

ACADEMIC SERVICES

PROGRAMME SPECIFICATION

Part 1: Basic Data		
<b>Awarding Institution</b>	University of the West of England	
<b>Teaching Institution</b>	University of the West of England	
<b>Delivery Location</b>	UWE Frenchay Campus	
<b>Faculty responsible for programme</b>	Faculty of Environment and Technology	
<b>Department responsible for programme</b>	Computer Science and Creative Technologies	
<b>Modular Scheme Title</b>		
<b>Professional Statutory or Regulatory Body Links</b>	British Computer Society	
<b>Highest Award Title</b>	MSc Software Engineering	
<b>Default Award Title</b>		
<b>Fall-back Award Title</b>		
<b>Interim Award Titles</b>	PG Dip Software Engineering PG Cert Software Engineering	
<b>UWE Progression Route</b>	N/A	
<b>Mode(s) of Delivery</b>	FT and PT	
<b>Codes</b>	<b>UCAS:</b>	<b>JACS:</b>
	<b>ISIS2:</b> G70012	<b>HESA:</b>
<b>Relevant QAA Subject Benchmark Statements</b>	Computing ...	
<b>CAP Approval Date</b>	June 2013; November 2015 v1.1	
<b>Valid from</b>	September 2013 v1; September 2016 v1.1	
<b>Valid until Date</b>	June 2019	
<b>Version</b>	1.1	

## Part 2: Educational Aims of the Programme

The general educational aims of the programme are in line with the faculty's taught postgraduate educational aim:

- to provide an intellectual experience of advanced study in software engineering, underpinned by staff expertise, research, and experience;
- to enable the student not only to further and deepen his/her knowledge in software engineering, but also his/her understanding and analytical abilities in a stimulating and challenging academic environment;
- to prepare the student for a further professional development in software engineering and related sub fields;
- to develop the student's ability to choose and conduct advanced research in particular areas of software engineering;
- to provide opportunities to engage in knowledge exchange between academia and industry; and
- to offer postgraduate opportunities for part-time students in employment.

Specifically and upon completion of this programme, students will:

- have developed advanced knowledge both in the engineering of software systems and aspects of the software development process;
- be able to apply software engineering principles in a professional manner;
- understand the problems and constraints that routinely confront software engineers and develop the underlying software engineering knowledge and cognitive skills to resolve them; and
- be able apply the research skills they have developed in Software Engineering to a particular area of interest in their chosen field of advancement in software engineering.

### Programme requirements for the purposes of the Higher Education Achievement Record (HEAR)

Not Applicable being an MSc programme

## Part 3: Learning Outcomes of the Programme

The award route provides opportunities for students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas:

### Part 3: Learning Outcomes of the Programme

	<i>Learning Outcomes:</i>	Module No: UFCFPI-15-M	Module No: UFCFSD-15-M	Module No: UFCFPD-15-M	Module No: UFCFRD-15-M	Module No: UFCFDD-15-M	Module No: UFCFED-30-M	Module No: UFCFCD-15-M	Module No: UFCFUD-60-M
	<b>A) Knowledge and understanding of:</b>								
	i. Providing an intellectual experience of advanced study in software engineering, underpinned by staff expertise, research, and experience.	X	X	X	X	X	X	X	X
	ii. Distinguishing software engineering from other disciplines and which thus allow it to be used as the basis for organised software development.	X	X				X	X	
	iii. Project planning, cost estimation, and control methods, and tooling.	X					X		X
	iv. The common activities associated with requirements elicitation, analysis, specification, validation, and management.		X				X		X
	v. The problems associated with development within a particular application domain.			X	X	X			
	vi. The nature of the research process.							X	X
	vii. How to carry out research in order to synthesise a computer-based system that meets end user requirements?		X			X			X
	<b>(B) Intellectual Skills</b>								
	i. To comprehend new concepts both for use during the programme and, later on, professionally.	X	X	X	X	X	X	X	X
	ii. Understand human roles and how various functions interact to successfully produce a software artifact.	X			X		X		
	iii. Recognize the role of the engineering approach in the production of a software artifact – in particular a software system.	X	X		X		X		
	iv. Formulate, analyse,								

### Part 3: Learning Outcomes of the Programme

	visualise, synthesize and communicate plans and designs to solve problems in software applications.			X		X	X		
v.	To explore, evaluate and use software development technologies.			X		X	X		X
vi.	Evaluate alternative approaches to problem solving within an application domain.		X	X		X			X
vii.	Critically analyse theoretical perspectives relevant to the research process.								X
viii.	Evaluate research methods, tools techniques, and the process of research.						X		X
<b>(C) Subject Professional/Practical Skills</b>									
i.	Apply SE concepts throughout the lifecycle of a non-trivial software project.	X			X		X		X
ii.	Use established methods to assess and manage project risks.	X					X		
iii.	Comprehend and apply requirements engineering methods to develop software requirements specifications for computer- based systems.		X				X		X
iv.	Apply in depth knowledge of object-oriented analysis, design and programming; component-based development, and software architectural modelling.			X		X			
v.	Apply Configuration and Quality Management principles and recognise the relationship between these two activities and the overall software development life cycle.				X		X		
vi.	Develop a research proposal in the subject area.								X
<b>(D) Transferable skills and other attributes</b>									
i.	Communication skills: to communicate principally in writing, including for instance, the results of						X	X	

### Part 3: Learning Outcomes of the Programme

	technical investigations, to peers and/or to “problem owners”.								
ii.	Self-management skills: to manage one’s own time; to meet deadlines; to work with others having gained insights into the problems of team-based systems development.	X	X	X		X	X	X	
iii.	IT Skills in Context (to use software in the context of problem-solving investigations, and to interpret findings).	X	X	X		X	X		
iv.	Problem formulation: To express problems in appropriate	X	X	X	X	X	X	X	X
v.	Progression to independent learning: To gain experience of, and to develop skills in, learning independently of structured class work. For example, to develop the ability to use on-line facilities to further self- study.	X	X	X	X	X	X	X	X
vi.	Comprehension of professional literature: to read and to use literature sources appropriate to the discipline to support learning activities.	X	X	X	X	X	X	X	X
vii.	Working with others: to be able to work as a member of a team; to be aware of the benefits and problems which teamwork can bring.						X		

### Part 4: Student Learning and Student Support

#### Teaching and learning strategies to enable learning outcomes to be achieved and demonstrated

The programme is designed with an emphasis on a combination of resource-based and problem-based learning. Thus throughout, the learner is directed to a variety of resources and is expected to undertake a series of activities in relation to them. In addition, the learner is also encouraged to undertake independent reading both to supplement and consolidate what is being taught/learned and to broaden individual knowledge and understanding of the subject. For the most part, access to resources will be provided on-line. However, for some individual modules, it will be necessary to purchase a course text. Details of such necessary directives are given in the individual module specifications.

To support the learning outcomes, all modules will provide on-line conferencing facilities within Blackboard. The conferences will provide learners with easy access to their fellow learners and

## Part 4: Student Learning and Student Support

provide a forum for the discussion of issues raised during the programme. Each forum will be monitored by the relevant module leader.

The award route provides opportunities for students to develop and demonstrate knowledge and understanding, intellectual skills, subject-specific skills and transferable skills as shown in the following pages.

Students will also have the opportunity to learn and exchange knowledge while attending to the research and development seminars offered by the Faculty's Software Engineering Research Group on monthly basis especially seminars delivered by external guest speakers from the industry and academia.

At UWE, Bristol there is a policy for a minimum average requirement of contact time over the course of the full postgraduate programme. This contact time encompasses a range of face to face activities as described below. In addition, a range of other learning activities will be embedded within the programme which, together with the contact time, will enable learning outcomes to be achieved and demonstrated.

On the MSc Software Engineering programme teaching is a mix of scheduled and independent learning.

**Scheduled learning** includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and attendance of research and development seminars; Scheduled sessions may vary slightly depending on the modules undertaken as part of the programme of study.

**Independent learning** includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. Scheduled sessions may vary slightly depending on the modules undertaken as part of the programme of study.

### Academic Support

A named module leader is responsible for each module on the programme and the module leader is responsible for providing academic support for his/her module. In addition, the programme is managed by a programme leader. The programme leader is also available to provide academic support across the modules.

### Pastoral Care

The faculty offers pastoral care through its Student Advisers, a team of staff who provide a comprehensive, 9 - 5 (UK time) support service. This service can be accessed by email or telephone. Where appropriate, support can also be given via an instant messaging service. All students on the programme are allocated to the same Adviser, who is trained to provide advice on matters commonly of concern, including regulatory and other matters. The Adviser will, when necessary, advise the student to seek advice to from other professional services including the university's Centre for Student Affairs or from members of academic staff.

### Progression to Independent Study

All of the modules on this programme require students to carry out independent study, such as research for projects and assignments. An extensive range of on-line journals and reference material is available to students of UWE. These materials are accessed through the University's library web- site.

#### **Part 4: Student Learning and Student Support**

The progression to independent study will also be assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources.

##### **Student Collaboration**

One of the great potential benefits of E-learning is the enhanced possibilities for collaborative work. In classroom-based programmes, it is comparatively rare for students to have legitimate access to the work of fellow students. In this programme, students may post some of their work on conferences and examine the work of others. Some of this work, including the review of the work of others, will contribute to the assessment. Conference contributions will also be used for discussion of key topics.

##### **Description of any Distinctive Features**

This programme is the only full masters degrees in Software Engineering to be offered in the South West of England, for example being unique in its offering compared to Bath and Bristol universities, and also comparable to programmes offered by York, UCL and Oxford. The programme has been designed with the vision for evolution as per emerging advanced software engineering paradigms, concepts and practices along with the annual review of the coverage of these aspects in association with the Faculty's Software Engineering Research Group. Once completed the programme, students will have the opportunity to evaluate embarking on further career paths in research/development or further advanced industrial posts. Furthermore, students will have the opportunity to advance their team working and software development skills while working as part of a team in group-based software development projects in addition to working independently to plan and manage a complex computing research project over an extended period of time, and complete it by a given deadline as part of their MSc dissertation by research and development. Finally, the programme makes extensive use of UWE's virtual learning environment (Blackboard) to provide an integrated entry point to the modules on offer. For ease of use, all modules on the programme are offered with almost a common look and feel. Technical support is well-established and the reliability of both hardware and software well-proven. All modules have their space on Blackboard. For each module, this space will include all the resources needed to complete the module. A separate on-line space is provided for information relating to the programme as a whole.

#### **Part 5: Assessment**

Delete one of the following statements as appropriate

A: Approved to [University Regulations and Procedures](#)

##### **Assessment Strategy**

Assessment strategy to enable the learning outcomes to be achieved and demonstrated is based on a variety of means including final written examinations, software development exercises, essay-type questions, group projects, and dissertation. In particular, the dissertation gets assessed using a presentation, research proposal, dissertation report and a software-intensive

## Part 5: Assessment

system.

### Assessment Map

The programme encompasses a range of **assessment methods** including essays, project, project reports, written examinations, research proposal, and dissertation. These are detailed in the following assessment map:

#### Assessment Map for MSc in Software Engineering

		Unseen Written Exam	Oral assessment and/or presentation	Written Assignment	Report / Project	Dissertation
Compulsory Modules Level M	UFCFPJ-15-M	A (100)				
	UFCFSD-15-M	A (50)		B (50)		
	UFCFPD-15-M	A (50)		B (50)		
	UFCFRD-15-M	A (100)				
	UFCFDD-15-M	A (70)	B (30)			
	UFCFED-30-M				A (100)	
	UFCFUD-60-M					A (100)
	UFCFCD-15-M			A (100)		
Optional Modules Level M						



## Part 6: Programme Structure

This structure diagram demonstrates the student journey from Entry through to Graduation for a typical **full time student**, including:  
 level and credit requirements  
 interim award requirements  
 module diet, including compulsory and optional modules.

ENTRY	Compulsory Modules	Optional Modules	Interim Awards
	UFCFPJ-15-M Project Management		<b>PG Cert Software Engineering</b> minimum 60 credits.
	UFCFSD-15-M Requirements Engineering		
	UFCFPD-15-M Object-Oriented Analysis, Design and Programming		<b>PG DIP Software Engineering</b> minimum 120 credits excluding the dissertation.
	UFCFRD-15-M Quality and Configuration Management		
	UFCFDD-15-M Enterprise and System Architecture Modelling and Development		<b>MSc Software Engineering</b> 180 credits
	UFCFED-30-M Group Software Development Project		
	UFCFCD-15-M Emerging Topics in Software Engineering		
	UFCFUD-60-M Dissertation by Research and Development		

## GRADUATION

### Part time:

The following structure diagram demonstrates the student journey from Entry through to Graduation for a typical **part time student**.

ENTRY	Compulsory Modules	Optional Modules	Interim Awards
1 <sup>st</sup> Year 1 <sup>st</sup>	UFCFPJ-15-M Project Management		<b>PG Cert Software Engineering</b>

Semester	UFCFPD-15-M Object-Oriented Analysis, Design and Programming		minimum 60 credits.
	UFCFCD-15-M Emerging Topics in Software Engineering		
1 <sup>st</sup> Year 2 <sup>nd</sup> Semester	UFCFDD-15-M Enterprise and System Architecture Modelling and Development		<b>PG DIP Software Engineering</b> minimum 120 credits excluding the dissertation.
2 <sup>nd</sup> Year 1 <sup>st</sup> Semester	UFCFRD-15-M Quality and Configuration Management		<b>MSc Software Engineering</b> 180 credits
	UFCFSD-15-M Requirements Engineering		
2 <sup>nd</sup> Year 2 <sup>nd</sup> Semester	UFCFED-30-M Group Software Development Project		
	UFCFUD-60-M Dissertation by Research and Development		

### Part 7: Entry Requirements

The university's requirements for entry to a postgraduate programme apply. An honours degree in Computer Science, Software Engineering or a closely related discipline, and/or extensive relevant professional experience is required. A copy of the Academic Regulations is available from the University web site.

### Part 8: Reference Points and Benchmarks

In designing this programme, the following external reference points and benchmarks have been used:

[QAA UK Quality Code for HE](#)

[The QAA Benchmark Statement for Master's in Computing](#)

[University strategies and policies](#)

**The QAA UK Quality Code for HE** describes the attributes and skills expected of

## Part 8: Reference Points and Benchmarks

Masters graduates. It is our view that the learning outcomes of this programme are fully consistent with the qualification descriptor in the Framework, and hence that graduates will be able to demonstrate that they meet the expectations of the Framework. For example, students will be introduced to contemporary research in Requirements Engineering and will be required to analyse and critique that work throughout their period of study; Students will develop “a comprehensive understanding of techniques applicable to their own research or advanced scholarship”, both through the study of the Research Methods part of the Dissertation module, though the development of their dissertation and elsewhere; students will “deal with complex issues both systematically and creatively, make sound judgments in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences” especially in the context of the group software development module. Thus, students will have the opportunity to shape their learning experience at an advanced level in software engineering with knowledge exchange taking place in, for example, the Emerging Topics in Software Engineering module. Coupled with the external review of the programme and key industrial participation in for example the delivery of Software Configuration and Quality Management standards, this provides a form of assurance to the maintenance of academic and industrial standards, and also enhancing the quality of the learning opportunities provided.

### The QAA Subject Benchmark Statement for Master’s in Computing:

This subject benchmark statement in:

[http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/QAA386\\_Computing.pdf](http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/QAA386_Computing.pdf)

defines the threshold standard of achievement at a master’s level in computing. In particular, the following list from Section 7.2 of the above guide defines the threshold level with *a brief indication of our attempt to meet this threshold explained in italics below for each item in this list:*

“7.2 All students graduating with a master's degree in computing are expected to be able to have demonstrated:

- “a systematic understanding of the knowledge of the domain of their programme of study, with depth being achieved in particular areas, including both foundations and issues at the forefront of the discipline and/or professional practice in the discipline; this should include an understanding of the role of these in contributing to the effective design, implementation and usability of relevant computer-based systems”

*This has been attended to through the design of the programme starting from the Life Cycle Models and Project Management module to the Requirements Engineering module (with aspects of non-functional requirements in relation to for example usability, interoperability, external standards, etc) to Enterprise and System Architectural Modelling and Development (with effective design) to the Group Software Development Project module (covering aspects of legal and professional practice) in relation to engineering software products.*

- “a comprehensive understanding, and a critical awareness of: the essential principles and practices of the domain of the programme of study as well as current research and/or advanced scholarship; current standards, processes, principles of quality and the most appropriate software technologies to support the specialism; the relevance of these to the

## Part 8: Reference Points and Benchmarks

discipline and/or professional practice in the discipline; and an ability to apply these”

*This critical aim is well addressed through the programme of study being very closely related to the software engineering life cycle with associated learning outcomes achieved as per related modules covering principals aspects and practices in the key stages of software development including current standards and practices, for example in quality and configuration management (in a dedicated module) and applying taught principles in the group software development project undertaken in the Group Software Development Project module.*

- “consistently produced work which applies to and is informed by research and/or practice at the forefront of the developments in the domain of the programme of study; this should demonstrate critical evaluation of aspects of the domain, including appropriate software support, the ability to recognise opportunities for software or hardware tool use as well as possible tool improvement, an understanding of the importance of usability and effectiveness in computer systems development, and generally the acquisition of well-developed concepts”

*This is to be attained through out the life cycle of the programme of study as per the research elements in particular areas of the modules being studied; however, this gets magnified and well attended to in the Dissertation by Research and Development module where students learn research methods, synthesise their research hypothesis and related questions, develop their research methodology, conduct research in the aspects of the problem domain of their thesis, software engineering methods, requirements models, design alternatives, software implementation technologies, etc.*

- “understanding of the professional, legal, social and ethical framework within which they would have to operate as professionals in their area of study; this includes being familiar with and being able to explain significant applications associated with their programme of study and being able to undertake continuing professional development as a self-directed lifelong learner across the elements of the discipline.”

*This outcome relates to key learning outcomes covering professional, legal, social, and ethical issues to do with the engineering of software development. In particular, such aspects are for example addressed with associated learning outcomes in the Requirements Engineering, Group Software Development Project, Dissertation by Research and Development modules.*

- “the ability to apply the principles and practices of the particular programme's domain in tackling a significant domain related activity; the solution should demonstrate a sound justification for the approach adopted as well as originality (including exploration and investigation) and a self-critical evaluation of effectiveness but also critical awareness of current problems and new insights, and a sense of vision about the direction of developments in aspects of the domain of the programme. “

*Immediately upon entry to this programme, students will be required to make use of knowledge and skills appropriate to an honours graduate in computing. They will be required to use skills of software development and design to analyse and extend problems presented in the first semester; they will use critical evaluation to discuss journal papers at an advanced level; they will use their understanding of key aspects of computing to extend their knowledge in new directions. Ultimately, they will also be required to demonstrate original thinking in the development of their level master's dissertation. In conclusion, this becomes well magnified and attained summatively in the “Dissertation by Research and Development” module having a set of well-associated and*

## Part 8: Reference Points and Benchmarks

*targeted learning outcomes that coincide well with the above benchmark.*

### **UWE's Learning Teaching & Assessment Strategy**

This initiative chimes well with UWE's stated [Learning Teaching, and Assessment Strategy](#) as articulated in Section A4.1 page 10 and in particular:

- “to be a learning-centred university in all that it does;
- to develop approaches to learning, teaching and assessment that are underpinned by shared values and ethical frameworks, sound health and safety practices and are informed by research and professional practice;
- to develop inclusive, flexible and accessible curricula, learning spaces and resources that enable personalised learning in campus, placement and work based settings;
- to provide diverse modes of assessment both for and of learning;
- to develop learners who know and value themselves as open-minded, reflective and inter-dependent learners, and participants, employees, self-employed professionals and entrepreneurs in global settings and as global citizens;
- to develop self critical learners who value others as collaborators in their learning and co-constructors of knowledge and its exchange.”

What methods have been used in the development of this programme to evaluate and improve the quality and standards of learning? This could include consideration of stakeholder feedback from, for example current students, graduates and employers.

Feedback from previous and current students was solicited through discussions with individual students on the programme and students reps. Graduates feedback was a key instrument in providing areas they wished to improve on, gaps in knowledge they thought were needed, enhancing the learners' opportunity and experience in particular modules or subject areas, etc. A very key and rewarding feedback was from employers and in particular feedback received in placement visits and employers' expectations of software engineers. One particular area that was well addressed by our colleagues from Airbus, which coincided with our vision in the same direction, for a key area to add, namely configuration and quality management. Also, an investigation was made in relation to what other key providers of master's education in software engineering such as UCL, Oxford and York provide. Furthermore, alignment with state of the art developments in software engineering research through the faculty's Software Engineering Research Group (SERG) led to the vision to equip students on the programme with key emerging developments in software engineering in a form of knowledge exchange medium using SERG's distinguished invited guest speakers within the context of the related module of study.

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](#).