SECTION 1: KEY PROGRAMME DETAILS

PART A: PROGRAMME INFORMATION	
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
Teaching Institution	UWE Bristol
Delivery Location	Frenchay Campus
Study Abroad / Exchange / Credit Recognition	Placement X Sandwich Year X Credit Recognition X Year Abroad X
Faculty Responsible For Programme	Faculty of Environment & Technology
Department Responsible For Programme	FET Dept of Engineering Design & Mathematics
Apprenticeships	ST0119
Mode of Delivery	Part-time

ENTRY REQUIREMENTS	UCAS Tariff Points: For the current entry requirements see the UWE public website.
For Implementation From	1 Jan 2018
ISIS Code/s	Programme Code H65C42-JAN-PT-FR-H65C42 Other codes: JACS Electronic engineering HECoS 100000: Undefined UCAS

	SLC

SECTION 2: PROGRAMME OVERVIEW, AIMS and LEARNING OUTCOMES

PART A: PROGRAMME OVERVIEW, AIMS and LEARNING OUTCOMES

1. (Programme) Overview (c. 400 words)

Apprenticeship Standard: The Systems Engineering 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 PG Diploma (120 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.

The standard does permit a full masters award (180 Level 7 credits) to be used as the knowledge qualification but only 120 Level 7 credits may be funded from the Apprenticeship Levy with the remaining 60 credits funded from an alternative source (e.g. the employer).

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

2. Educational Aims (c. 4-6 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

PART A: PROGRAMME OVERVIEW, AIMS and LEARNING OUTCOMES

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.

3. Programme and Stage Learning Outcomes (c. 6-8 outcomes)

Programme (Learning) Outcomes (POs)

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
A3	The design architecture of digital signal processing controllers (DSC) and their use in embedded real time control applications
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

PART A: PROGRAMME OVERVIEW, AIMS and LEARNING OUTCOMES

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

C1	Use microcontrollers, DSP and FPGA processors in embedded applications
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

1. Structure

Year 1
PGCert
60 credits must include 30 credits from:
UFMFTC-15-M
UFME7G-15-M
UFMF7D-15-M

Year 1 Compulsory Modules

Code	Module Title	Credit	Type
UFMFPH-15-M	Aircraft Systems Integration 2018-19	15	Compulsory
UFMFQH-15-M	Aircraft Systems Verification 2018-19	15	Compulsory
UFMFTC-15-M	Embedded Real Time Control Systems 2018-19	15	Compulsory
UFMF97-15-M	Professional Development Appraisal and Continuing Review 2018-19	15	Compulsory
UFMF7D-15-M	Safety Critical Embedded Systems 2018-19	15	Compulsory
UFME7G-15-M	System Design Using HDLs 2018-19	15	Compulsory

Year 2
PGDip
120 credits must include:
UFMFTC-15-M
UFME7G-15-M
UFMF7D-15-M

Year 2 Compulsory Modules

Code	Module Title	Credit	Type
UFMFTF-60-M	Dissertation (Masters) 2019-20	60	Compulsory

UFMFUN-15-M	High Speed Electronic System Design 2019-20	15	Compulsory
UFMFRH-15-M	Platform and Major Systems 2019-20	15	Compulsory

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 2020

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

PART D: EXTERNAL REFERENCE POINTS AND BENCHMARKS

Level 7 Degree Apprenticeship Standard : Systems Engineer Engineering Masters Level: https://www.gov.uk/government/publications/apprenticeship-standard-systems-engineering

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