. Date of production/revision	February 2024, March 2026

Awards	Type of award	Duration
9. Final award	MSc(Res)	1 year
10. Intermediate awards	Postgraduate Certificate	

### Programme Codes

11. JACS code(s) Select between one and three codes from the <a href="#">HESA website</a> .	H300		
12. HECoS code(s) Select between one and three codes from the <a href="#">HECoS vocabulary</a> .	100190		

## Programme Delivery

13. Mode of study	Full time
14. Mode of delivery	Face to face

## 15. Background to the programme and subject area

Professional mechanical engineers are concerned with the design, development, production and marketing of all kinds of artefacts that improve and support our way of life. They are creative people and synthesise information, solve problems and innovate. A career in mechanical engineering can involve graduates in any stage of the conception, design, production, finance and marketing of all manufactured goods. Research-trained mechanical engineers can end up working for a small to medium-sized company, or a larger employer such as BAE Systems, Rolls Royce Plc, Jaguar Land Rover or ICI. They can also work independently, begin their own business, work in a large number of disciplines where innovation and numeracy are required, or become established in research.

The MSc (Research) Advanced Manufacturing Technologies programme gives new graduates and professional mechanical engineers the opportunity to enhance their knowledge and skills in this area. The programme offers a combination of modules on research techniques and transferable skills, a broad range of modules in advanced mechanical engineering appropriate to the programme, and a major research project which will be relevant to current advanced manufacturing technologies. The investigative project will expose students to cutting edge manufacturing techniques. It has been developed specifically to meet the need of industry for high quality post-graduates with enhanced knowledge in this specific area of mechanical engineering and with practical experience of research, including training in research methods and management.

Most of the modules used in the programme are accredited by the Institution of Mechanical Engineers and can be used towards the individuals matching section for becoming a Chartered Engineer. The programme is accredited by the Institution of Mechanical Engineers.

The programme will equip graduates to enter and succeed in a wide range of career areas, both within mechanical engineering and more generally, and to meet the challenges of working within an ever-changing discipline and world.

Further information about the programme may be found at <http://www.shef.ac.uk/mecheng>

## 16. Programme aims

MSc (Res) Advanced Manufacturing Technologies aims to:	
<b>A1</b>	instil an independence of thought, intellectual curiosity and critical approach to evidence, theories and concepts.
<b>A2</b>	provide advanced understanding and critical knowledge in selected areas of mechanical engineering appropriate to the programme.
<b>A3</b>	provide experience in a substantial research investigation appropriate to the programme and prepare students for further postgraduate work and a research career in mechanical engineering.
<b>A4</b>	provide a broad understanding of the social, environmental, and commercial context within which research is undertaken.
<b>A5</b>	develop a range of transferable lifetime skills that help students to maximise their potential in all aspects of their course.

## 17. Programme learning outcomes

<b>Knowledge and understanding</b>		
On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:		
		<b>Links to Aim(s)</b>
<b>K1</b>	advanced knowledge and understanding of the concepts, theories and principles in areas of mechanical and manufacturing engineering appropriate to the programme.	A2
<b>K2</b>	an understanding of how advanced analytical methods are used in mechanical and manufacturing engineering appropriate to the programme.	A1, A3
<b>K3</b>	critical knowledge of areas of mechanical and manufacturing engineering appropriate to the programme.	A2
<b>K4</b>	a broad understanding of approaches to research in mechanical and manufacturing engineering.	A3
<b>K5</b>	a broad understanding of the social, environmental, and commercial context within which research is undertaken.	A4
<b>Skills and other attributes</b>		
On successful completion of the programme, students will be able to:		
<b>S1</b>	demonstrate skills in the acquisition, use and critical evaluation of subject-related information.	A1, A2
<b>S2</b>	conduct a research investigation taking account of technical, environmental, ethical, and commercial considerations.	A3, A4
<b>S3</b>	use engineering science, mathematics and information technology to analyse and solve engineering problems.	A1, A2
<b>S4</b>	exercise independent thought and judgement. display creativity and innovation in solving unfamiliar problems.	A1, A3
<b>S5</b>	communicate at a professional level, orally and in writing.	A5
<b>S6</b>	work in collaboration with others.	A4, A5

Note: Certificate students will have developed the learning outcomes associated with the acquisition of 60 credits selected in accordance with the programme regulations. An award of Certificate shall therefore exclude the project.

## 18. Learning and teaching methods

The following are the main teaching and learning methods used:

**Lectures** - the principal means of transmitting academic material and analysis techniques. Most lecture courses provide tutorial sheets to enable students to develop their understanding of the subject matter and methods during their private study.

**Tutorials and Example Classes** - these may be small group or up to class sized tutorials and are a main source of providing help to students to resolve problems in their understanding of course material.

**Coursework Assignments, Oral 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 and poster presentations are often included as part of coursework assignments to provide opportunities for developing these essential skills.

**Individual Research Project** - This is a research project at the frontiers of mechanical engineering appropriate to the programme which accounts for more than half of the overall credits for the programme. It is conducted under the supervision of a member of the academic staff and provides an excellent opportunity for the students to pull together every aspect of their development during the programme.

## 19. Assessment and feedback methods

The following are the main assessment methods used:

**Written Examinations** - these are typically 2 hours in duration. Many modules use this as the only or major assessment method.

**Coursework Assignments, Oral and Poster Presentations** - coursework assignments are used in a number of modules 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 and poster presentations in order to assess the development of presentation and communication skills. Some modules use coursework assignments as the only or main method of assessment whilst others have this as a minor part with a written examination forming the major part of the overall assessment.

**Individual Research Project** - The project is assessed on the student's commitment and progress throughout the project. A poster presentation is organised in the second semester. A written report, an oral presentation to a panel of academic staff and the response to questions from the panel form the main assessment of the project at the end of the summer period. The project is expected to be at a professional level.

**Portfolio** - professional skills and personal development are supported, developed, recorded and assessed through a portfolio which combines mandatory elements and personalised evidence.

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 tutor feedback to improve the quality of their work. The feedback can be summative (e.g. written comments on assignments) or formative (e.g. verbally during lecture or tutorial sessions).

## 20. Programme structure and student development

The programme structure is modular and runs full-time for 12 months; two academic semesters run from October to June with a summer period running from June to September. Students must obtain a total of 180 credits. During the first two academic semesters they will study 105 credits of taught modules (including two 15-credit optional modules) and carry out at least 15 credits worth of work for their individual research project (75 credits). Their individual research project will continue into the summer period and be completed before the end of the academic year.

During the first two academic semesters students undertake modules in core research skills in preparation for their project work, as well as developing their general and transferable skills, as well as a broad understanding of the social and commercial context within which research is undertaken.

Over both the semesters students must take a 15 credit, professional development portfolio module where students tailor the module to their own skill development, this includes units for improving IT skills, career readiness and personal management skills as well as the professional responsibility of an engineer considering the ethical, social, legal and environmental issues that are essential for a professional engineer in the modern world.

The optional modules available to students are in topic areas appropriate to the programme (e.g. work holding, manufacturing techniques, component inspection and assembly, etc). Students select two 15-credit modules, with a maximum one module in the first semester. The strong core of the programme and flexible options help students gain key general skills in advanced manufacturing technologies as well as more progressive specific expertise, helping to prepare them for the initial stages of their career.

Students take a 5-credit report writing module taught by the ELTC as one of the core modules. This is classroom-based, and the students learn how to structure and write engineering reports effectively. Students also take a 10-credit mini project in order to develop their research skills. The students who have met the learning outcomes of these two modules will be able to substitute these with an optional module in the first semester, with the permission from the head of the Department of Mechanical Engineering.

The individual research project is carried out throughout the year. It is undertaken under the supervision of an academic member of staff from the Department of Mechanical Engineering and is related to established research work and/or industrial problems. It provides the student with an excellent opportunity to consolidate the skills and knowledge learnt on the programme during a major piece of individual work.

On successful completion of the programme They will have acquired a capacity to understand and to manage the process of innovative research and have acquired a range of subject-specific and generic skills appropriate to employment both within and outside mechanical and manufacturing engineering. They will be well placed to assume positions of responsibility within industry, and will be able to make an immediate, effective contribution for their employers. Alternatively, graduates wishing to pursue further research will have received thorough research training, and will be able to proceed more effectively to a PhD or other postgraduate research work. They will have also completed a range of modules that they can use in their individual matching sections portfolio for obtaining full Chartered Engineer status.

Students who do not achieve the requirements for the Masters' programme will be awarded Postgraduate Certificate provided they achieve at least 60 credits. These credits shall exclude MEC605 MSc (Res) Individual Research Project.

Detailed information about the structure of programmes, regulations concerning assessment and progression and descriptions of individual modules are published in the University Calendar available online at <http://www.sheffield.ac.uk/calendar/>.

## **21. Criteria for admission to the programme**

The programme is suitable for well-qualified and motivated students. The admissions procedure is aimed at ensuring students taken onto the course meet the requirements for successful completion regardless of the applicant's educational or other background.

Typically applicants are expected to have a 2:1 honours degree or equivalent in mechanical engineering or a related subject. Applicants who have a qualification in another science/engineering subject, such as maths or physics, or relevant professional experience will also be considered.

All applicants require an English language qualification, typically a GCSE or an IELTS test (a score of 6.5 or above is required).

Detailed information regarding admission to the programme is available at <https://www.sheffield.ac.uk/mecheng/postgraduate/masters>

## 22. Reference points

The learning outcomes have been developed to reflect the following points of reference:

Subject Benchmark Statements

<https://www.gaa.ac.uk/quality-code/subject-benchmark-statements>

Framework for Higher Education Qualifications (2014)

<https://www.gaa.ac.uk/docs/gaa/quality-code/qualifications-frameworks.pdf>

University Vision and Strategic Plan

<https://www.sheffield.ac.uk/vision>

## 23. Additional information

The programme described provides potential opportunities for students to carry out projects in the AMRC. The AMRC is located approximately 5 miles from the Department of Mechanical Engineering, towards the east of the city. Students will be expected to make their own way between the AMRC and Mechanical Engineering.

All of the Personal Tutors are members of the academic staff of the department. They are also involved in research and take part in the administration of the course. Students first meet their personal tutor when they arrive for registration in the department. The personal tutor is available to provide general help and advice on all aspects of university life and play a key role in helping the student find a suitable research project and supervisor. Students are in regular contact with their tutor in the first semester when they seek guidance on the choice of their optional modules and research project. In following semesters in addition to the personal tutor, the research project supervisor can also provide general help and advice. The personal tutor and project supervisor will monitor the student's progress throughout the year and will be able to help in providing references and advice on career decisions.

Academic staff in both the Department of Mechanical Engineering and AMRC are organised into research themes that reflect their specific areas of research activity. Within each theme are a number of research clusters, comprising of staff who work in small groups with colleagues from both within the department and across the University. Each theme contains staff whose interests encompass both fundamentals and applications. At the applied level groups co-operate with industry. Expertise in the different groups covers the need for the different programmes. Students are taught in a research-led environment and the programmes reflect the research strengths of staff.

Current research themes in the Department of Mechanical Engineering can be summarised in five main themes: Biomechanics, Dynamics, Manufacturing and Design, Solid Mechanics and Thermofluids. Further details about the department, research profiles, courses offered and admission procedures can be found at the departmental Web site <http://www.shef.ac.uk/mecheng>

The AMRC is a multi-million pound collaboration within the University of Sheffield, incorporating academics as well as world leaders in the aerospace supply chain, and key government offices. Research themes within the AMRC include advanced manufacturing process technologies, composite materials, work holding and assembly, component inspection and verification, innovative metals processing and supply chain management. Further details about the AMRC, including a full research profile, can be found at <http://www.amrc.co.uk>.

This specification represents a concise statement about the main features of the programme and should be considered alongside other sources of information provided by the teaching department(s) and the University. In addition to programme specific information, further information about studying at The University of Sheffield can be accessed via our Student Services web site at <http://www.shef.ac.uk/ssid>.