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

1	**Programme Title**	General Engineering
2	**Programme Code**	AMRU28
3	**JACS Code**	H300, HECOS Code: 100209
4	**Level of Study**	Level 4
5a	**Final Qualification**	Pearson BTEC Level 4 Higher National Certificate in General Engineering
5b	**FHEQ Level**	4
6	**Intermediate Qualifications**	Not applicable
7	**Teaching Institution** (if not Sheffield)	AMRC Training Centre
8	**Faculty**	Engineering
9	**Department**	Advanced Manufacturing Research Centre
10	**Other Departments involved in teaching the programme**	None
11	**Mode of Attendance**	Part-time
12	**Duration of the Programme**	2 years
13	**Accrediting Professional or Statutory Body**	IMechE sought
14	**Date of production/revision**	September 2021

15. Background to the programme and subject area

The AMRC Training Centre offers a comprehensive engineering/manufacturing curriculum from level 2 to level 7. The majority of the centre's apprentices in learning are following a level 3 programme. The HNC forms a key part of the AMRC Training Centre's curriculum offer, alongside the centre's degree apprenticeships, as an additional progression route from the centre's level 3 apprenticeships.

The HNC forms the technical element of the centre's Automation and Control Engineering Technician level 4 apprenticeship (AMRU27). In addition, learners may join the programme on a programme only basis, (AMRU28).

Upon completion of the HNC, learners may be able to progress to the centre's degree apprenticeships.

16. Programme aims

The University's Mission is to educate others and ourselves and to learn through doing so, as a civic institution proud of its urban character, driving growth and vibrancy for the city, the region, and the globe. Our vision is research, teaching and learning together create a positive culture of higher education.

The AMRC implements this through a strong commitment to local industry, with a large number of employers both within Sheffield and the region working with the AMRC to address the engineering skills gap by training and educating Advanced, Higher and Degree Apprentices. The AMRC has a strong commitment to both teaching and research and works to create and stimulate a commitment to self-learning and development in its students.

The objectives of the BTEC Higher Nationals in Engineering are as follows:

- To provide students with the core knowledge, skills and techniques that all engineers require, irrespective of future specialism, to achieve high performance in the engineering profession.
- To build a body of specialist knowledge, skills and techniques in order to be successful in a range of careers in engineering at the Associate Engineer or Operational Engineer level.
- To develop the skills necessary to fault find and problem solve in a timely, professional manner, reflecting on their work and contributing to the development of the process and environment they operate within.

● To understand the responsibilities of the engineer within society, and work with integrity, regard for cost, sustainability and the rapid rate of change experienced in world class engineering.

● To provide opportunities for students to enter, or progress in, employment within the engineering sector, or progress to higher education qualifications such as degrees and honours degree in engineering or a closely related area, by balancing employability skills with academic attainment.

● To provide opportunities for students to make progress towards achieving internationally recognised registration with a Professional Body regulated by the Engineering Council.

● To allow flexibility of study and to meet local or specialist needs.

We aim to meet these objectives by:

● Providing a thorough grounding in engineering principles at Level 4 that leads the student to a range of specialist progression pathways at Level 5, relating to individual professions within the engineering sector.

● Equipping individuals with the essential qualities of an engineer, including integrity, regard for cost and sustainability, as they apply to a range of roles and responsibilities within the sector.

● Enabling progression to a university degree by supporting the development of academic study skills and the selection of appropriate units for study at Level 4 or 5.

● Enabling progression to further professional qualifications in specific engineering disciplines by mapping the units studied to the requirements of the Professional Bodies applicable to that discipline.

● Supporting a range of study modes and timeframes for completion of the qualifications. Prepare students for professional accreditation.

17. Programme learning outcomes

Knowledge and Understanding:	
Students will have a knowledge and understanding of the:	
K1	the concepts, theories and principles of engineering;
K2	mathematics necessary to apply engineering science to mechanical and electrical engineering;
K3	analytical and design methods used in engineering;
K4	use of information technology for analysis, design and simulation/modelling;
K5	professional responsibility of mechanical manufacture engineers and the influence of social, environmental, ethical, economic and commercial considerations on their activities.

Skills and other attributes:	
Intellectual Skills - Students will be able to:	
I1	Cognitive and problem solving skills;
I2	Critical thinking: approaching non-routine problems by applying expert and creative solutions;
I3	use engineering science, mathematics and, information technology to analyse engineering problems;
I4	acquire, analyse and interpret experimental and other numerical data;
I5	exercise independent thought and judgement;
I6	undertake effective research, using physical and electronic resources.

Practical Skills - Students will be able to:	
P1	use appropriate mathematical methods for modelling and analysing mechanical manufacturing problems;
P2	conduct experimental laboratory work and analyse the results;
P3	use IT tools for design, computational and analytical purposes;
P4	produce designs in a professional manner, taking account of social, environmental, practical and commercial considerations;
P5	use commercial software for analysis and design;
P6	prepare technical reports and presentations.

Transferable Skills - Students will be able to:	
T1	self-management, adaptability and resilience;
T2	self-monitoring and self-development, self-analysis and reflection;
T3	Use of IT systems and digital technology;
T4	articulate effectively; communicate effectively, orally and in writing;
T5	collaborate with others in teams;
T6	manage their time efficiently - planning and prioritising;
T7	find information and learn independently;
T8	solve problems logically;
T9	scope out and manage a work-based project.

18. Teaching, learning and assessment

Development of the learning outcomes is promoted through the following teaching and learning methods:

Learning activities will adopt an active learning approach, with a combination of lecture, individual work and group problem solving, research and analysis activities. Learners will be given access to electronic and physical research material through the University's library resources. In addition, all units will be supported by on-line VLE resources, encouraging learners to learn independently outside the classroom.

Reference will be made to the industrial context of each subject in learning activities, encouraging students to contribute knowledge and experience from their employment to enrich group learning.

Learners will develop practical skills, as required, at the AMRC Training Centre. Learners will have access to well-equipped IT suites and the centre's state of the art practical workshops, as appropriate.

Tutorial sessions will provide 1:1 support and guidance to all learners and will provide the opportunity for target setting and monitoring of learner progress.

Opportunities to demonstrate achievement of the learning outcomes are provided through the following assessment methods:

Assessment will take the form of centre produced assignments, devised in accordance with Pearson's requirements and internally verified to ensure quality and fitness for purpose. Where possible, a range of assessment instruments will be used.

Assessment processes will follow Pearson's specifications for HN assessment and will be subject to internal verification, as required by Pearson. Learners will receive written formative and summative feedback, as required by Pearson, to allow learners to improve their grades in accordance with Pearson regulations.

All assessment activities will be subject to external scrutiny by an External Examiner, in accordance with Pearson external quality assurance requirements.

19. Reference points

The learning outcomes have been developed, by Pearson, to reflect a range of points of reference, including:

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

20. Programme structure and regulations

The HNC programme is modular, being constructed of eight 15-credit units delivered over two years, with a total of 120 credits. All units have been designed by Pearson and units have been selected according to the published rules of combination. The programme is delivered on a part-time, day release basis.

Units are scheduled to allow logical progression in development of skills and knowledge. For example, Engineering Maths and Engineering Science are delivered in the first year, as prerequisites for subsequent specialist units.

Programme quality is monitored and assured, as required, through annual Examination Boards, annual programme review and routine internal quality assurance activities. The AMRC Learning and Teaching Committee provides programme oversight, in accordance with University regulations.

21. Student development over the course of study

Level 1 (1st year)	In the first year, students will develop their essential mathematical and analytical skills and knowledge by studying three core units: Engineering Maths, Engineering Science. Students contextualise and develop their learning further through the following core units; Electrical and Electronic Principles, and Automation, Robotics and PLCs. Where possible and appropriate, students are encouraged to draw upon their learning and experience in the workplace to contextualise their learning.
Level 2 (2nd year)	In the second year, students build on their first-year learning by studying the two final core units: Engineering Design and Managing a Professional Engineering Project. In addition to building on prior learning, these units further develop students' transferable and intellectual skills and knowledge and require students to apply these skills and knowledge. During the second year, students also undertake two core units: Electrical Systems and Fault Finding, and Instrumentation and Control.

22. Criteria for admission to the programme

Students with one of the following criteria are eligible for admission to the programme:

- A BTEC Level 3 Diploma in Engineering (with 120 credits at merit-merit level) or equivalent qualifications such as Cambridge Technicals;
- A minimum of two A-Levels at grade C or above, including a mathematical based subject and a science, technology, engineering or an additional mathematics-related subject;
- An EAL Diploma - merit or higher.

23. Additional information

Further information is available at http://www.amrctraining.co.uk/