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	Nuclear Manufacturing (Apprenticeship)
2. Programme code	AMRU30
3. QAA FHEQ level	5
4. Faculty	Engineering
5. Department	AMRC Training Centre
6. Other departments providing credit bearing modules for the programme	None
7. Accrediting Professional or Statutory Body	IMechE to be sought
8. Date of production/revision	December 2021

Awards	Type of award	Duration
9. Final award	Foundation Degree	2 years
10. Intermediate awards		

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	H700		
12. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100209		

Programme Delivery

13. Mode of study	Full-time as part of an apprenticeship
14. Mode of delivery	Blended learning: in person delivery at the Training Centre, labs, and independent study

15. Background to the programme and subject area

The Foundation Degree in Nuclear Manufacturing forms an important element of the Nuclear Scientist and Nuclear Engineer apprenticeship standard. Students will be apprentices working in engineering and manufacturing, with roles in nuclear manufacturing.

Students will develop fundamental and core knowledge of some key aspects of the science and engineering principles underpinning manufacturing and practice: mathematics, electrical systems, manufacturing and materials, engineering science, design and engineering practice. In the second year of the programme, students will also be introduced to the principles of nuclear engineering and professional practice in the nuclear sector.

On completion of the Foundation Degree, students will be expected to progress to the Top Up BEng in Nuclear Manufacturing.

16. Programme aims

Foundation Degree in Nuclear Manufacturing aims to:	
A1	Enable students to develop a sound knowledge and understanding of key manufacturing principles and practice.
A2	Develop, in students, a critical approach to evidence, theories and concepts, and the ability to use established techniques to undertake critical analysis of information.
A3	Prepare students for a professional career in the Nuclear sector that meets some of the requirements of the Nuclear Scientist and Nuclear Engineer apprenticeship standard.
A4	Develop, in students, independence of thought, intellectual curiosity and critical approach to evidence, theories and concepts.
A5	Develop, in students, a variety of generic and transferable skills required by both the apprenticeship standard and that are relevant to graduate level employment.

17. Programme learning outcomes

Knowledge and understanding

On successful completion of the programme, students will be able to demonstrate knowledge and understanding of:

		Links to Aim(s)
K1	Scientific principles and methodology necessary to underpin an education in nuclear manufacturing.	A1, A2, A4
K2	The materials and manufacturing processes used by nuclear manufacturing engineers.	A1, A2, A4

K3	Mathematical and analytical methods necessary to underpin their education and work in manufacturing and to enable them to apply mathematical methods for the analysis and solutions of manufacturing problems.	A1, A2, A4, A5
K4	The context in which nuclear engineers work, including codes and standards.	A1, A3, A4
K5	The professional responsibilities of engineers in society including safety, equality, diversity and inclusion and sustainability.	A3, A5
Skills and other attributes On successful completion of the programme, students will be able to:		
S1	Select and use experimental equipment relevant to nuclear manufacturing with an understanding of their advantages, drawbacks and appropriate use.	A1, A2, A3
S2	Recognise where health and safety risk occurs in practical activities, perform risk assessments and work safely.	A1, A5
S3	Work effectively in teams to deliver work, sharing skills and expertise to deliver work.	A1, A4, A5
S4	Locate, manage and use information, using both formal and informal sources, including technical and academic literature.	A1, A2, A4
S5	Plan and manage a programme or work or project using recognised project management techniques.	A1, A2, A3, A5

18. Learning and teaching methods

All of the students taking this course of study will be in full time employment with an engineering employer. The professional skills developed during the students' employment, eg the knowledge and application of manufacturing processes, professional conduct and social responsibility, report writing, team work and communication are expected to support many of the learning outcomes assessed through the course. Where specific opportunities arise for students to develop their learning based on their employment, appropriate skills will be embedded into the module design. Where students are working in the areas of industry which are studied in the course, students will be actively encouraged to contribute knowledge and experience from their employment to enrich group learning, for example by bringing videos, examples of products or practical engineering projects.

The main teaching, learning and assessment methods adopted for each learning outcome are shown below. In most cases a combination of methods is used.

The blended learning pedagogical model will be adopted where appropriate, with instructional content provided for independent study time so that contact time can be used for exercises, problem cases and discussion.

Independent study is relevant to all modules and is intended to be used by students to watch pre-recorded lectures, with quizzes, available on-line through computers, laptops and tablets; read chapters from nominated textbooks and other material; prepare for contact time i.e. tutorials, problem classes, seminars; and develop coursework to improve the understanding of presented topics during the classes.

Lectures (whether during contact time or recorded) are the principal means of imparting knowledge. Some lectures will be pre-recorded for independent study or captured and made available on-line through computers, laptops and tablets.

Tutorials will be used to briefly and formatively assess independent study (the instructional content from lecture captures, case study examples and reading material). The main aim of tutorials is to

explore topics in more detail either through structured discussion or case studies.

Problem solving classes will provide time for students to identify specific problems, difficulties and solutions, to develop their confidence and competence in problem solving. Students will also be given more complex problems to solve in small groups or individually, with lecturer support.

Laboratory classes provide opportunities for students to practice and develop a range of discipline-based techniques; apply and investigate theoretical and conceptual knowledge; develop experimental techniques and approaches, analysing, interpreting and presenting their findings and data; developing personal and transferable skills such as problem solving, team working, following protocols and working safely.

Design classes enable students to practice design methods and to offer a design solution relevant to their workplace. The students will test their creativity, problem solving skills and will utilise team working, communication and presentation skills. Tackling a design challenge within their own organisation will also test students' commercial awareness.

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 understanding of the subject matter.

19. Assessment and feedback methods

Knowledge and understanding are primarily assessed through written examinations and coursework, which includes oral presentations and written reports.

Written examinations – unseen examinations.

Coursework submission – designed to test knowledge and communication skills; these include design studies, computing assignments, and laboratory reports.

Oral presentations – these take the form of individual oral presentations or group presentations in which each group member plays a part.

20. Programme structure and student development

The first year of the Foundation Degree programme is taught through a series of compulsory 10 and 20 credit modules. The core syllabus of six key threads (mathematics; electrical systems, manufacturing systems and materials, mechanical science, design, engineering practice) aim to develop the essential skills and knowledge in the fundamentals of engineering science, mathematics, professional engineering practice and design required of a professional engineer.

The second year continues with compulsory 20 credit modules within the six threads such as Further Mathematics and Computing for Engineering; Further Engineering Science; Control and Automation; Machining, Joining and Thermal Processing. The Nuclear Manufacturing specific modules include The Professional Nuclear Engineer and Principles of Nuclear Engineering.

All modules on the Nuclear Manufacturing foundation degree will ensure that students acquire the necessary knowledge, understanding and skills to meet the programme objectives and sufficient preparation for the top up degree year.

Students are expected to continue to take a top up degree in Nuclear Manufacturing which will allow them to graduate with a BEng degree in Nuclear Manufacturing.

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

A minimum of two A-Levels at grade B or above, including a mathematical based subject and a science, technology, engineering or an additional mathematics related subject; an Engineering BTEC level 3 with 120 credits at distinction and merit level; or equivalent qualifications such as Cambridge Technicals.

Plus five GCSEs at grades 4 to 6, including mathematics, English and a science, technology or engineering related subject.

Degree Apprenticeships | Apprenticeship Levels | AMRC Training

22. Reference points

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

Subject Benchmark Statements
https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Framework for Higher Education Qualifications (2014)
https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

University Vision
Vision and strategy | Vision and strategy | Staff hub (sheffield.ac.uk)

Institute for Apprenticeships and Technical Education (IFATE)
Nuclear scientist and nuclear engineer (integrated degree) / Institute for Apprenticeships and Technical Education

23. Additional information

None

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.