



Programme Specification

Digital Electronic Systems Engineering {Apprenticeship-UWE}
 [Jan][FT][Frenchay][2yrs]

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Section 1: Key Programme Details

Part A: Programme Information

Programme title: Digital Electronic Systems Engineering {Apprenticeship-UWE}
[Jan][FT][Frenchay][2yrs]

Highest award: MSc Digital Electronic Systems Engineering

Interim award: PGCert Digital Electronic Systems Engineering

Interim award: PGDip Digital Electronic Systems Engineering

Awarding institution: UWE Bristol

Affiliated institutions: Not applicable

Teaching institutions: 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: Not applicable

Apprenticeship: ST0119

Mode of delivery: Part-time

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

For implementation from: 01 January 2018

Programme code: H65C42-JAN-FT-FR-H65C42

Section 2: Programme Overview, Aims and Learning Outcomes

Part A: Programme Overview, Aims and Learning Outcomes

Overview: Apprenticeship Standard: The Electronic Systems Principal Engineer Masters Level Standard defines the mandatory qualification requirements which all apprentices must achieve in order to complete an apprenticeship.

Alongside the work-based professional behaviours and competencies, apprentices must achieve a MSc (180 credits at Level 7) which will be stipulated by the employer.

While there is an expectation that the modules studied as part of this knowledge qualification can be used towards an application for professional status awarded by an Engineering Council licensed Professional Engineering Institution, it is not a mandatory requirement that the programme of study is accredited. However an application will be made to gain accredited status for this programme at the earliest opportunity.

For full details how the MSc Digital Electronic Systems Engineering aligns to the Apprenticeship Standard please see Appendix 1 (in Documents).

Educational Aims: The aim of the Faculty's MSc programmes is to respond to the need for effective engineering practitioners by offering programmes that are an intellectually challenging mix of taught engineering science and experiential learning. The practitioner approach is intended to produce engineers with a strong orientation towards problem solving, underpinned by theoretical knowledge.

The educational aims of the programme are;

To provide an intellectual experience of advanced study, underpinned by staff expertise, research and experience;

To enable the student to further and deepen their knowledge, understanding and

analytical abilities in a stimulating and challenging academic environment;

To prepare the student for further professional development in their chosen field;

To develop the student's ability to conduct research in their chosen field;

To provide opportunities for advanced study to part-time students in employment.

The MSc Digital Electronic Systems Engineering has been designed to fulfill these needs and its prime goal is to produce effective highly skilled practitioners who will be able to lead technology based projects within an industrial environment. It aims to provide an educational framework by which graduates of electronic engineering, systems engineering or other appropriate sciences can develop, deepen or update their skills and knowledge, not only in industrially-relevant areas of embedded electronic systems, but also within a chosen research field. The programme promotes a strong underlying view that these technologies must be developed and applied in a systems environment.

After completion of this programme, students should be able to:

Understand advanced aspects of embedded systems such as safety critical systems, embedded systems design using HDLs.

Develop an understanding of practical problem solving in the field of embedded systems.

Develop research skills: specifically advanced analysis, collection and interpretation of data and production of a publishable standard of work.

Apply their learning in the workplace or to further education; acquire and apply a wide range of appropriate professional, presentational and inter-personal skills;

Pursue advanced level learning for career development primarily in embedded electronics.

Develop autonomy in the learning process and to become effective self-directed learners;

Achieve a high level of communication, presentation and defend of own work.

Programme Learning Outcomes:

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

Knowledge and Understanding

- A1. The scientific principles and methodology necessary to underpin electronic concepts and embedded system principles
- A2. The requirement for engineering activities to promote sustainable development
- A4. The critical features of embedded real time systems and the ability to use HDL techniques in conjunction with such systems
- A5. System on chip design methodologies (using HDLs) and their application to top down design of embedded systems
- A6. Systems approaches to engineering problems
- A7. The importance of professional development in the context of a rapidly changing environment

Intellectual Skills

- B1. Apply the engineering principles covered in the programme in a research or workplace environment
- B2. Apply a systems approach to engineering problems and demonstrate an ability to work with uncertainty within an engineering environment
- B3. Evaluate existing knowledge and to assess the opportunities for further improvement and development
- B4. Critically evaluate new developments in a variety of electronic related technologies and how these may be used in embedded applications

- B5. Ability both to apply appropriate analysis methods in engineering and to assess their limitations
- B6. Ability to work effectively with uncertain and incomplete information and quantify the effect of this on an engineering design
- B7. Demonstrate an awareness of personal competency needs and plan future career developments

Subject/Professional Practice Skills

- C2. Demonstrate the ability to develop an innovative design for a new system
- C3. Implement discipline specific design, test and measurement equipment
- C4. Communicate scientific and technical information using a variety formats and methods
- C5. Undertake practical testing of design ideas through laboratory work or simulation including technical analysis and critical evaluation of results
- C6. Work individually or in a group to solve discipline specific problems
- C7. Understand the different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader
- C8. Show awareness of relevant legal and ethical requirements relating to safety and the ability to evaluate risks
- C9. Demonstrate the application of engineering techniques within commercial constraints
- C10. Undertake planning and review of own development needs and identify CPD opportunities. Regularly reflect on own competence and behavioural development

Transferable Skills and other attributes

- D1. Communicate effectively, including, for instance, the results of technical investigation, to peers and/or to “problem owners”
- D2. Manage one’s own time; to meet deadlines; to work with others having gained insights into the problems of team-based system development
- D3. Use software in the context of problem-solving investigation and to interpret findings

- D4. Gain experience of, and develop skills in, learning independently of structured class work
- D5. Read and use literature sources appropriate to the discipline to support learning activities
- D6. Work as a member of a team; to be aware of the benefits and problems that teamwork can bring
- D7. Identify personal goals, plan and negotiate professional development opportunities

Part B: Programme Structure

Year 1

PGCert

60 credits must include 30 credits from:

UFMFNB-15-M

UFME7G-15-M

UFMF7D-15-M

Year 1 Compulsory Modules

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

Module Code	Module Title	Credit
UFMFNB-15-M	Foundations of Systems Engineering 2021-22	15
UFMFFQ-30-M	Masters Group Technical Project 2021-22	30
UFMF97-15-M	Professional Development Appraisal and Continuing Review 2021-22	15
UFMF7D-15-M	Safety Critical Embedded Systems 2021-22	15
UFME7G-15-M	System Design Using HDLs 2021-22	15

Year 2

PGDip

120 credits must include:

UFMFNB-15-M

UFME7G-15-M

UFMF7D-15-M

Year 2 Compulsory Modules

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

Module Code	Module Title	Credit
UFMFTF-60-M	Dissertation (Masters) 2022-23	60
UFMFUN-15-M	High Speed Electronic System Design 2022-23	15
UFMFRH-15-M	Platform and Major Systems 2022-23	15

Part C: Higher Education Achievement Record (HEAR) Synopsis

The programme has been developed with employers as part of a degree apprenticeship programme. Graduates from this programme will be high-level practitioners with a deep understanding of digital electronics and systems engineering as applied to the design of embedded electronic components within an industrial design and manufacturing context.

Students will develop the skills to identify their professional development needs as future managers and leaders in their field. One third of the study programme is devoted to an individual research project, allowing the qualification to contain a substantial bespoke element geared towards the individual student and employer interest.

Part D: External Reference Points and Benchmarks

QAA UK Quality Code for HE:

Framework for higher education qualifications (FHEQ)

Subject benchmark statements

Qualification characteristics for Foundation degrees and Master's degrees

Strategy 2030

University policies

Staff research projects

Any relevant PSRB requirements

Any occupational standards

QAA subject benchmark statements:

The programme has been developed in accordance with the:

QAA Subject Benchmark Statement for Engineering (Feb 2015)

QAA Characteristics Statement for Masters Degrees (Sep 2015)

Individual modules are derived from the requirements for electronic and digital engineering as described by the IET handbook of learning outcomes at M Level.

The programme has been developed with reference to the Engineering Council UK-Spec: <https://www.engc.org.uk/ukspec>

L7 Degree Apprenticeship Standard: ST0681 Electronic Systems Principal

University strategies and policies:

The programme aligns to all four themes of the strategy.

Outstanding Learning

Ready and Able Graduates

Strategic Partnerships

Research with Impact.

In line with the university teaching and learning policies, this programme takes a student-centred approach to learning by allowing students to take control of aspects of their learning and providing a learning environment that stimulates active engagement and participation. The programme seeks to create an environment that will stimulate students to take responsibility for aspects of their learning, while the module team facilitates this learning. This is achieved via a combination of peer-assisted learning project work and self-directed research.

Research and Industrial Experience:

The Faculty of Environment and Technology is research and consultancy active and consequently the programme development, formal teaching and project work is underpinned and informed by current work. Most of the staff contributing to the MSc programme are directly involved in research either at an individual level or as part of our research groups and centres of excellence. The interaction between research and teaching provides the students with a multidisciplinary environment that eases their transition to the next level either as potential researchers (e.g. PhD research programmes) or as practitioners ready to take their responsibilities as professional engineers in industry. Many of the academic staff teaching on this programme have relevant industrial experience in the embedded electronics sector.

Employer Interaction and Feedback:

The faculty has strong links with a large number of companies in the field of electronic systems. This consortium of companies feeds into our curriculum development through the EDM Industrial Advisory Board. The complexity of embedded systems has increased to a point where new undergraduate students are

lacking the skills for filling this gap. This programme has been developed with industrial advisors from GE-Aviation.

Part E: Regulations

Approved to University Regulations and Procedures.