MSc in Computing

Programme Specification

AOU / OU-UK

(Revised September 2015)

Arab Open University

Faculty of Computer Studies

MSc in Computing

F66

(Adapted from UK OU's F66 Programme)

Programme Specification

Outlines

Programme Specification

1. Overview/ factual information

Programme/awards title(s)	MSc in Computing (Software Development) MSc in Computing (Information Security and Forensics) Postgraduate Diploma in Computing (Exit award only)
Teaching Institution	The Arab Open University
Awarding Institution	The Arab Open University The Open University, UK
Date of latest OU validation	21 May 2015
Next revalidation	2020
Credit points for the award	180 points
Registration Code	F66
Programme start date	The MSc in Software Development Programme was started in September 2012 and has been updated as the MSc in Computing with 2 Pathways from October 2015.
Underpinning QAA subject benchmark(s)	Computing
Professional/statutory recognition	N/A
Duration of the programme for each mode of study (P/T, FT)	2 Years (F/T), 5 Years (P/T) and 5 Years (Maximum for both)
Dual accreditation (if applicable)	The Arab Open University The Open University, UK
Date of production/revision of this specification	Revised in September, 2015

2. Programme aims and objectives

2.1 Educational aims and objectives

The MSc in Computing is an intensive programme of study designed specifically for graduates of computing and related disciplines. The qualification enables you to develop your knowledge and skills in computing and to promote a professional attitude to the application of those skills.

The qualification will:

- Give you the knowledge and skills necessary to become an effective professional in the computing industry.

- Develop your abilities in the critical evaluation of the theories, practices and systems used in a range of areas of computing.

- Provide you with selected specialised areas of study so that you can experience and develop the frontiers of practice and research in focussed aspects of computing and its application.

- Encourage you, through the provision of appropriate educational activities, to develop study and transferable skills applicable to your employment and your continuing professional development.

- Enable you to develop a deeper understanding of a specialist area of computing [software development (SD) or information security and forensics (ISF)]

- Enable you to contribute to future developments in the field (software development or information security and forensics)

- provide the opportunity for you to develop and apply research skills, focused on a substantial practical project (in the selected specialist area of computing: SD or ISF) .

2.2 Relationship to other programmes and awards

To gain an MSc in Computing (Software Development) or (Information Security and Forensics), the student needs to complete 90 points of compulsory modules and 30 points of elective modules for a total of 120 points of study in Software Development or in Information Security and Forensics. The student is also required to carry out research and study in a specialist topic by taking the 60-point module Research Project and Dissertation (T802). The student will need to select a research proposal topic that is in the area of software development (or information security and forensics). The student may choose a topic from those offered by the University, or a topic of his own choice that is linked to one or more of the courses he has studied. The student must register for the Research Project and Dissertation module (T802) either for the module start date immediately following his completion of the pathway modules or for the following start date.

Students who do not successfully complete the Research Project and Dissertation module (T802) can obtain as an Exit Award, the Postgraduate Diploma in Computing (Software Development) or

(Information Security and Forensics), provided they have successfully completed the 120 points of pathway study (90 compulsory and 30 points of optional modules).

3. Programme outcomes

Intended learning outcomes are listed below.

3A. Knowledge and understanding	
Learning outcomes	**Learning and teaching strategy/ assessment methods**
On completion of this degree you will be able to demonstrate knowledge and understanding of: – a wide range of computing tools, techniques, development practices, and systems and their application to business, societal and personal requirements – the application of a combination of computing theory and practice, with the ability to use theoretical considerations and practical constraints to guide application – computer systems their development, specification and use, allowing their evaluation against a range of criteria – computing and related standards, codes of practice, quality and evaluation frameworks and their application. You will also have: – the conduct of research processes at MSc level, from problem definition through defining, planning and carrying out a research, to final academic writing, in your chosen specialist area. – Specialist knowledge in related areas can be gained from the available optional courses. Each option addresses the principles underpinning the particular topic area, relates these to practical applications and allows students the facility for applying the principles in the workplace	The student will acquire **knowledge and understanding** mainly from the course texts, 25% face-to-face tutorials with supporting material provided via reference texts, commercially available computing environments, specially developed computing environments, computer conferencing and web-based resources. Formal assessment of the taught courses is by way of continuous assessment in the form of the tutor-marked assignment (TMA), submitted at a fixed point in the course, and an examination for each course. Some courses use case study-based assignments where you will choose a project from your personal experience. Assessment of the final research project course is based on the production of a 10,000–15,000-word dissertation on a topic of the students choice in the area of Software Development (or information security and forensics depending on their selected pathway). Support and advice is given at all stages of the dissertation course by University staff. **Support** We will support students learning with: – self-assessment questions and exercises, included in the teaching texts; – programming tasks, computer-based investigations and open-ended project work; – feedback and guidance from a tutor; tutorials, revision and 25% face-to-face tutorial sessions; – e-mail and computer conferences; – Study and project guides. **Assessment:** – TMAs – MTAs – Final Exam – Practical project

3B. Cognitive skills	
Learning outcomes	**Learning and teaching strategy/ assessment methods**

On completion of this degree, you will be able to:
 	
– integrate knowledge and skills from various sources into a coherent whole, making appropriate abstractions
– deal with complex issues both systematically and creatively, using appropriate tools and techniques, notations and formalisms
– pursue an original, independent, practical project involving an appropriate balance of research, development, evaluation and review and to communicate effectively the project aims, processes and outcomes.
 	
In addition, to the above mentioned, you will be able to:
 	
– analyse complex situations in order to select issues or problem situations suitable for research
– evaluate other research by comparing and contrasting findings in technical journals, proceedings and reports, in order to
   (a) establish the wider context of the issues or problems selected, and
   (b) derive research questions to be answered and/or hypotheses to be tested
 	
– select appropriate research methods and techniques to plan a programme of research
 	
– carry out a research programme involving the processes of observing, measuring and other forms of data collection as appropriate, making informed judgments in the absence of complete data
 	
– deal with complex issues both systematically and creatively taking account of legal and ethical issues
 	
– summarise and interpret observations and results, in order to produce information relevant to the research questions/hypotheses
 	
– synthesise arguments and draw conclusions from the information obtained
 	
– identify gaps in theory and specify further work to be carried out.
 	
– Critically evaluate and reflect upon own work.
	Cognitive skills are also assessed in the assignments and examinations of the various courses. Assignments are carefully designed; complex pieces of work that require the skills of analysis, evaluation and integration You will also be provided with practical activities to develop cognitive skills, using course software where appropriate. The Research project and dissertation (T802), mandatory for the award of MSc, provides an extended opportunity for you to further develop and be assessed on these skills.
	
	Assessment
	Cognitive abilities are assessed by a combination of traditional written examinations and continuous assessment, including Tutor marked Assignments, class tests, both individual and group project work and computer programming problems
	
	Support
	We will support students learning with:
	
	– self-assessment questions and exercises, included in the teaching texts;
	
	– programming tasks, computer-based investigations and open-ended project work;
	
	– feedback and guidance from a tutor; tutorials, revision and 25% face-to-face tutorial sessions;
	
	– e-mail and computer conferences;
	
	– Study and project guides.

3C. Practical and professional skills	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
On completion of this degree you will be able to: – recognise and respond to opportunities for innovation in computing – recognise social, legal and ethical responsibilities and their appropriate application – critically evaluate developments in computing including the identification of limitations and risks, legal issues, cultural and ethical impact and societal and business needs – identify needs, articulate goals, locate and employ resources and to follow action plans in support of independent learning and professional development. In addition you will be able to: – select appropriate texts, journals and reports, and assess applicability to a particular workplace scenario or area of academic or professional interest – evaluate the work of other researchers and appraise new developments in the area of interest – identify and define problems and issues in a professional context – select appropriate research methods – advocating the appropriate use of technologies and/or problem solving techniques – plan and schedule a research programme – carry out research without supervision – observe and assess results – draw conclusions – write detailed reports – operate within the legal and ethical constraints and procedures relevant to the area of research.	**Professional skills** are covered specifically in some courses, implicitly as part of the continuous assessment on each taught course and are studied and assessed specifically in the Research project and dissertation. All teaching and assessment strategies will help you develop knowledge and skills that are transferable to your workplace, and the programme encourages a problem-solving approach to professional tasks in the assignments, **Assessment** Practical abilities are assessed mostly by continuous assessment. Practical and Professional skills are assessed by a range of assessment methods such as: – practical tutor-marked assignments (TMAs); – Demonstration of practical implementation of project work – progress and project reports. – Oral presentation – formal examinations; – practical project **Support** We will support students learning with: – self-assessment questions and exercises, included in the teaching texts; – programming tasks, computer-based investigations and open-ended project work; – feedback and guidance from a tutor; tutorials, revision and 25% face-to-face tutorial sessions; – e-mail and computer conferences; – study and project guides.

3D. Key/transferable skills	
Learning outcomes:	**Learning and teaching strategy/ assessment methods**
On completion of this degree you will be able to: – communicate effectively with technical and non-technical audiences, using appropriate channels and media and where appropriate incorporating research and practice from the forefront of the computing discipline and professional practice – make and articulate decisions, including collating appropriate evidence and opinions, even in the presence of incomplete information – independently apply problem solving principles; using appropriate underpinning knowledge and skills – review, evaluate, reflect on and critique your own work and the work of others, engaging in peer review processes that lead to innovation and improvement. In addition, you will be able to – explore the demands of the work and formulate viable proposals for meeting those demands – plan to manage the work, and meet personal skill-development needs – advance own knowledge and understanding through independent learning – manage the work, adapting strategy to resolve a major complex problem and achieve the quality of outcomes required	**Key skills** (many of which you will already have gained in your workplace) can be further demonstrated and developed by this programme through the in-course assignments and the Research project and dissertation. **Assessment:** – TMAs – MTAs – Final Exam – Practical project

4. Programme Structure
4.1. Software development pathway

Programme Structure - LEVEL 1			
Compulsory modules	**Points**	**Elective modules**	**Credit points**
Students need to take <u>90 points</u> of compulsory courses: – Software Development (M813) (A & B) – Software Engineering (M814) (A & B) – Data Management (M816) (A& B)	30 30 30	AND <u>30 points</u> from the following: – Project Management (M815A&B) – Databases in Enterprise Systems (M888) – Artificial Intelligence Algorithms (M890) The core courses from the other pathway can be taken as electives in addition to the specified electives above.	30 15 15
You are also required to take the 60-point dissertation module – Research Project and Dissertation (T802) In order to gain the MSc in Computing (Software Development) your project topic will need to be in the area of software development.			60

4.2. Information security and forensics pathway

Programme Structure - LEVEL 1			
Compulsory modules	**Points**	**Optional modules**	**Credit points**
Students need to take <u>90 points</u> of compulsory courses: – Information Security (M811) (A & B) – Digital Forensics (M812) (A & B) – Network Security (T828) (A & B)	30 30 30	AND <u>30 points</u> from the following: – Project Management (M815A&B) – Databases in Enterprise Systems (M888) – Artificial Intelligence Algorithms (M890) The core courses from the other pathway can be taken as electives in addition to the specified electives above.	30 15 15
You are also required to take the 60-point dissertation module – Research Project and Dissertation (T802) In order to gain the MSc in Computing (Information Security and Forensics) your project topic will need to be in the area of information security and forensics.			60

Annex 1 - Curriculum map

The two tables below indicate which study units assume responsibility for delivering and assessing particular programme learning outcomes, for each of the two pathways of the programme.

Software Development pathway

Learning Outcomes	t= taught , d = developed, a = assessed						
	M816 A&B	M813 A&B	M814 A&B	T802	M815 A&B	M888	M890
Knowledge and Understanding							
a wide range of computing tools, techniques, development practices, and systems and their application to business, societal and personal requirements	t,d,a	t, d, a	t, d, a		t, d, a	t, d, a	
the application of a combination of computing theory and practice, with the ability to use theoretical considerations and practical constraints to guide application	t,d,a	t,d,a	t, d, a		t, d, a	t, d, a	t, d, a
computer systems, their development, specification and use, allowing their evaluation against a range of criteria	t,d, a	t,d,a	t, d, a			t, d, a	t, d, a
computing and related standards, codes of practice, quality and evaluation frameworks and their application.	t,d	t, d a	t, d, a		t, d, a		
the conduct of research processes at MSc level, from problem definition through defining, planning and carrying out a research, to final academic writing, in your chosen specialist area.				t,d,a			
Specialist knowledge in related areas can be gained from the available optional courses. Each option addresses the principles underpinning the particular topic area, relates these to practical applications and allows students the facility for applying the principles in the workplace					t, d, a	t, d, a	t, d, a

Learning Outcomes	M816 A&B	M813 A&B	M814 A&B	T802	M815 A&B	M888	M890
	t= taught , d = developed, a = assessed						
Cognitive Skills							
integrate knowledge and skills from various sources into a coherent whole, making appropriate abstractions	a	t, d, a	t, d, a	t, d ,a	t, d ,a		t, d ,a
deal with complex issues both systematically and creatively, using appropriate tools and techniques, notations and formalisms	d,a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a	t, d ,a
Pursue an original, independent, practical project involving an appropriate balance of research, development, evaluation and review and to communicate effectively the project aims, processes and outcomes.				t,d,a			t, d
analyse complex situations in order to select issues or problem situations suitable for research				t,d,a			
evaluate other research by comparing and contrasting findings in technical journals, proceedings and reports, in order to establish the wider context of the issues or problems selected, and derive research questions to be answered and/or hypotheses to be tested				t,d,a			
select appropriate research methods and techniques to plan a programme of research				t,d,a			
carry out a research programme involving the processes of observing, measuring and other forms of data collection as appropriate, making informed judgments in the absence of complete data				t,d,a			
deal with complex issues both systematically and creatively taking account of legal and ethical issues	d,a			t,d,a			
summarise and interpret observations and results, in order to produce information relevant to the research questions/hypotheses				t,d,a			
synthesise arguments and draw conclusions from the information obtained				t,d,a			
identify gaps in theory and specify further work to be carried out.				t,d,a			
Critically evaluate and reflect upon own work	t,d, a	t, d, a	t, d, a	t,d,a	t,d,a	t,d,a	t,d,a

Learning Outcomes	t= taught , d = developed, a = assessed						
	M816 A&B	M813 A&B	M814 A&B	T802	M815 A&B	M888	M890
Practical and/or professional skills and attributes							
Recognise and respond to opportunities for innovation in computing			t, d, a				
recognise social, legal and ethical responsibilities and their appropriate application	t, d				t, d, a		
critically evaluate developments in computing including the identification of limitations and risks, legal issues, cultural and ethical impact and societal and business needs	t, d, a	t, d, a	t, d, a		t, d		
identify needs, articulate goals, locate and employ resources and to follow action plans in support of independent learning and professional development.	t, d, a	t, d, a	t, d, a		t, d, a	t, d, a	t, d, a
select appropriate texts, journals and reports, and assess applicability to a particular workplace scenario or area of academic or professional interest	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a		
evaluate the work of other researchers and appraise new developments in the area of interest				t, d ,a			t, d ,a
identify and define problems and issues in a professional context	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a	t, d ,a	
select appropriate research methods				t, d ,a			
advocating the appropriate use of technologies and/or problem solving techniques	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a
plan and schedule a research programme				t, d ,a			
carry out research without supervision				t, d ,a			
observe and assess results	t, d, a			t, d ,a			
draw conclusions				t, d ,a			
write detailed reports				t, d ,a			
operate within the legal and ethical constraints and procedures relevant to the area of research.				t, d ,a			

Learning Outcomes	t= taught , d = developed, a = assessed						
	M816 A&B	M813 A&B	M814 A&B	T802	M815 A&B	M888	M890
Key skills							
communicate effectively with technical and non-technical audiences, using appropriate channels and media and where appropriate incorporating research and practice from the forefront of the computing discipline and professional practice	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
make and articulate decisions, including collating appropriate evidence and opinions, even in the presence of incomplete information	t, d,a	t, d, a	d, a	t, d, a	t, d, a	t, d, a	t, d, a
independently apply problem solving principles; using appropriate underpinning knowledge and skills	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
review, evaluate, reflect on and critique your own work and the work of others, engaging in peer review processes that lead to innovation and improvement.	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a		
explore the demands of the work and formulate viable proposals for meeting those demands				t, d, a	t, d, a		
plan to manage the work, and meet personal skill-development needs	d	d	d	t, d, a	d	d	d
advance own knowledge and understanding through independent learning	d	d	d	t, d, a	d	d	d
manage the work, adapting strategy to resolve a major complex problem and achieve the quality of outcomes required				t, d, a			

Information Security and Forensics Pathway

Learning Outcomes	t= taught , d = developed, a = assessed						
	T828 A&B	M811 A&B	M812 A&B	T802	M815 A&B	M888	M890
Knowledge and Understanding							
a wide range of computing tools, techniques, development practices, and systems and their application to business, societal and personal requirements	t,d,a	t, d, a	t, d, a		t, d, a	t, d, a	
the application of a combination of computing theory and practice, with the ability to use theoretical considerations and practical constraints to guide application	t,d,a	t,d,a	t, d, a		t, d, a	t, d, a	t, d, a
computer systems their development, specification and use, allowing their evaluation against a range of criteria	t,d, a	t,d,a	t, d, a			t, d, a	t, d, a
computing and related standards, codes of practice, quality and evaluation frameworks and their application.	t, d, a	t, d a	t, d, a		t, d, a		
the conduct of research processes at MSc level, from problem definition through defining, planning and carrying out a research, to final academic writing, in your chosen specialist area.				t,d,a			
Specialist knowledge in related areas can be gained from the available optional courses. Each option addresses the principles underpinning the particular topic area, relates these to practical applications and allows students the facility for applying the principles in the workplace					t, d, a	t, d, a	t, d, a

Learning Outcomes	t= taught , d = developed, a = assessed						
	T828 A&B	M811 A&B	M812 A&B	T802	M815 A&B	M888	M890
Cognitive Skills							
integrate knowledge and skills from various sources into a coherent whole, making appropriate abstractions	t, a	t, d, a	t, d, a	t, d ,a	t, d ,a		t, d ,a
deal with complex issues both systematically and creatively, using appropriate tools and techniques, notations and formalisms	t, d,a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a	t, d ,a
Pursue an original, independent, practical project involving an appropriate balance of research, development, evaluation and review and to communicate effectively the project aims, processes and outcomes.				t,d,a			t, d
analyse complex situations in order to select issues or problem situations suitable for research				t,d,a			
evaluate other research by comparing and contrasting findings in technical journals, proceedings and reports, in order to establish the wider context of the issues or problems selected, and derive research questions to be answered and/or hypotheses to be tested				t,d,a			
select appropriate research methods and techniques to plan a programme of research				t,d,a			
carry out a research programme involving the processes of observing, measuring and other forms of data collection as appropriate, making informed judgments in the absence of complete data				t,d,a			
deal with complex issues both systematically and creatively taking account of legal and ethical issues	t, d, a	t, d, a	t, d, a	t,d,a			
summarise and interpret observations and results, in order to produce information relevant to the research questions/hypotheses			t, d, a	t,d,a			
synthesise arguments and draw conclusions from the information obtained			t, d, a	t,d,a			
identify gaps in theory and specify further work to be carried out.				t,d,a			
Critically evaluate and reflect upon own work		t, d, a	t, d, a	t,d,a	t,d,a	t,d,a	t,d,a

	T828 A&B	M811 A&B	M812 A&B	T802	M815 A&B	M888	M890
	t= taught , d = developed, a = assessed						
Learning Outcomes	T828 A&B	M811 A&B	M812 A&B	T802	M815 A&B	M888	M890
Practical and/or professional skills and attributes							
Recognise and respond to opportunities for innovation in computing	t, d, a	t, d, a	t, d, a				
recognise social, legal and ethical responsibilities and their appropriate application			t, d, a		t, d, a		
critically evaluate developments in computing including the identification of limitations and risks, legal issues, cultural and ethical impact and societal and business needs		t, d, a	t, d, a		t, d		
identify needs, articulate goals, locate and employ resources and to follow action plans in support of independent learning and professional development.	t, d, a	t, d, a	t, d, a		t, d, a	t, d, a	t, d, a
select appropriate texts, journals and reports, and assess applicability to a particular workplace scenario or area of academic or professional interest	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a		
evaluate the work of other researchers and appraise new developments in the area of interest				t, d ,a			t, d ,a
identify and define problems and issues in a professional context	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a	t, d ,a	
select appropriate research methods				t, d ,a			
advocating the appropriate use of technologies and/or problem solving techniques	t, d, a	t, d, a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a
plan and schedule a research programme				t, d ,a			
carry out research without supervision				t, d ,a			
observe and assess results	t, d, a			t, d ,a			
draw conclusions				t, d ,a			
write detailed reports				t, d ,a			
operate within the legal and ethical constraints and procedures relevant to the area of research.				t, d ,a			

Learning Outcomes	t= taught , d = developed, a = assessed						
	T828 A&B	M811 A&B	M812 A&B	T802	M815 A&B	M888	M890
Key skills							
communicate effectively with technical and non-technical audiences, using appropriate channels and media and where appropriate incorporating research and practice from the forefront of the computing discipline and professional practice	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
make and articulate decisions, including collating appropriate evidence and opinions, even in the presence of incomplete information	t, d,a	t, d, a	d, a	t, d, a	t, d, a	t, d, a	t, d, a
independently apply problem solving principles; using appropriate underpinning knowledge and skills	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
review, evaluate, reflect on and critique your own work and the work of others, engaging in peer review processes that lead to innovation and improvement.	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a		
explore the demands of the work and formulate viable proposals for meeting those demands				t, d, a	t, d, a		
plan to manage the work, and meet personal skill-development needs	d	d	d	t, d, a	d	d	d
advance own knowledge and understanding through independent learning	d	d	d	t, d, a	d	d	d
manage the work, adapting strategy to resolve a major complex problem and achieve the quality of outcomes required				t, d, a			

Annex 2: Exit Awards (Postgraduate Diploma in Computing)

AOU awards a Postgraduate Diploma (E81) only as an exit award. This means that students register for a Postgraduate MSc in Computing (in Software Development or in Information Security and Forensics). If you fail to complete the research and dissertation module T802, you will be awarded a Postgraduate Diploma in Computing (in Software Development or in Information Security and Forensics).

For this 120-point postgraduate diploma you require:

Software development pathway

90 points from these compulsory courses:

- o Data Management (M816 A&B)

- o Software development (M813A&B)

- o Software engineering (M814A&B)

AND 30 points from the following:

- o Project management (M815A&B)

- o Databases in Enterprise Systems (M888)

- o Artificial Intelligence Algorithms (M890)

- o Any compulsory course in the other pathway

Information Security and Forensics pathway

90 points from these compulsory courses:

- o Information Security (M811A&B)

- o Digital Forensics (M812A&B)

- o Network Security (T828A&B)

AND 30 points from the following:

- o Project management (M815A&B)

- o Databases in Enterprise Systems (M888)

- o Artificial Intelligence Algorithms (M890)

- o Any other compulsory course in the other pathway

Learning Outcomes of the Postgraduate Diploma in Computing:

PG Diploma - Curriculum map

The two tables below indicate which study units assume responsibility for delivering and assessing particular programme learning outcomes, for each of the two pathways of the Post Graudate Diploma programme.

Software Development pathway

Learning Outcomes	t= taught , d = developed, a = assessed					
	M816 A&B	M813 A&B	M814 A&B	M815 A&B	M888	M890
Knowledge and Understanding						
a wide range of computing tools, techniques, development practices, and systems and their application to business, societal and personal requirements	t,d,a	t, d, a	t, d, a	t, d, a	t, d, a	
the application of a combination of computing theory and practice, with the ability to use theoretical considerations and practical constraints to guide application	t,d,a	t,d,a	t, d, a	t, d, a	t, d, a	t, d, a
computer systems, their development, specification and use, allowing their evaluation against a range of criteria	t,d, a	t,d,a	t, d, a		t, d, a	t, d, a
computing and related standards, codes of practice, quality and evaluation frameworks and their application.	t,d	t, d a	t, d, a	t, d, a		
Cognitive Skills						
integrate knowledge and skills from various sources into a coherent whole, making appropriate abstractions	a	t, d, a	t, d, a	t, d ,a		t, d ,a
deal with complex issues both systematically and creatively, using appropriate tools and techniques, notations and formalisms	d,a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a

Learning Outcomes	t= taught , d = developed, a = assessed					
	M816 A&B	M813 A&B	M814 A&B	M815 A&B	M888	M890
Practical and/or professional skills and attributes						
Recognise and respond to opportunities for innovation in computing			t, d, a			
recognise social, legal and ethical responsibilities and their appropriate application	t, d			t, d, a		
critically evaluate developments in computing including the identification of limitations and risks, legal issues, cultural and ethical impact and societal and business needs	t, d, a	t, d, a	t, d, a	t, d		
identify needs, articulate goals, locate and employ resources and to follow action plans in support of independent learning and professional development.	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
Key skills						
communicate effectively with technical and non-technical audiences, using appropriate channels and media and where appropriate incorporating research and practice from the forefront of the computing discipline and professional practice	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
make and articulate decisions, including collating appropriate evidence and opinions, even in the presence of incomplete information	t, d,a	t, d, a	d, a	t, d, a	t, d, a	t, d, a
independently apply problem solving principles; using appropriate underpinning knowledge and skills	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
review, evaluate, reflect on and critique your own work and the work of others, engaging in peer review processes that lead to innovation and improvement.	t, d, a	t, d, a	t, d, a	t, d, a		

Information Security and Forensics Pathway

Learning Outcomes	t= taught , d = developed, a = assessed					
	T828 A&B	M811 A&B	M812 A&B	M815 A&B	M888	M890
Knowledge and Understanding						
a wide range of computing tools, techniques, development practices, and systems and their application to business, societal and personal requirements	t,d,a	t, d, a	t, d, a	t, d, a	t, d, a	
the application of a combination of computing theory and practice, with the ability to use theoretical considerations and practical constraints to guide application	t,d,a	t,d,a	t, d, a	t, d, a	t, d, a	t, d, a
computer systems their development, specification and use, allowing their evaluation against a range of criteria	t,d, a	t,d,a	t, d, a		t, d, a	t, d, a
computing and related standards, codes of practice, quality and evaluation frameworks and their application.	t, d, a	t, d a	t, d, a	t, d, a		
Cognitive Skills						
integrate knowledge and skills from various sources into a coherent whole, making appropriate abstractions	t, a	t, d, a	t, d, a	t, d ,a		t, d ,a
deal with complex issues both systematically and creatively, using appropriate tools and techniques, notations and formalisms	t, d,a	t, d, a	t, d ,a	t, d ,a	t, d ,a	t, d ,a
Practical and/or professional skills and attributes						
Recognise and respond to opportunities for innovation in computing	t, d, a	t, d, a	t, d, a			
recognise social, legal and ethical responsibilities and their appropriate application			t, d, a	t, d, a		
critically evaluate developments in computing including the identification of limitations and risks, legal issues, cultural and ethical impact and societal and business needs		t, d, a	t, d, a	t, d		
identify needs, articulate goals, locate and employ resources and to follow action plans in support of independent learning and professional development.	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a

Learning Outcomes	t= taught , d = developed, a = assessed					
	T828 A&B	M811 A&B	M812 A&B	M815 A&B	M888	M890
Key skills						
communicate effectively with technical and non-technical audiences, using appropriate channels and media and where appropriate incorporating research and practice from the forefront of the computing discipline and professional practice	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
make and articulate decisions, including collating appropriate evidence and opinions, even in the presence of incomplete information	t, d,a	t, d, a	d, a	t, d, a	t, d, a	t, d, a
independently apply problem solving principles; using appropriate underpinning knowledge and skills	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a	t, d, a
review, evaluate, reflect on and critique your own work and the work of others, engaging in peer review processes that lead to innovation and improvement.	t, d, a	t, d, a	t, d, a	t, d, a		