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	Electrical and Electronic Engineering
2. Programme code	EEEU59
3. QAA FHEQ level	6
4. Faculty	Engineering
5. Department	Electronic and Electrical Engineering
6. Other departments providing credit bearing modules for the programme	Core and optional teaching: School of mathematics and statistics, Automatic control and systems engineering, Mechanical Engineering
7. Accrediting Professional or Statutory Body	Institute of Engineering Technology
8. Date of production/revision	December 2020

Awards	Type of award	Duration
9. Final award	Bachelor of Engineering (BEng)	3 years
10. Intermediate awards		

Programme Codes

11. JACS code(s) *Select between one and three codes from the HESA website.*	H600		
12. HECoS code(s) *Select between one and three codes from the HECoS vocabulary.*	100163		

Programme Delivery

13. Mode of study	Full-time
14. Mode of delivery	On campus

15. Background to the programme and subject area

Electronic and electrical engineers are responsible for the design and development of electronic and electrical aids to modern living. The area of Electronic and Electrical Engineering (EEE) is very wide and, after two years of common study, this programme gives students the opportunity to keep a relatively broad perspective of the subject or to choose a specialisation stream (Electrical, Electronic, or Communications). In addition to providing a firm foundation in all areas of EEE, the commonality provided in the first two years enables students to make an informed choice of specialisation at the end of year 2 and widens considerably the range of employment possibilities open to them upon graduation. Although most of the students graduating from the course gain employment in the electrical/electronic engineering industrial sector, some gain employment in other apparently unrelated areas such as banking, chartered accountancy, technical journalism and teaching. A significant number embark on further studies towards MSc or PhD degrees.

Accreditation by the Institution of Engineering and Technology as satisfying part of the academic requirements for membership of the Institution and for Chartered Engineer status will be sought. The remaining requirements may be satisfied after graduation by undertaking a programme of further study, such as an “approved” MSc, to bring a student’s educational attainment to masters’ level. Further information about the programmes may be found on the internet at http://www.sheffield.ac.uk/eee/admissions/our_courses

16. Programme aims

BEng Electrical and Electronic Engineering aims to:	
A1	provide teaching that is informed and invigorated by the research and scholarship of its staff.
A2	enable students to develop a thorough knowledge and understanding of electrical and electronic science and its engineering applications.
A3	give students the opportunity to study particular aspects of electronic and electrical engineering in depth, according to their interests.
A4	encourage in students independence of thought and a critical approach to the interpretation of experimental evidence and to the evaluation of existing information.
A5	foster in students a commitment to self-improvement and continuing professional development.
A6	help students develop a range of generic presentational and interpersonal skills appropriate to employment in the engineering sector and elsewhere.

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	the fundamental principles of engineering science relevant to electronic and electrical engineering.	A2; A3
K2	the mathematics necessary to predict the behaviour of electrical and electronic systems.	A2; A3
K3	analytical and design methods and tools appropriate for electronic and electrical systems.	A2; A3
K4	the principles underlying engineering management, interpersonal interactions in a group working context and the legal and ethical responsibilities of a professional engineer.	A6; A3
In addition to K1 to K4, for students on the Electrical Engineering stream and on the Electrical & Electronic Engineering stream:		
K5	the requirements, specifications and dynamic operation of electrical and electromechanical systems.	A2; A3
In addition to K1 to K4, for students on the Electronic Engineering stream and on the Electrical & Electronic Engineering stream:		
K6	the physical principles applicable to electronic instrumentation, measurement, signal conditioning, system control and component level design.	A2; A3
In addition to K1 to K4, for students on the Electronic and Communications Engineering programme:		
K7	principles of both the information and transmission aspects of a communication system and the relevant analytical and computer based analysis tools.	A2; A3
Skills and other attributes On successful completion of the programme, students will be able to:		
S1	gather, organise and critically evaluate information needed to formulate and solve problems.	A5; A3
S2	apply acquired knowledge effectively and efficiently in the relevant areas of Engineering.	A4; A3
S3	interpret the results of experimental investigations.	A2; A3
S4	design and execute experiments to investigate component, circuit or system behaviour.	A2; A3

S5	use appropriately computer aids for design and analysis.	A2; A3
S6	prepare technical reports and poster presentations.	A7; A3
S7	write computer programmes to solve engineering problems.	A2; A3
S8	write reports and deliver oral presentations in a style appropriate for the audience.	A3; A7
S9	use IT resources effectively.	A2
S10	work independently on a research problem with an unknown solution.	A1; A3
S11	plan simple projects and manage time effectively.	A2;A 3

18. Learning and teaching methods

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

- 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 classes - working in groups of two or three, students undertake laboratory experiments and small design projects to gain practical skills. The design projects require students to seek additional information. A second year industrial project, the "SHIPS" project, in which students work on a feasibility study in groups of four to six, is used to give students the chance to practice the team-working methods they have been taught in lectures.
- Personal tutorials - run for small groups of six or less to discuss both technical and transferable skill based material. Students are encouraged to take an active part in discussions.
- Problem classes - run for the whole class to help students to resolve difficulties as they work through the problem sheets.
- Individual research project - a major study, carried out over two semesters, involving a significant research component. It is supervised by a member of the academic staff and allows the student to display initiative, originality and creativity.

19. Assessment and feedback methods

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

- Written examinations.
- Coursework submissions - these include formal laboratory reports, programming assignments and tutorial assignments.
- Oral presentations - oral presentation is used as one of the methods of assessment in all three years of the course.
- Individual project reports - written reports prepared individually.

20. Programme structure and student development

Programme structure

The structure of this programme is modular and each year students study modules worth a total of 120 credits. The first two years of the programme is common with a wide range of subject areas being covered. With the benefit of a more detailed knowledge of the degree options available, at the end of year 2 students must choose between the BEng or MEng Electrical and Electronic Engineering programmes. A student's initial application in no way constrains this choice, but changes between BEng and MEng programmes and vice versa are not generally permitted after the beginning of Year 3. Students must satisfy the appropriate progression criteria in order to proceed to Year 3 of an MEng programme; those who do not will be required to remain on their chosen BEng programme. In Year 3 students must choose to either remain on the general Electrical and Electronic stream or choose a specialisation in either Electrical, Electronic, or Communications Engineering where students will study modules biased towards their area of interest. An individual design project is carried out by students in year 3 which is spread across two semesters.

Year 1 - Students are introduced to the physical concepts, mathematical tools and elementary experimental methods of Electronic and Electrical Engineering. Professional approaches to the presentation of technical information are introduced. By the end of the year students will be able to apply basic analytical and experimental methods to modest problems and will be able to communicate the results of short experiments and investigations in oral and written form.

Year 2 - New concepts are explained in practically useful contexts to help students develop the art of applying fundamental principles to real and complicated situations. Non-technical second year modules help students to begin to appreciate the professional and ethical responsibilities of an Engineer. The design project in the second year requires students to find things out for themselves and manage their time effectively. Both oral and written presentation skills are further developed and students have their first taste of presenting orally to an audience including external industrial engineers.

Year 3 - Students study a programme biased towards their chosen area of specialisation. The design project is done in the supervisor's laboratories and interacting with research workers develops further the student's approach to personal organisation, time management and problem solving. By the end of the year students will be able to plan and organise projects independently and will have the confidence to apply standard techniques to unfamiliar problems. Students will begin to realise that by creative and imaginative application of their knowledge they can make original contributions to unsolved problems.

On successful completion of the programme - Students will have obtained academic qualifications forming part of the educational requirement for becoming a Chartered Engineer (CEng). To complete the educational requirements for chartered status, they will need to complete a programme of approved further learning to bring them to Masters level and they must then gain appropriate experience working as a graduate engineer before fully satisfying CEng requirements. They will be well prepared for a career not only in the Engineering sector but also in a wide variety of other areas and may choose to embark on a programme of postgraduate academic or vocational study. Throughout their careers they will be able to assess their continuing professional development needs and take action to satisfy those needs.

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

Detailed information regarding admission to programmes is available from the University's On-Line Prospectus at http://www.shef.ac.uk/courses/.

Most students enter with A level qualifications in Mathematics, Physics and either a third A level or two AS levels. Students have also entered with BTEC, International Baccalaureate, Scottish Highers and other qualifications.

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 Strategic Plan
http://www.sheffield.ac.uk/strategicplan

Learning and Teaching Strategy (2016-21)
https://www.sheffield.ac.uk/polopoly_fs/1.661828!/file/FinalStrategy.pdf

23. Additional information

The programmes offered by the EEE department cover an unusually wide range of topics in their first two years. This differentiates our graduates from those of some other institutions because, whatever their specialisation, they will have a solid foundation across all areas of the subject. This makes our graduates effective in an interdisciplinary environment and makes it possible for them to work in areas different from their degree specialisation. This effectiveness is enhanced further by the Faculty skills weeks that are compulsory interdisciplinary activities for all first and second year students across the Faculty. The aim of these activities is to develop the transferable skills that are valued by employers.

The department has extensive semiconductor clean room facilities, a result of its research excellence in this area, and in both the first and second years of the course, students benefit from these facilities by fabricating simple semiconductor devices as part of the laboratory class schedule. The clean rooms are also used by students undertaking semiconductor device fabrication projects in the later stages of the degree. The Electrical Machines and Drives research group has extensive industrial contacts with automotive, aerospace and power control industries and the first and second year laboratory machine test beds, which use the latest machine and control technology, were donated by one of these contacts. State of the art facilities such as lamination cutting, magnetising rigs for creating unique permanent magnet geometries, computer controlled dynamometers and extensive magnetic circuit and power electronic computer modelling facilities are available to students who take on projects in this area. The Communications research group has wide contact with the aerospace and mobile communications industries and is equipped with state of the art network analysis and antenna test facilities, the latter including anechoic chambers. These facilities are used by second year design project and third year project students undertaking projects in the communications area.

Further information about this programme and the department can be found on-line at http://www.shef.ac.uk/eee

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.