PROGRAMME SPECIFICATION

Awarding body/institution	Glyndŵr University
Teaching institution (if different from above)	Glyndŵr University
Details of accreditation by a professional, statutory or regulatory body	N/A
What type of accreditation does this programme lead to?	N/A
Is accreditation in some way dependent on choices made by students?	N/A
Final award/s available eg BSc/DipHe/CertHE	MSc Computer Science, PGDip Computing Science PGCert Computing
Award title	Computer Science
JACS 3 code	I100
UCAS code (available from Admissions)	N/A
Relevant QAA subject benchmark statement/s	The Quality Assurance Agency for Higher Education 2011 (ISBN 978 1 84979 284 4) defines Computing as: “Computing is the discipline associated with the structuring and organisation of information as well as the automatic processing and communication of that information. The application of ideas from computing underpins innovation across a wide range of activity, including engineering, business, education, science and entertainment”. Additionally it defines taught Masters programmes as: “The range of possible master's degree programmes in computing includes: degree programmes which build very directly on undergraduate honours degrees in some aspect of computing and provide a focus on some particular technology or aspect of computing in greater depth, e.g. as preparation for research”.
Other external and internal reference points used to inform the programme outcomes	

Mode/s of study *(p/t, f/t, distance learning)*	Part Time, Full Time, FT/PT Block delivery
Language of study	English
Date at which the programme specification was written or revised	September 2014

Criteria for admission to the programme

The MSc Computer Science is intended for graduates who already have a first degree in Computer Science or a closely related subject, and who wish to extend the knowledge gained in their undergraduate study with more advanced specialised material reflecting current research at the "cutting edge" of the discipline.

General Academic Requirements

The standard entry requirement for the MSc programme is an honours degree of at least 2:2 classification in a Computer Science related subject area, or equivalent in a science-based degree with a strong computing and/or engineering element. In some cases applicants with substantial commercial or industrial experience can be accepted, subject to interview and references.

In some cases a non-graduate candidate may be accepted provided that the applicant has substantial commercial or industrial experience or held a responsible position which is relevant to the programme to be pursued for a minimum of two years, within the previous five years. This is subject to interview and references.

Applicants whose first language is not English, or whose Bachelor degree is not from a university in an English speaking country, are required to provide evidence of proficiency in English by having attained an IELTS certificate or its equivalent:

English test & Minimum score:

Postgraduate study	IELTS 6.5 (no band lower than 6.0)

Students should have achieved IELTS scores within the previous 2 years.

Pre-sessional English language courses are available at the University Second Language Learning Centre for students who wish to improve their language skills prior to commencing their studies.

AP(E)L

In some cases it may be appropriate to provide students with an exemption form studying certain modules. This will be done in line with the Glyndŵr University AP(E)L procedures.

Aims of the programme

Being both academic and industry facing the MSc in Computer Science is intended for graduates from a computing discipline who wish to update or focus their computing skills and competencies. Modules studied on the programme have been designed to provide the skills

to meet industrial and commercial needs as well as those of traditional academic standing. In addition to the academic and theoretical aspects the emphasis will be on the practical side of computer science to enable graduates to practise as computing and IT professionals or continue with further study towards a doctorate.

The programme aims to provide the students with the following:

- provide specialist, advanced technical skills in the areas of Networking, Web and Mobile development and Professional Issues;
- produce practitioners with an advanced understanding of and competence with, the hardware and software available and/or needed for the development and use of computer systems
- enable students to access, critically appraise and disseminate research results;
- provide students with a sound basis for further research and / or professional development.

Distinctive features of the programme

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

One of the significant advantages of undertaking the MSc in Computer Science is that it prepares students for the external Cisco CCNA qualification. Modules within the programme include all the material necessary to take this qualification externally. Since the Cisco Academic Academy is an International qualification it is very beneficial to student's overall job prospects.

When designing this curriculum the programme team based the decisions on the previous 5 years' experience of running this course. In particular discussions have taken place with Universities who provide students for the programme and the Computing Industrial Liaison Group. When re-validating MSc Computer Science it has been decided to concentrate on the core skills. Previously the programme was designed to be flexible by offering a number of optional routes. Since the greatest number of student chose one set of options then concentrating on this set of modules makes the overall masters' offering within Computing more efficient. This means that it combines core modules with other masters' programmes e.g. Computer Networking and MSc Computing. The overall flexibility has been maintained by providing the optionality within the MSc Computing programme.

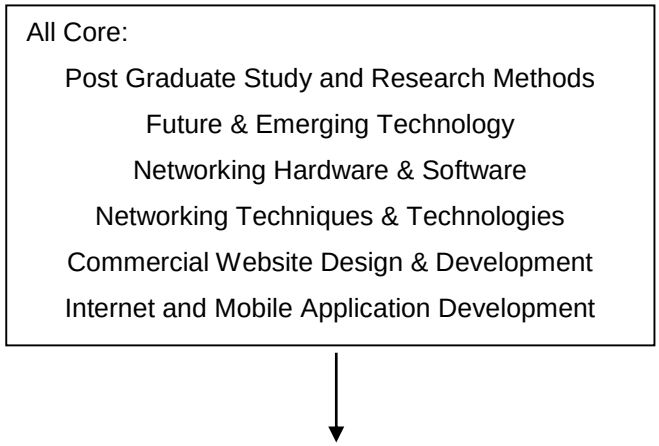
Programme structures and requirements, levels, modules, credits and awards

The MSc Computer Science is offered in full-time and part-time mode additionally due to the use of the Cisco Networking Academy some parts of the programme can be offered using the block delivery option.

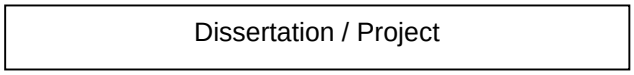
As with most masters programmes the MSc in Computer Science has 2 parts, a taught part and then the dissertation. Students study 120 credits taught modules made up of 6 20 credit modules followed by a 60 credit dissertation making a total of 180 credits. The structure and the modules can be seen in the diagram.

Due to the number of shared modules between this programme and the University's MSc Computing programme, the PGC exit award from MSc Computer Science is PGC Computing and is available students who successfully complete 60 credits, but who find they are unable or choose not to continue with programme. The PGD exit award is PGD Computer Science and this is available to students who successfully complete 120 credits of Stage One, and ind they are unable or choose not to continue with the programme.

Stage One



Stage Two



Students create their Dissertation Proposal and students are matched up with suitable supervisors.

It is possible to undertake the dissertation as a work placement but this isn't the normal mode due to the time constraints of the programme.

Full Time

In full-time mode, the entire MSc syllabus may be completed in 12 months. Modules are equivalent to 20 credits. Typically, a full-time student studies modules equivalent to 60 credits per trimester (normally 3 modules), with 14 weeks of teaching, revision and assessment activities for each module. These are normally studied in trimesters 1 and 2. The full degree scheme, including submission of the dissertation is normally completed in trimester 3.

Students are expected to attend lectures, tutorials and practical session as specified in the Glyndŵr University timetables. Additionally for the networking modules students will be expected to study on-line material which is part of the Cisco Networking Academy.

Typical Full time delivery September start at the Wrexham Campus

Level 7 Part 1	Tri 1	Post Graduate Study and Research Methods COMM50 20 Credits - Core Mod Leader: S. Cunningham	Networking Hardware and Software COMM52 20 Credits - Core Mod Leader: J Davies	Networking Techniques and Technologies COMM53 20 Credits - Core Mod Leader: J Davies
	Tri 2	Future & Emerging Technologies COMM51 20 Credits - Core Mod Leader: V Grout	Commercial Website Design & Development COM707 20 Credits – Core Mod Leader: J Worden	Internet and Mobile Application Development COM708 20 Credits - Core Mod Leader: J Worden
Level 7 Part 2	Tri 3	Dissertation COMM56 60 Credits – Core R Picking		

It is possible to start the Full Time MSc Computer Science in January however the duration will be 15 months rather than 12 months. Students will study the modules in the reverse order to the September start students allowing them to be in filled with the MSc Computer Science students.

Typical Full time delivery January start at the Wrexham Campus

Level 7 Part 1	Tri 2	Future & Emerging Technologies COMM51 20 Credits - Core Mod Leader: V Grout	Commercial Website Design & Development COM707 20 Credits – Core Mod Leader: J Worden	Internet and Mobile Application Development COM708 20 Credits - Core Mod Leader: J Worden
	Tri 3	Holiday		
	Tri 1	Post Graduate Study and Research Methods COMM50 20 Credits - Core Mod Leader: S. Cunningham	Networking Hardware and Software COMM52 20 Credits - Core Mod Leader: J Davies	Networking Techniques and Technologies COMM53 20 Credits - Core Mod Leader: J Davies
Level 7 Part 2	Tri 2 (Next year)	Dissertation COMM56 60 Credits – Core R Picking		

Part Time

In part time mode there are a number of categories depending on the requirements of the students. UK based students will normally be employed and so have a delivery designed

specifically for them but will fit in with the classes delivered for the full time students however the duration of their study will be extended and will not be less than 2 years.

International students can be accommodated on this programme by studying in block mode. Students will attend summer schools (blocks) at Wrexham. A typical summer school will be run for a 6 week period June and July each year. During this intense study period typically 3 modules will be studied using lectures, tutorials and practical sessions. Students will complete some of the module assessments during the summer school and others in the weeks following being supported by remote access e.g. Skype, Moodle. These 3 modules will be completed by September. Following the completion of the first 3 modules at Summer School 1 students will be able to do preparation for Summer School 2 since they will be studying the modules based on the Cisco Academy which has excellent on-line material. This will ensure that the students have the technical background to undertake the practical aspects of the modules.

By attending 2 summer schools 6 modules will be completed and the student will then be in a position to start their dissertation. Students will normally submit their dissertation the following April/May time. The dissertation will be supported by the supervisor allocated following the submission of their proposal. Students are required to submit work regularly via Moodle which is used as the basis for remote meetings with the students via Skype. This allows one to one support for the dissertation process.

Typical Part Time delivery June start at the Wrexham Campus

<table>
<tr><td rowspan="3">Level 7

Part 1</td><td>Summer school 1 (June – Sept)</td><td>Post Graduate Study and Research Methods
COMM50
20 Credits - Core
Mod Leader:
S. Cunningham</td><td>Commercial Website Design & Development
COM707
20 Credits – Core
Mod Leader:
J Worden</td><td>Internet and Mobile Application Development
COM708
20 Credits - Core
Mod Leader:
J Worden</td></tr>
<tr><td>Sept - May</td><td colspan="3">Remote study in advance of next Summer school</td></tr>
<tr><td>Summer school 2 (June – Sept)</td><td>Future & Emerging Technologies
COMM51
20 Credits - Core
Mod Leader:
V Grout</td><td>Networking Hardware and Software
COMM52
20 Credits - Core
Mod Leader:
J Davies</td><td>Networking Techniques and Technologies
COMM53
20 Credits - Core
Mod Leader:
J Davies</td></tr>
<tr><td>Level 7

Part 2</td><td>Sept - May</td><td colspan="3">Dissertation
COMM56
60 Credits – Core
R Picking</td></tr>
</table>

Intended learning outcomes of the programme

On successful completion of the programme a graduate should demonstrate knowledge and skills as follows:

PG Certificate Computing

A: Knowledge and Understanding

A1 Demonstrate comprehensive, detailed, state-of-the-art knowledge of the specialist area of (Networking, Web and Mobile development) covered by the programme within the context of the broader discipline of Computer Science.

A2 Make professional judgements in the selection of technologies for complex and dynamic computing scenarios/

B: Intellectual Skills

B1. Work autonomously or with minimal guidance where appropriate, 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 with the specialist area(s) covered by the programme.

B2. Work autonomously or with minimal guidance where appropriate, identify and classify principles and ideas in contemporary information sources and situations to professional standards; analyse rigorously, effectively, critically and creatively; cope with complexity.

C: Subject Skills

C1 : Make effective use of a range of theories, techniques, programming languages, operating systems, design support tools and development environments

C2 : Specify, design, implement, test and document a computer-based system

D: Practical, professional and employability skills

D1. Engage effectively in a range of independent roles; debate in a confident, professional manner; produce detailed critiques and coherent project reports to professional standards; give confident, high-quality oral and other presentations in a wide range of contexts appropriate to the specialist area(s) covered by the programme.

D2. Practise and demonstrate professional competence in the full range of numerical/mathematical skills associated with the specialist area(s) covered by the programme.

D3. Practise and demonstrate professional competence in the full range of IT skills associated with the specialist area(s) covered by the programme.

D4. Work autonomously or with minimal guidance where appropriate, directing and managing own learning using the full range of resources and study techniques appropriate to the specialist area(s) covered by the programme.

PG Diploma Computer Science

Students will be expected in addition to the skills developed at the PG Certificate stage to:

A3 Where appropriate, distinguish between or combine the principles of design and implementation in the production of new computer solutions or in the enhancement, modernisation or troubleshooting of existing solutions

A4 Give an account of current and emerging developments in Internet technology

A5 Evaluate and progress their own performance on both a technological level and with consideration to professional codes of IT practice and ethics.

B: Intellectual Skills

B3. Work autonomously or with minimal guidance where appropriate, bring together facts/ideas/elements in support of an argument or case presented to professional standards; confidently evolve alternative solutions and concepts.

B4. Work autonomously or with minimal guidance where appropriate, confidently integrate theory with professional/vocational practice; evaluate theories, processes, solutions and outcomes critically and effectively; use the evaluations of others critically, reflectively and constructively.

B5. Work autonomously or with minimal guidance where appropriate, identify, define and resolve a range of problems associated with the specialist area(s) covered by the programme, work to professional standards.

C: Subject skills

C3 : Work as a member of a development team, contributing to the planning and execution of a shared design and implementation task

C4 : Propose, plan, undertake and report a self-directed individual programme of investigation, design and implementation

D: Practical, professional and employability skills

D5. Interact confidently and effectively within a range of learning and professional groups, as appropriate to the specialist area(s) covered by the programme; demonstrate appropriate negotiating, role, leadership and group-support skills to professional standards.

MSc Computer Science

The 'Masters' stage of the programme will build upon the knowledge and understanding developed at the PG Diploma and Certificate stages by providing knowledge and understanding of those aspects of research methodology that are appropriate to the specialist area(s) covered by the programme. It will also require the student to develop detailed knowledge and understanding of the particular area in which the advanced independent-study project associated with the 'Masters' stage of the programme is carried out.

Students will again be expected in addition to the understanding developed at the PG Diploma stage to:

A6. Utilise information resources and demonstrate how to access these to obtain state-of-the-art knowledge of current computer systems technology

A7. Demonstrate a sufficiently detailed knowledge of research methods appropriate specifically to their 'Masters' advanced independent-study dissertation/project, together with detailed knowledge of the particular area in which the project is carried out

B: Intellectual Skills

B6. Demonstrate mastery of the principles, techniques and procedures associated with the advanced independent-study project carried out during the 'Masters' stage, including the ability to work effectively from information provided , with little or no guidance.

B7. Demonstrate mastery of the analytical skills associated with the 'Masters' stage project, again working autonomously or with minimal guidance where appropriate.

B8. Demonstrate the full range of skills needed to plan and manage a 'Masters'-level project and produce a report/dissertation/thesis or other suitable research output on same working to a detailed specification and to professional standards.

B9. Demonstrate the full range of evaluative skills associated with the 'Masters' stage project, including the effective exercise of judgement based on incomplete and/or contradictory information.

B10. Demonstrate professional competence in participating in the identification of a suitable 'Masters' project task and seeking a satisfactory solution that meets the specific requirements of the problem.

C: Subject Skills

C5 : Undertake a significant computing 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 computing techniques and / or technologies

D: Practical, professional and employability skills

D6. Produce a detailed, professional research report/dissertation/thesis or other suitable research output to the specification laid down for the advanced independent-study project; present and defend this against in-depth examination in an appropriate live context.

D7. Demonstrate mastery of the specialist numerical/mathematical skills associated with the particular area in which the 'Masters' stage advanced independent-study project is carried out, including appropriate data analysis/statistical skills.

D8.	Demonstrate mastery of the specialist IT skills required to carry out the ‘Masters’ stage project, including search skills, data-analysis skills, data-presentation skills and document-production skills.
D9.	Work autonomously or with minimal guidance where appropriate, direct and manage own development of mastery of the various research-methodology skills associated with the ‘Masters’ stage project.
D10.	Demonstrate the various skills required to work effectively with a research supervisor and with any other support staff

CURRICULUM MATRIX

Module Title		Post Graduate Study and Research Methods	Future and Emerging Technologies	Network Hardware and Software	Network and Technologies	Commercial Website Design & Development	Internet and Mobile Application Development	Dissertation
Level 7	A1	×	×	×	×	×	×	
	A2	×	×	×				
	A3			×	×	×	×	
	A4	×	×		×		×	
	A5	×	×					
	A6			×	×	×	×	×
	A7	×						×
	B1	×	×	×	×	×	×	
	B2	×	×	×	×	×	×	
	B3	×	×		×	×		
	B4	×	×	×			×	
	B5			×	×	×	×	
	B6							×
	B7							×
	B8							×
	B9							×
	B10							×
	C1			×	×	×	×	
	C2			×	×	×	×	
	C3		×	×	×	×	×	
	C4	×		×	×	×	×	
	C5							×
	C6							×
	D1	×	×			×	×	×
	D2	×		×	×	×	×	×
	D3	×	×	×	×	×	×	×
	D4	×	×	×	×	×	×	×
	D5		×	×	×	×	×	×
	D6	×	×	×	×	×	×	×
	D7	×		×	×	×		×
	D8	×	×	×	×	×	×	×
	D9	×	×	×	×	×	×	×
	D10	×	×	×	×	×	×	

Learning and teaching strategy used to enable outcomes to be achieved and demonstrated

The Computing subject area has a Learning, Teaching and Assessment implementation plan as part of wider Institute and University developments. This seeks to assist the student to become an independent learner whilst still supporting the students in their transition to higher education. The curriculum is designed to encourage an appreciation for learning. Learning is enriched by appropriate underpinning, current research, industrial applications and the development of transferable skills

Postgraduate teaching focuses on depth of study, and critical awareness and evaluation, in selected areas of current research and advanced scholarship within the academic discipline of Computer Science; while at the same time ensuring a more general all round ability. In addressing these aims, the postgraduate MSc programme in Computer Science includes material on the theory, design and implementation of large computer systems while at the same time focusing on particular specialist areas of research within the academic discipline of Computer Science.

There are a number of specialist computer labs on the Wrexham campus, including B117, B119 (programming laboratories) and B121 laboratory (a Cisco Science laboratory) which teaching is based around. These specialist labs offers access to a range of software that is utilised within the modules defined in the programme. Students normally undertake pre-prepared tutorials and work in pairs on this equipment. An additional laboratory is available to enable students studying for the dissertation part of the course to have access to equipment over extended periods.

The pace of delivery and range of syllabus content to be covered at the taught stage requires a combination of teaching and learning strategies to be adopted in most areas of study. Modules are in general divided into 2 types, technical and more general. Technical modules cover the specialised area of Computer Science while the more general modules cover other areas of professional development and research.

Technical modules have to be delivered sequentially since they build on the knowledge gained in the earlier modules.

The Cisco Network academy is used as the basis for the Hardware & Software (NH&S) and Science Techniques & Technologies (NT&T) modules. One of the advantages of following the Cisco structure is that each module is divided into a number of chapters, approx. 10, that cover different topics. Since students have Cisco Academy ids then they are able to login-in on-line and try end of chapter tests. This gives the student the opportunity to identify areas that they don't understand and can therefore seek help from the lecturer or tutorial supervisor. The Cisco Network Academy provides excellent on–line material and is kept up to date by the academy, there being significant upgrade every 3-4 years reflecting the changing nature of the subject area.

Commercial Website Design & Development is intended to give students the ability to design and produce of Internet based applications. This practical module covers the methods, tools and techniques required to develop high quality and secure web-based systems. It utilises industry standard languages and IDEs to aid troubleshooting. A series of lectures and tutorials are provided along with show and tell techniques a common approach used in the field of computer science.

Internet and Mobile Application Development module builds on the knowledge and skills gained in the Commercial Website module and applies them to mobile devices. Students developing Internet based business applications over the Web typically using C#, AJAX, ASP.NET. Mobile Applications, Web 2.0, XML-based applications (eg Web Services, xhtml-mobile).

For the more general modules lectures are used to present core elements of the syllabus and are the main delivery mechanism, typically supplemented by supervised problem solving and group discussion.

Post Graduate Study and Research Methods provides students with a knowledge of methods used to carry out research as well as supporting skills and professional issues related to a career in the commercial world of computing. The module will provide the necessary underpinning skills to ensure that competent work and standards are achieved and maintained throughout the student's chosen programme of study. This will encompass the development of professional level information handling and analysis skills, as well as ensuring students become proficient at recognising and managing their own professional development (PDP).

The other general module is called Future and Emerging Technology and is intended to explore emerging and future technologies in Computing; to investigate novel application areas and environments where Computing can be potentially beneficial; to consider the legal, ethical and cultural implications that future technologies may impact on; to use appropriate research methods and forecasting techniques to make and justify credible predictions in Computing. The basis of the module is to run it on a split basis, a series of lectures given by specialists in the field and then student-led seminars which requires the students to present selected topic areas to their peers and members of staff.

In the early stages of each module, problems will be well-defined and limited in scope and scale. At later stages, problems will become less structured (to encourage reflection on problem issues) and open-ended (to give scope to propose and evaluate alternative solution strategies). Case studies are used extensively to integrate study topics and to underline vocational relevance. Coursework assignments are important throughout.

As the programme progresses, students are expected to demonstrate increasing proficiency in use of IT tools and techniques to support production of technical documentation, to enhance oral and written presentations, to aid organisation of personal study material.

Part 2 of the programme is the Dissertation and is an area that has been given special consideration since it is such a significant piece of work undertaken by the student. Whilst students study the taught part of the course they are given a 1 hour a week special lecture to inform them of the requirements of the Dissertation. This module is run so that it coincides with the end of the taught part of the course which means that on completion of Part 1 students can then start immediately on producing the proposal for the dissertation. On submission of the proposal it is assessed and passed to an appropriate supervisor with expertise in the area that the student wishes to carry out the work. It is the supervisor's task to work with the student to improve the proposal to a level that is acceptable and achievable for a Masters level with in the time constraints. Students work independently on the dissertation having regular meetings with the supervisor. It is important that the student identifies at the proposal stage the various requirements needed to complete the dissertation e.g. equipment, software, space.

It is possible to undertake the COMM56 Dissertation as a work placement but this isn't the normal mode due to the time constraints of the programme.

Welsh Medium Provision

There is currently no opportunity for any part of the programme to be delivered through the medium of Welsh, but in line with the University's Welsh Language Scheme, students are entitled to submit assessments in Welsh if they so wish. Where a qualified tutor is available, students will then be allocated to a tutor who is able to assess the work in Welsh. At present, the Department does not have enough bilingual tutors or full-time academic staff capable of assessing through the medium of Welsh. Where a need for Welsh medium assessment has been identified and no appropriate Welsh speaking tutor/assessor is available, the written assessment will be translated into English. This translation will be conducted by University qualified translators.

Assessment strategy used to enable outcomes to be achieved and demonstrated

The Department has an agreed Assessment Strategy for all computing programmes which provides a framework for the assessment of students' competence, knowledge and understanding, and the grading of students for progression and the conferring of awards. It allows staff to give feedback to students and to evaluate the effectiveness of their own teaching. This strategy will be closely

adhered to in the delivery of the programme and is guided by QAA Code of Practice- Section 6: Assessment of Students, National Qualifications Framework, and Glyndŵr University Assessment Guidelines.

Students will receive formative assessment, particularly during the practical and self-study elements of the programme to ensure they can keep track of their progress and development. This will also be a key factor in ensuring student engagement and retention on the programme of study. In the case of practical assessment, this may be a final summative assessment, so more frequent formative assessment provides academic rigour and increases student awareness and confidence in the subject.

There will be emphasis placed upon students to undertake independent study and research activities, in particular when completing the Dissertation / Project element of the programme. This Dissertation / Project will be facilitated by a traditional summative assessment approach at the culmination of the work, however, there will be extensive use of formative feedback, milestones, and guidance from staff during this, and other, independent-study and research-based assessment undertaken by students. This is common practice for such modes of study and is in-line with the approach taken by postgraduate programmes in other HE institutions.

On submission of the dissertation the supervisor marks the work using a standard mark sheet allocating marks for specified areas. Where appropriate a student may be asked to demonstrate their work to the supervisor and second marker. All dissertations are second marked and if there is a dispute in the mark then it is moderated by a third person. On completion of this process and before the module board the External Examiner comments on all the marking

Indicative submission dates MSc Computer Science

Module	Core/ optional	Level/ Credit	Assessment type and weighting	Assessment loading	Approx submission
Post Graduate Study and Research Methods	Core	7/20	50% Coursework 50% Case Study	2,000 words 1,500 words	Week 4 End of Tri 1
Networking Hardware and Software	Core	7/20	10% Online theory exam 1 10% Online theory exam 2 30% Practical exam 50% Coursework	1.15 hrs 1.15 hrs 2 hrs 2,000 words	Week 3 Week 6
Networking Techniques and Technologies	Core	7/20	10% Online theory exam 1 10% Online theory exam 2 30% Practical exam 50% Coursework	1.15 hrs 1.15 hrs 2 hrs 2,000 words	Week 9 Week 12 End of Tri 1
Future and Emerging Technology	Core	7/20	100% Coursework	20min Presentation + 2,000 words	Week 4-11 End of Tri 2

Internet and Mobile Application Development	Core	7/20	100% Coursework	4,000 words	End of Tri 2
Commercial Website Design & Development	Core	7/20	50% Coursework 50% Coursework	2,000 words	Week 9 Week 12
Dissertation	Core	7/60	Dissertation	15,000 words	End of Tri 3

Assessment regulations that apply to the programme

The assessment regulations that apply to the MSc Computer Science is the Glyndŵr University Taught Masters.

All modules except for Future and Emerging Technologies would be eligible for trailing.

Programme Management

Programme Team
Prof Vic Grout – Head of Department
John Davies – Programme Leader
John Worden
Dr. Stuart Cunningham
Dr. Rich Picking
Denise Oram

Supporting team
Prof. P. Excell
Bindu Jose
Nigel Houlden
J. Matthews

Programme Management

The programme will be managed under the auspices of the Institute for Arts, Science and Technology Department of Computing and the programme will develop and operate within the terms of the overall management of curriculum within the Institute.

However, there will be a designated MSc Programme Leader for the MSc Computer Science who will be responsible for the day-to-day running of the programme, including the following:

- The management and development of curriculum and the course portfolio
- Student tracking and student records
- Collation of assessment data and presentation of data at assessment boards Management/co-ordination of overall assessment activities across the programme
- Liaison with external bodies and agencies,
- Quality assurance and annual monitoring, including compilation of the Annual Monitoring Report

- Co-ordination of admissions activities and other recruitment activities, including relevant publicity activities

At module level there is devolved responsibility for the following:

- The maintenance and development of teaching and learning materials for all students enrolled on the module,
- The publishing and updating of module timetables, which shall include a weekly schedule of module sessions and required reading, to be distributed to students at the start of all modules
- The setting, marking and collation of marks for all module assessments and examination papers, including resit assessments, and submission of student results to the Programme Leader
- Tutorial support for students taking the module which they are responsible
- Quality monitoring, including processing of annual student feedback questionnaires and, where appropriate, student feedback for individual modules
- Liaison with part-time members of staff involved in module teaching

Student Feedback

The University has procedures in place for the regular review of its educational provision, including the annual review of both modules and programmes which draw on feedback from such sources as external examiners' reports, student evaluation, student achievement and progression data. In addition, programmes are subject to a programme periodic review (PPR) and re-validation in year 5 that includes external input.

Feedback from students plays a critical part in informing the Department's strategic thinking. It also allows the Department to evaluate how its service provision is viewed by its most important group of stakeholders, its students.

Students can provide feedback in a number of ways:

Staff-Student Consultative Committee.– SSCCs, chaired by a member of academic staff from outside the programme, will be held at least once per trimester. The Chair will minute student feedback for action/response by the Programme Leader. Minutes of the SSCCs and the response from the Programme Leader will be posted on the programme pages of Moodle. The MSc Computer Science has a representative on the Computing Student Staff Consultative Committee.

SEMs-– Module Leaders will distribute SEMs at the end of each module. A summary of the analysis of the SEMs, along with any other feedback (e.g. from the student suggestion box), will be passed to the Programme Leader for action/response.

Students submit work in a number of different ways depending on the module being studied. Wherever possible Moodle is used for electronic submission and Turnitin to check the similarity score and feedback is given via this interface within 2 weeks. However due to the nature of Computing it is not possible to do this with programming modules and networking modules. As part of the networking modules a number of on-line tests are taken and their score is given immediately and the supervisor can highlight the areas where problems occur. Also practical work in both networking and the programming modules are implemented by getting the student to demonstrate their work, again immediate feedback is given. At the end of a module overall feedback is provided along with a clear indication of what area the student needs, if necessary, resubmit work or what areas were good and which areas can be improved on.

Research and Scholarship underpinning the curriculum

The Department believes that students learn best in a research oriented environment taught by people working at the forefront of their disciplines. The skills and expertise in the Department are augmented by the presence of the Centre for Applied Internet Computing (CAIR) which has now been encompassed into the Creative and Applied Research for the Digital Society (CARDS) research Centre, where staff are researching in the areas of Computer Programming and Software Engineering, Science and Internet Technologies, Mobile Communications, Web systems, Security and Computer Forensics, Computer Graphics, Media Technologies, E-Commerce and business impact. Current research projects include:

- Computer Music and Audio
- Metrics for determining network stability
- Social and Behavioural Algorithms
- Computational mathematics
- Combinatorial optimisation and network algorithms
- Information Systems Failure
- Intelligent user interface design and adaptive tutoring systems
- Games Technology
- Routing algorithms and protocols
- Database optimisation
- Search engines
- Holistic visualisation of distributed knowledge
- Security and security visualization
- Complex decision analysis
- Wireless network optimisation
- Standardisation of reusable interface components
- Computing and Internet Ethics
- e-Learning/Business/Commerce
- Teaching and learning in IT
- Domotics and Remote-Controlled Home Automation Systems
- Document compression and transmission.

The Research Centre - Creative and Applied Research for the Digital Society (CARDS) has taken over the Centre for Applied Internet Research (CAIR) which has built up its activities very impressively over the past four 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. This particular success formed part of an undergraduate student project, emphasising the integration of teaching and research.

Staff on this programme team are very active in undertaking research, scholarship and professional activities, as reflected in an expanding published output, a significant grant-funded research project (and bids for new examples), growing numbers of Knowledge Transfer Partnerships, and the very successful conference series organised within the Research Centre. For their dissertations/theses, students will be expected to investigate cutting-edge technologies, implement and test novel / innovative science or commercial solutions or develop or analyse original computer science

applications / techniques. A series of lectures are provided to introduce students to the process and students are encouraged to select their own topic with help from a supervisor. In previous years some excellent publishable work has been produced in particular in the last 3 years in excess of 10 papers have been published based on the dissertation work.

Particular support for learning

Students on the programme will receive the following forms of student support and guidance:

- Admissions. All students on the programme will have the opportunity to discuss their application with staff, and receive appropriate advice and guidance prior to admission. This will include review of expectations of the programme and clarification of workload and requirements.
- Induction. New students on the programme will undergo an induction programme which will provide them with a full introduction to the programme, and will include elements of work on study skills and professional development.
- Student Handbook. All students on the programme will receive a Student Handbook which will contain details and guidance on all aspects of the programme and forms of student support and guidance, programme-based, Department-based and institutional
- Progress Review and Attendance Monitoring. Student attendance will be subject to regular monitoring through registers, and this will be a means of addressing issues of student support. There will also be regular reviews for each student with personal tutors.

Student Support

Every student is allocated a personal tutor in the first weeks of the programme. The personal tutor is someone students can contact to discuss any problems of a non-academic nature. These may relate to special needs or personal problems that may affect the student's academic performance.

Academic problems should first be addressed to the lecturer concerned. If the problem is not resolved or it does not relate to a specific module, then the Programme Leader should be contacted. A more detailed complaints procedure is given in the Student Handbook

Another forum for discussion is the Staff Student Consultative Committee. Student representatives, who are elected by the students, meet lecturing staff on the programme once a trimester to exchange ideas about the programme. This allows students to communicate their shared concerns in an informal manner, and for the staff to react and respond speedily to address their concerns.

Additional support for International students

There is network of support that is available at many different levels within the University and these combine to provide a supportive framework for the international students. Specifically, this includes three main activities:

- Language provision designed to ensure that the international students have achieved a minimum level of language skills before they embark on their chosen degree programme. This is a six-week pre-sessional intensive English Language for Academic Study course that aims to bring students to an IELTS (International English Language Testing System) level of 6.5 – the standard demanded for entry into master's degree programmes.
- Glyndŵr University offers English language classes alongside studies that improve not only spoken and written English but also academic English. Classes take place weekly and are delivered by the University's English language tutors also t help students to integrate into the life of the local community as well as helping them develop transferable skills such as practical, research and report-writing skills.

- An induction / orientation course that precedes the start of formal teaching and that allows the international students to become familiar with the University and studying at the University whilst at the same time outlining some of the cultural differences that exist between their country of origin and the UK.

Facilities

There are 4 specialist IT labs used for Computing students and in addition, students have access to the University open-access computing labs and other University wide services, including the wireless network.

There is comprehensive Virtual Learning Environment (Moodle) containing a range of advice and guidance. Module lecture notes and programme content are available online through Moodle and it is used for all the modules within the programme. This enables students to gain access to tutorial work and assignments set for the various modules. Many study materials are available via Moodle such as online databases; e-journals and library catalogue information are also available online.

Equality and Diversity

The University has adopted a policy of providing equal opportunities for all its students, staff, applicants and others involved in its work. One aspect of this policy is its intention to prevent, as far as possible, the harassment of one person by another, whether on the basis of gender, sexual orientation, sexuality, race or ethnic origin, religion, disability, or any other personal attributes or views held by the person harassed.

As part of the University's Disability Policy, students with a physical disability or learning difference are encouraged to contact the University Disability Adviser to ensure their needs are acknowledged formally. The outcome of such an assessment could result, for example, in additional time being allowed for examinations, or the provision of further learning support.