Programme Specification

Electrical and Electronic Engineering {Foundation} [Frenchay]

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Contents

Section 1: Key Programme Details

Part A: Programme Information

Programme title: Electrical and Electronic Engineering {Foundation} [Frenchay]

Highest award: BEng (Hons) Electrical and Electronic Engineering

Interim award: BEng Electrical and Electronic Engineering

Interim award: DipHE Electrical and Electronic Engineering

Interim award: CertHE Electrical and Electronic Engineering

Awarding institution: UWE Bristol

Teaching institutions: UWE Bristol

Study abroad: No

Year abroad: No

Sandwich year: Yes

Credit recognition: No

School responsible for the programme: CATE School of Engineering, College of Arts, Technology and Environment

Professional, statutory or regulatory bodies:

Institution of Engineering and Technology (IET)

Modes of delivery: Full-time, Sandwich

Entry requirements:

For implementation from: 01 September 2025

Programme code: H60L13

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: The Foundation Year entry route provides the opportunity for students to enter the programme from an academic background that is different to that normally required for the study of engineering undergraduate programmes.

The curriculum is designed for students seeking an engineering education closely aligned to engineering practice. Technical knowledge, engineering practice, business awareness and sustainability are integrated through projects and revisited to produce confident graduates able to apply their skills to novel situations and create engineering solutions that benefit society.

Technical expertise and professional development is placed at the heart of the curriculum. From day one, students are taken on a technical and professional journey from student engineer to graduate engineer, preparing them for life as an engineering professional. Students will identify, develop and demonstrate competencies expected of a professional engineer in the workplace. Projects and activities, embedded throughout the curriculum, are designed to develop the engineering habits of mind such as: Problem-finding, Problem-solving, Visualising, Systems Thinking, Improving, and Adapting. Foundation principles of engineering science, skills and practice are integrated throughout all years of study.

The programme is designed to provide the balance of theoretical and practical understanding needed to meet the demands of the electrical and electronic engineering industry for engineering practitioners, and in particular to meet the requirements for professional accreditation in partial fulfilment of CEng. Furthermore, it caters for students with both industrial and/or academic backgrounds, to develop problem solving skills and be able to demonstrate leadership in a number of engineering settings.

The Electrical and Electronic Engineering programme produces graduates with a wide range of expertise relevant to the electrical and electronics industry in different regions. Electrical and Electronic engineers are employed throughout the engineering sector in the creation, maintenance and improvement of engineering

operations. Consequently, Electrical and Electronic engineering graduates need to be able to integrate engineering knowledge skills from across engineering and be able to be an effective member of a multidisciplinary team. The programme covers a broad range of disciplines such as digital and analogue circuit design, electro-mechanical energy conversion, embedded systems, power electronics, control, signal processing and project management. Two sets of optional technical modules provide a deeper level of learning into more advanced and state of the art technologies. As we move closer to a more digitally connected network of systems and devices, this programme allows students to develop expertise particularly in system design, microprocessor hardware/software design and simulation and modelling techniques.

The ability to work in multidisciplinary teams on projects that require a broader view of the role of engineering in industry and society is developed through the core programme using project weeks to bring students together in problem finding and solution spaces where students are able to interact with each other, academics and external practitioners in a range of engineering fields.

The integration of knowledge, skills and practice allows the tacking of real engineering challenges and encourage students to engage with the wider role that electronic engineers and specifically engineering habits of mind can play in tackling global challenges. This is a modern engineering curriculum designed to attract students from diverse backgrounds able to see the future role of engineering in industry and society.

Features of the programme: Immersive Project Weeks create student engineer community within curriculum and a collaboration-fostering building.

Integrated Learning Framework and use of problem-based learning with deep technical understanding.

Industry informed curriculum that provides depth and breadth across.

Technical and professional scaffolding of the journey from student engineer to

graduate engineer.

Professional and personal development embedded throughout all levels of the programme.

Interdisciplinary projects.

Real engineering problems in core curriculum where students can explore industrial, environmental and societal impact of discipline.

Educational Aims: To be able to work as a graduate electrical and electronics engineer across the engineering sector as an effective member of a multidisciplinary team.

To have acquired the knowledge and understanding of scientific principles and methods necessary to underpin an education in engineering.

To be able to apply their engineering knowledge to develop and maintain complex engineering products and explore the environmental impact of engineering.

To have demonstrated an ability to integrate knowledge and understanding of core subject material in order to solve a substantial range of engineering problems, including ones of a complex nature.

To understand the competencies and social responsibilities of a professional engineer and be able to critically appraise the value and effectiveness of future engineering innovations in the field.

To have the requisite academic knowledge, skills and preparation to study for higher degrees in appropriate engineering disciplines.

Programme Learning Outcomes:

On successful completion of this programme graduates will achieve the following learning outcomes.

Programme Learning Outcomes

PO1. Apply scientific and analytical methods to solve engineering problems involving design, evaluation and manufacture across electrical and electronic engineering applications.

PO2. Use systems that incorporate analogue and digital hardware, algorithms, interfacing circuits and communication, sensing and actuating devices.

PO3. Design, model and build electrical and electronic engineering systems and be able to specify and assess technical designs.

PO4. Use a systems approach to establish rigorous solutions that are fit for purpose and consider multiple aspects of a problem, such as production, operation, maintenance and disposal.

PO5. Demonstrate a critical awareness of manufacturing, financial and marketing implications of design proposals.

PO6. Pursue independent study, undertake enquiry into novel and unfamiliar concepts and implement change in an engineering environment.

PO7. Communicate and operate effectively, professionally and ethically as individuals and as members of a team.

PO8. Make considered judgements and decisions on complex engineering issues in which not all facts and consequences are accurately known.

Assessment strategy: The assessment strategy for the curriculum is designed to connect topics and levels within the curriculum and to enable students to reflect upon their development. The assessment methods on the programme are aligned to the requirements of the Institution of Engineering and Technology (IET) who place high importance on the demonstration of authentic and verifiable learning outcomes for each individual student. This consideration can lead to a reliance on written examinations and limit the scope for project or group work activities. We have therefore widened the range of activities within our examinations to include more open book examinations, questions based on pre-seen scenarios, questions that build on practical laboratory-based activities and computer-based examinations

where students demonstrate the use of software to solve engineering problems. In addition, distributed assessment is used in a number of modules in all three years, that give student rapid feedback about their submission.

The above Factors influence and inform the design of this programme's assessment strategy. At level 4, the Professional Skills for Engineers module develops professional attributes and engineering habits of mind through activities and assessments that encourage reflections through a structured portfolio and presentations. As part of the portfolio we have the concept of a "passport" where students demonstrate key professional skills such as workshop skills, library skills and health and safety awareness. This "replicates" part of the experience of an engineering apprentice but for one who is working in an academic environment.

The assessment strategies of the other core level 4 modules each designed to make sure that the content covered is connected. Applied Electronics is a strong example of the design as students are assessed on key technical material during or at the end of the first semester, then moving to multiple exercises where the knowledge and skill is assessed in the context of an engineering design problem. The written examination references and builds upon design activities undertaken during the module and provides an efficient vehicle for integrating the different module elements and assessing individual knowledge. The assessment strategy is programmatic and connects the two immersive project weeks with the task from the first feeding into the second where a more technical treatment is considered bringing the content from these two modules together.

The level 4 module Applied Electronics feeds into the immersive project week activity. The assessment at this level should create the culture required for students to embrace active learning styles.

At level 5, Embedded Systems provides an example of how content and assessment is developed from level 4 to level 5.

The module Project Management for Engineers takes over from the level 4 Professional Skills for Engineers module and relies on the importance and creation

of the team with key roles allocated and the dynamics of the team monitored through a regular peer assessment process. The problem to be tackled and forms the vehicle for the assessment is designed to be motivational and accessible and is assessed through group presentation.

The level 6 module Power Electronics and Energy Systems is a good example how distributed assessment in Semester 1 provides student with rapid feedback about their understanding, while tutorial sessions with a laboratory examination at the end of Semester 2 ensure controlled conditions.

In the final years of the programmes students are able to work on individual and group projects to showcase their understanding and skill as engineering practitioners. The design of the Maths module at level 4 will strengthen the analytical skills needed for this module.

The two sets of optional technical modules provide the opportunity to pursue specialist areas and a variety of assessment approaches are used for these modules.

Assessment modes are scaffolded throughout the years, so that students at level 5 or 6 have already experienced the mode of assessment in earlier years.

Student support: Espresso Engineering and Espresso Maths drop-in support stations.

Personality and professional strengths finding activity at start of programme.

Mathematics diagnostic testing and follow-up interventions early in year 1.

Development of group work skills and attributes.

Academic mentors to provide continuity of support to SpLD students.

Academic personal tutors.

Video capture of course content delivery.

E-assessments for rapid feedback in multiple modules in all three years.

Students can explore industrial, environmental and societal impact of discipline.

Mathematics skills aligned taught in engineering context.

Part B: Programme Structure

Year 1

Full time and sandwich students must take 120 credits from the modules in Year 1.

Year 1 Compulsory Modules

Module Code	Module Title	Credit
UFMFEG-30-0	Engineering Experimentation 2024-25	30
UFMFHG-15-0	Foundation Group Project 2024-25	15
UFMFBG-30-0	Foundation Mathematics: Algebra and Calculus 2024-25	30
UFMFAG-30-0	Foundation Mechanics 2024-25	30
UFMFCG-15-0	Introduction to Mechatronics 2024-25	15

Year 2

Full time and sandwich students must take 120 credits from the modules in Year 2.

Year 2 Compulsory Modules (Full Time and Sandwich)

Full time and sandwich students must take 120 credits from Compulsory Modules (Full Time and Sandwich).

Module Code	Module Title	Credit

UFMEAS-15-1	Professional Skills for Engineers 2025-26	15
UFMEAV-30-1	Mathematics for Electrical Engineers 2025-26	30
UFMFHT-30-1	Applied Electronics 2025-26	30
UFMFJT-30-1	Principles of Electrical Engineering 2025-26	30
UFMFGT-15-1	Programming for Engineers 2025-26	15

Year 3
Full time and sandwich students must take 120 credits from the modules in Year 3.

Year 3 Compulsory Modules (Full Time and Sandwich)
Full time and sandwich students must take 120 credits from Compulsory Modules (Full Time and Sandwich).

Module Code	Module Title	Credit
UFMEB5-15-2	Project Management for Engineers 2026-27	15
UFMFQT-15-2	Digital System Design 2026-27	15
UFMFPT-15-2	Analogue Electronic Systems 2026-27	15
UFMEY1-30-2	Electrical Machines and Power Systems 2026-27	30
UFMF11-15-2	Embedded Systems 2026-27	15
UFMFMT-30-2	Signals and Systems 2026-27	30

Year 4
Full time students must take 120 credits from the modules in Year 4.
Sandwich students must take 15 credits from the modules in Year 4.

Year 4 Compulsory Modules (Full Time)
Full time students must take 90 credits from the modules in Compulsory Modules (Full Time).

Module Code	Module Title	Credit

UFMEB6-15-3	Engineering in Society 2027-28	15
UFMFW7-15-3	Control Systems Design 2027-28	15
UFMFX8-30-3	Engineering Project 2027-28	30
UFMFST-30-3	Power Electronics and Energy Systems 2027-28	30

Year 4 Optional Modules Set One (Full Time)
Full time students must take 15 credits from Optional Modules Set One (Full Time)

Module Code	Module Title	Credit
UFMEAW-15-3	Electromagnetic Fields and Waves 2027-28	15
UFMFH8-15-3	Digital Signal Processing 2027-28	15

Year 4 Optional Modules Set Two (Full Time)
Full time students must take 15 credits from Optional Modules Set Two (Full Time)

Module Code	Module Title	Credit
UFMFS7-15-3	Communications 2027-28	15
UFMFPR-15-3	Introduction to CMOS IC Design 2027-28	15

Year 4 Compulsory Modules (Sandwich)
Sandwich students must take 15 credits from the modules in Compulsory Modules (Sandwich).

Module Code	Module Title	Credit
UFMF89-15-3	Industrial Placement 2027-28	15

Year 5
Sandwich students must take 105 credits from the modules in Year 5.

Year 5 Compulsory Modules (Sandwich)
Sandwich students must take 75 credits from the modules in Compulsory Modules (Sandwich).

Module Code	Module Title	Credit
UFMFW7-15-3	Control Systems Design 2028-29	15
UFMFX8-30-3	Engineering Project 2028-29	30
UFMFST-30-3	Power Electronics and Energy Systems 2028-29	30

Year 5 Optional Modules Set One (Sandwich)
Sandwich students must take 15 credits from Optional Modules Set One (Sandwich).

Module Code	Module Title	Credit
UFMEAW-15-3	Electromagnetic Fields and Waves 2028-29	15
UFMFH8-15-3	Digital Signal Processing 2028-29	15

Year 5 Optional Modules Set Two (Sandwich)
Sandwich students must take 15 credits from Optional Modules Set Two (Sandwich).

Module Code	Module Title	Credit
UFMFS7-15-3	Communications 2028-29	15
UFMFPR-15-3	Introduction to CMOS IC Design 2028-29	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Designed in conjunction with key national and multi-national employers, the programme provides graduates with the mix of skills and capabilities required by UK business for the specification, design and delivery of electronic and embedded systems and solutions, including safety critical systems, as required by the aerospace, transport, medical, military and other industries.

Delivered in a way that develops technically competent individuals who think and communicate effectively and who can conduct inquiry, solve problems, undertake critical analysis and deliver effective electronic and embedded software systems solutions in a constantly changing business context. It provides a solid foundation for

lifelong learning, emphasising the development of knowledge, skills and professional values essential to the practice of systems development.

Part D: External Reference Points and Benchmarks

Description of how the following reference points and benchmarks have been used in the design of the programme:

QAA UK Quality Code for HE (October 2019)

Framework for higher education qualifications (FHEQ)

Subject benchmark statement for Higher Education qualifications in engineering (October 2019)

Strategy 2030

University policies

Staff research projects

IET requirements: AHEP4

Industrial Advisory Board

DA standard ST0151, Embedded Electronic Systems Design and Development Engineer.

DA standard ST0025, Manufacturing Engineer.

The learning outcomes required by the Engineering Council UK are mandatory for accredited engineering programmes. The specific outcomes are derived from the requirements for electronic engineering described in the IET Learning Outcomes Handbook for BEng programmes. There are constraints from IET that have been

taken into account, for example a suitable amount of an acceptable form of controlled assessment.

The modules have been designed to ensure adequate and appropriate coverage of these outcomes across the levels of study.

SEEC level descriptors have informed the design of the assessment of the learning outcomes.

University strategies and policies: This programme is a refreshed and updated version of a programme that has run for many years. It has a long tradition of accepting students from diverse backgrounds and a wide range of entry qualifications. It accommodates student entry on a part-time basis at several points within the programme as well as having a tradition of direct entry to year 2 for full-time overseas students. Modules within the programme are also delivered within partner institutions regionally and globally. Foundation degrees and higher apprenticeship schemes have been developed in conjunction with academic and industrial partners as feeders into this programme.

The curriculum has been designed to take the best practice from the previous structure along with an increase of technical content to better suit the different pathways our graduates take after graduation. This, with an increased laboratory coverage, will provide enhanced student experience.

Employer interaction and feedback: The Department works with a number of industrial partners through two consortia and an industrial liaison panel. Feedback from employers during visits to placement students has also has also helped inform this revised programme. The programme provides part-time options which ensure an ongoing interaction with regional employers. This specification provides a concise 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 he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and

assessment methods of individual modules can be found in module specifications, available on the University's website.

Part E: Regulations

B: Approved variant to University Academic Regulations and Procedures

The Institution for Engineering and Technology accreditation requirements:

All level 5 and 6 credits are considered when calculating the Degree classification.

The degree classification for the 360 credit honours degrees BEng (Hons) Electrical and Electronic Engineering, BEng (Hons) Electronic Engineering, BEng (Hons) Robotics and BEng (Hons) Electronics and Computer Engineering (or 480 credit honours degree with an integrated foundation year) is based upon all the marks achieved at level 5 and all the marks achieved at level 6. Marks achieved for level 6 credits are weighted three times the value of the marks for the level 5 credits (Paper AB16/05/07).

Condoned Credit

Approved to variant University Academic Regulations and Procedures.

The following variant regulation for compensation applies to students on this award which has been accredited by a PSRB that comes under the auspices of Engineering Council UK.

The variant applied to Level 4 September 2023 intake onwards (Note - Compensation applied to all levels not just new students).

- The permitted maximum compensated credit is 30 credits for a Bachelors or Integrated Masters degree and a maximum of 20 credits in a Masters degree.

- The awarding of compensated credit may be considered for an overall module mark in the range 30% to 39% for Levels 4-6 and 40%-49% for Level 7.

No excused credit.

It is the Award Board's responsibility to determine whether the student's attainment at FHEQ Level 3 is sufficient to progress to Level 4.