



Programme Specification

Electronic and Computer Engineering {Apprenticeship- GLOSCOLL} [Sep][FT][GlosColl][5yrs]

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Contents

Programme Specification	1
Section 1: Key Programme Details	2
Part A: Programme Information	2
Section 2: Programme Overview, Aims and Learning Outcomes	3
Part A: Programme Overview, Aims and Learning Outcomes	3
Part B: Programme Structure.....	6
Part C: Higher Education Achievement Record (HEAR) Synopsis	8
Part D: External Reference Points and Benchmarks	9
Part E: Regulations	10

Section 1: Key Programme Details

Part A: Programme Information

Programme title: Electronic and Computer Engineering {Apprenticeship-GLOSCOLL} [Sep][FT][GlosColl][5yrs]

Highest award: BEng (Hons) Electronic and Computer Engineering

Interim award: BEng Electronic and Computer Engineering

Interim award: DipHE Electronic and Computer Engineering

Interim award: CertHE Electronic and Computer Engineering

Awarding institution: UWE Bristol

Affiliated institutions: Gloucestershire College

Teaching institutions: Gloucestershire College, UWE Bristol

Study abroad: No

Year abroad: No

Sandwich year: No

Credit recognition: No

Department responsible for the programme: FET Dept of Engineering Design & Mathematics, Faculty of Environment & Technology

Contributing departments: Not applicable

Professional, statutory or regulatory bodies:

Institution of Engineering and Technology (IET)

Apprenticeship: ST0151

Mode of delivery: Full-time

Entry requirements: For the current entry requirements see the UWE public website

For implementation from: 01 September 2022

Programme code: H65K43-SEP-FT-GC-H650

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: 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.

Professional development is placed at the heart of the curriculum. From day one, students are taken on a 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 electronic and computer 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. This programme conforms to a level 6 Degree Apprenticeship Standard ST0151, developed in conjunction with the Employer Trailblazer Group.

The Electronic and Computer Engineering programme produces graduates with a

wide range of expertise relevant to the electronics and computer science industries. Electronic and computer engineers are employed throughout the engineering sector in the creation, maintenance and improvement of engineering operations. Consequently graduates in this field 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, software and programming, power electronics, systems engineering and project management. A number of optional modules provide a deeper level of learning into more advanced and state of the art technologies. As move closer to a more digitally connected network of systems and devices, this programme allows students to develop expertise particularly in embedded systems design and simulation and modeling 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 tackling of real engineering challenges and encourage students to engage with the wider role that electronic and computer 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.

Educational Aims: Support graduates to develop the necessary skills to be able to work as an effective member of a multidisciplinary team, as a graduate electronic and computer engineer across the engineering sector.

Support undergraduates in acquiring the knowledge and understanding of scientific principles and methods necessary to underpin an education in engineering.

Instill the requisite academic knowledge, skills and preparation for progression to

study for higher degrees in appropriate engineering disciplines.

The programme will provide insight into, and practical skills in, the creation and maintenance of complex engineering products and will explore the environmental impact of engineering.

Develop and demonstrate an ability to integrate their knowledge and understanding of core subject material in order to solve a substantial range of engineering problems, including ones of a complex nature either individually or as part of a team.

Develop and demonstrate an understanding of the competencies and social responsibilities required by a professional engineer in the workplace and society. Activities to scaffold this development are embedded throughout the core curriculum to develop the engineering habits of mind. As a consequence, students will be able to critically appraise the value and effectiveness of future engineering innovations in the field in terms of business improvement and environmental sustainability.

Programme Learning Outcomes:

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

Programme Learning Outcomes

- PO1. Apply scientific and mathematical principles necessary to underpin electrical and electronic engineering and mathematical methods, computational methods and tools and notation used in the evaluation, integration and analysis of electrical, electronic and computer engineering problems
- PO2. Use systems incorporating digital hardware, software, communication, processing algorithms, interfacing circuits and parameter sensing and actuating devices
- PO3. Plan, design, model and build electronic and computer engineering systems and be able to specify and assess technical designs
- PO4. Apply advanced problem-solving skills and technical knowledge, using a systems approach, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including 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 either as individuals or 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

Part B: Programme Structure

Year 1

Year 1 is delivered at Gloucestershire College.

Year 1 Compulsory Modules

The student must take 75 credits from the modules in Compulsory modules.

Module Code	Module Title	Credit
UFMFXT-15-1	Engineering Practice 1b 2022-23	15
UFMFFT-15-1	Mathematical Modelling for Electronics and Robotics 2022-23	15
UFMFJT-30-1	Principles of Electrical Engineering 2022-23	30
UFMFGT-15-1	Programming for Engineers 2022-23	15

Year 2

Year 2 is delivered at Gloucestershire College.

Year 2 Compulsory Modules

The student must take 90 credits from the modules in Compulsory modules.

Module Code	Module Title	Credit
UFMFHT-30-1	Applied Electronics 2023-24	30
UFMFSJ-15-1	Computing Practice 2023-24	15

UFMFXE-30-2	Embedded Systems Design 2023-24	30
UFMFQS-15-2	Engineering Practice 2 2023-24	15

Year 3

Year 3 is delivered at Gloucestershire College.

Year 3 Compulsory Module

The student must take 75 credits from the modules in Compulsory Module.

Module Code	Module Title	Credit
UFMFQT-15-2	Digital System Design 2024-25	15
UFMFRS-15-2	Engineering Research 2024-25	15
UFMFMT-30-2	Signals and Systems 2024-25	30
UFMF9W-15-2	Systems Engineering 2024-25	15

Year 4

Year 4 is delivered at Frenchay.

Year 4 Compulsory Modules

The student must take 60 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMFPQ-15-3	Embedded Systems Development 1 2024-25	15
UFMFV8-15-3	Group Design and Integration Project 2025-26	15
UFMFDE-15-3	Power Electronics 2025-26	15
UFMFNQ-15-3	Professionalism for Engineers 2025-26	15

Year 5

Year 5 is delivered at Frenchay.

Year 5 Compulsory Modules

The student must take 45 credits from the modules in Compulsory Modules.

Module Code	Module Title	Credit
UFMF7-15-3	Control Systems Design 2026-27	15
UFMF8-30-3	Engineering Project 2026-27	30

Year 5 Optional Modules

The student must take 15 credits from the modules in Optional Modules.

Module Code	Module Title	Credit
UFMFVT-15-3	Advanced Analogue Electronics 2026-27	15
UFMFJ4-15-3	Building and Porting Embedded Operating Systems 2026-27	15
UFMFS7-15-3	Communications 2026-27	15
UFMFH8-15-3	Digital Signal Processing 2026-27	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

Designed in conjunction with key national and multi-national employers, the Electronic and Computer Engineering programme provides graduates with the mix of skills and capabilities required by UK business for the specification, design and delivery of electronic, computing 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: AHEP3
- Industrial Advisory Board
- Level 6 Degree Apprenticeship standard ST0151

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 and computer engineering described in the The IET Learning Outcomes Handbook for BEng programmes. There are constraints from IET that have been taken into account, for example, that a minimum of 40% written examinations across the programme is considered an acceptable form of controlled assessment. Whilst this provides a constraint on the style of assessments, it does not inhibit the our integrated learning approach.

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 new curriculum has been designed to take the best practice from the previous structure along with the introduction of the integrated learning framework. This, when combined with the new laboratories, will provide enhanced student experience.

Employer interaction and feedback: The Department of Engineering Design & Mathematics works with a number of industrial partners through two consortia and a newly formed industrial liaison panel. Feedback from employers during visits to placement students 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

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) Electronic 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 condoned credit (E4) 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 2020 intake onwards.

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

The awarding of condoned credit may be considered for an overall module mark in the range 30% to 39%.

As a consequence Engineering Council UK regulations about the offer of excused credit for modules critical to the awarding of accreditation, excused credit will not be available on this award.