



University of the
West of England

ACADEMIC SERVICES

PROGRAMME SPECIFICATION

Part 1: Basic Data	
Awarding Institution	University of the West of England
Teaching Institution	Global College of Engineering and Technology (GCET)
Delivery Location	GCET, Muscat Oman
Study abroad / Exchange / Credit recognition	
Faculty responsible for programme	Faculty Environment and Technology (FET)
Department responsible for programme	Computer Science and Creative Technology
Modular Scheme Title	UWE UG Modular Scheme
Professional Statutory or Regulatory Body Links	
Highest Award Title	BSc (Hons) Computer Security and Forensics
Default Award Title	
Fall-back Award Title	
Interim Award Titles	BSc Computer Security and Forensics DipHE Computer Security and Forensics CertHE Computer Security and Forensics
UWE Progression Route	
Mode(s) of Delivery	FT, PT
ISIS Codes	ISIS2: G4HC
Relevant QAA Subject Benchmark Statements	Computing (2016)
CAP Approval Date	
Valid from	November 2017
Valid until Date	
Version	2

Part 2: Educational Aims of the Programme

The general aims of the programme are:

- To prepare students for careers in computer security and computer crime-investigation (e.g. 'forensic technician')
- To develop problem-solving, communication and other transferable skills applicable to a variety of careers
- To prepare students for study for higher degrees in related subjects

The specific aims of the programme are:

- To develop knowledge of computer hardware and software systems
- To provide an understanding of applicable law, court procedure and the role of the expert witness
- To introduce a variety of approaches to both the analysis of the security requirements of computer systems and the investigation of computer crime

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

Graduates in the field of Computer Security and Computer Forensics would be expected to have an excellent understanding of the internal operation of computers and operating and file systems. They would be able to use appropriate tools to investigate computer-based activities, deploy tools and techniques to prevent security breaches and investigate the mis-use of computer systems and other devices. As much of this work is carried out either directly in support of legal processes an understanding of appropriate legal systems and law would be expected.

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:

(A) Knowledge and Understanding of:

On completion of the programme students will have developed an understanding of a complex body of knowledge, some of it at the current boundaries of the disciplines, in the areas of:

1. Computer systems and networks Trusted computing base, threats and security policy. Computer security mechanisms in networks and computers at various layers and levels. Security technology innovations.
2. Information, data and its representation and organisation in computer systems
3. National legal system and court procedure. Skills and responsibilities of a forensic computing practitioner and expert witness
4. Law pertaining to computer crime and digital evidence and its investigation and legal and commercial aspects of Computer Security and Forensics
5. Security management. Defining, modelling and describing the concepts of trust and security policy. Securing access to services and applications from various devices.
6. Tools and techniques for investigating computer crime such as data mining and profiling

Part 3: Learning Outcomes of the Programme

(B) Intellectual Skills

On completion of the programme students will be able to demonstrate skills in:

1. Critical Thinking
2. Analysis
3. Synthesis of different types of information
4. Evaluation
5. Problem Solving
6. Appreciate problem contexts
7. Balance conflicting objectives
8. Construction of logical arguments
9. Discussion and debate about technical subjects

(C) Subject/Professional/Practical Skills

On completion of the programme students will be able to:

1. Understand a variety of computer systems, configurations and networking topologies
2. Understand the professional and legal obligations of forensic computing investigations and communicate with legal personnel at an appropriate level
3. Assess a computer crime scene and formulate a strategy for securing the evidence, investigating it impartially, and produce a report in appropriate language
4. Describe the key security mechanisms used in access control, authentication, encryption and digital signatures and perform systems analysis in terms of computer security.
5. Use software libraries and toolkits to implement security aware applications conforming to appropriate designs
6. Employ a range of tools and notations to support the activities listed above.
7. Know the limits of their knowledge and how to extend those limits through self-managed learning

(D) Transferable skills and other attributes

On completion of the programme students will be able to demonstrate:

1. Communication skills: to communicate orally or in writing, including, for instance, the results of technical investigations, to peers and/or to "problem owners".
2. 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.
3. IT Skills in Context (to use software in the context of problem-solving investigations, and to interpret findings)
4. Problem formulation: To express problems in appropriate notations.
5. 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.
6. Comprehension of professional literature: to read and to use literature sources appropriate to the discipline to support learning activities.
7. 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.

Part 4: Student Learning and Student Support

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

The programme learning outcomes are delivered through an appropriate mix of lecture, tutorial and practical lab-based sessions supported by directed independent learning. Throughout the delivery, fundamental software engineering principles are explored and consolidated through practical lab-based learning. The development of design and modelling skills is embedded in a number of modules at each level. Group work activities and projects are used to add to the development of academic knowledge with the aim of producing well-rounded individuals who understand the demands of the professional environment they will enter as graduates. At appropriate stages of the programme industrial experts are brought in to lead sessions.

At GCET Muscat (Oman), there is a policy for a minimum average requirement of 18 hours/week contact time over the course of the full undergraduate 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.

In STEM subjects it is recognized that a higher contact time is desirable and so laboratory-based modules have an extra factor included in the time calculation which provides more hours. In addition the level 2 and 3 students have timetabled Peer-Assisted Learning hours, where trained level 3 and 4 students (as appropriate) work with groups.

On the BSc(Hons) Computer Security and Forensics programme teaching is also a mix of scheduled learning and independent learning.

Class Activities

The mode of delivery of a module is determined by its Module Leader, and typically involves a combination of one or more lectures, tutorials, 'lectorials', laboratory classes, group activities and individual project work.

Modules are predominantly delivered by means of large group lectures, supported by smaller 'lectorials': classes for groups of 20-30 students to allow a closer interaction and discourse with staff.

Academic Support

Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or during published "surgery" hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Pastoral Care

The College offers pastoral care through two routes:

- Academic Personal Tutors: All level 1 students are assigned a Personal Academic Tutor, who is an academic member of staff in their department. Students meet individually with their tutor at least twice a year and also participate in group sessions with the Personal Academic Tutor's tutor group (max size 15) during years 1 and 2. In year 3 project supervisors take on the role of Personal Academic Tutor.*
- Student Advisers, a team of administrative staff who provide comprehensive, full-time student support service on a drop-in basis or by appointment. Advisers are trained to provide advice on matters commonly of concern, including regulatory and other matters;*

Part 4: Student Learning and Student Support

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

Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study. Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable, and this is especially important because of the high content of practical work in the programme.

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.

Description of the teaching resources provided for students

The College offers a specialised computing facility alongside the general College provision. There is a general PC computing laboratory running Windows and two specialist computing labs. The specialist laboratories are equipped with the specific software for Computing students; including Software Design Tools development environment, mathematics and statistics packages to support the taught program. The specialist Computing laboratories are designed to target the discipline taught in that area.

The College provides a user support Helpdesk. The Helpdesk provides first line support to the users.

Description of any Distinctive Features

Professional Practice and Lab Facilities

Students can access a suite of newly purchased PCs (I7 and I5), modern software, free printing facilities and an IT help desk/line. The General IT lab is open from 8am till 9pm.

Besides the College's plan of extending its IT facilities as the number of students grows, it also has a policy of upgrading 25% of its IT facilities every year.

Technology Enhanced Learning

Staff members in the department are keen adopters of technology to support and enhance student learning. This includes:

- Computer based e-assessment implemented in a number of modules, so that students can take regular short tests with automated computer generated feedback.
- Recordings of some lectures (audio and video) which are made available after classes via the university's Virtual Learning Environment.

Mathematics Support

The Math Support Centre provides drop-in one-to-one tuition each day and a web-site that provides a portal to a variety of on-line resources in mathematics and statistics.

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

ENTRY		Compulsory Modules	Option modules	Awards: Interim Awards
	Part-time 0.1	<u>UFMFBG-30-0</u> Foundation Mathematics: Algebra and Calculus <u>UFCFGK-30-0</u> Professional and Academic Skills	None	Interim award: 120 credits at Level 0 Successful completion of all level 0 modules required to permit progression to level 1.
	Part-time 0.2	<u>UFCEXX-30-0</u> Program Design and Implementatio <u>UFMFEG-30-0</u> Engineering Experimentation	None	
	Part – time Level 1.1	<u>UFCFC3-30-1</u> Introduction to OO Systems Development <u>UFCFP4-30-1</u> Computer Crime and Digital Evidence	None	Interim award: Certificate of Higher Education Computer Security and Forensics Credit Requirements: 240 credits At least 100 credits at level 1 or above. 120 credits at level 0
	Part – time Level 1.2	<u>UFCF93-30-1</u> Computer and Network Systems <u>UFCFB3-30-1</u> Web Programming	None	
	Part – time Level 2.1	<u>UFCFW5-30-2</u> Mobile and Embedded Devices <u>UFCFJ6-30-2</u> Security and Forensic Tools	None	Interim award: DipHE Computer Security and Forensics Credit requirements: 360 credits At least 100 credits at level 2 or above. At least 120 credits at level 1 or above. 120 credits at level 0.
	Part - time Level 2.2	<u>UJUUKM-30-2</u> Law, Experts and Justice <u>UFCFLC-30-2</u> Secure Computer Networks	None	
	Part – time Level 3.1	<u>UFCFRB-15-3</u> Security Management in Practice <u>UFCFC5-15-3</u> Forensic Computing Practice <u>UFCF95-15-3</u> Entrepreneurial Skills	15 credits from: <u>UFCFM6-15-3</u> Requirements Engineering <u>UFCFU3-15-3</u> Advanced Databases <u>UFCFT4-15-3</u> Cryptography	Interim award: BSc (Hons) Computer Security and Forensics Credit requirements: 420 credits At least 60 credits at level 3 or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0
	Part – time Level 3.2	<u>UFCFR4-45-3</u> Computing Project	15 credits from: <u>UFCFVJ-15-3</u> Professional Development <u>UFCF7H-15-3</u> Mobile Applications <u>UFCFD5-15-3</u> Technical Writing and Editing	Highest Award BSc (Hons) Computer Security and Forensics Credit requirements: 480 credits At least 100 credits at level 3 or above. At least 100 credits at level 2 or above. At least 140 credits at level 1 or above. 120 credits at level 0.

GRADUATION

Part 6: Entry Requirements

Applicants holding the following qualifications are eligible to apply for entry to Level 0 of the programme:

- Thanawiya amma (General Secondary School Certificate) or the one year certificate with an overall mark of 70%, or above
- Thanawiya amma (General Secondary School Certificate) with an overall mark of 65% or above PLUS a mark of over 60% in each stage of the GCET Foundation Studies Programme

PLUS

- A minimum overall score of IELTS 5.5, or equivalent

Further details of entry requirements for applicants holding the IB Diploma or A Levels can be found at

<http://www1.uwe.ac.uk/whatcanistudy/applyingtouwe/undergraduateapplications/entryrequirements.aspx>

Applicants holding more advanced qualifications may be considered for entry to the programme with advanced standing on an individual basis.

Part 7: Reference Points and Benchmarks

Reference points/benchmarks (UWE)

This programme is consistent with the UWE 2020 strategy in that its focus on the practice of computer security and forensics aligns with our aim of producing practice-oriented graduates. The partnership with GCET helps to ensure that the programme has an inclusive and global reach. The programme adopts the general approach of the department of Computer Science and Creative Technologies in including input from industry in terms both of visiting speakers and placement and work experience opportunities.

The QAA Computing and Law benchmark statements

The QAA Subject Benchmark Statements for Computing and for Law were published in 2007, and are applicable to this programme.

The programme clearly falls into the cognate area described by the Computing benchmark. Due to the nature of Forensic Computing practice, much of the computing material is of a technical, low-level nature, with relatively little computing theory. Thus, in terms of the benchmark's high level characterisation of Computing, the emphasis of the programme is on software, communication and interaction and practice, developed within the context of the specialised requirements of the programme. From the body of knowledge the following are considered essential to a study of Forensic Computing: Data Mining (in the context of forensic investigations); Computer Based Systems; Computer Networks; Data Structures and Algorithms, with emphasis on data structures; Distributed Computer Systems; Operating

Part 7: Reference Points and Benchmarks

Systems; Programming Fundamentals; Security and Privacy; Web-based Computing. The Computing Benchmark Statement also contains (section 5) statements of the standards expected of graduates at both modal and threshold levels. The team is of the view that graduates of the proposed programme will be able to meet the required standards.

The Law benchmark has been considered during the design process at the 'Law as Subsidiary' level of performance, which focuses on the development of legal skills related to some specific area (in this case Forensic Computing). Though the Statement is targeted at programmes with at least 180 credits of legal subjects, its expectations also apply to programmes such as Forensic Computing, where the legal aspects make up a relatively small, but very important component. No attempt has been made to include all aspects of law or to provide the foundation for a legal career as such – instead the most important points of law and court procedure are covered. The aim of the design team has been to provide sufficient legal knowledge to be aware of the rules and legal system pertaining to Forensic Computing: as suggested in the Benchmark, the relevant law is treated mainly as data from which legal conclusions or opinions can be derived. It is expected that student will be able to assimilate legal information from a variety of sources and apply the knowledge acquired to computer crime investigation and security analysis.

LEARNING OUTCOMES	Compulsory Modules Level 1				Compulsory Modules Level 2				Compulsory Modules Level 3			
	UFCFC3-30-1	UFCF93-30-1	UFCFB3-30-1	UFCFP4-30-1	UFCFW5-30-2	UFCFJ6-30-2	UJUUKM-30-2	UFCFLC-30-2	UFCFR4-45-3	UFCFRB-15-3	UFCFC5-15-3	UFCF95-15-3
SECTION C: SUBJECT PROFESSIONAL PRACTICAL SKILLS												
Understand a variety of computer systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Understand professional and legal obligations			✓	✓		✓	✓	✓	✓	✓	✓	✓
Be able to assess a computer crime scene				✓		✓				✓	✓	
Describe key security mechanisms				✓	✓	✓		✓		✓		
Use software libraries and toolkits	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Employ a range of tools and notations	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Know the limits of their knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

LEARNING OUTCOMES	Compulsory Modules Level 1				Compulsory Modules Level 2				Compulsory Modules Level 3			
	UFCFC3-30-1	UFCF93-30-1	UFCFB3-30-1	UFCFP4-30-1	UFCFW5-30-2	UFCFJ6-30-2	UJUUKM-30-2	UFCFLC-30-2	UFCFR4-45-3	UFCFRB-15-3	UFCFC5-15-3	UFCF95-15-3
SECTION D: TRANSFERABLE SKILLS AND OTHER ATTRIBUTES												
Communication skills	✓		✓	✓		✓	✓		✓	✓	✓	✓
Self-management skills	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IT Skills in Context	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Problem formulation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Progression to independent learning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Comprehension of professional literature	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Working with others	✓		✓	✓		✓	✓			✓	✓	✓

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First CAP Approval Date	September 2016			
Revision CAP Approval Date <i>Update this row each time a change goes to CAP</i>	6 Nov 2017	Version	1	Link to APT (ID 4220)
			2	Link to RIA (ID 4533)
Next Periodic Curriculum Review due date	2023-24			
Date of last Periodic Curriculum Review				