OFFICE USE ONLY	
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PART TWO PROGRAMME SPECIFICATION

MSc Computer Science
MSc Computer Science with Big Data Analytics
MSc Computer Science with Cyber Security
MSc Computer Science with Networking
MSc Computer Science with Software Engineering

1	**Awarding body**
	Glyndŵr University
2	**Programme delivered by**
	Glyndŵr University
3	**Location of delivery**
	100% online (staff based at Plas Coch, Wrexham)
4	**Faculty/Department**
	Faculty of Arts, Science and Technology (FAST)
5	**Exit awards available**
	PGDiploma Computer Science PGDiploma Computer Science with Big Data Analytics PGDiploma Computer Science with Cyber Security PGDiploma Computer Science with Networking PGDiploma Computer Science with Software Engineering PGCert Computer Science
6	**Professional, Statutory or Regulatory Body (PSRB) accreditation**
	n/a
7	**Accreditation available**

n/a

8 **Please add details of any conditions that may affect accreditation (e.g. is it dependent on choices made by a student?)**

n/a

9 JACS3 / HECoS **codes**

MSc Computer Science
I000 / 100366

MSc Computer Science with Big Data Analytics
I490 / 100359

MSc Computer Science with Cyber Security
I190 / 100366

MSc Computer Science with Networking
I190 / 100366

MSc Computer Science with Software Engineering
I390 / 100374

10 UCAS **code**

n/a

11 **Relevant QAA subject benchmark statement/s**

https://www.qaa.ac.uk/quality-code/UK-Quality-Code-for-Higher-Education-2013-18
Masters Characteristics Statement published September 2015
Computing (2016)
Master's degrees in computing (2011)
Master's degree characteristics (2015)

12 **Other external and internal reference points used to inform the programme outcomes**

BCS, The Chartered Institute for IT

13 **Mode of study**

Online/distance learning part time

14 **Normal length of study** for each mode of study
Note that students are not eligible for funding for a postgraduate qualification if the duration of the part time route is more than double the duration of the full time route.

Minimum: 2 years part-time
Maximum: 4 years part-time

16 **Language of study**

English

17 Criteria for admission to the programme

Standard entry criteria

Entry requirements are in accordance with the current University regulations. Normally, a good first honours degree (2:2 or above) plus relevant English Language policy criteria. As conversion programmes, it is expected that students' prior study will have been in a variety of domains cognate with Computer Science.

Following the applicant's first initial interest they will be contacted by the Enrolment Advisor (EA), this will be through both email and telephone. The EA coaches the student to identify that a fully online distance programme is the suitable programme for them and establishes whether they have a profile which will be likely to succeed in applying for the programme. The EA then compiles a complete file on the applicant helping them to provide all necessary documentation, such as proof of identification, transcripts, certificates, IELTS certificates, etc. This file is then used to complete the enrolment process for the next available (or the applicants preferred) intake. Where applicants may be borderline, their file will be passed to the person(s) responsible for enrolment decisions within the Subject area. The EA supports the applicant and is available to deal with any queries up until the point when the applicant pays for their first module, at which point they are introduced to the Student Success Coordinator. (see student support section p. 47)

English language requirements:
Where an applicant's first language is not English or Welsh, evidence must be provided that they have attained the required standard in a recognised test of English Language ability. More details can be found on the University website under the programmes admissions requirements or please access our English Language requirements page: https://www.glyndwr.ac.uk/en/Internationalstudents/EntryandEnglishLanguageRequirements/

DBS Requirements

n/a

Non-standard entry criteria and programme specific requirements

n/a

18 Recognition of Prior (Experiential) Learning

Applicants may enter the programme at various levels with Recognition of Prior Learning (RPL) in accordance with the University General Regulations. See the programme specific restrictions outlined below.

Programme specific restrictions

Applicants may RPL a maximum of 60 credits onto the online programmes. RPL is not permitted in relation to the CONL701 Critical Research for Postgraduate Study, CONL717 Applied Research Methods or CONL718 Dissertation modules.

Candidates who are admitted to a Taught Master's scheme but do not progress to completion may qualify for either a Postgraduate Certificate, provided that they have attained a minimum of 60 credits of which none were RPL and that this constitutes a validated programme or for a Postgraduate Diploma, provided that they have attained 120 credits of which no more than 60 were RPL and that this constitutes a validated programme.

19 Aims of the programmes

These programmes aim to provide a platform for acquisition of higher-level skills and knowledge, increased employability, and professionalism. The intention of our master's level suite of programmes is to build upon the experiences and achievements of our students and take them to the next level of personal development.

The suite of programmes has overarching aims, which will provide students with:

- A suitable conversion to Computer Science from a related degree specialism;
- A deepened and specialist knowledge in a specific field of computing;
- Higher-level technical and professional skills;
- Awareness of emerging trends and technologies in their specialist field;
- The ability to critically appraise and disseminate research results;
- A sound basis for further research and/or professional development.

At programme specific level, the additional aims are:

MSc Computer Science

To provide an advanced level of technical skills in the areas of networking, web and software development.

MSc Computer Science with Big Data Analytics

To provide a deep knowledge of the techniques and unique issues surrounding the emerging use of data for analytics, decision making and monitoring within real world contexts.

MSc Computer Science with Cyber Security

To provide a deep and specialist set of knowledge and high-level practical abilities in the field of cyber security, incorporating techniques for the

development and analysis of secure systems and technology platforms.

MSc Computer Science with Networking

To provide a systematic understanding and critical awareness of network structure and data communications principles, current technologies, existing and emerging technological difficulties and new technological insights.

MSc Computer Science with Software Engineering

To develop a deep understanding of the specialist skills required to design, develop and maintain scalable, secure and appropriate software solutions within academic and industry environments.

20 Distinctive features of the programmes

The online MSc programmes are to be delivered fully online and have a modular delivery pattern, which includes modules at 15 credits each. The delivery pattern begins with a common first module, followed by the carousel model encompassing a framework of eight 15 credit modules depending on the programme, before moving on to the dissertation stage. This online learning programmes offer high levels of support and flexibility through a modular delivery pattern enabling students to work at a pace that suits their individual preferences.

The programmes develop the individual profile of the student and incorporate several instances where the student is able to analyse contemporary computing contexts to provide judgements and solutions that reflect best practice in technological development. This is augmented with a number of practical modules, where students gain hands-on experience and knowledge within appropriate domains.

All of the modules have been designed to draw upon academic guidelines and industry expectations to ensure that they meet current best practice and provide the necessary skills for future graduate employment. It is envisaged that upon completion of their programme of study, students will either gain commercial employment within a cognate role or continue to further MPhil/PhD study with a relevant academic domain.

The specific features of each programme are detailed below.

MSc Computer Science

The generic MSc Computer Science provides a grounding for students within computing domains. This builds students' knowledge based on prior study or relevant commercial experience, providing professional skills in software development, networking, databases and machine learning. This is augmented with a 45-credit research project, where students will work on a specialist topic with

relevant supervision. Problem solving and legal/ethical/professional issues are embedded throughout the modules.

MSc Computer Science with Big Data Analytics

The MSc Computer Science with Big Data Analytics focuses on the development of skills within the fields of machine learning, data analysis and the use of datasets for predictions and monitoring purposes. With the recent emergence of this domain, there is a requirement for graduates who are skilled in both the technical development and problem solving skills, as well as the relevant ethical, legal and professional issues.

MSc Computer Science with Cyber Security

The MSc Computer Science with Cyber Security is designed to build students' knowledge in the field of computer security, cyber security, network security, and related fields. This programme focuses upon several specialist disciplines, which are technical in nature, particularly around the areas of developing secure software platforms and protecting against complex attack processes used to breach system security and create deficits in normal functionality. The programme also integrates professional level skills that relate to the audit and management or institutional and organizational risk relating to cyber security and data protection regulations. This is achieved via a mixture of interactive theory work as well as deep technical and practical teaching and exercises.

MSc Computer Science with Networking

This programme focuses on practical networking and concepts in data communications. Although the necessary background is introduced as appropriate, the course on the whole deals with problem solving and the provisioning of real network services using current and emergent network hardware and protocols along with the development of applications to exploit these technologies. In addition to developing an understanding of underlying principles, students are engaged in the practical application of network design, implementation, trouble-shooting and management for real-world problems. The practicalities of network troubleshooting are embedded deeply. At all stages of the programme, appropriate reflection on their progress and development will be a requirement of progress. For their dissertations/theses, students will be expected to investigate cutting-edge technologies, implement and test novel networking solutions or develop or analyse original network applications.

MSc Computer Science with Software Engineering

The MSc in Computer Science with Software Engineering focuses on the practical science of computer programming with a commercial slant, the development of applications for up to date mobile devices as well as the concepts in data

communications. In addition, the programme seeks to develop advanced software development and programming skills and expertise, making graduates ready for challenging and high-paced software development employment. Although the necessary background is introduced as appropriate, the course deals with problem solving and the provisioning of real computer based services and applications using current and emerging technologies. In addition to developing an understanding of underlying principles, students are engaged in the practical application of programme design, modern web technologies, network design, implementation, trouble-shooting and management for real- world problems. The practicalities of troubleshooting applications are embedded deeply within the programme.

21 Programme structure narrative

All of the online MSc programmes follow a common structure with a variation in specialised modules.

All students will begin by completing the 15 credit CONL701 Critical Research for Postgraduate Study module that will prepare them for the rest of the programme. For the purposes of the academic regulations for online taught masters programmes, this will be deemed as the 15 credit *research methods* module and must be completed prior to progression to the dissertation stage.

This common first module will be followed by eight core 15 credit modules relevant to their specialism that will meet the learning outcomes for the specific programme. These modules will be delivered through a rolling carousel structure, with students completing the elements in any order following the order of delivery. Any individual module may have students enrolled from a number of cohorts with various start dates and programme specialisms.

Once the eight carousel modules have been completed, students will study their 45 credit dissertation stage. This is comprised of the 15 credit CONL717 Applied Research Methods module (the *lit review/dissertation proposal module* in the current academic regulations), followed by the 30 credit CONL718 Dissertation module. Students will be assigned a supervisor for this stage, who will provide one-to-one support and guidance relevant to the topic and field of study. Students will be required to have studied (though not necessarily passed at point of registration) all of the first 135 credits before registering for the dissertation stage. It is permitted for students to trail up to one carousel module, 15 credits, in accordance with the current academic regulations for online taught masters programmes.

PGCert Computer Science

Students who have completed 60 credits comprised of CONL701 Critical Research for Postgraduate Study and any three carousel modules and are unable to or choose not to continue on the programme will be entitled to the generic PGCert Computer Science exit award.

PGDiploma Computer Science (and specialisms)

Students who have completed 120 credits comprised of CONL701 Critical Research for Postgraduate Study and any seven of the eight carousel modules for their programme and are unable to or choose not to continue on the programme will be entitled to the relevant PGDiploma Computer Science exit award.

22 Programme structure diagrams

The following diagrams identify the module structure for each programme.

MSc Computer Science

First module	Module title	Critical Research for Postgraduate Study		
	Module code	CONL701		
	Credit value	15		
	Core/Option	Core		
	Mod leader	Julie Mayers		
Carousel	Module title	Virtual and Cloud Computing	Module title	Data Structures and Algorithms
	Module code	CONL715	Module code	CONL704
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Jessica Muirhead
	Module title	Systems Engineering	Module title	Database Systems
	Module code	CONL714	Module code	CONL705
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Denise Oram	Mod leader	Bindu Jose
	Module title	Software Development for the Web	Module title	Security and Risk Management in a Digital Environment
	Module code	CONL713	Module code	CONL721
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Jessica Muirhead	Mod leader	Denise Oram
	Module title	Networking Principles	Module title	Machine Learning
	Module code	CONL710	Module code	CONL708
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Bo Liu
Dissertation	Module title	Applied Research Methods	Module title	Dissertation
	Module code	CONL717	Module code	CONL718
	Credit value	15	Credit value	30
	Core/Option	Core	Core/Option	Core
	Mod leader	Julie Mayers	Mod leader	Denise Oram

MSc Computer Science with Big Data Analytics

First module	Module title	Critical Research for Postgraduate Study		
	Module code	CONL701		
	Credit value	15		
	Core/Option	Core		
	Mod leader	Julie Mayers		
Carousel	Module title	Virtual and Cloud Computing	Module title	Data Structures and Algorithms
	Module code	CONL715	Module code	CONL704
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Jessica Muirhead
	Module title	Systems Engineering	Module title	Database Systems
	Module code	CONL714	Module code	CONL705
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Denise Oram	Mod leader	Bindu Jose
	Module title	Big Data: Challenges and Opportunities	Module title	Security and Risk Management in a Digital Environment
	Module code	CONL722	Module code	CONL721
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Bindu Jose	Mod leader	Denise Oram
	Module title	Data Analysis and Visualisation	Module title	Machine Learning
	Module code	CONL703	Module code	CONL708
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Bindu Jose	Mod leader	Bo Liu
Dissertation	Module title	Applied Research Methods	Module title	Dissertation
	Module code	CONL717	Module code	CONL718
	Credit value	15	Credit value	30
	Core/Option	Core	Core/Option	Core
	Mod leader	Julie Mayers	Mod leader	Denise Oram

MSc Computer Science with Cyber Security

First module	Module title	Critical Research for Postgraduate Study		
	Module code	CONL701		
	Credit value	15		
	Core/Option	Core		
	Mod leader	Julie Mayers		
Carousel	Module title	Virtual and Cloud Computing	Module title	Data Structures and Algorithms
	Module code	CONL715	Module code	CONL704
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Jessica Muirhead
	Module title	Systems Engineering	Module title	Ethical Hacking
	Module code	CONL714	Module code	CONL707
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Denise Oram	Mod leader	Nigel Houlden
	Module title	Digital Forensics	Module title	Security and Risk Management in a Digital Environment
	Module code	CONL706	Module code	CONL721
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Denise Oram
	Module title	Secure Software Development	Module title	Machine Learning
	Module code	CONL711	Module code	CONL708
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Jessica Muirhead	Mod leader	Bo Liu
Dissertation	Module title	Applied Research Methods	Module title	Dissertation
	Module code	CONL717	Module code	CONL718
	Credit value	15	Credit value	30
	Core/Option	Core	Core/Option	Core
	Mod leader	Julie Mayers	Mod leader	Denise Oram

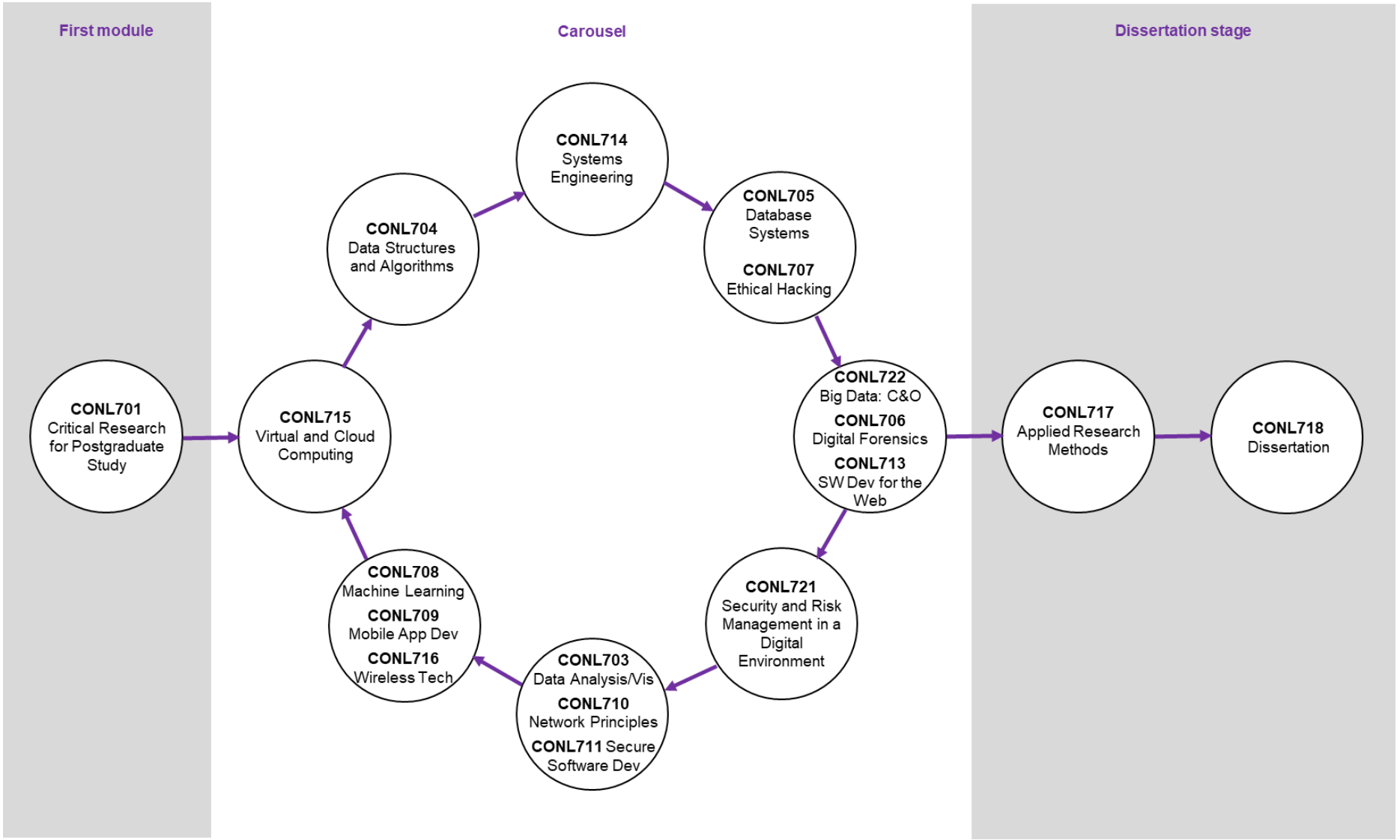
MSc Computer Science with Networking

First module	Module title	Critical Research for Postgraduate Study		
	Module code	CONL701		
	Credit value	15		
	Core/Option	Core		
	Mod leader	Julie Mayers		
Carousel	Module title	Virtual and Cloud Computing	Module title	Data Structures and Algorithms
	Module code	CONL715	Module code	CONL704
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Jessica Muirhead
	Module title	Systems Engineering	Module title	Ethical Hacking
	Module code	CONL714	Module code	CONL707
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Denise Oram	Mod leader	Nigel Houlden
	Module title	Software Development for the Web	Module title	Security and Risk Management in a Digital Environment
	Module code	CONL713	Module code	CONL721
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Jessica Muirhead	Mod leader	Denise Oram
	Module title	Networking Principles	Module title	Wireless Technologies
	Module code	CONL710	Module code	CONL716
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Nigel Houlden
Dissertation	Module title	Applied Research Methods	Module title	Dissertation
	Module code	CONL717	Module code	CONL718
	Credit value	15	Credit value	30
	Core/Option	Core	Core/Option	Core
	Mod leader	Julie Mayers	Mod leader	Denise Oram

MSc Computer Science with Software Engineering

First module	Module title	Critical Research for Postgraduate Study		
	Module code	CONL701		
	Credit value	15		
	Core/Option	Core		
	Mod leader	Julie Mayers		
Carousel	Module title	Virtual and Cloud Computing	Module title	Data Structures and Algorithms
	Module code	CONL715	Module code	CONL704
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Nigel Houlden	Mod leader	Jessica Muirhead
	Module title	Systems Engineering	Module title	Database Systems
	Module code	CONL714	Module code	CONL705
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Denise Oram	Mod leader	Bindu Jose
	Module title	Software Development for the Web	Module title	Security and Risk Management in a Digital Environment
	Module code	CONL713	Module code	CONL721
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Jessica Muirhead	Mod leader	Denise Oram
	Module title	Secure Software Development	Module title	Mobile App Development
	Module code	CONL711	Module code	CONL709
	Credit value	15	Credit value	15
	Core/Option	Core	Core/Option	Core
	Mod leader	Jessica Muirhead	Mod leader	Jessica Muirhead
Dissertation	Module title	Applied Research Methods	Module title	Dissertation
	Module code	CONL717	Module code	CONL718
	Credit value	15	Credit value	30
	Core/Option	Core	Core/Option	Core
	Mod leader	Julie Mayers	Mod leader	Denise Oram

Module delivery structure



Module summary

Module code	Module title	Module leader	# prog	CS	CS BDA	CS CS	CS N	CS SE
CONL701	Critical Research for Postgraduate Study	Julie Mayers	5	1	1	1	1	1
CONL722	*Big Data: Challenges and Opportunities*	Bindu Jose	1		C			
CONL703	*Data Analysis and Visualisation*	Bindu Jose	1		C			
CONL704	Data Structures and Algorithms	Jessica Muirhead	5	C	C	C	C	C
CONL705	Database Systems	Bindu Jose	3	C	C			C
CONL706	*Digital Forensics*	Nigel Houlden	1			C		
CONL707	Ethical Hacking	Nigel Houlden	2			C	C	
CONL708	Machine Learning	Bo Liu	3	C	C	C		
CONL709	*Mobile App Development*	Jessica Muirhead	1					C
CONL710	Networking Principles	Nigel Houlden	2	C			C	
CONL711	Secure Software Development	Jessica Muirhead	2			C		C
CONL721	Security and Risk Management in a Digital Environment	Denise Oram	5	C	C	C	C	C
CONL713	Software Development for the Web	Jessica Muirhead	3	C			C	C
CONL714	Systems Engineering	Denise Oram	5	C	C	C	C	C
CONL715	Virtual and Cloud Computing	Nigel Houlden	5	C	C	C	C	C
CONL716	*Wireless Technologies*	Nigel Houlden	1				C	
CONL717	Applied Research Methods	Julie Mayers	5	D	D	D	D	D
CONL718	Dissertation	Denise Oram	5	D	D	D	D	D

Key:

1 First module

C Carousel module

D Dissertation stage module

Modules with *name in italics* are unique to one programme.

23 Intended learning outcomes of the programmes

MSc Computer Science

Knowledge and understanding	
A1	Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios
A2	Give a critical account of current and emerging developments in computer science
A3	Evidence deep comprehension of specialist applications for computer science and recognise the boundaries of knowledge in this domain
A4	Appraise computer network configurations and evaluate their application scenarios
A5	Compare and contrast software development tools and techniques for a variety of practical situations
A6	Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the specific area in which the project is carried out
Intellectual skills	
B1	Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of computer science
B2	Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity
B3	Synthesise and predict the future development of current and emerging technologies in the field of computer science, being mindful of external factors
B4	Design and synthesise software and hardware systems in response to a range of technological and practical constraints
B5	Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of computer science
B6	Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge
Subject skills	
C1	Work with a range of computer hardware and networked devices to implement complete and functional systems or platforms
C2	Be effective in the acquisition and analysis of data, from a range of sources
C3	Make effective use of a range of theories and techniques applicable to computer science scenarios
C4	Assimilate and integrate emerging developments in computer science into their own work
C5	Undertake a significant computer science related thesis which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation
C6	Synthesise the knowledge, skills and theories from the computing areas covered by the programme in order to solve a complex problem that may require the integration of different computer science techniques and/or technologies
Practical, professional and employability skills	
D1	Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner
D2	Professionally and efficiently operate a range of IT software, specialist computing applications, and configure a range of hardware devices
D3	Effectively and proficiently work with stakeholders in designing IT and computer systems in response to their needs and demands
D4	Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information
D5	Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner
D6	Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value

MSc Computer Science with Big Data Analytics

Knowledge and understanding	
A1	Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios
A2	Give a critical account of current and emerging developments in computer science
A3	Evidence deep comprehension of specialist applications for computer science and recognise the boundaries of knowledge in this domain
A4	Evaluate the use of big data within computing contexts to obtain and support new information.
A5	Compare and contrast software development tools and techniques for a variety of practical situations
A6	Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the specific area in which the project is carried out
Intellectual skills	
B1	Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of computer science
B2	Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity
B3	Synthesise and predict the future development of current and emerging technologies in the field of computer science, being mindful of external factors
B4	Design and synthesise software and machine learning in response to a range of technological and practical constraints
B5	Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of computer science
B6	Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge
Subject skills	
C1	Work with a range of online, software and database tools to implement complete and functional systems or platforms
C2	Be effective in the acquisition and analysis of data, from a range of sources
C3	Make effective use of a range of theories and techniques applicable to computer science scenarios
C4	Assimilate and integrate emerging developments in computer science into their own work
C5	Undertake a significant computer science related thesis which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation
C6	Synthesise the knowledge, skills and theories from the computing areas covered by the programme in order to solve a complex problem that may require the integration of different computer science techniques and/or technologies
Practical, professional and employability skills	
D1	Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner
D2	Professionally and efficiently operate a range of IT software, specialist computing applications, and data analysis tools
D3	Effectively and proficiently work with stakeholders in designing IT and computer systems in response to their needs and demands
D4	Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information
D5	Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner
D6	Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value

MSc Computer Science with Cyber Security

Knowledge and understanding	
A1	Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios
A2	Give a critical account of current and emerging developments in cyber security
A3	Evidence deep comprehension of specialist applications for cyber security and recognise the boundaries of knowledge in this domain
A4	Relate the theories and paradigms of security, risk and information management to the backdrop of a range of cyber attacks and penetration methods
A5	Compare and contrast development tools and techniques for producing secure software
A6	Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the specific area in which the project is carried out
Intellectual skills	
B1	Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of cyber security
B2	Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity
B3	Synthesise and predict the future development of current and emerging technologies in the field of cyber security, being mindful of external factors
B4	Formulate a range of strategies and advanced techniques for secure and auditable information and data storage in contemporary situations
B5	Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of cyber security
B6	Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge
Subject skills	
C1	Work with a range of computer hardware, software and network devices to implement complete, functional and secure systems or platforms
C2	Be effective in the acquisition and analysis of data, from a range of sources
C3	Make effective use of a range of theories and techniques applicable to cyber security scenarios
C4	Assimilate and integrate emerging developments in cyber security into their own work
C5	Undertake a significant cyber security related thesis which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation
C6	Synthesise the knowledge, skills and theories from the computer science areas covered by the programme in order to solve a complex problem that may require the integration of different cyber security techniques and/or technologies
Practical, professional and employability skills	
D1	Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner
D2	Professionally and efficiently operate a range of IT software, specialist computing applications, and configure a range of hardware devices
D3	Effectively and proficiently work with stakeholders in designing IT and computer systems in response to their needs and demands
D4	Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information
D5	Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner
D6	Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value

MSc Computer Science with Networking

Knowledge and understanding	
A1	Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios
A2	Give a critical account of current and emerging developments in computer networking
A3	Evidence deep comprehension of specialist applications for computer networking and recognise the boundaries of knowledge in this domain
A4	Appraise computer network configurations and evaluate their application scenarios
A5	Compare and contrast the theories and models of network protocols, algorithms and systems
A6	Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the specific area in which the project is carried out
Intellectual skills	
B1	Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of computer networking
B2	Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity
B3	Synthesise and predict the future development of current and emerging technologies in the field of computer networking, being mindful of external factors
B4	Design and synthesise software and hardware systems in response to a range of technological and practical constraints
B5	Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of computer networking
B6	Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge
Subject skills	
C1	Work with a range of computer network devices to implement complete and functional systems or platforms
C2	Be effective in the acquisition and analysis of data, from a range of sources
C3	Make effective use of a range of theories and techniques applicable to computer networking scenarios
C4	Assimilate and integrate emerging developments in computer networking into their own work
C5	Undertake a significant computer networking related thesis which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation
C6	Synthesise the knowledge, skills and theories from the computing areas covered by the programme in order to solve a complex problem that may require the integration of different computer networking techniques and/or technologies
Practical, professional and employability skills	
D1	Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner
D2	Professionally and efficiently operate a range of IT software, specialist computing applications, and configure a range of hardware devices
D3	Effectively and proficiently work with stakeholders in designing computer networks in response to their needs and demands
D4	Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information
D5	Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner
D6	Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value

MSc Computer Science with Software Engineering

Knowledge and understanding	
A1	Make professional judgements in the selection of technologies or processes for complex and dynamic scenarios
A2	Give a critical account of current and emerging developments in computer science
A3	Evidence deep comprehension of specialist applications for software engineering and recognise the boundaries of knowledge in this domain
A4	Appraise software development processes and evaluate their applications within simulated environments
A5	Compare and contrast software development tools and techniques for a variety of practical situations
A6	Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their advanced independent-study dissertation/project, together with detailed knowledge of the specific area in which the project is carried out
Intellectual skills	
B1	Carry out confident and accurate selection and application of principles and procedures appropriate to the resolution of a range of situations and professional problems associated within the specialist area of computer science
B2	Identify and classify principles, ideas in contemporary information sources, and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity
B3	Synthesise and predict the future development of current and emerging technologies in the field of computer science, being mindful of external factors
B4	Design and synthesise software systems in response to a range of technological and practical constraints
B5	Utilise complex, often contradictory, resources and demonstrate how to access these to obtain state-of-the-art knowledge of computer science
B6	Evaluate methods, and plan for, a complex, self-led, investigation in response to a recognised problem or gap in knowledge
Subject skills	
C1	Work with a range of computer software and distributed devices to implement complete and functional systems or platforms
C2	Be effective in the acquisition and analysis of data, from a range of sources
C3	Make effective use of a range of theories and techniques applicable to computer science scenarios
C4	Assimilate and integrate emerging developments in software engineering into their own work
C5	Undertake a significant software engineering related thesis which involves an analytical, rigorous and critical approach to problem identification, solution and evaluation
C6	Synthesise the knowledge, skills and theories from the computing areas covered by the programme in order to solve a complex problem that may require the integration of different computer science techniques and/or technologies
Practical, professional and employability skills	
D1	Display a mastery of working with a range of information sources and be able to objectively arrange these in a holistic manner
D2	Professionally and efficiently operate a range of IT software, specialist software development applications, and configure a range of deployment platforms
D3	Effectively and proficiently work with stakeholders in designing software and systems in response to their needs and demands
D4	Make critical decisions regarding technology adoption and success, based upon technological, societal, ethical, and market information
D5	Conduct and control a piece of research or investigation and professionally present the outcomes in a succinct and reflexive manner
D6	Carry out a large-scale, independent project and provide detailed and reflective analysis of its efficacy and value

24 Curriculum matrices

To successfully complete the final MSc award, students must pass all modules in accordance with the academic regulations for online programmes.

A PGDiploma can only be awarded after the successful completion of CONL701 Critical Research for Postgraduate Study and any seven of the eight carousel modules for each programme.

A generic PGCert Computer Science can only be awarded after the successful completion of CONL701 Critical Research for Postgraduate Study and any three of the eight carousel modules.

MSc Computer Science

Module code / title	*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*
CONL701 Critical Research for Postgraduate Study	■	□	□	□	□	□	■	■	□	□	■	■	■	□	□	□	□	□	■	□	□	□	□	□
CONL715 Virtual and Cloud Computing	■	□	■	■	□	□	■	■	□	□	□	□	■	□	□	□	□	□	□	■	□	■	□	□
CONL704 Data Structures and Algorithms	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL714 Systems Engineering	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL705 Database Systems	■	□	□	□	□	□	■	■	□	■	□	□	□	■	■	□	□	□	□	■	□	□	□	□
CONL713 Software Development for the Web	■	□	□	□	■	□	■	□	□	■	□	□	□	□	■	□	□	□	□	■	□	□	□	□
CONL721 Security and Risk Management in a DE	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL710 Networking Principles	■	□	□	■	□	□	■	□	□	■	□	□	■	□	■	□	□	□	□	■	■	□	□	□
CONL708 Machine Learning	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL717 Applied Research Methods	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■
CONL718 Dissertation	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■

MSc Computer Science with Big Data Analytics

Module code / title	*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*
CONL701 Critical Research for Postgraduate Study	■	□	□	□	□	□	■	■	□	□	■	■	■	□	□	□	□	□	■	□	□	□	□	□
CONL715 Virtual and Cloud Computing	■	□	■	■	□	□	■	■	□	□	□	□	■	□	□	□	□	□	□	■	□	■	□	□
CONL704 Data Structures and Algorithms	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL714 Systems Engineering	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL705 Database Systems	■	□	□	□	□	□	■	■	□	■	□	□	□	■	■	□	□	□	□	■	□	□	□	□
CONL722 Big Data: Challenges and Opportunities	■	■	□	■	□	□	■	■	■	■	■	□	■	□	■	□	□	□	□	■	□	■	□	□
CONL721 Security and Risk Management in a Digital Env	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL703 Data Analysis and Visualisation	□	□	□	■	□	□	□	□	□	■	□	□	■	□	■	□	□	□	□	■	■	□	□	□
CONL708 Machine Learning	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL717 Applied Research Methods	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■
CONL718 Dissertation	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■

MSc Computer Science with Cyber Security

Module code / title	*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*
CONL701 Critical Research for Postgraduate Study	■	□	□	□	□	□	■	■	□	□	■	■	■	□	□	□	□	□	■	□	□	□	□	□
CONL715 Virtual and Cloud Computing	■	□	■	■	□	□	■	■	□	□	□	□	■	□	□	□	□	□	□	■	□	■	□	□
CONL704 Data Structures and Algorithms	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL714 Systems Engineering	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL707 Ethical Hacking	■	□	□	□	■	□	■	■	□	■	■	□	■	■	■	□	□	□	□	■	□	□	□	□
CONL706 Digital Forensics	■	□	□	□	■	□	■	□	□	■	□	□	■	■	■	■	□	□	□	■	□	□	□	□
CONL721 Security and Risk Management in a Digital Env	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL711 Secure Software Development	■	□	□	■	■	□	■	□	□	■	■	□	■	□	■	□	□	□	□	■	■	□	□	□
CONL708 Machine Learning	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL717 Applied Research Methods	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■
CONL718 Dissertation	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■

MSc Computer Science with Networking

Module code / title	*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*
CONL701 Critical Research for Postgraduate Study	■	□	□	□	□	□	■	■	□	□	■	■	■	□	□	□	□	□	■	□	□	□	□	□
CONL715 Virtual and Cloud Computing	■	□	■	■	□	□	■	■	□	□	□	□	■	□	□	□	□	□	□	■	□	■	□	□
CONL704 Data Structures and Algorithms	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL714 Systems Engineering	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL707 Ethical Hacking	■	□	□	□	■	□	■	■	□	■	■	□	■	■	■	□	□	□	□	■	□	□	□	□
CONL713 Software Development for the Web	■	□	□	□	■	□	■	□	□	■	□	□	□	□	■	□	□	□	□	■	□	□	□	□
CONL721 Security and Risk Management in a Digital Env	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL710 Networking Principles	■	□	■	■	■	□	■	□	□	■	■	□	■	□	■	■	□	□	□	■	■	■	□	□
CONL716 Wireless Technologies	■	□	■	■	■	□	■	□	□	■	■	□	■	□	■	■	□	□	□	■	■	■	□	□
CONL717 Applied Research Methods	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■
CONL718 Dissertation	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■

MSc Computer Science with Software Engineering

Module code / title	*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*B1*	*B2*	*B3*	*B4*	*B5*	*B6*	*C1*	*C2*	*C3*	*C4*	*C5*	*C6*	*D1*	*D2*	*D3*	*D4*	*D5*	*D6*
CONL701 Critical Research for Postgraduate Study	■	□	□	□	□	□	■	■	□	□	■	■	■	□	□	□	□	□	■	□	□	□	□	□
CONL715 Virtual and Cloud Computing	■	□	■	■	□	□	■	■	□	□	□	□	■	□	□	□	□	□	□	■	□	■	□	□
CONL704 Data Structures and Algorithms	□	□	■	□	□	□	■	□	□	■	■	□	□	□	■	□	□	■	□	■	□	□	□	□
CONL714 Systems Engineering	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL705 Database Systems	■	□	□	□	□	□	■	■	□	■	□	□	□	■	■	□	□	□	□	■	□	□	□	□
CONL713 Software Development for the Web	■	□	□	□	■	□	■	□	□	■	□	□	□	□	■	□	□	□	□	■	□	□	□	□
CONL721 Security and Risk Management in a Digital Env	■	□	■	□	■	□	■	■	■	□	■	□	□	■	□	■	□	□	■	□	■	■	□	□
CONL711 Secure Software Development	■	□	□	■	■	□	■	□	□	■	■	□	■	□	■	□	□	□	□	■	■	□	□	□
CONL709 Mobile App Development	□	□	■	■	■	□	■	□	□	■	■	□	■	□	□	■	□	□	□	■	■	■	□	□
CONL717 Applied Research Methods	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■
CONL718 Dissertation	■	■	■	□	□	■	■	■	□	□	■	■	□	■	■	■	■	■	■	■	■	■	■	■

25 Learning and teaching strategy

As this programme is being delivered online via a VLE to students who will always be working at a distance, it is important to provide a learning experience that suits the students' study context. In addition, it will also have to be taken into consideration the fact that online distance learning (DL) students in part time study are typically professionals in full-time employment, who have busy work and home lives and hence are time-poor, tending to be strategic in approaching their studies. In view of these expectations, the learning and teaching approach has the following characteristics.

Each 15-credit module is composed of 7 study weeks, with a further week for completion of final assessment. Each week is treated as a distinct learning chunk, with separate content presentation and deadlines for the completion of learning activities. The structured integration of knowledge, presentation, content and practice activities is provided in order for the students to have the opportunity to investigate and apply the learning content as well as demonstrate their level of progress through the use of the VLE tools, such as discussion boards and quizzes. Sections of content, with associated activities, are used in order to make the modules accessible and digestible, and to enable the students to demonstrate their progress and acquisition of knowledge and skills. Similarly, this provides opportunities for the module leader and tutors to provide feedback, support and intervention where required.

Knowledge and understanding are developed through the use of a variety of content presentation methods, such as online videos, narrated presentation (mini-lectures), text content written by the module leader, hyperlinked web content, digital reading resources, and the students' own research and collaboration. The aim is to use a variety of these methods in order to assist the students to remain engaged.

Skills development is facilitated through the use of a variety of learning activities, presented through, and usually recorded in, the VLE. Online forums will be used for discursive and collaborative tasks and students will be asked to work together in whole-class or small group activities. Students will carry out research, reflect on their own professional practice, collaborate on the development of reports and presentations, and carry out practice activities appropriate to the module topic. The use of the online tools for the students to discuss or record their results allows for the module leader and online tutors to see the progress the students are making and to provide constructive feedback. Training in and support for the use of any required digital tools will be provided.

All of these activities will be planned so that they constructively align with the module and weekly learning outcomes, as well as the formative and summative assessment tasks, to ensure their efficacy in enabling the students to achieve the outcomes. This alignment and focus on active learning tasks will be initiated through the use of the ABC Learning Design process (developed by UCL and promoted by Jisc) at the kick-off of each module's development.

For these programmes, the student's own application of the learning and theories presented in the modules is crucial for their successful completion of the programme, and the collaborative tasks planned into the weekly structure provide plenty of opportunity for students to do so and compare their own professional context and experience to that of their classmates. This collaboration also provides an excellent opportunity for internationalisation of the teaching content, as it is anticipated that the programme will recruit globally.

Learning and teaching undergoes a change in style at the dissertation stage. Individual specialist supervision is provided to support the student through the individual chapters which make up the submission and work within the confines of the research design and question.

In accordance with sound educational research and current best practice, the programme will be delivered and assessed through a broad range of methods, reflecting the distinctive features of the programme, providing learning opportunities in a supportive environment to ensure knowledge transfer is affected.

Regular communication will be scheduled in the form of programme meetings to share best practice and engage in reflective practice from an individual perspective and contribute views.

26 Work based/placement learning statement

n/a

27 Welsh medium provision

The programmes will be delivered through the medium of English. Students are entitled to submit assessments in the medium of Welsh.

28 Assessment strategy

In light of the programme format mentioned against the Learning and Teaching Strategy in point 25, above (online DL delivery, time poor strategic learners) the goal is to make best use of assessment practices that similarly meet the needs of students in this context.

The nature of the assessment tasks will be derived through a process of constructively aligning these with the learning outcomes and learning activities for the module and will be designed to ensure coverage. Typical characteristics of the online DL delivery approach of this programme include the following.

When students are working at a distance, it is critical to ensure that they are demonstrating progress through the submission of work in the VLE. Also, for professional learners, smaller submissions are more achievable in the working

week. Therefore, we aim to use multiple points of assessment in each module unless the nature of the module topic dictates otherwise. For example, there may be 3 assessments with a 25/25/50 split and submission points throughout the learning period. A major final piece will often, though not always, be retained as the students have their final eighth week free from study for the completion of this assessment. These submissions may be discrete. However, it will be helpful to make the assessment components progressive or accumulative, where appropriate. Methods that will facilitate this include accumulative report writing or case studies, portfolios of work, or assessments that build directly on the previous submission and its feedback. However, this has the implication that grading and feedback on minor pieces will need to be turned around relatively quickly.

Assessment methods will be varied to include formats such as online quizzes, reports and essays, case studies, projects, portfolios of work, reflective statements and reflective portfolios, strategic plans, presentations (both written and recorded) and journals. There will be a mixture of individual and group-work activities.

Formative assessment tasks will be provided early in the modules to further allow students to demonstrate their progression and gain feedback on their work.

In addition, the assessment schedule of the programme considers the dual needs of assessment for learning and assessment of learning. The strategy is to provide a sequence and variety of assessment tasks to reflect the modular learning outcomes which contribute towards the achievement of the award. Assessments are written in a manner which incorporates subject specific theory and content together with consideration of professional practice and educational scholarship based on current scenarios, where applicable. Each assessment pack includes the standard Masters level marking criteria as a foundation for consistency and provides clarity with regard to the subsequent academic judgements.

The Assessment Strategy is based on commentary provided with the UK Quality Code for Higher education, that: Assessment and feedback practices are informed by reflection, consideration of professional practice, and subject specific and educational scholarship to develop assessment activities which are closely connected with real-world situations or tasks. Criteria for assessment marking are included with each assessment document to clearly articulate and promote consistency at each level and a shared understanding of the basis on which academic judgements are made.

Feedback provision will be in accordance with current policies and practices in place throughout Glyndŵr University to support ongoing progression and development, this will be in electronic format. Up to date details are provided in the annual Programme Handbook.

All assessments are subject to inclusion in current quality practices which include second marking of a satisfactory sample and external examiner scrutiny.

The following pages contain details of indicative assessment types, which will be a varied mix of assessment types. More specific detail can be found in the module specification, and of modules to be delivered on the carousel model.

MSc Computer Science

	Code	Module title	#	Weight	Type	Loading	Indicative submission date
First module	CONL701	Critical Research for Postgraduate Study	1	35%	Case Study	1,000 words	Week 5
			2	65%	Essay	2,000 words	Week 8
Carousel	CONL715	Virtual and Cloud Computing	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL704	Data Structures and Algorithms	1	70%	Portfolio	2,000 words (equiv)	Week 7
			2	30%	Practical	1,000 words (equiv)	Week 8
	CONL714	Systems Engineering	1	40%	Essay	1,250 words	Week 4
			2	40%	Essay	1,250 words	Week 7
			3	20%	Quiz	1 hour	Week 8
	CONL705	Database Systems	1	70%	Coursework	2,000 words (equiv)	Week 7
			2	30%	Coursework	1,000 words (equiv)	Week 8
	CONL713	Software Development for the Web	1	30%	Coursework	1,000 words	Week 5
			2	70%	Project	2,000 words (equiv)	Week 8
	CONL721	Security and Risk Management in a Digital Environment	1	40%	Report	1,200 words	Week 4
			2	60%	Essay	1,800 words	Week 8
	CONL710	Networking Principles	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL708	Machine Learning	1	25%	Coursework	1,000 words	Week 6
			2	75%	Project	2,000 words	Week 8
Dissertation stage	CONL717	Applied Research Methods	1	100%	Proposal	3,000 words	Week 8
	CONL718	Dissertation	1	100%	Dissertation	6,000 words	Week 16

MSc Computer Science with Big Data Analytics

	Code	Module title	#	Weight	Type	Loading	Indicative submission date
First module	CONL701	Critical Research for Postgraduate Study	1	35%	Case Study	1,000 words	Week 5
			2	65%	Essay	2,000 words	Week 8
Carousel	CONL715	Virtual and Cloud Computing	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL704	Data Structures and Algorithms	1	70%	Portfolio	2,000 words (equiv)	Week 7
			2	30%	Practical	1,000 words (equiv)	Week 8
	CONL714	Systems Engineering	1	40%	Essay	1,250 words	Week 4
			2	40%	Essay	1,250 words	Week 7
			3	20%	Quiz	1 hour	Week 8
	CONL705	Database Systems	1	70%	Coursework	2,000 words (equiv)	Week 7
			2	30%	Coursework	1,000 words (equiv)	Week 8
	CONL722	Big Data: Challenges and Opportunities	1	60%	Portfolio	1,800 words (equiv)	Week 7
			2	40%	Report	1,200 words	Week 8
	CONL721	Security and Risk Management in a Digital Environment	1	40%	Report	1,200 words	Week 4
			2	60%	Essay	1,800 words	Week 8
	CONL703	Data Analysis and Visualisation	1	100%	Portfolio	3,000 words (equiv)	Week 8
	CONL708	Machine Learning	1	25%	Coursework	1,000 words	Week 6
			2	75%	Project	2,000 words	Week 8
Dissertation stage	CONL717	Applied Research Methods	1	100%	Proposal	3,000 words	Week 8
	CONL718	Dissertation	1	100%	Dissertation	6,000 words	Week 16

MSc Computer Science with Cyber Security

	Code	Module title	#	Weight	Type	Loading	Indicative submission date
First module	CONL701	Critical Research for Postgraduate Study	1	35%	Case Study	1,000 words	Week 5
			2	66%	Essay	2,000 words	Week 8
Carousel	CONL715	Virtual and Cloud Computing	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL704	Data Structures and Algorithms	1	70%	Portfolio	2,000 words (equiv)	Week 7
			2	30%	Practical	1,000 words (equiv)	Week 8
	CONL714	Systems Engineering	1	40%	Essay	1,250 words	Week 4
			2	40%	Essay	1,250 words	Week 7
			3	20%	Quiz	1 hour	Week 8
	CONL707	Ethical Hacking	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL706	Digital Forensics	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL721	Security and Risk Management in a Digital Environment	1	40%	Report	1,200 words	Week 4
			2	60%	Essay	1,800 words	Week 8
	CONL713	Secure Software Development	1	60%	Portfolio	1,500 words	Week 6
			2	40%	Case Study	1,500 words	Week 8
	CONL708	Machine Learning	1	25%	Coursework	1,000 words	Week 6
			2	75%	Project	2,000 words	Week 8
Dissertation stage	CONL717	Applied Research Methods	1	100%	Proposal	3,000 words	Week 8
	CONL718	Dissertation	1	100%	Dissertation	6,000 words	Week 16

MSc Computer Science with Networking

	Code	Module title	#	Weight	Type	Loading	Indicative submission date
First module	CONL701	Critical Research for Postgraduate Study	1	35%	Case Study	1,000 words	Week 5
			2	65%	Essay	2,000 words	Week 8
Carousel	CONL715	Virtual and Cloud Computing	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL704	Data Structures and Algorithms	1	70%	Portfolio	2,000 words (equiv)	Week 7
			2	30%	Practical	1,000 words (equiv)	Week 8
	CONL714	Systems Engineering	1	40%	Essay	1,250 words	Week 4
			2	40%	Essay	1,250 words	Week 7
			3	20%	Quiz	1 hour	Week 8
	CONL707	Ethical Hacking	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL713	Software Development for the Web	1	30%	Coursework	1,000 words	Week 5
			2	70%	Project	2,000 words (equiv)	Week 8
	CONL721	Security and Risk Management in a Digital Environment	1	40%	Report	1,200 words	Week 4
			2	60%	Essay	1,800 words	Week 8
	CONL710	Networking Principles	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL716	Wireless Technologies	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
Dissertation stage	CONL717	Applied Research Methods	1	100%	Proposal	3,000 words	Week 8
	CONL718	Dissertation	1	100%	Dissertation	6,000 words	Week 16

MSc Computer Science with Software Engineering

	Code	Module title	#	Weight	Type	Loading	Indicative submission date
First module	CONL701	Critical Research for Postgraduate Study	1	35%	Case Study	1,000 words	Week 5
			2	65%	Essay	2,000 words	Week 8
Carousel	CONL715	Virtual and Cloud Computing	1	25%	Coursework	750 words	Week 4
			2	25%	Coursework	750 words	Week 6
			3	50%	Report	1,500 words	Week 8
	CONL704	Data Structures and Algorithms	1	70%	Portfolio	2,000 words (equiv)	Week 7
			2	30%	Practical	1,000 words (equiv)	Week 8
	CONL714	Systems Engineering	1	40%	Essay	1,250 words	Week 4
			2	40%	Essay	1,250 words	Week 7
			3	20%	Quiz	1 hour	Week 8
	CONL705	Database Systems	1	70%	Coursework	2,000 words (equiv)	Week 7
			2	30%	Coursework	1,000 words (equiv)	Week 8
	CONL713	Software Development for the Web	1	30%	Coursework	1,000 words	Week 5
			2	70%	Project	2,000 words (equiv)	Week 8
	CONL721	Security and Risk Management in a Digital Environment	1	40%	Report	1,200 words	Week 4
			2	60%	Essay	1,800 words	Week 8
	CONL713	Secure Software Development	1	60%	Portfolio	1,500 words	Week 6
			2	40%	Case Study	1,500 words	Week 8
	CONL709	Mobile App Development	1	50%	Coursework	1,500 words	Week 4
			2	50%	Coursework	1,500 words (equiv)	Week 8
Dissertation stage	CONL717	Applied Research Methods	1	100%	Proposal	3,000 words	Week 8
	CONL718	Dissertation	1	100%	Dissertation	6,000 words	Week 16

29 Assessment regulations

These programmes will follow the Regulations for Taught Masters Degrees taught entirely by online distance learning.

Derogations

n/a

Non-credit bearing assessment

n/a

Borderline classifications (for undergraduate programmes only)

n/a

Restrictions for trailing modules (for taught masters programmes only)

CONL701 Critical Research for Postgraduate and CONL717 Applied Research Methods must be successfully completed with an agreed research proposal prior to commencement of CONL718 Dissertation.

30 Programme Management

Programme leader

Jessica Muirhead

Module leaders

Bindu Jose
Bo Liu
Denise Oram
Julie Mayers
Jessica Muirhead
Nigel Houlden

Once the module has launched, the Student Success Coordinator will consciously monitor and observe all students' progress through the learning activities, communicating with students who are failing to engage and report out on any concerns. The SSC will collate student feedback gathered and report out on any concerns raised about the learning materials used and design of the activities and assessments.

Further, the intention is to mirror existing student voice and representation processes in virtual formats as much as this is possible, further details can be found in the Programme Handbook.

31 Quality Management

Quality management is an integral part of the programme with the overall responsibility for quality being assigned to the Associate Dean and Programme Leader, drawing on the relevant contents in the University's Programme Leaders Handbook. Quality management is well documented within the specific Programme Handbook which is available to all students registered on the programme via the virtual learning environment. This includes details of the academic calendar, scheduled teaching weeks, the modular diet and submission dates for assignments.

It is University policy to allocate a Personal Tutor to each student and encourage students to raise any concerns, at an early stage, through this pathway. A student representative is also elected by the students and matters requiring attention can also be progressed via this route.

At a modular level the named module leader designs a scheme of work in accordance with the module specification and academic calendar. It is usual practice for the module leader to write the relevant assessments which are subsequently peer reviewed by an academic colleague within the Faculty.

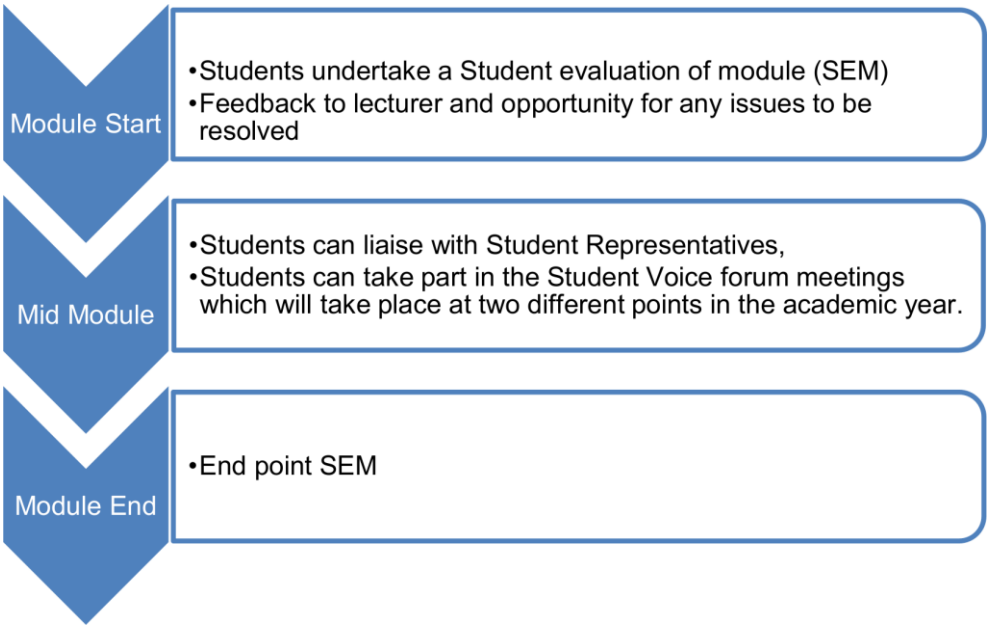
When assessment work is submitted, it undergoes first marking by the module leader and a sample based on the range of marks is independently second marked and also made available for external examiner comments via the virtual learning environment prior to the assessment boards.

Students are encouraged to submit modular feedback via the virtual learning environment. Two Student Voice Forum meetings are held online during the course of each academic year which are independently chaired and encourage an exchange of opinions and perceptions between staff and students, noting areas for improvement or good practice as a foundation for quality evaluation. The Minutes and any responses from the Student Voice Forum meetings are posted onto the programme site of the Virtual Learning Environment.

Annual reports are submitted by external examiners which are subsequently shared with students and the programme leader replies, noting any actions that have been taken. This report forms part of the Annual Monitoring Review which enables reflective practice, in relation to the programme, to occur. This includes a number of data sources to produce a robust insight into the health of the programme. Completed reports are discussed at a Faculty Board and are a further source of best practice and suggestions for improvement, which are enacted in the first half of the academic year.

Faculty meetings also provide a forum for programme discussion and to highlight issues which could include attendance and progression. Peer review of teaching is scheduled to provide a second opinion on programme delivery.

Student Voice Flow Chart



32 Research and scholarship activity

Research within the programme team is co-ordinated at a Faculty level and, at a local level manifests itself through the Applied Research in Computing Laboratories (ARClab) group. ARClab's research encompasses the broader computing subject and is concentrated in the following areas:

- IoT, Networking and Cybersercurity
- Audio and Affective Computing
- Health and Assisted Living Technologies
- HCI, Augmented and Virtual Reality
- CAD/Engineering software
- MIS/Business
- Ethics/professionalism
- Robotics/AI

ARClab has taken over from the previous Computing research groups of Creative and Applied Research for the Digital Society (CARDS) and the Centre for Applied Internet Research (CAIR), which built up their activities very impressively over the past ten years. The commitment and enthusiasm of the staff is very evident and significant outputs have been achieved over a whole range of activities, covering publications, grant winning, conference organisation, industrial engagement etc.

Significant achievements during the recent past include the very professional organisation of a conference to the highest international standards; the development of a large-scale EU-funded research project, the steady production of conference publications, in addition to a sound proportion of academic journal publications; the setting up of a usability laboratory - a relatively unique facility in Wales; the importing of a substantial new base of specialism in wireless technologies and a success in a radio frequency identification tagging (RFID) project, which is intended to be rapidly grown into an additional research theme.

33 Learning support

Institutional level support for students

The University has a range of departments that offer the support for students as:

- Library & IT Resources
- The Assessment Centre
- DisAbility Support Team
- Irlen Centre
- Careers Centre and Job Shop
- Zone Enterprise hub
- Chaplaincy
- Counselling & Wellbeing
- Student Funding and Welfare
- International Welfare
- Student Programmes Centre
- Glyndŵr Students' Union

Faculty support for students

All students at Wrexham Glyndŵr University are allocated a Personal Tutor whose main responsibility is to act as the first point of contact for their personal students and to provide pastoral and academic support throughout their studies at the University. It is a vital role to support student engagement and retention, and to help every student to success to the best of his or her ability.

Partner specific support for students

Student Success Team

The Student Success team is there to provide proactive encouragement and support to all students throughout their online journey. It is their responsibility to ensure that each student is given the right level of support and to identify when students need encouragement or guidance in order to succeed. The team will reach out to every student by phone and follow up with email communications whilst recording activities, participation and attendance to each key element of their chosen course.

Support for New Students

All students are allocated a Student Success Coordinator (SSC) who will stay with the student for the duration of their study. The student will be handed over from the Enrolment Services team at the point at which they pay for the first module and thereby commit to study. The Student Success Coordinator (Retention Specialist) will email the student within 48 hours and ask them to confirm their availability to receive a welcome call.

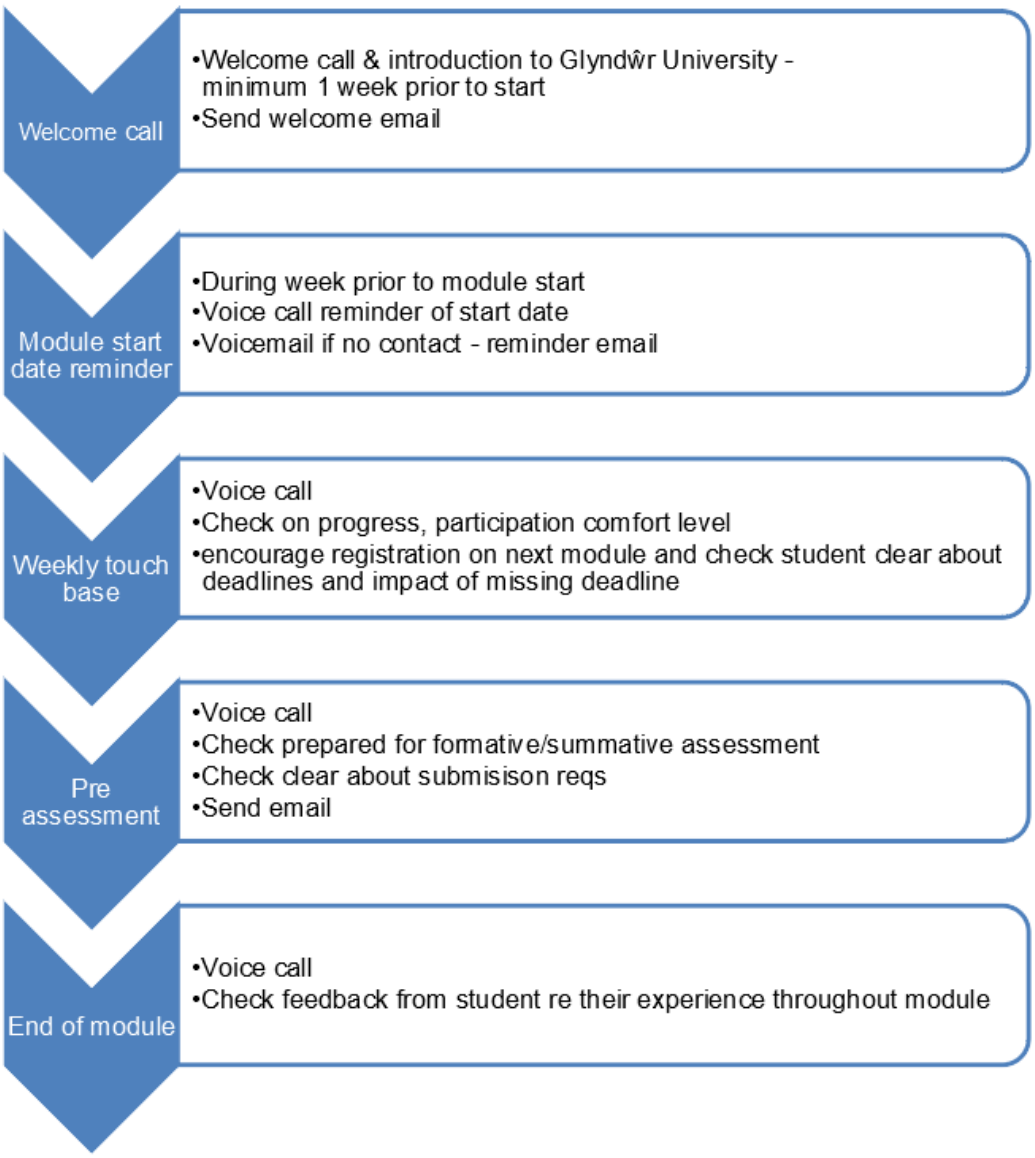
This initial welcome call is a 'virtual walk to class' designed to assuage any concerns the student has at the start of their journey and assure them that support will always be close at hand. During this call the SSC will explain their role and the roles of other team members with whom the student may have contact. They would revisit any concerns the student might have, agree the frequency and mode of communication (telephone, Zoom, Whatsapp, Google Hangout etc), and explain the next steps in the student journey. All support from Glyndŵr University; personal tutor etc. will be provided online, via Skype and email, and all contact will keep to UK business hours.

During the initial welcome call the SSC will -

- advise the student who to contact and what for (with initial point of contact almost always being the SSC)
- review their programme plan with the student
- explain the importance of undertaking the Orientation module and any other ancillary modules
- direct the student to the Student Handbook and Programme Handbook
- ensure the student can access the VLE
- explain how to access other University support and resources
- check the student is clear about how and when to register for their next module
- ensure the student understands how the option to take a study break operates.
- Agree next steps

The SSC will operate a weekly outreach to students prior to, and during, the first two modules and will then provide regular contact points from the third module onwards. The team will monitor attendance of all students daily and weekly to ensure all students feel supported. The SSC will identify 'at risk' students where there is any lack of engagement and proactively contact them to discuss and address. A summary of the outreach approach is below:

SEM Flowchart



It is important to identify 'at risk' students from an early point so that appropriate plans

Programme specific support for students

As referred to previously, the Student Programme Handbook provides extensive detail regarding sources of support and is available on the virtual learning environment to all students registered on the programme and includes signposts to regulations and policies.

At programme induction students will be allocated to a Personal Tutor, drawn from the programme team. This mechanism enables the student to discuss options available for additional personal development or specific support issues that may

arise, from time to time, throughout the duration of the programme. The Programme Leader, in many instances, has a dual role, acting as Personal Tutor for students on the programme. Allocation of personal tutors is reviewed at the beginning of each academic year and students have the facility to raise issues through the Student Representative or the Student and Programmes Centre should they choose to do so in an anonymous manner.

An online induction for the students will be provided in the Canvas VLE. This will be made available to students when they have paid for their first module, and no later than two weeks prior to starting their first module. The orientation is intended to have several sections including:

- Welcome to the University (from the VC)
- Overview of the programme
- Rules and regulations
- Support services
- Academic skills
- How to use the Canvas VLE

Students will be encouraged to participate in the induction, and required to fill in an online completion statement, which will be checked by the SSC.

34 Equality and Diversity

Glyndŵr University is committed to providing access to all students and promotes equal opportunities in compliance with the Equality Act 2010 legislation. This programme complies fully with the University's Equality and Diversity Policy https://www.glyndwr.ac.uk/en/AboutGlyndwrUniversity/EqualityandDiversity/ ensuring that everyone who has the potential to achieve in higher education is given the chance to do so.