

## PROGRAMME SPECIFICATION

<b>Awarding body/institution</b>	Glyndŵr University under Pearson licence
<b>Teaching institution</b> (if different from above)	N/A
<b>Details of accreditation by a professional, statutory or regulatory body</b> (including link to relevant website)	N/A
<b>What type of accreditation does this programme lead to?</b>	N/A
<b>Is accreditation in some way dependent on choices made by students?</b>	N/A
<b>Final award/s available</b> eg BSc/DipHe/CertHE	Higher National Certificate in Computing Higher National Diploma in Computing
<b>Award title</b>	HND Computing HNC Computing
<b>JACS 2 code</b>	
<b>UCAS code</b> (available from Admissions)	N/A
<b>Relevant QAA subject benchmark statement/s</b>	Computing
<b>Other external and internal reference points used to inform the programme outcomes</b>	The following reference points were used in designing the programme: QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland QAA guidelines for programme specifications QAA Code of Practice for the assurance of academic quality and standards in HE University's Regulations BTEC Centre Guide to Assessment: Level 4 to 7 – Issue 4: December 2013
<b>Mode/s of study</b> (p/t, f/t, distance learning)	Part time
<b>Language of study</b>	English
<b>Date at which the programme specification was written or revised</b>	September 2014 Revised December 2015

## Criteria for admission to the programme

Entry requirements are in accordance with the University regulations.

The general requirement for the Higher National Certificate is 120 UCAS points at A level or equivalent. In addition applicants must have five GCSE passes at grades A, B or C including Mathematics and English/Welsh.

Other learning and experience may be considered for entry to the programme. A student may be allowed entry to a course if he or she does not have the standard entry qualifications but can provide evidence of necessary knowledge and skills to successfully enter and complete the course.

In keeping with the University's, and the Computing department's aim to widen participation, the academic entry requirements are kept as general as possible. The aim is to admit students who would benefit from the course by obtaining a qualification by the end of their period of study. For some students this course is seen as an access route to the degree programme in computing which has more rigorous entry requirements, whilst others will see it as an award in its own right.

In addition to the academic entry requirements, overseas students require an IELTS score of 6.0 (with no sub-part less than 5.5): this should have been achieved within the two years prior to application.

## Introduction

This document describes the rationale and structure of a programme for the award of Higher National Diploma (HND) and Certificate (HNC) in Computing and the modular framework within which it will be managed and delivered.

The aim of this document is:

- to pinpoint the main differences between the current programmes relating to the computing department and the new HND/C Computing Programmes
- to present a rationale for the design decisions that have been taken in the development of the new programme.

The department of Computing has reviewed its existing portfolio and has restructured this provision recognising that for a strong and viable future, responsiveness to market demand and effective delivery are vital. This is one of several new programmes designed to build an increasingly dynamic and sustainable future for Computing.

The computing graduate represents a set of qualities that the Department passionately believes is necessary for success in the 21st-century. Our programmes will produce reflective and critical learners with a global perspective, prepared to contribute in the world of work. With this in mind, our graduate qualities are embedded into the core modules for both the HNC and HND in computing.

Both awards have been designed to facilitate the development of the professional, technical and academic skills required for a career as a computer professional.

On successful completion of the HND, students may have the opportunity to continue their studies and work towards a degree within the computing discipline. Please see the Composition of awards and progression section later in this document for fuller details of progression opportunities. The HND is a recognised Level 5 qualification, and on successful completion will provide opportunities to gain employment within the computing industry.

The programme team maintains active links with businesses through our Industrial Liaison Group (ILG). Group discussions on intermediate qualifications through the delivery of foundation degrees (FD) and Higher National Diplomas (HNC/D) has highlighted a lack of understanding in relation to the Foundation degree award. Employers are generally more familiar with the traditional HNC/D route for further part-time or fulltime study. Feedback from our ILG and FE partners support the delivery of these intermediate qualifications.

Employment related learning and the development of industry awareness are vital aspects of the programme. The programme team has consulted with employers, collaborative partners and other stakeholders to develop this Higher national programme that will provide an opportunity for eligible students to develop their skills underpinned on knowledge and understanding in Computing, and to enhance their ability to contribute effectively at an appropriate level within an organisation or to progress to a higher level course. The programme offered is a motivating and intellectually challenging experience and provides the students with an enhanced capacity to cope with the demands and responsibilities of adult life and work. The programme contains options which allow some specialisation in particular subject areas.

The programmes are therefore, designed to meet the needs of employers and the computing professionals they require. In the development of this proposal the programme team were mindful of the descriptors for a Higher Nationals qualification described in the Framework for Higher Education Qualifications, the benchmark standards for computing proposed by the Quality Assurance Agency (2007).

### **Aims of the programme**

Computing is an exciting, challenging and dynamic discipline. Computers form an integral part of every aspect of society and modern life. New computing technologies are introduced at an enormous rate and the Computer Science field develops and changes continually and rapidly.

The aims for the programme are consistent with the BTEC guidelines for Higher National Diplomas in Computing.

The course is practical in nature and its general aims are to:

- Develop a broad range of knowledge of the concepts, principles and practice from a range of discipline areas appropriate to a Computing environment.
- Develop the student's creative abilities through practice and evaluation of that practice, while also developing their critical understanding in the area of their choice
- Stimulate an enquiring, creative, and reflective approach that encourages independent judgement and critical awareness
- Provide students with transferable skills, such as oral and written communication, time management and group working, to assist students in subsequent employment or further study
- Ensure that students have the basis for both future personal development and for continuing professional development

- Provide students with sound knowledge and expertise of software development principles across the whole software development lifecycle
- Investigate, analyse, design and implement systems in line with specific requirements
- Provide students with an awareness of the roles and responsibilities of a professional working within the computing profession.

In addition to these programme aims it is also expected that the following complementary aims may be achieved due to the proposed framework:

- To provide a variety of ways to complete the programme, according to the needs and abilities of the individual students
- To provide a platform for further study at a higher level

### **Distinctive features of the programme**

Higher national certificates and diplomas are nationally recognised qualifications, which allow the development of a wide range of knowledge and skills, relevant to computing, and skills that are transferable to a broad range of careers. The HNC/D programmes are designed to provide an educational foundation, to encourage progression into higher education for students who are working or studying within the computing sector. The programmes will provide students with current in-demand industry skills and has an emphasis on practical techniques underpinned by theory and informed by research and knowledge transfer activity. As such the programme has great employability potential - either as an employee within a company or as a means to empower students to progress entrepreneurially.

The programmes focus on a foundation of 'core computing', software development and systems design with elements of communication networks and the Internet. This broad base of knowledge is supported by robust professional skills that are vital to teamwork, problem-solving and career development. In the later stages, students develop more specialised abilities in areas that best fit their career aspirations. Students will develop their awareness of professional standards of conduct and practice; which will provide them with the ability to apply their skills, knowledge and understanding to a variety of computing problems and contexts.

The types of career prospects that students can expect to pursue upon successful completion of this award are: - a programmer, web developer, network administrator or database designer.

The Computing department has close contacts with industry through research, knowledge transfer programmes and consultancy. Wherever possible, industry specialists are invited to give guest lectures, conduct workshops and meet with students in order to impart their knowledge of real-life issues and opportunities. The programme will benefit from these established links by setting real world problems and using real data in practical projects and coursework - both individually and in groups.

#### key facts

- This course responds to identified skills gaps. It will provide students with the critical understanding, knowledge and skills needed for successful employment
- Personal Development Planning is integrated throughout the course to develop the skills framework necessary for effective personal, academic and career management

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

<b>Module Title</b>	<b>Core/ Optional</b>	<b>Level</b>	<b>Module Code</b>	<b>Credit Value</b>
Artificial Intelligence	O	5	COM521	20
Serious Games Technology	O	5	COM522	20
3D Modelling & Animation	O	5	COM505	20
Audio Technology for Games	O	5	COM503	20
Internet & Mobile App Development	O	5	COM502	20
Server Technology	O	5	COM523	20
Data Communications and Networks	O	5	COM524	20
Applied Programming	O	5	COM526	20
Human Computer Relationships	O	5	COM527	20
Databases and Web-based Information Systems	O	5	COM533	20
Agile Application Development	O	5	COM518	20
Database Administration and Optimisation	O	5	COM519	20
Student Initiated Module (SIM5)	O	5	COM525	20
HND Project Implementation	C (HND)	5	COM536	20
HND Project Design	C (HND)	5	COM535	20
Responsible Computing	C (HND)	5	COM528	20
HNC Project	C (HNC)	5	COM534	30
Computational Thinking	O	4	COM418	20
Interactive Design	O	4	COM419	20
Computing Maths	O	4	COM420	20
Digital Media Principles	O	4	COM405	20
Network Technologies	O	4	COM421	20
Web Technologies	C	4	COM423	20
Managing Data	O	4	COM425	20
Intro to JavaScript programming and DOM scripting	O	4	COM417	20
Student Initiated Module (SIM4)	O	4	COM422	20
Computer Systems	C	4	COM424	20
Problem Solving with Programming	C	4	COM426	20
Professional Development in Computing: Information Engineering	C	4	COM427	20

O – Option

C – Core

All modules are 20 credits apart from the Level 5 HNC Project module which is 30 credits. Level 5 optional modules are available on the HND only.

## Indicative Delivery Schedule

The following programme structure diagrams show the various delivery models for both programmes. Delivery is on a part time basis.

Students enrolled on the part-time HNC programme will study 60 credits a year for the first two years. At the end of their second year the students will be presented with a choice. Either to complete a 30 credit work-based project or to continue further studies and transfer to the part-time HND programme.

Typically, part-time delivery will be offered as a full day release or possibly over two afternoons and evenings per week depending on the cohort size and preference. If both routes are timetabled there will be some unavoidable delivery repetition.

### Year 1 HNC/D Computing (P/T)

Trimester 1		Trimester 2	
Professional Development in Computing: Information Engineering	Computer Systems	Professional Development in Computing: Information Engineering	Web Technologies

### Year 2 HNC/D Computing (P/T)

Trimester 1		Trimester 2	
Problem Solving with Programming	Option 1	Problem Solving with Programming	Option 2

### Year 2 Trimester 3 or Year 3 Trimester 1 HNC Computing (P/T)

Year 2 Trimester 3 or Year 3 Trimester 1
HNC Project (30 credit)

### Year 3 HND Computing (P/T)

Where a student is able to fully attend and engage with the part-time programme the following model will allow completion of the HND in one additional full year of study.

Trimester 1		Trimester 2	
Option 3	Option 4	Option 5	Responsible Computing

Students completing two modules per trimesters of year three will have an option to undertake and compete their HND project during trimester three. Alternatively, the project could be completed during the following year. The preferred choice largely depends on the type of project chosen. If a student is currently working within the sector then the project may be completed at their place of work.

**EITHER** Year 3 HND Computing (P/T)

Trimester 3	
HND Project Design	HND Project Implementation

**OR** Year 4 HND Computing (P/T)

Trimester 1	Trimester 2
HND Project Design	HND Project Implementation

The following alternative model displays a structure to deliver level 5 of the programme in a more balanced fashion that will be more appropriate where students are unable to attend during the working day. Typical delivery of this model will be over two evenings per week.

The Department recognises the timetabling and delivery implications of this approach but it may be required, in order to market our programmes and attract part-time students.

Year 3 HND Computing (P/T)

Trimester 1	Option 3	HND Project Design
Trimester 2	Responsible Computing	

Year 4 HND Computing (P/T)

Trimester 1	Option 4	HND Project Implementation
Trimester 2	Option 5	

**Composition of Awards and Progression**

The Higher National Certificate in Computing is an award available for a student who has completed 150 credits, of which 120 credits were studied at level 4 or above and 30 credits at level 5.

The Higher National Diploma in Computing is an award available for a student who has completed 240 credits, of which 120 credits were studied at level 4 or above and 120 credits at level 5.

Progression from the Higher National programmes can be directly into employment or via further study at degree level. Employed graduates of the programme will continue in employment and many fulltime graduates go into employment on achievement of their award.

The Higher National Certificate and Diploma offers a progression route to the second or third year of a Glyndŵr University honours degree programme, depending on the match of modules taken to the degree programme in question.

Progression HNC -> HND	After completing 120 credits at level 4 transfer to the HND award.		
Progression HND -> Degree	After completing 120 credits at level 4 transfer to the fulltime 2 <sup>nd</sup> year of a degree course.  Condition: Pass all modules at the first attempt. Achieve an overall average of at least 60%.	After completing the HND. Direct entry to level 6 of the BSc Computing degree programme.	After completing the HND. Transfer to level 5 of a named degree programme.

**Intended learning outcomes of the programme**

The first stage of all Undergraduate Computing programmes at the University provide students with core modules designed to provide students with the basic knowledge needed to undertake a degree in Computing. All students are introduced to: basic concepts of object-

oriented software development, basic knowledge of computer architecture and principles of hardware and operating systems. Students are expected to demonstrate basic understanding of these fundamental areas and display basic skills through a combination of written and computational work

#### Higher National Certificate / Diploma

The Higher national programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas.

The following reference points were used to inform the development of the programme and its learning outcomes:

- the University's vision and core strategic aims, teaching and learning strategy and policies;
- the QAA subject benchmark statement for Computing;
- the Framework for Higher Education Qualifications in England, Wales and Northern Ireland;
- the Credit and Qualification Framework for Wales (CQFW);
- current needs of the local, national and international computing industry;
- current research and other scholarship carried out by academic staff;
- BTEC Centre Guide to Assessment: Level 4 to 7 – Issue 4: December 2013

The following section identifies the Programme Learning Outcomes common to all computing undergraduate programmes.

Students will be able to demonstrate the following:

<b>A. Knowledge and understanding</b>	
<b>A1</b>	A critical appreciation of the facts, concepts, principles and theories relating to computing and computer applications as appropriate to the programme of study.
<b>A2</b>	The range of tools necessary to develop computational solution
<b>A3</b>	Industry standards for software confirmation, operation and testing
<b>A4</b>	Recognition of professional considerations involved in the sustainable exploitation of computer technology and is guided by the adoption of appropriate professional, ethical and legal practices.
<b>A5</b>	Working in collaborative teams, partnerships and industry networks

<b>B. Intellectual skills</b>	
<b>B1</b>	Identify, select and apply appropriate computational system development models and processes
<b>B2</b>	Develop cognitive skills of critical thinking, analysis and synthesis
<b>B3</b>	Select and apply suitable software development models and processes
<b>B4</b>	Apply industrial standards to software performance, interoperability and evaluation.
<b>B5</b>	Critically appraise the environment, industry and work place; identifying opportunities and threats.

<b>C. Subject specific skills</b>	
<b>C1</b>	Utilise appropriate research methods for presentation, analysis and interpretation of both qualitative and quantitative data, relevant to the discipline.
<b>C2</b>	Work collaboratively in teams and with potential partners in industry.

<b>C3</b>	Students are required to develop technical skills. This involves the students engaging in practical and project work throughout the course. This work is actively integrated to ensure that students relate theory and analysis to the design, operation and maintenance of computer software systems and networks
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**D. Practical, Professional and Employability skills**

<b>D1</b>	Written communication skills: Research, analyse and interpret information from a variety of sources and synthesise and communicate ideas effectively both orally and in writing
<b>D2</b>	Numeracy
<b>D3</b>	Multidisciplinary teamwork skills: actively participate in groups and also be capable of independent work.
<b>D4</b>	Information and communications technology skills
<b>D5</b>	Cognitive skills: Critically assess the relevance and importance of ideas of others
<b>D6</b>	Managing own learning: evaluate own performance and working standards and manage own learning and continuing professional development and develop lifelong learning skills

## A. Knowledge and understanding

		HNC	HND
<b>A1</b>	A critical appreciation of the facts, concepts, principles and theories relating to computing and computer applications as appropriate to the programme of study.	Demonstrates a working understanding of some essential facts, concepts, principles and theories relating to computing and computer applications. Shows competence in basic IT and communication skills, workshop practice and laboratory investigations	Demonstrates a widening appreciation of the significance of key concepts, principles, theories and practices that underpin computing as an academic discipline and explores its extent and boundaries through practical work, design exercises and case studies.
<b>A2</b>	The range of tools necessary to develop computational solution	Evaluate the appropriateness of a range of development tools for the creation of software applications.	Demonstrate an ability to apply a range of programming tools and techniques in new contexts from that in which they were first studied at level 4, in the design of applications.
<b>A3</b>	Industry standards for software confirmation, operation and testing	Demonstrate a working knowledge of some of the tools, practices and methodologies used in the specification, design, implementation and testing of computer software systems; understand some of the risks of software implementation	Demonstrates a widening appreciation of some of the tools, practices and methodologies used in the specification, design, implementation and testing of computer software systems; understand the risks of software implementation, Demonstrate a working of the general rules and best practices adopted and knowledge of software testing techniques
<b>A4</b>	Recognition of professional considerations involved in the sustainable exploitation of computer technology and is guided by the adoption of appropriate professional, ethical and legal practices.	a basic knowledge and understanding of the professional, economic, social, environmental, moral and ethical issues involved in the sustainable exploitation of computer technology	knowledge and understanding of the professional, economic, social, environmental, moral and ethical issues involved in the sustainable exploitation of computer technology
<b>A5</b>	Working in collaborative teams, partnerships and industry networks	The ability to work effectively with tutors and fellow students; participates in clearly defined group situations.	Demonstrates more advanced interactive and group skills, including

			effective participation with others on a common task or group project.
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## B. Intellectual skills

		HNC	HND
<b>B1</b>	Identify, select and apply appropriate computational system development models and processes	Based on classifications presented by tutors, demonstrates some ability to apply basic concepts, principles, theories when analysing case study examples with the help of detailed guidance from Tutors.	Demonstrates increasing ability to apply the key concepts, principles, theories and practices to relatively simple situations, still with some guidance provided.
<b>B2</b>	Develop cognitive skills of critical thinking, analysis and synthesis.	Using the tutor as a facilitator, the student begins to analyse basic problems, identify requirements and propose alternative solutions for computer software systems.	Starts to develop an understanding of the limits of their knowledge, and how this influences analysis and interpretations based on that knowledge; identify requirements and propose and compare alternative solutions for computer software systems
<b>B3</b>	Select and apply suitable software development models and processes	Carries out rote application of basic computing principles and procedures to standard, simple situations, with considerable guidance provided by tutors.	Applies standard computing principles and procedures to somewhat more demanding situations, still with some guidance provided.
<b>B4</b>	Apply industrial standards to software performance, interoperability and evaluation	Starts to form own value judgements of software development etc., based on criteria provided, albeit very reliant on tutors' evaluative opinions.	Starts to develop own criteria and develops ability to form independent judgements, although still dependent on guidance from tutors.
<b>B5</b>	Critically appraise the environment, industry and work place; identifying opportunities and threats	Develops an ability to explore and recognise any risks or safety aspects that may be involved in their work and to the relevance of selected professional, legal, moral, social and ethical issues; communicate the	Uses a range of established techniques within tutorials, for example, using experiential learning exercises, to explore and recognise the relevance of selected professional, legal, moral, social and ethical issues in their work

		results of their study/work accurately and reliably, and with structured and coherent arguments.	and to communicate the results of their study/work accurately and reliably, and with structured and coherent arguments.
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### C. Subject specific skills

		HNC	HND
<b>C1</b>	Utilise appropriate research methods for presentation, analysis and interpretation of both qualitative and quantitative data, relevant to the discipline.	Systematically relates a limited number of facts/ideas/elements in an imitative manner, with considerable guidance provided by tutors.	Demonstrates appreciation of need for the relating and collecting of a range of facts/ideas/elements in an argued case; produces new ideas in closely-defined situations with some guidance provided as appropriate.
<b>C2</b>	Work collaboratively in teams and with potential partners in industry.	The ability to work effectively with tutors and fellow students; participates in clearly defined group situations.	Demonstrates more advanced interactive and group skills, including effective participation with others on a common task or group project.
<b>C3</b>	Students are required to develop technical skills. This involves the students engaging in practical and project work throughout the course. This work is actively integrated to ensure that students relate theory and analysis to the design, operation and maintenance of computer software systems and networks	<p>On successful completion of this level, the student will be able to:</p> <p>Demonstrates basic skills that underpin good practice in the field of computers and networking, e.g. laboratory tasks involving the creation of simple programs and the use of operating systems.</p> <p>Demonstrates skills in IT (e.g. word processing, spreadsheets) and web techniques (e.g. web searching, web page creation).</p>	<p>Students will deepen their knowledge of programming concepts and approaches as well as being introduced to systems development techniques, information structure, and web applications. At this level, students will also be introduced to professional, legal and ethical issues relevant to the computing and IT industry.</p> <p>On successful completion of this level, the student will be able to:</p> <p>Undertake the requirement specification and design of a computing/I.T. system using a variety of tools and techniques.</p>

		<p>Demonstrate an understanding of hardware issues, including interfacing and data communications, and their impact on the overall design and performance of computer based systems.</p> <p>Undertake the conceptual design of a database system using an established data modelling technique and demonstrate critical judgement in selecting a proprietary database management system for any given application.</p> <p>Apply object oriented software development methods and make an informed selection of algorithms and/or data representatives for solving a range of standard problems.</p> <p>Demonstrate an awareness and understanding of the concepts, techniques, design process and context of computer graphics</p>	<p>Design and implement object oriented software for interactive systems that require a windows or web-based graphical user interface.</p> <p>Co-operate in an effective manner with colleagues and other professionals through the development of interpersonal and communication skills, within a project and business context.</p> <p>Display knowledge and understanding of programming and professional issues.</p>
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#### D. Practical, Professional and Employability skills

		HNC	HND
<b>D1</b>	Written communication skills: Research, analyse and interpret information from a variety of sources and synthesise and communicate ideas effectively both orally and in writing	Communicates in a clear and concise way, in writing and orally, in relatively informal and limited-length pieces of work. In particular written communication demonstrates competence in technical reporting.	Communicates in a clear, systematic and concise way, in writing and orally, in more formal academic and professional styles, and in longer pieces of work of a technical nature.

<b>D2</b>	Numeracy	Demonstrates basic numeracy and algebraic competence; ability to manipulate data related to simple business problems	Demonstrates more advanced standard numerical/ mathematical skills as appropriate to their chosen specialist subject.
<b>D3</b>	Multidisciplinary teamwork skills: actively participate in groups and also be capable of independent work	Interacts effectively with tutors and fellow students; participates in clearly defined group situations	Demonstrates more advanced interactive and group skills, including effective participation in more demanding group tasks, including a group project.
<b>D4</b>	Information and communications technology skills	Select under guidance and use relevant sources of information to identify potential computing resources for a specific purpose.  Demonstrates basic skill in using the Internet and designing web pages.	Demonstrates more advanced IT skills;  Demonstrates competent use and application of business databases, additional specialist subject packages and produce reports to business standard.  Use of online databases effectively to gain information.
<b>D5</b>	Cognitive skills: Critically assess the relevance and importance of ideas of others	Shows an understanding of the opinions of other people; flexibility in considering alternatives and opinions	Demonstrates the ability to take the perspective of others; identifying the similarities and differences between two approaches to the solution of a given problem
<b>D6</b>	Managing own learning: evaluate own performance and working standards and manage own learning and continuing professional development and develop lifelong learning skills	Studies in a systematic, directed way with the aid of appropriate Tutor guidance.	Learns in an increasingly effective and purposeful way, with beginnings of development as an autonomous learner.

**CURRICULUM MATRIX (Computing)** demonstrating how the overall programme outcomes are achieved and where skills are developed and assessed within individual modules.

		Knowledge and understanding, intellectual skills, subject skills, and practical, professional and employability skills																				
	Module Title	Core/ Opt	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4	D5	D6	
H N C	Professional Development in Computing: Information Engineering	C				X	X		X			X				X		X	X	X	X	
	Web Technologies	C	X	X	X			X	X	X			X	X	X		X		X		X	
	Problem Solving with Programming	C	X		X	X		X	X		X	X				X	X		X	X		
	Computer Systems	C	X		X	X		X	X		X	X				X	X		X	X		
	HNC Project	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Module Title	Core/ Opt	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	D1	D2	D3	D4	D5	D6	
H N D	HND Project Design	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	HND Project Implementation	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
	Responsible Computing	C	X	X	X	X	X	X	X			X	X		X	X			X	X	X	

**Module tutors**

<b>Module Title</b>	<b>Level</b>	<b>Module Leader</b>
3D Modelling & Animation	5	Nathan Roberts
Applied Programming	5	John Worden
Artificial Intelligence	5	Bo Liu
Audio Technology for Games	5	Richard J Smith
Data Communications and Networks	5	Nigel Houlden
HND Project Design	5	John Worden
HND Project Implementation	5	John Worden
Human Computer Relationships	5	Rich Picking
Internet & Mobile App Development	5	Jason Matthews
Responsible Computing	5	Denise Oram
Serious Games Technology	5	Nathan Roberts
Server Technology	5	John Davies
Databases and Web-based Information Systems	5	John Worden
Agile Application Development	5	John Worden
Database Administration and Optimisation	5	Bindu Jose
HNC Project	5	John Worden
Student Initiated Module (SIM5)	5	John Worden
Computational Thinking	4	Vic Grout
Computer Systems	4	Stuart Cunningham
Computing Maths	4	Vic Grout
Digital Media Principles	4	Nathan Roberts
Interactive Design	4	Richard Hebblewhite
Managing Data	4	Bindu Jose
Network Technologies	4	Nigel Houlden
Problem Solving with Programming	4	Rich Picking
Professional Development in Computing: Information Engineering	4	Denise Oram
Web Technologies	4	John Worden
Intro to JavaScript programming and DOM scripting	4	John Worden
Student Initiated Module (SIM4)	4	John Worden

There may be additional deliverers but those individuals listed above are identified as the Module leaders.

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

The Computing department recognise the need to develop more flexible programmes that meet the needs of a more diverse student body. These programmes are designed to offer a wider variety of provision for students with different demands and commitments.

The Department of Computing is known for its flexible approach with a Learning, Teaching and Assessment implementation plan aligned to wider University developments. However, the core

of our strategy 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.

The learning and teaching strategy deployed will be suitable to maximise opportunities for attainment of the programme aims. The strategy aims to:

1. have a continued emphasis on student-centred learning;
2. employ teaching methods that promote effective student learning, self-development and reflection;
3. promote active learning throughout the course, e.g. theoretical concepts being delivered in a framework of lectures, practical demonstrations and workshops applying theory to practice using activity based assignments;
4. deploy a variety of learning and teaching methods including:
  - Lectures - This is usually a formal discourse for the purposes of dissemination of information, the demonstration of techniques and the discussion of supporting ideas and consequences. The lecture is supported by a full range of equipment including blackboard, whiteboard, video and computer projection facilities where appropriate. Although this type of presentation is suitable for a one-sided discourse ample opportunity exists for questions, interaction and discussion.
  - Seminar and Tutorials - These activities encompass a wide range of activities, each suited to the particular module. On the one hand, some tutorials will consist of the staff supporting students engaged in problem solving. On the other hand a tutorial may involve group exercises where each group is encouraged to allocate responsibilities, allocate tasks, etc. Generally, this type of teaching is used to support the lecture, clarify the material and experiment with the techniques and skills required.
  - Laboratory – The nature of the computing elements of all courses requires students to gain practical skills in the use of a personal computer. This activity takes place in one of the Computing Department’s four computer laboratories and consists of the student, supported by a staff member, practising skills in the use of sophisticated software applications and including software development and systems analysis and design tools.
  - Group Work – students are encouraged to work in groups to achieve set objectives. Assessment of these activities includes both group and individual elements. In this way, students learn to work as a team to achieve a common goal whilst at the same time individual contribution is recognised and evaluated.
  - HND Project Design & HND Project Implementation – All HND students participate in two twenty credit modules; HND Project Design and HND Project Implementation, at level 5. These modules provide students with an opportunity to research and implement a project based upon the areas they have studied during the programme. The modules are designed to develop team working skills, project management, communication and other interpersonal skills such as negotiation, influence, advising, interpreting and planning to work efficiently within a computing team. In the case of working students, the team environment could be work based with the student working on a commercial project.
  - HNC Project - The aim of the module is to provide an opportunity for students to apply the knowledge and skills that they gained during the first year of the course.

It enables students to undertake tasks and related activities in the field of computing, and produce agreed project deliverables within deadlines. This module is designed to promote personal development and a range of interpersonal, intellectual and practical (functional) skills based around and demonstrated through an individually negotiated project/work package.

This approach is intended to:

1. strike a balance between 'class' activity and directed study 'out of class';
2. provide sound feedback to students and attempt to involve them in identifying their own learning needs;
3. use directed and supported group work for sharing experience and knowledge and developing interpersonal skills;
4. provide realistic and relevant learning activities;
5. make use of a variety of assessment methods to allow students the opportunity to demonstrate their own particular capabilities.

Full use of Moodle will be made as a way of helping to manage teaching and learning, and to keep in contact with students. Each programme and module within a programme has its own space on Moodle. A wide range of information is placed within each of these areas for students to access. General information such as the module handbook will be placed into the programme area, and lecture notes together with activities for completion such as directed reading and worksheets will be placed into module spaces. Lecture notes will be either posted 24hours prior to the lecture or immediately after, dependent on the preference of the member of staff.

Moodle will be also an effective way of keeping in contact with students by posting messages, for example informing students on arrangements for guest speaker visits.

**See overleaf for Trimester Delivery Schedule**

<b>2014/15 Academic Year Calendar -Framework</b>				
<i>Timetable week number</i>	<i>Date</i>	<i>trimester teaching weeks</i>	<i>single intake programmes - students</i>	<i>single intake programmes - staff*</i>
1	28-Jul-14			
2	04-Aug-14			
3	11-Aug-14			
4	18-Aug-14			
5	25-Aug-14			
6	01-Sep-14			
7	08-Sep-14			
8	15-Sep-14			
9	22-Sep-14	1	Teaching/induction	Teaching/induction
10	29-Sep-14	2	Teaching	Teaching
11	06-Oct-14	3	Teaching	Teaching
12	13-Oct-14	4	Teaching	Teaching
13	20-Oct-14	5	Teaching	Teaching
14	27-Oct-14	6	Teaching	Teaching
15	03-Nov-14	7	Teaching	Teaching
16	10-Nov-14	8	Teaching	Teaching
17	17-Nov-14	9	Teaching	Teaching
18	24-Nov-14	10	Teaching	Teaching
19	01-Dec-14	11	Teaching	Teaching
20	08-Dec-14	12	Teaching	Teaching
21	15-Dec-14	13	Teaching	Teaching
22	22-Dec-14		Christmas vacation	Christmas
23	29-Dec-14		Christmas vacation	Christmas
24	05-Jan-15	1	Teaching	Teaching
25	12-Jan-15		University Exams	University Exams
26	19-Jan-15	2	Teaching	Teaching
27	26-Jan-15	3	Teaching	Teaching
28	02-Feb-15	4	Teaching	Teaching
29	09-Feb-15	5	Teaching	Teaching
30	16-Feb-15	6	Teaching	Teaching
31	23-Feb-15	7	Teaching	Teaching
32	02-Mar-15	8	Teaching	Teaching
33	09-Mar-15	9	Teaching	Teaching
34	16-Mar-15	10	Teaching	Teaching
35	23-Mar-15	11	Teaching	Teaching
36	30-Mar-15		Spring Vacation	Spring Vacation
37	06-Apr-15		Spring Vacation	Spring Vacation
38	13-Apr-15	12	Teaching	Teaching
39	20-Apr-15	13	Teaching	Teaching
40	27-Apr-15		University Exams inc Saturday	University Exams inc Saturday
41	04-May-15		University Exams Tues/Wed Marking Thur/Fri	University Exams Tues/Wed Marking Thur/Fri
42	11-May-15		Additional Study weeks*	Marking /Pre board
43	18-May-15		Additional Study weeks*	Module board
44	25-May-15		Additional Study weeks*	Progression & Award Board

The university's adoption of a trimester system divides the academic year into three periods of 13 teaching weeks. Typically, a 20 credit module specification will specify the module duration as 200 hours, of which the scheduled learning and teaching hours total 60 hours and the independent study hours total 140 hours. This delivery pattern is recognised by the department as being appropriate for modules that are both academically and technically demanding and

challenging. However, the GU Wrexham, programme team has discussed contact hours in detail and feels that in order to provide our students with the best opportunity the department will deliver modules with the following contact hours. The delivery is based on a delivery schedule of 12 weeks, allowing for a study break.

Level 4 = up to 6 hours per week per module

Level 5 = up to 5 hours per week per module

The Department also recognises that some modules such as the project, are more students focused and directed and therefore do not require the same level of staff contact.

### **Welsh Medium Provision**

All students have the opportunity to submit assessment in Welsh, in line the University's Welsh Language Policy. Currently, 0% of the programme can be delivered in Welsh.

### **Assessment strategy used to enable outcomes to be achieved and demonstrated**

The approach to assessment has been guided by the QAA Code of Practice for the assurance of academic quality and standards in Higher Education (2006) (Section 6: Assessment of students) and Glyndŵr University Assessment Guidelines.

Students will be bound by the general assessment regulations of the University. The University regulations provide 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.

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.

The practical nature of the programme is reinforced through the importance of coursework as part of the learning process and assessment. Despite the importance of their theoretical basis, many of the concepts can often best be grasped by practical exercises and assignments. The coursework of a module typically carries 50% weight of the assessment, although this varies with modules assessed entirely by coursework.

Practical coursework includes:

- exercises for private study or in practical/tutorial classes
- exercises in computing laboratories
- programming exercises and projects
- team and individual projects

In the process of formulating the proposed assessment strategy, the programme team discussed at length, the number of, and the types of assessment most appropriate for the programmes. The general view of the team is that where it is appropriate to do so, the learning outcomes may be assessed with each element of assessment. The module learning outcomes indicate to the student what they are expected to know and how they are expected to

demonstrate that knowledge in their assessment tasks. The programme team recognise that when determining the types of assessment tasks that will align with the modules learning outcome statements they consider that one task can cover more than one learning outcome and a learning outcome can be assessed more than once. Assessing a learning outcome more than once provides an opportunity for feedback and further learning (such as in an assessment task during the trimester, and then again, in a different way, in a final test or assignment). This approach is also supported by the fact that the Programme Team intends to apply for full British Computer Society (BCS) accreditation for the main suite of programmes once validated and populated with students. Guidance given to BCS accreditation assessors (of which the Computing's Head of Department is one) suggests that key criteria from the BCS required lists should be 'embedded' in each programme rather than 'included superficially'. Also these terms are not precisely defined; unofficial guidance to assessors is that this should mean that a number of key criteria, when traced down through module specifications into assignments, should be seen to be assessed at least twice.

There will be emphasis placed upon students to undertake independent study and research activities, in particular when completing the Project element of the course. This 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.

Feedback is provided continuously to students through informal contact with subject lecturers and tutors in the seminar/tutorial and laboratory settings. In accordance with University Guidance, feedback is provided on assessed practical work normally within three weeks of submission of the work.

An overview of the assessment details will be provided in the Student Handbook and full details of the assessment criteria for each module is provided in the module descriptor which forms part of the module pack available to students.

## Module Assessment

Level	Module Title	HE Credit	Assessment Type	Weighting	Submission
5	3D Modelling & Animation	20 Option	Coursework	100%	Trimester - End
5	Applied Programming	20 Option	Coursework	100%	Trimester - End
5	Artificial Intelligence	20 Option	Group Project Group Project	50% 50%	Trimester - Mid Trimester - End
5	Audio Technology for Games	20 Option	Coursework Coursework	50% 50%	Trimester - Mid Trimester - End
5	Data Communications and Networks	20 Option	Coursework Examination	60% 40%	Trimester - Mid Trimester - End
5	HND Project Design	20 Core	Group Project	100%	Trimester - End
5	HND Project Implementation	20 Core	Group Project	100%	Trimester - End
5	HNC Project	30 Core	Project	100%	Trimester - End
5	Human Computer Relationships	20 Option	Report	100%	Trimester - End
5	Internet & Mobile App Development	20 Option	Coursework Coursework	50% 50%	Trimester - Mid Trimester - End
5	Responsible Computing	20 Core	Coursework	100%	Trimester - End
5	Serious Games Technology	20 Option	Coursework Coursework	50% 50%	Trimester - Mid Trimester - End
5	Server Technology	20 Option	Case Study	100%	Trimester - End
5	Databases and Web-based Information Systems	20 Option	Coursework Group Project	50% 50%	Trimester - Mid Trimester - End
5	Agile Application Development	20 Option	Coursework	100%	Trimester - End
5	Database Administration and Optimisation	20 Option	Coursework Coursework	50% 50%	Trimester - Mid Trimester - End
5	SIM5	20 Option	Coursework	100%	Trimester 1 or 2 - End
4	Computational Thinking	20 Option	Group Project In-class test	50% 50%	Trimester - Mid Trimester - End
4	Computer Systems	20 Core	Essay In-class test	50% 50%	Trimester - Mid Trimester - End

4	Computing Maths	20 Option	Coursework In-class test	50% 50%	Trimester - Mid Trimester - End
4	Digital Media Principles	20 Option	Portfolio	100%	Trimester - End
4	Interactive Design	20 Option	Group Project Portfolio	50% 50%	Trimester - Mid Trimester - End
4	Managing Data	20 Option	Coursework In-class test	70% 30%	Trimester - Mid Trimester - End
4	Network Technologies	20 Option	Coursework In-class test	50% 50%	Trimester - Mid Trimester - End
4	Problem Solving with Programming	20 Core	Report	100%	Trimester - End
4	Professional Development in Computing: Information Engineering	20 Core	Portfolio	100%	Trimester - End
4	Web Technologies	20 Core	Coursework	100%	Trimester - End
4	Intro to JavaScript programming and DOM scripting	20 Option	Coursework	100%	Trimester - End
4	SIM4	20 Option	Coursework	100%	Trimester - End

### **Assessment regulations that apply to the programme**

The University's Academic Regulations for BTEC Higher National Qualifications apply to these programmes.

### **Programme Management**

The programmes will be managed by the Undergraduate Programme Leader within the Computing department. Module tutors and the Undergraduate School Office will provide additional support.

Department student performance and monitoring meetings will take place where required and the programme team will be invited to attend the appropriate programme board meetings scheduled during each trimester.

#### **Programme team:**

Prof Vic Grout – Head of Computing  
John Worden – Undergraduate Programme Leader  
John Davies  
Stuart Cunningham  
Denise Oram  
Rich Hebblewhite  
Nathan Roberts  
Bindu Jose  
Nigel Houlden  
Rich Picking  
Bo Liu  
Jason Matthews  
Stephen Caulder  
Clive Buckley

The Undergraduate Programme Leader will have overall responsibility for the operation and development of the course. He will work closely with Module Leaders, Module Tutors, Personal Tutors and Administrative Support personnel to provide the day to day general academic support to students. He will also meet regularly with the Academic Head of Computing.

The Undergraduate Programme Leader 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, 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

The assurance of quality will conform to the procedures set out by Glyndŵr University's requirements for academic quality assurance, monitoring and review. The primary indicators of quality come through regular student feedback, module reviews, external examiners' reports, annual and periodic programme reviews and student surveys.

Methods for evaluating and enhancing the quality of learning opportunities:

- Subject / Programme committees with student representation
- Module evaluations by students
- Students surveys, e.g. National Student Survey (NSS)
- Annual quality monitoring and action planning through the AMR process
- Peer review/observation of teaching
- The moderation of assessed coursework
- Student Representatives and Staff Student Consultative Committees
- Module, Progression and Award Boards
- External Examiners - External examiners are appointed for all programmes of study. They oversee the assessment process and their duties include: approving assessment tasks, reviewing assessment marks, attending assessment boards and reporting to the University on the assessment process.

Mechanisms for gaining student feedback:

- Student Representation on Subject Board
- Staff Student Consultative Committees
- Module and Programme level student questionnaires

Staff Development Priorities:

- Academic staff undertake activities related to research, scholarship, teaching and learning and student support and guidance
- Annual staff appraisals match development to needs
- New academic staff required to undertake PgCert in Professional Development in Higher Education.
- All academic staff are encouraged to seek Higher Education Academy membership

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..

Staff on the 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. Staff are encouraged to undertake regular publication of academic papers and attendance of specialised conferences.

### **Particular support for learning**

Support and guidance is available to students throughout the programme. Students have access to a great deal of guidance for students through the virtual learning environment (Moodle). In addition, they can also get help and guidance from their Programme Leader, Personal Tutor and Year Tutor. They can also get module specific advice from the Module Leader and any of the staff teaching on the relevant module.

Additional support mechanisms include:

- Extensive induction programme introduces the student to the University and their course. The programme will include course related issues, student support, library induction, study skills, career development etc.
- Each student has a personal tutor, responsible for pastoral support and guidance.
- University support services include - careers, financial advice, housing, study skills, counselling etc.
- Excellent library and Internet facilities.
- Student handbook provides information about course structures, University regulations etc.
- Transferable skills / Key Skills are usually incorporated into all modules.
- Written feedback is provided for all assessments usually within three weeks of the hand-in date.

- Open door policy throughout the departments.

### **Student Feedback**

The programme team is committed to receiving and responding to student feedback in order to improve the quality of the student experience and development of learning and teaching. The core principle is that all students should have the opportunity to contribute to and enhance their experience. Student representation therefore, is crucial to ensure the opinions and concerns of the student body are communicated to staff. This is also key to ensure an efficient flow of communication from staff back to students.

Feedback from students plays a critical part in informing the programme team's strategic thinking. It also allows the team 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:

- The Staff-Student Consultative Committee (SSCC) chaired by the Programme Leader will be held at least once per trimester and involves elected student representatives from each cohort of study. The Chair will minute student feedback for action/response by the Programme Leader. Minutes of the SSCCs and the response from the Programme Leader are posted on the programme pages of Moodle.
- Student Evaluation of Module (SEM) – Students are encouraged to complete an on-line SEM midway and at the end of each module through Moodle. A summary of the analysis of the SEM, along with any other feedback, will be available to the Programme Leader for action/response. Student feedback is collected and reported as part of the Annual Monitoring Report (AMR) process.

### **Equality and Diversity**

Glyndŵr University is committed to providing access to all students and promotes an equal opportunities statement including equal treatment for all applicants and students. This programme fully complies with the university's policy on Equality and Diversity.