

SWANSEA METROPOLITAN UNIVERSITY
PRIFYSGOL FETROPOLITAN ABERTAWE

Faculty of Applied Design and Engineering/Cyfadran Dylunio Cymhwysol a Pheirianneg
School of Applied Computing/Ysgol Cyfrifiadureg Gymhwysol

BSc Computing Portfolio

B.Sc. (Honours) Business Information Technology
B.Sc. (Honours) Computer Networks
B.Sc. (Honours) Computing and Information Systems
B.Sc. (Honours) Software Engineering
B.Sc. (Honours) Web Development

STUDENT HANDBOOK 2011 - 12

September 20th 2011

B.Sc. (Honours/Ordinary) Computing Portfolio
Diploma/Certificate of Higher Education Computing Portfolio

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INTRODUCTION AND PROGRAMME STRUCTURES

This document contains the module syllabi of the B.Sc. Computing Portfolio of Programmes offered by the School of Applied Computing, Swansea Metropolitan University and also provides additional information for the students reference.

The Portfolio comprises:

- B.Sc. (Honours) Business Information Technology
- B.Sc. (Honours) Computer Networks
- B.Sc. (Honours) Computing and Information Systems
- B.Sc. (Honours) Computer Games Development
- B.Sc. (Honours) Software Engineering
- B.Sc. (Honours) Web Development

- B.Sc. (Ordinary) Business Information Technology
- B.Sc. (Ordinary) Computer Networks
- B.Sc. (Ordinary) Computing and Information Systems
- B.Sc. (Ordinary) Computer Games Development
- B.Sc. (Ordinary) Software Engineering
- B.Sc. (Ordinary) Web Development

B.Sc. (Honours) Business Information Technology

The Business Information Technology programme focuses on the methods and technologies used to create effective information technology (IT) systems as solutions to business problems. The programme will provide for the development of skills and the acquisition of knowledge for development in organisations, of information systems utilising IT. A graduate from the programme would be expected to demonstrate knowledge of business functions and strategies, and undertake a range of tasks associated with conceiving, designing, developing, implementing and managing appropriate information systems within the business context. The successful utilisation of information technology will require an in-depth knowledge of IT management issues, project management, end-user computing, data management, e-Commerce/web development issues and the management of financial and human resources. It is anticipated that students following this programme will not wish to develop in-depth programming skills; however, a high level of competence should be attained in the development of software utilising a variety of software applications. The emphasis is on analysing business requirements and translating them into business systems made from standard software building blocks. Thus, the student will undertake complementary in-depth studies of systems analysis and design, and IT management issues, which will be allied to the development of practical skills and the study of business strategies.

B.Sc. (Honours) Computer Networks

The Computer Networks programme will provide for the development of skills and the acquisition of knowledge with respect to the installation, management and maintenance of a variety of computer networks. In addition to providing the necessary background in hardware, software and computer systems, the programme explores the

themes of network technology, network management, network security and network operating systems.

This programme will provide the necessary background knowledge required for appropriate professional qualifications in networking. A graduate from this programme would typically be employed as part of the technical support team, with network management responsibilities, within small or large installations.

B.Sc. (Honours) Computing and Information Systems

The Computing and Information Systems programme will provide for the development of skills and the acquisition of knowledge in respect of two main themes: information systems development, and software development in the information systems context. A graduate from the Computing and Information Systems programme may be employed appropriately by a variety of organisations, large or small, and using information systems and software for specialist or general purposes. S/he may be expected to undertake the range of tasks associated with conceiving, designing, developing and implementing appropriate information system and software solutions to meet organisational needs.

B.Sc. (Honours) Computer Games Development

The overall aim of this programme is develop students with the skills to work in the Games industry as games developers. Games development is a specialisation of software engineering, which focuses on the development of games or high performance real-time simulation involving a high standard of programming and mathematical skills. As such, many of the traditional core software engineering topics are addressed in the programme but are given a different emphasis with significantly more focus on interactive computer graphics. Given the relationship between games development and software engineering, some modules of the programme are common to both the B.Sc. Computer Games Development and the B.Sc. Software Engineering. Games programmers typically specialize in either Computer Graphics or Artificial Intelligence, although other areas of expertise include audio, games tools, etc. Topics such as Games AI cover the same content as found on a standard software engineering course, but are applied in different scenarios such as finding a path through a games level.

B.Sc. (Honours) Software Engineering

Students following the Software Engineering programme are concerned with the discipline of developing robust, complex software systems rather than systems in the wider context. Graduates from this programme will have a greater knowledge and skill mastery in the technical aspects of software development, and are likely to find employment either within specialist software organisations, or within organisations which commit resources to developing highly technical software systems. S/he is likely to have to work as a member of a team, conceiving, designing, developing and implementing distributed software.

Thus, the student will undertake an in-depth study of programming and software engineering, which emphasises the formal approach and software project management requirements for developing large and complex systems, underpinned by development

of theoretical and mathematical skills and complemented by an awareness of the wider role of computing in the organisational context.

B.Sc. (Honours) Web Development

The Web Development programme has been developed in response to the rapidly-increasing requirements of industry and commerce for qualified graduates in this discipline. Thus, the programme provides for the development of skills and the acquisition of knowledge in respect of the themes of web authoring, web design, web development and web management.

Graduates from the programme may be expected to gain employment in any of the above areas. The essential themes will be complemented by a study of systems analysis, programming, database design, multimedia and networking principles.

For ease-of-reference, the modular organisation of each pathway is depicted in figure 1 overleaf .

Figure 1 B.Sc. Computing Portfolio Structures

Level 4 modules are taken at year 1, level 5 at year 2 and level 6 at year 3.

Business Information Technology	Computer Networks	Computing and Information Systems
Level 4	**Level 4**	**Level 4**
Study Skills (10)	Study Skills (10)	Study Skills (10)
Computer and Network Architecture(20)	Computer and Network Architecture(20)	Computer and Network Architecture(20)
Data Analysis & Database Design (20)	Data Analysis & Database Design (20)	Data Analysis & Database Design (20)
Systems Analysis & Design (20)	Systems Analysis & Design (20)	Systems Analysis & Design (20)
Web Authoring (10) / Web Design & Development (10)	Web Authoring (10)	Web Authoring (10) / Web Design & Development (10)
Management in the IT Environment (20)	Computer Programming (20)	Visual Programming (30)
Programming for Business (10)	IP Internetworking (20)	
Level 5	**Level 5**	**Level 5**
Project Management and IT Consultancy (20)	Project Management and IT Consultancy (20)	Project Management and IT Consultancy (20)
Research and Development Methods (20)	Research and Development Methods (20)	Research and Development Methods (20)
Database Management Systems (20)	Local Area Networks (20)	Database Management Systems (20)
End User Computing (20)	Wireless Networks and Protocol Design (20)	Application Design & Development (20)
Entrepreneurship (20)	Network Operating Systems and Security (20)	Data Centric Windows Programming (20)
Options (1 of 2)	**Options (1 of 3)**	**Options (1 of 2)**
e-Commerce (20)	e-Commerce (20)	Entrepreneurship (20)
Multimedia Web Development(20)	Network Services and Web Technology (20)	Network Services and Web Technology (20)
	Entrepreneurship (20)	
Level 6	**Level 6**	**Level 6**
Project or Dissertation (40)	Project (40)	Project (40)
Information Systems Strategy (20)	Wide Area Networks (20)	Information Systems Strategy (20)
Data Warehousing for Business Intelligence (20)	Advanced Routing (20)	Data Warehousing for Business Intelligence (20)
Managing People and Change (20)	Network Management (20)	Geographical Information Systems (20)
Options (1 of 3)	**Options (1 of 2)**	**Options (1 of 3)**
Geographical Information Systems (20)	Geographical Information Systems (20)	Advanced Web Development (20)
Rich Internet Applications Development (20)	Internet Security (20)	Distributed Enterprise Applications (20)
Usability Engineering (20)		Usability Engineering (20)

Software Engineering	Web Development	Computer Games Dev

Level 4	Level 4	Level 4
Study Skills (10)	Study Skills (10)	Study Skills (10)
Computer and Network Architecture(20)	Computer and Network Architecture(20)	Games Physics and Maths (30)
Data Analysis & Database Design (20)	Data Analysis & Database Design (20)	Modelling Lighting and Rendering Theory(10)
Systems Analysis & Design (20)	Systems Analysis & Design (20)	Computer Systems (20)
Web Authoring (10)	Web Authoring (10) / Web Design & Development (10)	Games Design and History (10)
Introduction to Programming (40)	Visual Programming (30)	Introduction to Programming (40)

Level 5	Level 5	Level 5
Software Engineering Principles (20)	Project Management and IT Consultancy (20)	Software Engineering Principles (20)
Algorithms and Data Structures (10) / Academic Seminar (10)	Research and Development Methods (20)	Game Content Engineering (20)
Systems Software & Multi User Applications Engineering (20)	Application Design & Development (20)	Games Programming and Graphics (30)
Database Management Systems (20)	Multimedia Web Development (20)	Academic Seminar (10)
Data Centric Windows Programming (20)	Data Centric Windows Programming (20)	Introduction to Games AI (20)
	Network Services and Web Technology (20)	Casual Games Development (20)
Options (1 of 2)	Options (None)	Options (None)
Entrepreneurship (20)		
Application Design & Development (20)		

Level 6	Level 6	Level 6
Project (40)	Project (40)	Project (60)
Interactive Graphics Programming (20)	Rich Internet Applications Development (20)	Entrepreneurship (20)
Distributed Enterprise Applications (20)	Advanced Web Development (20)	Networked Multiplayer Games (20)
Real Time Systems Development (20)	Distributed Enterprise Applications (20)	
Options (1 of 3)	Options (1 of 3)	Options (1 of 2)
Geographical Information Systems (20)	Geographical Information Systems (20)	Advanced Graphics (20)
Advanced Web Development (20)	Usability Engineering (20)	Advanced AI (20)
Data Warehousing for Business Intelligence (20)	Internet Security (20)	

* Please note that some *optional* modules will only be offered if a sufficient number of students elect to study those modules.

LEVEL 4 MODULES

Module Title:	Computer and Network Architecture
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8605
Module Value:	20 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will provide the student with an understanding of the key concepts and building blocks of computer systems, and also clarify the issues associated with network use and how this has developed. It will identify the architectural concepts behind networking and help develop the preliminary skills necessary to install and manage networks.

LEARNING OUTCOMES:

Upon successful completion of this module the students will be able to:

1. Demonstrate a sound understanding of the essential characteristics and concepts of computer system architectures, operating systems and software.

2. Develop fundamental understanding of network basics in terms of architecture, devices, application and protocols.

INDICATIVE CONTENT:

- Hardware and Software characteristics of PC systems.
- Computer systems: system block diagram, CPU, memory, input/output unit, system clock, data, address, control buses and Von-Neuman architecture, pipelining, design strategies (RISC and CISC) etc.
- Memory Organisation: associative, cache, virtual memory (paged and segmented), memory system design for high performance.
- Input/output including polled, interrupt driven and direct memory access.
- Interface Design including bus systems, address decoding, registers and buffering.
- Operating System functions, processes/threads, memory, device drivers & storage, I/O and application management, User interface, proprietary & open source.
- Network principles and applications definition of a network.
- Evolution of network uses e.g. LANs, WANs. MANs.
- Networked applications, overview of cost/benefits of network use.

- Network architectures, OSI 7-layer model.
- Introduction to standards, e.g. IEEE 802.
- Topologies, e.g. bus, ring, hierarchical.
- Communication devices, repeaters, bridges and hubs, standard connectors and wiring.
- Description of main protocols, i.e. Ethernet, token ring, TCP/IP.
- Installation of server and client operating systems.
- Introduction to active directory.

LEARNING AND TEACHING STRATEGY:

Formal lectures will be accompanied by handouts and slide presentations to impart knowledge. Students will be required to consult relevant academic publications, such as peer-reviewed journals, technical reports, and industry publications to assist their learning. Weekly tutorials will be provided to enable students to gain a practical understanding of the fundamental principles of computer hardware, software, and network architectures. Students will be required to present their practical work to an audience of peers and the module lecturers.

	Hours
Lectures	30
Laboratory/workshop	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a sound understanding of the essential characteristics and concepts of computer system architectures, operating systems and software.	• Investigate, describe and evaluate the purpose and characteristics of computer components. • Explain, discuss and appraise the purpose and characteristics of operating systems and software.
2. Develop fundamental understanding of network basics in terms of architecture, devices, application and protocols.	• Identify the various parts of a network system and relate it to the 7-layered model. Differentiate and evaluate various structures and topologies. • Design a local area network for an organization and produce a coherent argument as to the advantages and disadvantages of using certain network technologies.

Learning outcome 1 will be assessed by one assignment that will involve group work. Learning outcome 2 will be assessed by a mid-term assignment and end-of-year exam. Thus, the assessment weightings for the module are:

Outcome 1:	Coursework	50%
Outcome 2:	Coursework	25%
	Exam	25%
	Total	**100%**

READING LIST:

Essential Texts:

Englander, I. (2009) — The Architecture of Computer Hardware and System Software: An Information Technology Approach, 5th Ed., Wiley: New York

Irving, P. (2005) — Computer Networks, 2nd Ed., Lexden Publishing: Colchester

Background Reading:

Carter, A., Hind, R. and Chalk, B (2003) — Computer Organisation and Architecture: An Introduction, 2nd Ed., Palgrave Macmillan: Basingstoke

Tanenbaum, A. S. (2007) — Modern Operating Systems, 3rd Ed., Prentice hall: Upper Saddle River

Tanenbaum, A. (2002) — Computer Networks, 4th Ed., Prentice Hall: New Jersey

Peterson, L. & Davie, B. (2007) — Computer Networks: A System Approach, 4th Ed., Elsevier: San Francisco

Hallihan, R. (2008) — Windows Home Server : Protect and Simplify Your Digital Life, John Wiley: Hoboken

Hennessy, J. & Patterson, D. A. (2007) — Computer Architecture : A Quantitative Approach, 4th Ed., Morgan Kaufmann: Amsterdam

Journals

IEEE Computer Magazine
IEEE Network Magazine
IEEE Transactions on Networking

IEEE Communications Magazine
IEEE Internet Computing Magazine
IEEE Transactions on Communications
IEEE Transactions on Wireless Communications

Useful Websites

http://www.cisco.com
http://www.microsoft.com
http://www.ss64.com/nt
http://www.networktutorials.info

PHYSICAL RESOURCES:

Network analysis and protocol analysis software, routers, switches, hubs, cables and connectors, PCs

ROOM REQUIREMENTS:

Lecture Theatre, Network Laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Dr. Xianhui Che
Staff delivering the module:	Dr. Xianhui Che Lee J. Cobley

Module Title:	Computer Programming
Date Of Validation:	SEPTEMBER 14TH 2009
Module Number	M1X8606
Module Value:	20 credits
Level:	4
Faculty Responsible for Delivery:	Faculty of Applied Design and Engineering
Prerequisites:	None

AIMS:

This module introduces high-level language programming concepts relevant to the networking domain, stressing the importance of good design techniques and developing in students the ability to program using a structured high level language.

LEARNING OUTCOMES:

Upon the successful completion of this module, the student will be able to:

1. Demonstrate an understanding of the components of a high level language.
2. Design algorithms in order to solve problems.
3. Produce modular code.

INDICATIVE CONTENT:

- The software life cycle - analysis, design, implementation, maintenance
- Algorithm design – flow charts, pseudo code
- The programming environment - editor, compiler, debugger
- High level language programming, using a structured language e.g. C
- Data types, variables, operators, control structures, data structures, functions
- Testing - black box, white box, testing strategies
- Documentation - user guide, technical guide etc.

LEARNING AND TEACHING STRATEGY:

	Hours
Lectures	30
Laboratory/workshop	30
Student Private Study	140
TOTAL	200

The theoretical content regarding high-level programming languages will be introduced in the lectures and developed in laboratory work. Practical work will involve the design and implementation of programs using a suitable methodology. The importance of a structured and modular approach will be emphasised throughout the module.

ASSESSMENT:

Coursework	75%
In-class Test	25%

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate an understanding of the components of a high level language.	• Use the features and characteristics of a high-level language to create solutions to given problems • Develop, test, debug and demonstrate a working solution.
2. Design algorithms in order to solve problems.	• Produce logically correct algorithmic solutions to given problems documented using flowchart and/or pseudo code. • Apply algorithms in order to write logically correct program code.
3. Production of modular code.	• Write and test a high level language program to satisfy a specification and produce efficient modular code. • Document the program listing appropriately.

Outcome 1 will be assessed formatively throughout the module with a number of practical worksheets relevant to the topic being studied. Each worksheet will set the student a number of small problems which require the student to write programs which implement programming concepts and structures obeying the syntax and semantics of the chosen language. This outcome will then be summatively assessed by means of in-class test (weighting 25%)

Outcome 2 will be assessed through a practical mid-year assignment (weighting 25%), this will involve students evaluating and writing a program/s to solve a network-related problem which implement/s a number of algorithms and data structures. This will be fully documented with flowcharts/pseudocode and other appropriate professional standards.

The final outcome (Outcome 3) will be assessed through a major end-of-year assignment (weighting 50%). This will require students to implement a software solution incorporating all appropriate technique studied throughout the academic year. This program should be appropriately documented.

READING LIST:

Essential:

Deitel, H. & Deitel, P. (2008)	C How to Program (5th edition) Prentice Hall
Kochan, Stephen (2004)	Programming in C, Sams

Background:

Kernighan, B. W. and Ritchie, D. (1998)	The C Programming Language (2nd Edition) Prentice-Hall
H Schildt (2000)	C: The Complete Reference, 4th Ed., Osborne

Useful websites:

http://www.cprogramming.com
http://www.acm.uiuc.edu/webmonkeys/book/c_guide/
http://www.geocities.com/SiliconValley/Software/5562/
http://www.relisoft.com/index.htm
http://www.oopweb.com/

PHYSICAL RESOURCES:

- PCs

ROOM REQUIREMENTS:

- PC laboratory
- Lecture Room

STAFF RESOURCES:

Module co-ordinator: Gaynor Thomas

Staff delivering this module: Gaynor Thomas
Kevin Palmer

Module Title:	Data Analysis and Database Design
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8607
Module Value:	20
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

The module will provide the student with the theory and essential concepts involved in the design and implementation of database systems. Data analysis techniques will be studied in order to gather and analyse end user requirements for the construction of a database through the use of both graphical tools and Structured Query Language (SQL).

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Understand and apply the underlying concepts, principles and practice involved in a database development process to analyse problem scenarios and design appropriate solutions.

2. Produce a database solution that involves problem solving and evaluation skills assembling the various components to create a prototype application and accompanying documentation.

INDICATIVE CONTENT:

- ANSI/SPARC three level architecture (external level, conceptual level, internal level).
- Data models (e.g. Relational, Object-Oriented and Object-Relational).
- DBMS Functions and Capabilities (Sorting, Searching, Indexing, Wizards etc)
- Entity Relationship Modelling, Determinancy Diagrams, Normalisation (1NF to 3NF)
- Database Design. Select suitable data types, entity and referential constraints, convert logical database design to physical implementation using appropriate visual tools and structured query languages.
- Database in the organisation: identification of data requirements from different user perspectives, comparison of top-down and bottom-up approaches to data analysis, their strengths and weaknesses
- Entity analysis techniques, entities, attributes, key identifiers, relationship types and enterprise rules, entity relation diagrams (ERDs), degrees of a relationships.

- Analysis: introduction to problems of redundancy, update anomalies, purpose of normalisation, functional dependency, determinancy diagrams and identification of unnormalised data structures, development of first, second and third normal forms
- Database Implementation. Use of query languages and visual tools for database maintenance, inserts, updates and amendments of data. Query languages (SQL) and query by example (QBE) to extract meaningful data, including formatting and use of functions/formulae, report writing tools, links to stored queries, design and format of reports, including graphical output. DBMS documenting tools and data dictionary. Application links to Office software products.

LEARNING AND TEACHING STRATEGY:

Key concepts and theoretical issues will be delivered through a formal mechanism such as lectures, which will allow the students to gain the knowledge applicable to this module During weekly laboratory sessions, students will apply the theoretical concepts to practical situations.

	Hours
Lectures:	30
Laboratory/workshop	30
Student private study hours:	140
TOTAL HOURS:	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand and apply essential concepts, principles and practice involved in a database development process to analyse problem scenarios and design an appropriate solutions.	• Demonstrate a sound understanding of the essential concepts, principles and current practices involved in database design. • Produce an appropriate database design for a given scenario.
2. Produce a database solution that involves problem solving and evaluation skills assembling the various components to create a prototype application and accompanying documentation.	• Implement a database solution to a given case study using the visual tools supplied by an appropriate database management system. • Test and debug the database solution.

Coursework 100%

Outcome 1 will be assessed through a midterm database design assignment. The students will be presented with a typical database design problem which will allow the student to demonstrate their ability to apply the database design techniques that they have studied. (Weighting 50%)
Outcome 2 will allow the students to demonstrate their ability to build an interactive database system using appropriate software (Weighting 50%).

READING LIST:

Essential Texts:

Begg, C. and Connolly, T. (2004)	Database Solutions: A Step-by-Step Approach to Building Databases, Addison Wesley
Begg, C. and Connolly, T. Holowczak R. (2008)	Business Database Solutions, Addison Wesley

Background Reading:

Bagui, S. and Earp, R. (2004)	Learning SQL: A Step-by-Step Guide Using Access, Addison Wesley,
Begg, C. and Connolly, T. (2004)	Database System: A Practical Approach to Design Implementation and Management, Addison Wesley
Elmasri, R. and Navathe, S. (2004)	Fundamentals of Database Systems, Addison Wesley
Ritchie, C. (2002)	Relational Database Principles 2nd Edition, Continuum

Journals:

Communications of the ACM
Journal of Very Large Databases

Useful Web Sites:

www.quasar.ualberta.ca/edpy202/
tutorials/database/database.htm
www.thinkbrown.com/programming
www.tutorgig.com
www.databasejournal.com
www.ovdvl.com/Authoring/Tutorials/Database.html
www.tutorialized.com/tutorials/Database
www.w3schools.com/sql/default.asp
www.sqlcourse.com
www.1keydata.com/sql/sql.html
www.sqlzoo.net
www.searchdatabase.techtarget.com
www.vtc.com
www.hot-oracle.com
http://w2.syronex.com/jmr/edu/db/
www.softlookup.com
www.informit.com/guides

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Access, SQL Server, Oracle

ROOM REQUIREMENTS:

PC laboratory, Lecture Room

STAFF RESOURCES:

Staff coordinator:	Beverley Holland Stephen Hole
Staff delivering module:	Beverley Holland Stephen Hole

Module Title:	Introduction to Programming
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8608
Module Value:	40
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering

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AIMS:

This module will introduce students to software constructs and to the development of software using a high level programming language. Simple design concepts and good programming practices will be adopted. Students will understand the fundamental algorithms and data structures and will apply them to solve software problems. The concept and use of software libraries will also be introduced, to familiarise the student with the use of commercially available software components.

OUTCOME STATEMENTS:

Upon successful completion of this module, the student will be able to:

1. Understand basic software constructs, the syntax & semantics of a high level language and develop programs using good programming practices.

2. Evaluate and apply fundamental algorithms and data structures.

3. Apply a provided software library and programming framework.

INDICATIVE CONTENT:

- Development tools
- Good programming practices e.g. structured and object oriented programming
- Software constructs e.g. selection construct, loop constructs, iteration, sub-routines, etc
- High level programming language/s e.g. C/C++/C#
- Control statements, functions, arrays, I/O, Data Types, File Handling,
- Object paradigm
- Classes, objects, inheritance, encapsulation, messages, behaviour, structure
- Implementation of the above through ADTs
- Introduction to Algorithms
- Simple data structures using ADTs e.g. stacks, queues
- Software debugging
- Software libraries e.g. Win32, MFC, Qt etc.
- Software Frameworks e.g. .Net, etc.

- An introduction to windows programming and window application development e.g. C# Windows Forms
- Software testing

LEARNING AND TEACHING STRATEGY:

This course will primarily have a practical focus. The material will be delivered in a laboratory setting allowing teaching strategies which keep the student active (inputting examples from the board, group solution of small programming problems etc.) This will also allow flexibility to review common problems which emerge when students are working though tutorial exercises.

	Hours
Lectures	0
Tutorials	0
Laboratory	120
Student Private Study	280
TOTAL	400

ASSESSMENT:

Student will be assessed by a number of assignments. Assignments may take the form of developing solutions to given real life problems using the techniques introduced during the lectures.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand basic software constructs, the syntax & semantics of a high level language and develop programs using good programming practices.	• Produce solutions to a range of simple programming problems using appropriate high level language constructs. • Debug and test high level language code to produce working programs with associated test results.
2. Evaluate and apply fundamental algorithms and data structures.	• Evaluate and select appropriate algorithms and data structures in order to solve a given problem. • Produce a working program that will implement these fundamental algorithms and data structures.
3. Apply a provided software library and programming framework.	• Develop software elements to a given specification using software library components. • Develop a program using a programming framework to a given specification.

Outcome 1 will be assessed through the use of a series of practical worksheets at the beginning of the module (weighting 25%). Each worksheet will set the student a number of

small problems which require the student to write programs which implement programming concepts and structures obeying the syntax and semantics of the chosen language. Outcome 2 will be assessed through a practical mid-year assignment (weighting 25%), this will involve students evaluating and writing a program/s which implement/s a number of algorithms and data structures. The final outcome (outcome 3) will be assessed through a major end-of-year assignment (weighting 50%). This will require students to utilise existing libraries and frameworks to implement a software solution to a given problem possibly with reference to a given design.

Coursework 100%

READING LIST:

Essential Texts:

Deitel, H. & Deitel, P. (2008)	C How to Program (5th edition) Prentice Hall
Nyhoff, L. (2005)	ADTs, Data Structures, and Problem Solving with C++ (2nd Edition) Prentice Hall
Liberty, J. (2007)	Programming C# 3.0 O'Reilly

Background Reading:

Lee, M. (2010)	C++ Programming for the Absolute Beginner Delmar
Deitel, H. & Deitel, P (2009)	C++ How to Program (7th edition) Prentice Hall
Deitel, H. & Deitel, P (2004)	Visual C++.NET: How to Program Prentice Hall
Liang, D. (2001)	Introduction to Programming with C++ (2nd Edition) Prentice Hall
Blanchette, J. & Summerfield, M. (2008)	C++ GUI Programming with Qt 4 (2nd Edition) Prentice Hall
Pearce (2004)	Windows programming Using MFC Addison – Wesley
Petzold, C. (1998)	Programming Windows (5th Edition) Microsoft Press

Sedgewick, R. (2002)	Algorithms in C++: (parts 1-5) Fundamentals, Data Structures, Sorting, Searching and Graph Algorithms Addison – Wesley
Stroustrup, B. (2008)	Programming: Principles and Practice Using C++ Addison – Wesley
Kernighan, B. W. and Ritchie, D. (1998)	The C Programming Language (2nd Edition) Prentice-Hall

Useful websites:

http://www.cprogramming.com
http://cplus.about.com/library/blcplustut.htm
http://www.winprog.org/tutorial/
http://www.acm.uiuc.edu/webmonkeys/book/c_guide/
http://www.geocities.com/SiliconValley/Software/5562/
http://www.relisoft.com/index.htm
http://www.oopweb.com/

RESOURCES:

Lecture room
Computer Laboratory

ROOM REQUIREMENTS:

PCs with appropriate specification
Appropriate software IDE
Blackboard VLE

STAFF RESOURCES:

Staff co-ordinator:	Glenn L. Jenkins
Staff delivering this module:	Glenn L. Jenkins Mike Dacey

Module Title:	IP Internetworking
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8609
Module Value:	20 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will provide the student with an in introductory knowledge of the technical issues related to the IP Protocol suite. Students will gain a detailed understanding of the various hardware devices used in modern network design and will understand the fundamental technical principles of routing protocols and IP Addressing

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate an ability to design subnets, VLSM subnets and the implementation of routing protocols
2. Design and test internetworks using routers and switches.

INDICATIVE CONTENT:

- IP Addressing Class A, B, C and subnet design
- Introduction to CIDR and VLSM
- The use of ARP and proxy ARP with MAC and IP addressing in LANs to successfully transfer data across LANs
- Role of routing in delivering data to remote networks.
- Routing Protocol types such as Distance Vector, Link State and Hybrid protocols with their strengths and weaknesses.
- Practical examples of Distance Vector routing protocols such as RIP version 1 and 2.
- Introduction to Link State Routing Protocols, Single area OSPF
- Configuring and Testing Networks

LEARNING AND TEACHING STRATEGY:

The use of case studies in tutorials will be used to reinforce the basic theory underlying this subject delivered during lectures. Practical work will be in the form of detailed design and evaluation of complex systems using Cisco routers and switches or simulation software.

	Hours
Lectures	30
Laboratory/workshop	30
Self Study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate an ability to design subnets, and the implementation of routing protocols	• design internetworks and subnets (including VLSM) and be able to detail all the calculations and decisions needed in this process • explain the details of routing protocols and how they can be implemented in practical situations
2. Design and test internetworks using routers and switches.	• design build and test an internetwork using Cisco hardware and/or simulation software such as Opnet or Packer Tracer • Produce a formal laboratory report.

Outcome 1 will be assessed by examination and outcome 2 will be assessed by coursework

Coursework	50%
Exam	50%

READING LIST:

Essential Texts:

Buchanan, W.J (2005)	Mastering Networks, Palgrave
Antoon Rufi, Priscilla Oppenheimer, Belle Woodward, Gerlinde Brady (2008)	Network Fundamentals, CCNA Exploration Labs and Study Guide
Allan Johnson (Dec 2007)	Routing Protocols and Concepts, CCNA Exploration Labs and Study Guide

Background Reading:

Tanenbaum, A.S. (2002)	Computer Networks, Prentice Hall
CISCO Systems (under continual revision)	CCNA Semester 1,2 and 4 Multimedia Examination Course, CISCO Systems
Lewis, C. (2000)	Cisco TCP/IP Professional Reference, McGraw-Hill

Journals

IEEE Network Magazine
IEEE Transactions on Networking
IEEE Communications Magazine
IEEE Transactions on Communications
IEEE Transactions on Wireless Communications

Useful Websites
www.cisco.com
cisco.netacad.net
http://www.wi-fiplanet.com/tutorials/

PHYSICAL RESOURCES:

Network analysis and protocol analysis software, routers, switches, hubs, cables and connectors, PCs, Cable Testing equipment.

ROOM REQUIREMENTS:

- PC Laboratory
- Network Laboratory

STAFF RESOURCES:

Module co-ordinator:	Gwynfor Higgins
Staff delivering this module:	Gwynfor Higgins Xianhui Che Ian Wells

Module Title:	Management in the IT Environment
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8610
Module Value:	20 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will provide students with the underlying knowledge and principles that help them to understand organisations and the environments in which they operate. Particular reference will be made to how the IT 'function' affects, supports and interacts with other business functions, and the management of the IT people.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Analyse the environment of a given organisation to evaluate the effects of information systems/information technology on the organisation.

2. Evaluate management strategies to lead and motivate employees based on an understanding of individual and group behaviour.

INDICATIVE CONTENT:

- Types of organisation and ownership (the public/private/not-for-profit sectors sole trader, partnerships, private and public limited companies, co-operatives, mutual societies, not-for-profit,).
- Analysing the business environment (e.g. SLEPT/SWOT analyses) to identify how IS/IT can be used to exploit opportunities and minimise threats.
- Organisational mission and objectives, and the contribution of the IT/IS function.
- Organisational structure, culture and communication and the effects of IS/IT
- The role of different business functions (e.g. marketing, production, human resources, finance, legal department) and the uses of IT/IS to support their activities.
- Managerial levels (e.g. strategic, tactical and operational levels) and their different types of information needs.
- Categories of information systems to satisfy different users' information needs (e.g. transaction processing systems, management information systems, decision support systems, expert systems, enterprise systems).
- Functions of management (e.g. Fayol's model: planning, organising, commanding, co-ordinating, controlling). The distinction between management and leadership.

- Theories of leadership: trait, style and contingency theories.
- Schools of managerial thought (for example, classical/scientific management, human relations, systems theory).
- Management ethics.
- Content and process theories of motivation. Motivation, rewards and performance.
- Individual behaviour: personality, perception and intelligence.
- Groups and group dynamics: the nature of groups and teams, informal and formal groups, advantages and disadvantages of groups, factors that affect group effectiveness and cohesion, team roles. IT Project team roles and skills.

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. However, for the exploration of these topics and their application to organisational case studies pertaining to management in the IT environment, tutorials are the most appropriate strategy. Tutorials /seminars will also facilitate student-directed small group activities, as students work within groups to achieve the assessment outcomes and enhance their group-working transferable skill.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Analyse the environment of a given organisation to evaluate the effects of information systems/information technology on the organisation.	• Produce a report that discusses the benefits and limitations associated with different types of organisation. • Conduct secondary research into the business environment of a chosen organisation/case study. • Use analytical frameworks to structure the investigation and results of the environmental analysis. • Produce a written evaluation of the ways that the IS function supports/impacts other functional departments and provide examples.
2. Evaluate management strategies to lead and motivate employees based on an understanding of individual and group behaviour.	• Extract and document the key people management problems experienced by a case organisation • Produce a report to discuss the effects of alternative styles of management, leadership and motivation on individual, group and/or organisational performance. • Produce a set of recommendations for the management, leadership and motivation of individuals in the workplace for a case organisation. • Produce a written evaluation of the strengths and weaknesses of teamwork compared with working individually.

Coursework 100%

The learning outcomes are assessed via two case study based course works (50:50 weighting). Outcome 1 will be assessed by a written assignment/report of approximately 2,000 words. This will allow students to demonstrate their knowledge of business and other organisations, their use of IT/IS and the environments in which they operate. Outcome 2 will involve group work (2,000 words or equivalent). This outcome encourages students to consider the realities of people management and suggest strategies to manage individuals and teams in the workplace.

READING LIST:

Essential reading:

Laudon, K.C. & Laudon, J.P. (2007)	Management Information Systems: Managing the Digital Firm, 10th Ed., Pearson: New Jersey, USA
Mullins, L. J. (2007)	Management and Organisational Behaviour, 8th Edition, Financial Times/Pitman Publishing: London
Worthington, I. & Britton, C. (2006)	Business Environment, 5th Ed., Pearson: Harlow

Recommended Reading:

Bovee, C.L. & Thill, J.V. (2008),	Business in Action, 4th International Edition, Prentice Hall: New Jersey
Brooks, I. (2009)	Organisational Behaviour: Individuals, Groups and Organisation, 4th Ed., Financial Times/Prentice Hall: London
Brooks, I., Weatherston, J and Wilkinson, G (2004)	International Business Environment, Financial Times/Prentice Hall: London
Business Basics: A Study Guide for Degree Students, (2003)	Organisational Behaviour, BPP Publishing: London
HND/HNC Business Study Text 4 (2004)	Business Environment, BPP Publishing: London
Huczynski, A. & Buchanan, D. (2007)	Organisational Behaviour, 6th Edition, FT/Prentice Hall: Harlow
Jessup, L. & Valacich, J. (2008)	Information Systems Today: Managing in the Digital World, 3rd Ed., Pearson: New Jersey, USA
Laudon, K.C. & Laudon, J.P. (2007)	Essentials of Business Information Systems, 7th Ed.,

Pearson: New Jersey, USA

Rollinson, D. (2008) Organisational Behaviour and Analysis, 4th Ed., Pearson: London

Stair, R. & Reynolds, G. (2008) Fundamentals of Information Systems, 4th Ed., Thomson Learning: Boston, Mass

Journals

Information Age
Information Management Journal
Information & Management
Information Systems Management
Journal of Management Studies
Management Today
People Management
Personnel Today

Useful Websites

Business Link	http://www.businesslink.gov.uk
Business Learning and Support	http://www.bized.co.uk
Emerald Fulltext Journals and Abstract Reviews	http://juno.emeraldinsight.com
IT Wales	http://www.itwales.com
IT and Business web site	http://www.silicon.com
Online technology magazine	http;//zdnetweek.co.uk

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.

STAFF RESOURCES:

Staff Co-ordinator: Karen Jones

Staff delivering this module: Karen Jones
James Williams

Module Title:	Programming for Business
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8611
Module Value:	10
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering

AIMS:

This module will provide students with an understanding of programming concepts and practice as applied to business problems and provide underpinning for software applications on the Business Information Technology programme.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate an understanding of fundamental programming concepts.

2. Evaluate and apply the appropriate methods, to create a simple business application

INDICATIVE CONTENT:

- Linking business needs and software development: prototyping and storyboarding
- The programming environment using a tool such as VB .Net
- Data and business organisations: Variable types and naming conventions
- Programming concepts such as selection and iteration.
- Files and databases
- Debugging and testing

LEARNING AND TEACHING STRATEGY:

The theoretical content regarding high-level programming languages will be introduced in the lectures and developed in laboratory work. Practical work will involve the design and implementation of programs using a suitable methodology. The importance of a structured and modular approach will be emphasised throughout the module.

	Hours
Lectures	15
Laboratory/workshop	15
Student Private Study	70
TOTAL	100

ASSESSMENT:

Outcomes	Assessment Criteria To achieve each outcome a student must:
1. Demonstrate an understanding of fundamental programming concepts.	- Use the features and characteristics of a programming environment to create solutions to given business problems - Develop, test, debug and demonstrate a working solution.
2. Evaluate and apply the appropriate methods, to create a simple business application	- Document and evaluate program solutions to business problems. - Produce a document of around 2,000 words with documentation to the prescribed format and standard as well as analysis of the business problem solution.

Outcome 1 and 2 will be assessed by coursework. The weighting is 50:50 for the two outcomes. Both outcomes will be assessed in a single piece of coursework involving both a program solution and a report analysing business issues in the scenario.

Coursework 100%

READING LIST:

Essential:

Shneider, David (2008) An Introduction to Programming in Visual Basic
Pearson Education

Background:

Bell, Douglas (2008) Visual Basic for Students (3rd Ed)
Addison Wesley

Tsay, Jeffrey (2003) Visual Basic: Programming Business Applications
Prentice Hall

PHYSICAL RESOURCES:

- PCs

ROOM REQUIREMENTS:

- PC laboratory
- Lecture Room

STAFF RESOURCES:

Module co-ordinator: Sue Maw

Staff delivering this module: Sue Maw

Module Title:	Study Skills
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8612
Module Value:	10 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

The study skills needed for higher education are ultimately gained through studying at that level; they evolve and mature through practice, trial and error, feedback from others and student reflection. This module aims to provide students with the underlying study strategies that can accelerate that learning process. Students will be encouraged to develop a reflective, active, positive approach to learning, and to take responsibility for their own learning. Such skills promote a deeper understanding of the topics studied throughout the B.Sc. programme; they support lifelong learning, and are the transferable skills desired in the employment context.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Create a personal development plan based on a self-evaluation of skills

2. Reflect on the application and achievement of the study skills learned

INDICATIVE CONTENT:

- Identifying skills (e.g. self-evaluation, skills needed for higher education, transferable skills, action plans for personal development).
- Understanding the learning process (e.g. definitions, the learning process, conditions for learning, learning styles, memory).
- Organising study (e.g. time management, organising space, organising resources)
- Gathering relevant information (e.g. effective note taking, using the library and the internet, reflecting on experience)
- Communicating and presenting information (e.g. presentation techniques, styles)
- Developing an appropriate writing style (e.g. planning and structuring essays and reports, linking ideas together, using facts, opinions or arguments, analytical thinking, etc.)
- Referencing convention (e.g. the Harvard System, the numeric system)
- Revision and examination techniques (e.g. preparation, organisation, memory aids, managing stress)

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. However, for the exploration of these topics and their application within the students' studies, tutorials are the most appropriate strategy.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	15
Tutorials/Seminars	15
Student private study	70
TOTAL	100

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Create a personal development plan based on a self-evaluation of skills	• Document the results of a personal skills audit that identifies strengths to build on and areas for improvement. • Produce written work that identifies the skills required for successful higher education learning • Identify the 'skills gap' and generate a written action plan to address the learning objectives required.
2. Reflect on the application and achievement of the study skills learned	• Write in report format. • Produce a written reflection upon the application of the study skills learned (e.g. report writing, presentation techniques, analytical techniques, referencing convention, exam technique, etc.) using examples to illustrate their use.

Coursework 100%

Both outcomes will be assessed via one written assignment, which will be completed in two parts (approximately 2,000-2,500 words).

READING LIST:

Essential Texts:

Cottrell, S. (2008) Study Skills Handbook, 3rd Ed., Palgrave Macmillan: Basingstoke

Background Reading:

Cottrell, S. (2003)	Skills for Success: The Personal Development Planning Handbook (Palgrave Study Guides), Palgrave Macmillan: Basingstoke
McMillan, K. & Weyers, J. (2007)	The Smarter Student: Study Skills & Strategies for Success at University, Prentice Hall: Harlow
Peck, J. & Coyle, M. (2005)	The Student's Guide to Writing: Grammar, Punctuation and Spelling 2nd Ed., Palgrave Macmillan: Basingstoke
Piscitelli, S.V. (2009)	Study Skills: Do I Really Need This Stuff? 2nd Ed., Prentice Hall: Harlow
Price, G. & Meier, P. (2007)	Effective Study Skills: Essential skills for academic and career success, Prentice Hall: Harlow
Sinfield, S & Burns, T. (2003)	Essential Study Skills: The Complete Guide to Success at University, Sage Publications Ltd

Journals
As appropriate to the research topic

Useful Websites

www.skills4study.com/
www.palgrave.com/skills4study/
www.ltscotland.org.uk/studyskills/
www.bized.co.uk/reference/studyskills/index.htm
www.how-to-study.com/
www.brunel.ac.uk/~mastmmg/ssguide/sshome.htm

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones, Sue Maw

Module Title:	Systems Analysis and Design
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8613
Module Value:	20 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

The module will introduce students to the underlying concepts and principles necessary for the analysis and design of computer-based systems, with an emphasis on requirements analysis. As well as gaining theoretical knowledge, the student will learn to appreciate the practical and business realities in relation to systems analysis and design.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Produce a project initiation document for a given computer-based system scenario

2. Apply appropriate systems investigation and analysis techniques to identify and translate user requirements into a requirement specification

3. Apply appropriate systems design techniques to produce a system specification

INDICATIVE CONTENT:

- Systems development lifecycle (SDLC) rationale and stages
- Project initiation, feasibility analysis and planning.
- Systems investigation techniques (e.g. document analysis, interviews, questionnaires, observation, joint application design).
- Understanding organisational needs and uses of IT/IS: requirements gathering, reporting and evaluation.
- Modelling and recording techniques appropriate to the approach employed (e.g. use case diagrams or DFD's, use case or process descriptions, class diagrams or ERD's, etc.).
- Design considerations (e.g. centralised/distributed systems, batch/real-time processing, packaged or bespoke software, hardware choices, input devices, files/database design, input/output/interface design).
- Implementation methods (e.g. testing, conversion, changeover).
- Alternative approaches to analysis and design (e.g. spiral systems development life cycle, structured methods, object-orientation, RAD).
- Ethics in systems analysis and design

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. However, tutorials are necessary to develop the practical skills required to investigate the requirements and design a solution to the business problem presented in the case study used as a vehicle for assessment. The lecture and tutorials will be student driven, reflecting the knowledge and skill required at each stage of the system's development.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Produce a project initiation document for a given computer-based system scenario	• Extract and document the key problems experienced by a case organisation. • Specify key objectives of a proposed system. • Consider constraints on the project. • Document according to professional standards.
2. Apply appropriate systems investigation and analysis techniques to identify and translate user requirements into a requirement specification	• Use a range of techniques to investigate and document a system problem. • Produce a written requirements catalogue for a computer based system. • Produce, using established techniques, a graphical model that reflects the current and/or proposed system.
3. Apply appropriate systems design techniques to produce a system specification	• Document suggestions for a range of outline alternative solutions for a case study organisation based on an evaluation of the case context and available technology. Select and justify the most suitable alternative solution from the range. • Produce a written cost-benefit analysis for an organisation's computer system. • Produce, using established techniques, a set of models that reflects aspects of the design of a computer-based system.

Coursework 100%

Assessment will be by one case study/practically based coursework assignment which will be split into three logical stages to simulate the process undertaken by systems analysts. The student will be required to:

1. Produce a statement of scope and objectives/project initiation document for the project (outcome 1, weighted 10%)
2. Analyse a given business information problem and specify the requirements for the proposed system (outcome 2, weighted 40%)
3. Design a computer-based solution in the format of a system specification (outcome 3, weighted 50%)

READING LIST:

Essential Texts:

Dennis, A. & Wixom, B.H (2009)	Systems Analysis and Design, 4th Ed., Wiley: NY.
Hoffer, J.A., George, J.F. and Valacich, J.S. (2008)	Modern Systems Analysis and Design, 5th International Ed., Prentice Hall: New Jersey
Yeates, D. & Wakefield, T. (2004)	Systems Analysis and Design, 2nd Edition, FT/Prentice Hall: Harlow

Background Reading:

Ashrafi, N. & Ashrafi, H. (2009)	Object Oriented Systems Analysis and Design: International Edition, Prentice Hall: New Jersey
Dennis, A., Wixom, B.H. and Tegarden, D. (2010)	Systems Analysis and Design: An Object-oriented Approach with UML, 3rd Ed., Wiley: MA.
Kendall, K.E. & Kendall, J.E. (2008)	Systems Analysis and Design, 7th International Ed., Prentice Hall: New Jersey
Maciaszek, L. (2007)	Requirements Analysis and Systems Design, 3rd Ed., Addison Wesley: Australia
Whiteley, D. (2004)	Introduction to Information Systems, Palgrave Macmillan: Basingstoke
Whitten, J.L., (2007)	Introduction to Systems Analysis and Design Methods, McGraw Hill: London
Whitten, J.L. & Bentley, L.D. (2006)	Systems Analysis and Design Methods, 7th International Ed., McGraw Hill: London

Journals

ACM Transactions on Information Systems
Behaviour and Information Technology
Communications on the ACM
International Journal of Electronic Commerce

Journal of Strategic Information Systems
Journal of Systems Management

Useful Websites

http://www.acm.org
http://www.bized.co.uk
http://www.managers.org.uk
http://www.cbronline.com
http://www.eevl.ac.uk
http://juno.emeraldinsight.com
http://www.ft.chadwyck.co.uk
http://www.itwales.com
http://www3.gartner.com
http://www.silicon.com
http://www.mckinseyquarterly.com
http://www.zdnetweek.co.uk

PHYSICAL RESOURCES:

Computer/projector.
Automated documentation tools

ROOM REQUIREMENTS:

Lecture theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Mike Dacey

Module Title:	Visual Programming
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8614
Module Value:	30 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

The module will provide the student with the essential software concepts involved in the implementation, testing and debugging of Windows applications. Simple design concepts and good programming practices will be adopted throughout the module.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Understand basic software constructs syntax and semantics of a Windows based programming language.

2. Develop, test, debug and document a Windows application that involves problem identification, analysis and design.

INDICATIVE CONTENT:

- Windows Programming Concepts (Development environment, Event Driven Programming, Structured Programming, Simple Object Oriented Programming)
- Forms and Controls
- Types, Variables, Arrays and Procedures
- Software Constructs including: Selection Structures and Loops
- Validating User Input
- Creating and Using Class Modules (for example, data abstraction/information hiding, message passing, etc.)
- Error Handling and Debugging (to include debug window, watch window, in-line error handling, etc.)
- Simple Database Interfacing (for example, connecting to external databases, data retrieval, data updates, etc.)

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	60
Student private study:	210
TOTAL HOURS	300

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand basic software constructs, syntax and semantics of a Windows based programming language.	• Demonstrate a sound understanding of the tools and constructs of a Windows based development language. • Develop a series of small programs using basic software constructs, syntax and semantics.
2. Develop, test, debug and document a Windows application that involves problem identification, analysis and design.	• Develop and document a Windows application using an appropriate development environment. • Test and debug a Windows application.

Outcome 1 will be assessed through a series of worksheets at the beginning of the module. Outcome 2 will be assessed through a major end of year assignment.

Coursework 100%

READING LIST:

Essential Texts:

Halvorson, M. (2008) Microsoft Visual Basic 2008 Step by Step, Microsoft Press

Sharp, J. (2008) Microsoft Visual C# 2008 Step by Step

Background Reading:

Gaddis, T. and Irvine, K. (2008) Starting Out with Visual Basic 2008, Pearson Education

Liberty, J. and Xie, D. (2007) Programming C# 3.0

Patrick, T. (2008) Programming Visual Basic 2008, O'Reilly

Petroutsos, E. (2008) Mastering Microsoft Visual Basic 2008, John Wiley

Useful Websites

www.vbnetadvisor.com
www.vb2themax.com
www.vbwm.com
www.msdn.microsoft.com/msdnmag
www.visualbasic.ittoolbox.com
www.fawcette.com/vsm
www.developer.com
www.programmersheaven.com
www.vbnet.mvps.org
www.vbdotnetheaven.com
www.a1vbcode.com
www.devarticles.com
www.developfusion.com
www.abstractvb.com

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Access, SQL Server, Oracle, Windows Integrated Development Environment.

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

STAFF RESOURCES:

Staff coordinator:	Stephen Hole
Staff delivering module:	Stephen Hole Mike Dacey

Module Title:	Web Authoring
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8615
Module Value:	10 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Prerequisites:	None

AIMS:

This module will give the student a conceptual and practical understanding of web standard languages and their application in the development of web sites and information systems. The module will explore the fundamental principles and techniques of mark-up, style and meta languages and will introduce client side scripting.

LEARNING OUTCOMES:

On successful completion of this module students will be able to:

1. Demonstrate an understanding of the syntax & semantics of meta, markup, style and client side scripting languages;

2. Evaluate, select and apply the essential concepts, principles and techniques required to hard-code a web site.

INDICATIVE CONTENT:

- Understand the rationale and semantics of Web Standard languages;
- Information structures such as website tree diagrams, wire-frames, site maps, storyboards;
- Construct websites using standard languages such as xHTML, XML, CSS, DOM, JavaScript;
- Structure web pages using HTML;
- Presentation and positioning using CSS;
- Scripting and site interactivity using JavaScript;
- Layout techniques such as table-based versus CSSP and hybrid designs.
- Introduce client-side application development and AJAX.
- Usability, accessibility and performance guidelines;
- Semantic web and Interoperability using XML;

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.
All course material will be stored on the Universities Virtual Learning environment, allowing students to gain access to handouts/slides/tutorials both on and off campus. Students are required to keep a self-reflective progress blog, documenting their personal learning strategy and progress on a weekly basis. Guided by the tutor this method ensures the most effective use of the 'Student private study' time and supports the student's professional and transformational learning and development. Collaborative learning is also supported by Social Networking tools.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	0
Tutorials/seminars	10
Laboratory/workshop	20
Student private study:	70
TOTAL HOURS	100

ASSESSMENT:

Outcomes:	**Assessment Criteria:** **To achieve each outcome a student must:**
1. Demonstrate an understanding of the syntax & semantics of meta, markup, style and client side scripting languages.	• Demonstrate an understanding of the underlying concepts and techniques of mark-up, meta, style and scripting languages in a written report. • Apply web standard languages to solve specific problems. • Provide report documentation explaining the site design and coding methods and techniques.
2. Evaluate, select and apply the essential concepts, and techniques required to hard-code a web site.	• Hand code a web site using mark-up, meta, style and scripting languages. • Document website testing and evaluation.

Coursework: 100%
Both outcomes will be assessed via one piece of coursework, which will take the form of a written assignment. The student will be required to:
1. Design an interactive website (outcome 2, weighted 50%)
2. Provide a written report documenting the analysis, design, implementation and evaluation process. (outcome 1, weighted 50%)

READING LIST:

Essential:

Deitel & Deitel (2007)	Internet and World Wide Web: How to Program, 4th Edition, Prentice Hall;
Niederst, J. (2007)	Learning Web Design: A Beginner's Guide to (X)HTML, StyleSheets, and Web Graphics, 3nd Edition, O'Reilly;
Kashyap, V, Bussler, C & Moran, M (2008)	The Semantic Web: Semantics for Data and Services on the Web, Springer.

Background:

Duckett, J (2008)	Beginning Web Programming with HTML, XHTML, and CSS, 2nd Edition, John Wiley & Sons;
Moller, A & Schwartzbach, M (2006)	An Introduction to XML and Web Technologies, Addison Wesley;
Ullman, C & Dykes, L (2007)	Beginning Ajax (Programmer to Programmer), John Wiley & Sons;
Wilton, P & McPeak, J (2007)	Beginning JavaScript (Programmer to Programmer), 3rd Editon, John Wiley & Sons;

Useful websites:
http://www.w3c.org
http://www.sitepoint.com
http://www.w3schools.com
http://www.dhtmlcentral.com
http://www.w3cschools.com
http://www.webstyleguide.com
http://www.useit.com/
http://www.websitetips.com
http://www.webopedia.com
http://www.webreview.com
http://www.webmonkey.com
http://www.webreference.com

Journals

The International World Wide Web Conference.
ACM Transactions on Internet Technology.
Visual Software Journal – the independent source for software developers.
Web Developers Journal (www.WebDevelopersJournal.com).
Future publishing: Cre@te Online

ROOM REQUIREMENTS:
PC Laboratory

PHYSICAL RESOURCES:

Hardware:
PCs.
Internet access.

Software:
Text Editor
Internet Web browser

STAFF RESOURCES:

Staff co-ordinator: James Williams

Staff delivering this module: James Williams
Michael Dacey.

Module Title:	Web Design & Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M1X8616
Module Value:	10 credits
Level:	4
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will provide students with the underlying principles and practices of web design and the web development process. Students will be exposed to web design and development environments used to create the user-interface, server-side code and link to back-end databases.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Produce a project specification including an evaluation of the underlying concepts and principles of web design and development;

2. Demonstrate an understanding of the appropriate methods and techniques required to design and develop a web application.

INDICATIVE CONTENT:

- The 3-tier web development model and development process.
- Website planning documentation specifying purpose, audience, content and requirements;
- User-centred design principles, requirements analysis, information structures, mock-ups/prototypes and design iteration;
- Usability, Accessibility guidelines and best practise techniques.
- Effective user communication, site design themes including colour schemes, page layouts and image and media object creation;
- Appreciate the role of Web development environments for rapid application design, development and management of online information systems;
- Client-side interactivity and processing using JavaScriptand AJAX.
- Site Management tools such as validation and error checking, template design, asset, synchronization, file and link management, reports and team working.
- Web Server software, Server-side technologies, database connectivity and session management;
- *Web 2.0 applications*.

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.
All course material will be stored on the University's Virtual Learning environment, allowing students to gain access to handouts/slides/tutorials both on and off campus. Students are required to keep a self-reflective progress blog, documenting their personal learning strategy and progress on a weekly basis. Guided by the tutor this method ensures the most effective use of the 'Student private study' time and supports the student's professional and transformational learning and development. Collaborative learning is also supported by Social Networking tools.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	0
Tutorials/seminars	10
Laboratory/workshop	20
Student private study:	70
TOTAL HOURS	100

ASSESSMENT:

Outcomes:	**Assessment Criteria** **To achieve each outcome a student must demonstrate the ability to:**
1. Produce a project specification including an explanation of the underlying concepts and principles of web design and development;	• Define, illustrate and apply the creative process to a Web design project area. • Produce a requirements catalogue, storyboard, site & information structures, design themes including colour schemes, page layouts, master templates and graphical elements;Document the purpose and function of web usability and accessibility guidelines; • Illustrate and define appropriate platform and development technologies at each layer of the web development model. • Describe the main web development issues required to build and host a dynamic web application.
2. Demonstrate an understanding of the appropriate methods and techniques required to design and develop a web application.	• Analyze the capabilities of professional web design tools including the ability to rapidly create web applications and information systems; • Document the virtual mechanics of content layout configurations and implement best practice techniques; • Synthesize web standard languages to produce interactive and dynamic effects that enhance the user experience; • Assess the accessibility and usability features of a website. • Demonstrate practical implementation skills at each layer of the web development model.

Coursework: 100%

Both outcomes will be assessed via one piece of coursework, which will take the form of a written assignment. The student will be required to:
1. Develop an interactive web application (outcome 2, weighted 50%)
2. Provide a written report documenting the analysis, design, implementation and evaluation process. (outcome 1, weighted 50%)

READING LIST:

Essential texts:

Moseley, R (2006)	Developing Web Applications**,** John Wiley & Sons**.**
Powers, D (2008)	The Essential Guide to Dreamweaver CS4 with CSS, Ajax, and PHP, FRIENDS OF ED; New edition.

Background texts:

Hester, N (2009)	Creating a Web Site in Dreamweaver CS4: Visual QuickProject Guide, Peachpit Press; 1st edition.
Fowler, S & Stanwick, V (2004)	Web Application Design Handbook: Best Practices for Web-Based Software (Interactive Technologies), Morgan Kaufmann.
Felke-Morris, T (2008)	Web Development and Design Foundations with XHTML, Pearson Education; 4 edition.
Kappel, G Pröll, Reich, S and Retschitzegger (2006)	Web Engineering: The Discipline of Systematic Development of Web Applications, John Wiley & Sons.
Feiler, J (2007)	How to Do Everything with Web 2.0 Mashups**,** McGraw-Hill Osborne.

Useful websites:
http://www.sitepoint.com
http://www.devshed.com/
http://msdn.microsoft.com
http://www.adobe.com
http://www.opensourcetutorials.com/
http://www.computerarts.co.uk
http://www.devx.com/
http://www.dhtmlcentral.com/
http://www.dynamicdrive.com/
http://www.tips-tricks.com
http://www.w3cschools.com
http://www.webstyleguide.com
http://www.w3c.org

http://www.useit.com/
http://www.websitetips.com
http://webdesign.templatemonster.com
http://www.webreview.com
http://www.webmonkey.com
http://www.webreference.com

Journals

ACM Transactions on Internet Technology.
Visual Software Journal – the independent source for software developers.
Web Developers Journal (www.WebDevelopersJournal.com).
The Database Journal - the Knowledge centre for Database professionals (www.databasejournal.com).
The International World Wide Web Conference.
Future publishing: Computer Arts
Future publishing: Cre@te Online

PHYSICAL RESOURCES:

Hardware:
High specification multimedia PCs
Internet access.

Software
Web browser
Web Server such as IIS, Cold Fusion, or Apache;
Development environment: such as Dreamweaver, Web Expression, Visual Studio.Net;
DBMS: such as Access, SQL Server or MySQL.

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

STAFF RESOURCES:

Staff co-ordinator: James Williams

Staff delivering this module: James Williams.
Michael Dacey.

Module Title: **Computer Systems (Games)**

Date of Validation:

Module Number: M1X

Module Value: 20

Level: 4 (Core)

Faculty Responsible for Delivery: Applied Design & Engineering

Pre-requisites: None

AIMS:

The aim of this module is to provide the student with an understanding of the key concepts and building blocks of computing and more specifically to evaluate various microprocessor-based computer systems used as gaming platforms including PC, Game console and mobile devices. In addition, this module aims to provide the student with an introduction to assembly language programming within the context of game software code optimisation.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Demonstrate a sound understanding of the essential characteristics and concepts of Computer Architectures and Operating Systems;

2. Evaluate the Computer Technologies used in diverse systems e.g. games consoles and mobile devices.

3. Understand the importance of assembly language in code optimization.

INDICATIVE CONTENT:

- Hardware and Software characterises of PC systems, Game consoles and mobile devices
- Computer systems: system block diagram, CPU, memory, input/output unit, system clock, data, address, control buses and Von-Neumann architecture, pipelining, design strategies (RISC and CISC) etc
- Memory Organisation: associative, cache, virtual memory (paged and segmented), memory system design for high performance
- Input/output including polled, interrupt driven and direct memory access
- Interface Design including bus systems, address decoding, registers and buffering
- Operating System functions, processes/threads, memory, device drivers & storage, I/O and application management, User interface, proprietary & open source
- Computer system software such as compilers, assemblers, linkers and interpreters
- Game's Console hardware effects such as alpha channel, bezier surfacing, perspective correction and mip mapping
- Purpose and functionality of video game system component parts such as the Central Processing Unit (CPU) & Graphics Processing Unit (GPU)
- PC Graphic card features such as VRAM, Video Graphics Array, PCI, AGP, 2D Engine and Video Processing Engine
- TV and Visual Display Units such as CRT, LCD, scan rates and screen resolution
- Networks: network fundamentals, network protocols, infrastructure of the intranet.
- Syntax and semantics of an assembler language, writing assembler code
- Code optimization techniques
- Profiling and code optimisation using assembler

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	30
Practical Work	30
Student Private Study	110
TOTAL	200

IMPLEMENTATION:

To develop the conceptual understanding of the design of a computer system, the module will be delivered by one lecture and one tutorial session each week. A supervised lab session lasting one hour will also be used to supervise research & practical based exercises. As the module develops, emphasis will be placed on the technical requirements and limitations on the performance of game systems.

Students will be strongly encouraged to read current journals to investigate and evaluate latest industry developments and take part in a group investigation and presentation.

ASSESSMENT:

Although the first half of this module is primarily theoretical, the students are encouraged to actively research concepts and where possible practical exercises are used. This approach promotes independent learning as well as motivating students to investigate games related technology. Therefore, a coursework approach is more beneficial to students.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a sound understanding of the essential characteristics and concepts of Computer Architectures and Operating Systems;	• Produce and present a written report which describes and evaluates the purpose and characteristics of architecture components, operating systems and the underlying complexity of Computer systems.
2. Evaluate the Computer Technologies used in diverse systems e.g. games consoles and mobile devices.	Produce a written report that: • Investigates and contrasts the functions and features of different types of operating systems; • Compares and analyses the hardware and software specifications of various Computer Gaming systems including for example the Desktop PC, Games Console, Digital TV, Mobile phone and PDA. The student's response should make reference to latest industry developments and emerging technologies.
3. Understand the importance of assembly language in code	• Implement and evaluate assembly language routines which form part of a software solution.

optimization.	

Coursework Weighting
Outcome 1: 35%
Outcome 2: 30%
Outcome 3: 35%

The assessment is coursework, reflecting the need to assess both the theoretical concepts and their application. Outcome 1 will be assessed through the application of a mid-year assignment, outcome 2 will be assessed through an end-of-year assignment and outcome 3 will be assessed through an end-of-year assignment.

READING LIST:

Essential:

Irvine, K (2008)	Assembly Language for Intel-based Computers (5th Edition), Pearson Education
Hennessy, J.L. and Patterson, D.A. (2002)	Computer Architecture: A quantitative approach, Morgan Kaufmann
Tanenbaum, A. S. (2008)	Modern Operating Systems (3rd Edition) Prentice Hall

Background:

Carter, A Hind, R and Chalk B (2003)	Computer Organisation and Architecture: An Introduction Palgrave Macmillan

Journals:

ACM: Technical Symposium on Computer Science Education
ACM: Queue
Develop
International Journal of Intelligent Games and Simulation
Journal of Game Development

Useful websites:

http://www.pccomputernotes.com/
http://www.pcmech.com/byopc/
http://www.iu.hio.no/~mark/os/os.html
http://courses.cs.vt.edu/~csonline/OS/Lessons/index.html
http://physinfo.ulb.ac.be/cit_courseware/opsys/ostart.htm
http://entertainment.howstuffworks.com/video-game.htm

RESOURCES:

- **Hardware:**
  Play Station 2/Xbox

Desktop PC Games System
Mobile phone (e.g. N-Gage)

- **Software:**
  Windows XP+
  Linux operating system
  Symbian OS

ROOM REQUIREMENTS:

- PC laboratory
- Lecture Room

STAFF RESOURCES:

Staff co-ordinator: Mike Dacey

Staff delivering this module: Lee J Cobley
Mike Dacey

Module Title:	**Games Design and History (Games)**
Date of Validation:	
Module Number:	M1X
Module Value:	10
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

To provide a historical overview and critique of the evolution of the computer and video games industry, issues of game quality, the social impact of games, demographics, and industry structure. Students will also be introduced to the principles and techniques of game design theory and the established frameworks of games development methodologies.

LEARNING OUTCOMES

On successful completion of this module students will be able to: -

1. Demonstrate a fundamental understanding of and reflection on the historical evolution of the games industry, and communicate these to an audience of peers.

2. Critically appraise the design of computer and video games following appropriate design principles and techniques by implementing appropriate methodologies.

INDICATIVE CONTENT:

- Historical overview of games and the games business:
- Embryonic era, early home consoles, home computers, 8-bit, 16-bit, 32-bit, 64-bit, 128-bit, current generation.
- The role and impact of amusement arcades.
- Game taxonomies.
- Game platforms: traditional games, arcade games, portable games, internet games, multi-player games, and educational games.
- Ludology and gameplay e.g. learning curve, flow concepts, pacing (planning or reflex drive).
- Play mechanics:
- Input structure of the game e.g. mouse, keyboard input.
- Game structure e.g. game engine, game script, resources.
- Structure and responsibilities of a games development team.
- Game design methodology and construction of a games design document:
- Requirements analysis, project planning, design principles, techniques and evaluation.

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	10
Practical Work	0
Student Private Study	60
TOTAL	100

IMPLEMENTATION:

This module provides students with an essential knowledge of the historical development of the games industry, and the basic theoretical concepts of game design. Theoretical concepts will be supported by tutorials to assist students with the development of informed critiques and debates on the key issues which play significant roles the games industry and the production of interactive games.

ASSESSMENT:

Students are required to develop and analyse game designs over the course of the module. Therefore, coursework only assessment is the most appropriate for this module.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a fundamental understanding of and reflection on the historical evolution of the games industry, and communicate these to an audience of peers.	• Produce an informed written report on a topic related to a significant aspect of historical development in the games industry, and present the results in an oral presentation to peers.
2. Critically appraise the design of computer and video games following appropriate design principles and techniques by implementing appropriate methodologies.	• Produce an informed and rigorous analysis which objectively evaluates the design of an existing game or genre.

Coursework 100%

The assessment is coursework, reflecting the need to assess both the theoretical concepts and their application. Outcome 1 will be assessed through the application of a mid-year assignment, and outcome 2 will be assessed via an end-of-year assignment.

Mid-year assignment and presentation	50%
End-of-year assignment	50%
Total	100%

READING LIST

Essential:

Crawford, C. (2003) Chris Crawford on Games Design, New Riders.

Kent, S. (2001) The Ultimate History of Video Games, Prima Lifestyles.

Rouse, R. (2001) Games Design: Theory and Practice, Wordware.

Background:

Bates, B. (2002) Game Design: The Art and Business of Creating Games, Premier Press.

Clayton, A. (2003) Introduction to Level Design for PC Games, Charles River Media.

Herman, L. (1997) Phoenix: The Fall and Rise of Videogames, Rolenta Press.

King, B. (2003) Dungeons and Dreamers, McGrawHill.

Meigs, T. (2003) Ultimate Games Design: Building Game Worlds, McGrawHill.

Poole, S. (2000) Trigger Happy: Video Games and the Entertainment Revolution, Arcade Books.

Rabin, S. (2005) Introduction to Game Development, Charles River Media.

Rollings, A. and Adams, E. (2003) Andrew Rollings and Ernst Adams on Game Design, New Riders.

Salen, K. and Zimmerman, E. (2004) Rules of Play: Game Design Fundamentals, MIT.

Journals:

ACM Digital Library
Convergence
Game Studies
Games and Culture
International Journal of Computer Games Technology
Journal of Computer Games Design

ROOM REQUIREMENTS

- Lecture room.
- Projector, historical and contemporary games consoles, games library.

STAFF RESOURCES

Staff co-ordinator: Andrew Baker

Staff delivering this module: Barry Ip

Module Title:	**Games Physics & Maths (Games)**
Date of Validation:	
Module Number:	M1X
Module Value:	30
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

To develop the fundamental mathematics skills required for games programming and to introduce the physics concepts relevant to games. The student will gain the necessary mathematical background to comprehend complex 2D and 3D programming techniques.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

3. Apply knowledge of the mathematics required to solve problems associated with complex 2D and 3D games.

4. Apply knowledge of theoretical physics and games physics engine principles to solve problems associated with games programming.

INDICATIVE CONTENT:

- Units and Measures
- Fundamental concepts and principles of forces and motion e.g.
  - Newton's Laws and kinematics
  - Projectiles e.g. trajectory, drag, etc
- Light e.g. colour, reflection, refraction, intensity, fog, parallax, iridescence, lens flare, etc
- Introduction to current games physic applications e.g. ragdoll physics, deformation etc
- Principles of Games Physics Engines:
- Principles of collision detection
- Differentiation and Integration
- Numerical Integration
- Geometry and trigonometry associated with transformations
- Linear algebra
- Co-ordinate Systems: cartesian, polar, scalars, vectors and operations on vectors
- Matrices including linear transformations
- Functions, exponential functions and logarithms
- Number systems and logic

LEARNING AND TEACHING:

	Hours
Lectures	45
Tutorials	90
Practical Work	0
Student Private Study	165
TOTAL	300

IMPLEMENTATION:

This course will concentrate on the physics and maths theory, although where possible practical software demonstrations of the applications of games physics will be provided.

ASSESSMENT:

Although, the application of the concepts is highly effective in promoting learning, the fundamental concepts of mathematics and physics are best assessed by examination. Therefore, both coursework assessment and examination/test are used to evaluate both the application and the understanding of the concepts respectively.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Apply knowledge of the mathematics required to solve problems associated with complex 2D and 3D games.	• Complete an in-class test or exam that will be used to demonstrate students' knowledge of mathematical principles and their application to games.
2. Apply knowledge of theoretical physics and games physics engine principles to solve problems associated with games programming.	• Demonstrate their knowledge of physics and its application to games by developing programs which demonstrate game physics engine principles.

Test 50%
Coursework 50%

Students will be tested on their ability to apply the knowledge gained to given problems during a time-constrained period.

Outcome 1 (50%) assessed by In-class tests
Outcome 2 (50%) assessed by Assignment

READING LIST:

Essential:

Van Verth, J and Bishop, L. M. (2008)	Essential Mathematics for Games and Interactive Applications, 2nd edition, Elsevier
Bourg, D. (2001)	Physics for Game Developers O'Reilly
Dunn, F. et al. (2002)	3D Math Primer for Graphics and Game Development Worldware

Background:

Stroud, K.A., Dexter Booth (1997)	Engineering Mathematics (5th Edition) Palgrave Macmillan
Eberly, D H (2004)	Game Physics ELSEVIER (Morgan Kaufmann)

Useful websites:

www.gamasutra.com
http://oldsite.havok.com/havok2/
http://www.gamedev.net
http://www.maths-help.co.uk/Links.htm
http://www.univie.ac.at/future.media/moe/

RESOURCES:

- Audio/Visual equipment

ROOM REQUIREMENTS:

- Lecture Room

STAFF RESOURCES:

Staff co-ordinator:	Gordon Dickers
Staff delivering this module:	Gordon Dickers Mike Dacey

Module Title:	**Introduction to Programming (Games)**
Date of Validation:	DOV
Module Number:	M1X
Module Value:	40
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design and Engineering

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AIMS:

This module will introduce students to software constructs and to the development of software using a high level programming language. Simple design concepts and good programming practices will be adopted. Students will understand the fundamental algorithms and data structures and will apply them to solve software problems. The concept and use of software libraries will also be introduced, to familiarise the student with the use of commercially available software components.

OUTCOME STATEMENTS:

Upon successful completion of this module, the student will be able to:

4. Understand basic software constructs, the syntax & semantics of a high level language and develop programs using good programming practices.

5. Evaluate and apply fundamental algorithms and data structures.

6. Apply a provided software library and programming framework.

INDICATIVE CONTENT:

- Development tools
- Good programming practices e.g. structured and object oriented programming
- Software constructs e.g. selection construct, loop constructs, iteration, sub-routines, etc
- High level programming language/s e.g. C/C++/C#
- Control statements, functions, arrays, I/O, Data Types, File Handling,
- Object paradigm
- Classes, objects, inheritance, encapsulation, messages, behaviour, structure
- Implementation of the above through ADTs
- Introduction to Algorithms
- Simple data structures using ADTs e.g. stacks, queues
- Software debugging
- Software libraries e.g. Win32, MFC, Qt etc.
- Software Frameworks e.g. .Net, etc.

- An introduction to windows programming and window application development e.g. C# Windows Forms
- Software testing

LEARNING AND TEACHING STRATEGY:

This course will primarily have a practical focus. The material will be delivered in a laboratory setting allowing teaching strategies which keep the student active (inputting examples from the board, group solution of small programming problems etc.) This will also allow flexibility to review common problems which emerge when students are working though tutorial exercises.

	HOURS
Lectures	0
Tutorials	0
Laboratory	120
Student Private Study	280
TOTAL	400

ASSESSMENT:

The assessment is by a number of assignments, reflecting the need to assess both the theoretical concepts and their application.. Assignments may take the form of developing solutions to given real life problems using the techniques introduced during the lectures.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
4. Understand basic software constructs, the syntax & semantics of a high level language and develop programs using good programming practices.	• Produce solutions to a range of simple programming problems using appropriate high level language constructs. • Debug and test high level language code to produce working programs with associated test results.
5. Evaluate and apply fundamental algorithms and data structures.	• Evaluate and select appropriate algorithms and data structures in order to solve a given problem. • Produce a working program that will implement these fundamental algorithms and data structures.
6. Apply a provided software library and programming framework.	• Develop software elements to a given specification using software library components. • Develop a program using a programming framework to a given specification.

Outcome 1 will be assessed through the use of a series of practical worksheets at the beginning of the module (weighting 25%). Each worksheet will set the student a number of

small problems which require the student to write programs which implement programming concepts and structures obeying the syntax and semantics of the chosen language. Outcome 2 will be assessed through a practical mid-year assignment (weighting 25%), this will involve students evaluating and writing a program/s which implement/s a number of algorithms and data structures. The final outcome (outcome 3) will be assessed through a major end-of-year assignment (weighting 50%). This will require students to utilise existing libraries and frameworks to implement a software solution to a given problem possibly with reference to a given design.

Coursework 100%

READING LIST:

Essential Texts:

Deitel, H. & Deitel, P. (2008)	C How to Program (5th edition) Prentice Hall
Nyhoff, L. (2005)	ADTs, Data Structures, and Problem Solving with C++ (2nd Edition) Prentice Hall
Liberty, J. (2007)	Programming C# 3.0 O'Reilly

Background Reading:

Lee, M. (2010)	C++ Programming for the Absolute Beginner Delmar
Deitel, H. & Deitel, P (2009)	C++ How to Program (7th edition) Prentice Hall
Deitel, H. & Deitel, P (2004)	Visual C++.NET: How to Program Prentice Hall
Liang, D. (2001)	Introduction to Programming with C++ (2nd Edition) Prentice Hall
Blanchette, J. & Summerfield, M. (2008)	C++ GUI Programming with Qt 4 (2nd Edition)
Pearce (2004)	Windows programming Using MFC Addison – Wesley
Petzold, C. (1998)	Programming Windows (5th Edition) Microsoft Press

Sedgewick, R. (2002)	Algorithms in C++: (parts 1-5) Fundamentals, Data Structures, Sorting, Searching and Graph Algorithms Addison – Wesley
Stroustrup, B. (2008)	Programming: Principles and Practice Using C++ Addison – Wesley
Kernighan, B. W. and Ritchie, D. (1998)	The C Programming Language (2nd Edition) Prentice-Hall

Useful websites:

http://www.cprogramming.com
http://cplus.about.com/library/blcplustut.htm
http://www.winprog.org/tutorial/
http://www.acm.uiuc.edu/webmonkeys/book/c_guide/
http://www.geocities.com/SiliconValley/Software/5562/
http://www.relisoft.com/index.htm
http://www.oopweb.com/

RESOURCES:

Lecture room
Computer Laboratory

ROOM REQUIREMENTS:

PCs with appropriate specification
Appropriate software IDE
Blackboard VLE

STAFF RESOURCES:

Staff co-ordinator: Glenn L. Jenkins

Staff delivering this module: Glenn L. Jenkins
Mike Dacey

Module Title:	**Modelling, Lighting & Rendering Theory (Games)**
Date of Validation:	
Module Number:	M1X
Module Value:	10
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

The intention of this module is to provide in-depth coverage of the theory behind 3D computer modelling techniques, using industry-standard software packages. The concepts behind shading and texturing 3D polygonal surfaces using common games techniques as well as new approaches will be introduced.

LEARNING OUTCOMES

On successful completion of this module students will be able to: -

1. Evidence a theoretical understanding of 3D modelling techniques to the solution of a problem.

2. Identify appropriate texturing and lighting techniques to the solution of a problem.

INDICATIVE CONTENT:

- Introduction to primitives, splines, polygon mesh, polygon modelling tools, polygon model file extensions.
- Materials, shaders, vertex shading, real-time rendering, computer-generated shading, the use of lighting, UVW wrapping and skinning models..

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	0
Practical Work	0
Student Private Study	70
TOTAL	100

IMPLEMENTATION:

Lectures, tutorials and demonstrations will be used throughout the module. Handouts will be given on each topic covered. Wherever possible, topics will be illustrated or demonstrated using examples of practical 3D-models.

ASSESSMENT:

This module content is theoretical in nature and therefore is suited to assessment via examination. A single exam which will cover both the learning outcomes. The exam will normally take place during the exam weeks at the end of the academic year.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Evidence a theoretical understanding of 3D modelling techniques to the solution of a problem.	• Articulate the theory behind 3D modelling techniques to meet a defined need
2. Identify appropriate texturing and lighting techniques to the solution of a problem.	• Define and explain appropriate techniques and theories with regard to the application of texture maps to given 3D surfaces.

Exam 100%

READING LIST

Essential:

Demers, O., Urszenyi, C. and Maestri, G. (2001) Digital Texturing & Painting, New Riders Publishing.

Franson, D. (2002) 2D Artwork and 3D Modeling for Game Artists, Premier Press.

Autodesk Maya press (2008) Learning Autodesk Maya 2009: Official Autodesk Training Guide, John Wiley & Sons

Autodesk Maya press (2009) Learning Autodesk Maya 2009: Foundation, Modelling and Animation, and Special Effects, John Wiley & Sons

Background:

ADOBE Creative Team (2008) Adobe Photoshop CS4 Classroom in a Book, Adobe Press.

Lee Lainer (2008) Advanced Maya Texturing and Lighting, John Wiley & Sons

Dariush Derakhshani (2009)	Introducing Maya 2009, John Wiley & Sons
Eric Keller (2009)	Mastering Maya 2009, John Wiley & Sons
Capizzi, T. (2002)	Inspired 3D Modelling & Texture Mapping, Premier Press, Inc.
Eisner, W. (1994)	Comics & Sequential Art, Poorhouse Press.
Eisner, W. (1996)	Graphic Storytelling, Poorhouse Press.
Jeremy, C. and Maestri, G. (2000)	Digital Lighting & Rendering, New Riders Publishing.

Useful websites:

http://www.3dbuzz.com/
http://3dtotal.com/
http://planetunreal.gamespy.com/
http://beyondunreal.com/
http://wiki.beyondunreal.com/

RESOURCES

Contemporary 2- & 3D-CG visualisation hardware and software.

ROOM REQUIREMENTS

- Lecture Room
- PC Studio

STAFF RESOURCES

Staff co-ordinator:	Martin Capey
Staff delivering this module:	John Carroll Andrew Baker

Module Title:	**Study Skills (Games)**
Date of Validation:	
Module Number:	M1X
Module Value:	10
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

The study skills needed for higher education are ultimately gained through studying at that level; they evolve and mature through practice, trial and error, feedback from others and student reflection. This module aims to provide students with the underlying study strategies that can accelerate that learning process. Students will be encouraged to develop a reflective, active, positive approach to learning, and to take responsibility for their own learning. Such skills promote a deeper understanding of the topics studied throughout the programme; they support lifelong learning, and are the transferable skills desired in the employment context.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

3. Create a personal development plan based on a self-evaluation of skills

4. Reflect on their application and achievement of the study skills learned

INDICATIVE CONTENT:

- Identifying skills (e.g. self-evaluation, skills needed for higher education, transferable skills, action plans for personal development).
- Understanding the learning process (e.g. definitions, the learning process, conditions for learning, learning styles, memory).
- Organising study (e.g. time management, organising space, organising resources)
- Gathering relevant information (e.g. effective note taking, using the library and the internet, reflecting on experience)
- Communicating and presenting information (e.g. presentation techniques, styles)
- Developing an appropriate writing style (e.g. planning and structuring essays and reports, linking ideas together, using facts, opinions or arguments, analytical thinking, etc.)
- Referencing convention (e.g. the Harvard System, the numeric system)
- Revision and examination techniques (e.g. preparation, organisation, memory aids, managing stress)

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. However, for the exploration of these topics and their application within the students' studies, tutorials are the most appropriate strategy.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	15
Tutorials/seminars	15
Practical Work	0
Student Private Study	70
TOTAL	100

ASSESSMENT:

Students are required to develop skills over the course of the module.
Therefore, this module is best assessed by coursework only.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
3. Create a personal development plan based on a self-evaluation of skills	• Document the results of a personal skills audit that identifies strengths to build on and areas for improvement. • Produce written work that identifies the skills required for successful higher education learning • Identify the 'skills gap' and generate a written action plan to address the learning objectives required.
4. Reflect on their application and achievement of the study skills learned	• Write in report format. • Produce a written reflection upon the application of the study skills learned (e.g. report writing, presentation techniques, analytical techniques, referencing convention, exam technique, etc.) using examples to illustrate their use.

Coursework 100%

The assessment is coursework, reflecting the need for students to reflect on the individualised application of theory. Both outcomes will be assessed via one written assignment, which will be completed in two parts (approximately 2,000-2,500 words).

READING LIST:

Essential:

Cottrell, S. (2008)	Study Skills Handbook, 3rd Ed., Palgrave Macmillan: Basingstoke

Background:

Cottrell, S. (2003)	Skills for Success: The Personal Development Planning Handbook (Palgrave Study Guides), Palgrave Macmillan: Basingstoke
McMillan, K. & Weyers, J. (2007)	The Smarter Student: Study Skills & Strategies for Success at University, Prentice Hall: Harlow
Peck, J. & Coyle, M. (2005)	The Student's Guide to Writing: Grammar, Punctuation and Spelling 2nd Ed., Palgrave Macmillan: Basingstoke
Piscitelli, S.V. (2009)	Study Skills: Do I Really Need This Stuff? 2nd Ed., Prentice Hall: Harlow
Price, G. & Meier, P. (2007)	Effective Study Skills: Essential skills for academic and career success, Prentice Hall: Harlow
Sinfield, S & Burns, T. (2003)	Essential Study Skills: The Complete Guide to Success at University, Sage Publications Ltd

Journals:

As appropriate to the research topic

Useful Websites:

www.skills4study.com/
www.palgrave.com/skills4study/
www.ltscotland.org.uk/studyskills/
www.bized.co.uk/reference/studyskills/index.htm
www.how-to-study.com/
www.brunel.ac.uk/~mastmmg/ssguide/sshome.htm

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Sue Maw

LEVEL 5 MODULES

Module Title:	Academic Seminar
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8617
Module Value:	10 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module underpins computing research and the final year Project, and will provide students with a comprehensive and systematic understanding of the knowledge and skills needed to collect, interpret, analyse, synthesise and present data using appropriate research methods.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Prepare and present to specialist and non-specialist audiences an academic seminar paper that reviews critically the current research literature pertinent to a research topic.

2. Propose and justify a suitable project for research and the research strategies to be applied for the achievement of the objectives of the study.

INDICATIVE CONTENT:

- Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity, generalisability)
- Research design strategies, (e.g. action research, experiments, surveys, case studies, ethnography), their advantages and limitations, and their suitability to a variety of research contexts.
- Data collection & sampling methods (e.g. interviews, questionnaires, observation), and their advantages and limitations in a variety of contexts.
- Data analysis techniques.
- Ethical and professional considerations
- Referencing conventions (e.g. the Harvard system, numeric system).
- Critical, analytical thinking and writing
- Academic writing convention (e.g. the structure and format of a seminar paper and a research proposal).
- Looking and behaving like an IT professional: presentation techniques/skills.

LEARNING AND TEACHING STRATEGY:

Students are required to *self-select* a computing topic for group research, write their findings in the format of an academic paper and present their findings to an audience of their peers and staff. Individually, students will also *self-select* a topic suitable for their own research in the final year Project module and produce a research plan that identifies how they will achieve the objectives of the research. This module, therefore, requires that students demonstrate a high level of self-direction and initiative, and take responsibility for the direction of their own learning. This is reflected in the teaching and learning strategy implemented. Lectures will introduce conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. However, for the exploration of these topics and their application to practical, pathway-specific situations and case studies, tutorials are the most appropriate strategy. During tutorials, a flexible, student-led approach will be taken; students will discuss and develop individual project ideas, and will be given the opportunity to consult with topic specialists amongst the teaching team. During academic seminars, student teams will develop and manage their group activities, then disseminate to their peers the findings of their research and respond to peer questioning; such activity further enhances their transferable skills of team working, and presentation techniques.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	15
Tutorials/Seminars	15
Student private study	70
TOTAL HOURS	100

ASSESSMENT:

Outcomes	**Assessment Criteria To achieve each outcome a student must demonstrate the ability to:**
1. Prepare and present to specialist and non-specialist audiences an academic seminar paper that reviews critically the current research literature pertinent to a research topic.	• Work as a team member to write and structure a seminar paper that documents the evaluation of secondary research of a self-selected contemporary computing related theme. • Employ an appropriate referencing system to evidence literature sources. • Present the findings of the research to an audience of peers and respond to their questions.
2. Propose and justify a suitable project for research and the research strategies to be applied for the achievement of the objectives of the study.	• Produce a written research proposal that proposes a topic suitable for computing research and documents briefly the literature to justify exploration of the topic. • Document the selection and justification for the research methods to be used in the study that reflects current research methodology/design theory and practice, incorporating problem identification, formulating aims/hypotheses, sampling, professional/ethical issues and the practicalities of design. • Produce a chart that plans the timescales and milestones of the research.

Coursework 100%

To achieve outcome 1, the student will be required to work as part of a team to prepare a written seminar paper of approximately 2,000 words based on secondary research and present the paper to his/her peers (50% weighting). Outcome 2 requires that the student produce a research plan for study during the final year of the programme (50% weighting).

There is an opportunity for integrated assessment between this Academic Seminar module and the Software Engineering Principles module: both modules require the student to plan for the final year Project (research methods and software development methods respectively), so both tasks could be incorporated into one coherent assignment.

READING LIST:

Essential Texts:

Saunders, M., Lewis, P. and Thornhill, A. (2007)	Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow

Background Reading:

Baase, S. (2008)	A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY
Collis, J. and Hussey, R. (2009)	Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke
Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	Projects in Computing and Information Systems: a Student's Guide, Addison Wesley: Harlow
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Computer/projector
Internet access

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Glenn Jenkins

Module Title:	Algorithms and Data Structures
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8618
Module Value:	10 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Introduction to Programming or Visual Programming

AIMS:

This module will provide students with a conceptual understanding of Abstract Data Types, Data Structures and algorithms used in Computer Science. It will also provide the opportunity for students to analyse, select and deploy appropriate ADTs to solve common computing problems.

LEARNING OUTCOMES:

Upon the successful completion of this module, the student should be able to:

1. Identify and critically evaluate appropriate algorithms and data structures for given problem specifications.

2. Design, implement and evaluate software solutions which incorporate appropriate algorithms and data structures.

INDICATIVE CONTENT:

- Abstract (Algebraic) Data Types (A(A)DT)
- Simple data structures: Stacks, Queues.
- Static and Dynamic memory allocation for implementing data structures.
- Files and record structures.
- Lists, Linked Lists, Heaps, Trees, Binary Trees, Graphs.
- Sorting and searching algorithms, such as Selection & Exchange, Bubble, Quick, Heap, Shell, Radix, Linear search, tree search.
- Hashing: Open Addressing, Chaining.
- Complexity considerations.
- More advanced, special-purpose Algorithms and Data Structures (at Lecturer's discretion, for example the Mini-Max game algorithm, Dijkstra's shortest path algorithm, data compression algorithms, etc.)

LEARNING AND TEACHING STRATEGY:

Key ideas and concepts will be delivered through lectures, which will allow students to gain the knowledge applicable to the module. The students will be encouraged to further study these topics and apply their findings in course-works and weekly programming exercises which will encourage the students to develop their technical skills. There will also be a number of seminar-style tutorials (discussion groups) for the more theoretical parts of this module and the dissemination of student research.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	10
Tutorials	20
Student Private Study	70
TOTAL HOURS	100

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Identify and critically evaluate appropriate algorithms and data structures for given problem specifications.	• select appropriate algorithms and data structures for given problem specifications • produce a written piece of work that critically evaluates the appropriateness of particular algorithms and data structures within the context of a specified problem
2. Design, implement and evaluate software solutions which incorporate appropriate algorithms and data structures.	• design and critically evaluate data structures and algorithms which solve given problems; • implement given algorithms and data structures using an appropriate programming language.

The module will be assessed through a combination of coursework and exams. The coursework will involve a programming assignment that will represent 50 % percent of the overall result, while the examination will be a series of staged in class tests.

Coursework 50%
Examination 50%

READING LIST:

Essential Texts:

Mehlhorn, K Sanders, P (2008)	Algorithms and Data Structures: The Basic Toolbox. Springer

Background Reading

Cormen,T.H. (2001)	Introduction to Algorithms. MIT Press
Sedgewick,R(2002)	Algorithms in C++, Part 1 to 5. Addison-Wesley
Aho, A., Hopcroft, J.& Ullman, D. (1994)	Data Structures and Algorithms. Addison-Wesley
Gonnet, G. & Baeza-Yates, R. (1991)	Handbook of Algorithms and Data Structures, Addison-Wesley
Mehlhorn, K. (1984).	Data Structures and Algorithms, Springer-Verlag
Nievergelt, J. & Hinrichs, K. (1993).	Algorithms and Data Structures, Prentice-Hall
Wirth, N. (1986)	Algorithms and Data Structures, Prentice-Hall

Journals:

Complexity
Journal of Algorithms
Journal of Experimental Algorithmics (JEA):
Journal of the ACM (JACM):

Useful Websites:

http://www.wombat.doc.ic.ac.uk/foldoc/index.html
http://ciips.ee.uwa.edu.au/~morris/Year2/PLDS210/dijkstra.html
http://carbon.cudenver.edu/~hgreenbe/sessions/dijkstra/DijkstraApplet.html
http://www.seanet.com/users/arsen/avltree.html
http://www.informatik.uni-stuttgart.de/ipvr/sgs/lehre/seminare/famous_algorithms_ws03_04/01_abstract.html
http://guinness.cs.stevens-tech.edu/~arz/CS600Spring03/LectureFour.pdf
http://www.iti.fh-flensburg.de/lang/algorithmen/sortieren/quick/quicken.htm

ROOM REQUIREMENTS:

Lecture hall, seminar room, computer lab.

STAFF RESOURCES:

Staff co-ordinator:	Gordon Dickers
Staff delivering this module:	Gordon Dickers, Glenn Jenkins

Module Title:	Application Design and Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8619
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Visual Programming

AIMS:

This module aims to enhance the student's appreciation of software design and application development, including the design process, concepts, principles and techniques involved in creating homogenous Web & Windows based applications.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Develop a systematic understanding of software design, application architecture/workflow and development frameworks for Windows and Web applications

2. Deploy appropriate programming frameworks tools in the implementation of applications and associated content and critically evaluate the design and techniques used in the development of interactive applications.

INDICATIVE CONTENT:

- Design and architecture of windows and web applications e.g. Web Engineering
- Formal requirements analysis e.g. UML Use Cases, etc.
- Software engineering including the use of a design process e.g. Class Diagrams, Sequence Diagrams, UML Web extensions, etc. Debugging and testing strategies e.g. black box, white box, test harnesses, etc.
- Workflow design e.g. Business Process Modelling Notation (BPMN)
- Workflow development e.g. Microsoft Workflow Foundation (WF). Sequential and state machine workflows, activities, hosting workflows, etc.
- UI page flows, Document-centric workflows, human workflows, business rule-driven workflows, etc.
- Workflow services including persistence, scheduling, transaction and tracking, etc
- Event and message driven programming including delegates. Drag and drop.
- Homogeneous framework for Web and Windows application development e.g. .Net for WindowForms, ASP.Net, Oslo, WPF+XAML development. Performance and interoperability of user interface technologies e.g. hosting content and multithreading.
- Web and window form/document/page creation, user input validation, etc

- Layout of controls using Grids, Flow Layout, Tabs, etc, and the navigation of information using hyperlinks, menus, ribbon bars, tree views, etc. Development and use of custom made controls, 3D controls, customization of existing GUI controls, etc Input technologies including mouse, joystick, etc. Rubber band selection, etc.
- File handling and serialization, database connectivity, data storage e.g. cookies, profiles, windows registry, clipboard, Entity Framework, LINQ to Entities, etc.
- Investigating the principles and techniques of creating visual content such as charts/graphs, images, texturing, "pseudo" virtual reality, enhanced reality, etc.
- Deploying elements of 2D and/or 3D technologies such as GDI+, WPF3D, etc.

LEARNING AND TEACHING STRATEGY:

Essentially this module will have a practical focus, with the theory supported with practical laboratory based exercises and demonstrations. Seminars will be punctuated with examples designed to underpin the ideas and techniques introduced, reducing the conceptual leap from theory to practice.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

This module focuses on the design and development of windows & web applications using software development techniques & appropriate technologies. The assessment is coursework only, reflecting the need to maintain the relationship between the design process and the translation of the design to a working implementation.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Develop a systematic understanding of software design, application architecture/workflow and development frameworks for Windows and Web applications.	• Document a design for a given scenario or software problem using appropriate formal graphical software modelling techniques. This documentation may be generated by a software case tool. • Document the evaluation of the architecture, workflow, development frameworks and technologies used in Windows and Web application development. • Demonstrate an understanding of the design process by implementing a design or specific aspects of a design by producing Web and Window application(s) in a homogenous Intranet scenario.
2. Deploy appropriate programming frameworks tools in the implementation of applications and associated content and critically evaluate the design and techniques used	• Implement visual applications and content using the programming framework(s) in a homogenous Intranet scenario. This may include the use of technologies such as Workflow Foundation to facilitate the construction of an application for a given design scenario.

in the development of interactive applications.	• Document the concepts and methods employed in the development of an application, including the evaluation of the principles and techniques used in the design and development process e.g. design patterns, software testing, algorithms and techniques.

The assessment comprises of two equally weighted practically-based coursework assignments. The first assignment (50% weighting) will assess outcome 1 to evaluate the student's knowledge of the design, architecture, and frameworks involved in application development. The design process will take the form of a group assignment, where each group is given an outline of a visual application for which they must develop a design document. Students will be required to identify their individual contributions to the process. Assignment two (50% weighting) will assess outcome 2, which tests the student's practical implementation skills in the development of homogenous applications.
Assignment one will be completed mid-year and assignment two at the end of the year.

The assessment may take the form a series of regular worksheets and seminars.

Coursework 100%

READING LIST:

Essential Texts:

Nathan, A. (2007) Windows Presentation Foundation Unleashed (WPF) Sams

Walther, S. (2008) ASP.NET 3.5 Unleashed, Sams

Scribner, K. (2007) Microsoft Windows Workflow Foundation Step by Step, Microsoft

Pender, T. (2003) UML Bible, Wiley

White, S., Miers, D. (2008) BPMN Modeling and Reference Guide, Future Strategies Inc

Background Reading:

Conallen, J. (2002) Building Web Applications with UML Addison-Wesley

Bennet, S., Mcrobb, S., Farmer, R. (2006) Object-Oriented Systems Analysis and Design Using UML, McGraw-Hill

Tidwell, J. (2005) Designing Interfaces: Patterns for Effective Interaction Design, O'Reilly

Cells, C. Griffiths, I. (2007) Programming WPF: Building Windows UI with Windows Presentation Foundation, O'Reilly

Spolsky, J., Winer, D. (2001) User Interface Design for Programmers, APress

Bishop, J. (2007) C# 3.0 Design Patterns, O'Reilly

Useful Websites:

http://www.microsoft.com
http://www.programmersheaven.com
http://www.w3c.org
http://www.wdvl.com
http://www.w3schools.com
http://www.ws-i.org/

Journals

ACM Transactions on Internet Technology
Visual Software Journal – the independent source for software developers.
Web Developers Journal (on-line resource – http://www.WebDevelopersJournal.com)

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

PHYSICAL RESOURCES:

Appropriate development tools e.g. Visual Studio

STAFF RESOURCES:

Staff co-ordinator: Mike Dacey

Staff delivering this module: Mike Dacey
Steve Hole

Module Title:	Database Management Systems
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8620
Module Value:	20
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Data Analysis and Database Design

AIMS:

The module aims to provide the student with the essential concepts involved in the design, implementation, and testing of multi-user database applications. This module builds on the concepts obtained in the pre-requisite module by scaling up both the size and complexity of the required database and database management system.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Design, implement and maintain a database solution for multiple simultaneous users

2. Evaluate critically database security threats and implement appropriate counter measures.

INDICATIVE CONTENT:

- Structured Query Language
    - Data Definition Language
    - Data Manipulation Language
    - Data Control Language
- Stored procedures
- SQL (server side) procedural programming
- Triggers
- Security
    - Database Security Threats
    - Counter Measures
    - Authorisation
    - Views
    - Backup and recovery
    - Roles
    - Integrity constraints
    - Encryption

- Multi-user strategies
    - Transaction Management
    - Properties of transactions
    - Concurrency control
    - Time stamping
    - Locking
    - Two phase commit
    - Concurrency problems
    - Inconsistency
    - Lost updates
- Object Relational Concepts
    - Object creation
    - Object querying
    - Inheritance

LEARNING AND TEACHING STRATEGY:

Conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. However, for the exploration of these topics and their application to practical, pathway-specific situations and case studies, workshops based in a computer laboratory are the most appropriate strategy. During tutorials, a flexible, student-led approach will be taken. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.

	Hours:
Lectures:	30
Laboratory/workshop	30
Student private study hours:	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Design, implement and maintain a database solution for multiple simultaneous users.	• Create and document a database design for a given case study. • Apply techniques that will facilitate multiple simultaneous users. • Create using SQL a multi-user database in a professional database server environment. • Maintain the data within the multi-user database in a professional database server environment • Implement transactions, locking, commit and rollback in a database server environment. • Suggest coping strategies to avoid loss of database integrity
2. Evaluate critically database security threats and implement appropriate counter measures.	• Analyse and document database security threats • Implement appropriate database server measures to counteract the threats.

Outcome 1 will be assessed through an end of year examination. Outcomes 2 will be assessed through a mid year report based assignment.

Examination	50%
Assignment	50%

READING LIST:

Essential Texts:

Connolly, T. and Begg, C., Holowczak, R., (2008)	Business Database Systems, Addison Wesley
Elmasri, R. (2006)	Fundamentals of Database Systems, Pearson Education

Background Reading:

Connolly, T. and Begg, C. (2004)	Database Systems: A Practical Approach to Design, Implementation and Management, Addison Wesley
Hoffer, J., Prescott, M., Topi, H. (2008)	Modern Database Management, Pearson Education
Kyte, T. (2003)	Effective Oracle by Design, Osborne McGraw-Hill
Rischert, A. (2004)	Oracle SQL by Example, Prentice Hall
Shah, N. (2004)	Database Systems Using Oracle, Prentice Hall

Journals:

Communications of the ACM
Journal of Very Large Databases

Useful Web Sites:

www.quasar.ualberta.ca/edpy202/
tutorials/database/database.htm
www.thinkbrown.com/programming
www.tutorgig.com
www.databasejournal.com
www.ovdvl.com/Authoring/Tutorials/
Database.html
www.tutorialized.com/tutorials/Database
www.w3schools.com/sql/default.asp
www.sqlcourse.com
www.1keydata.com/sql/sql.html
www.sqlzoo.net

www.searchdatabase.techtarget.com
www.vtc.com
www.hot-oracle.com
http://w2.syronex.com/jmr/edu/db/
www.softlookup.com
www.informit.com/guides

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Access, SQL Server, Oracle

ROOM REQUIREMENTS:

PC laboratory, Lecture Room

STAFF RESOURCES:

Staff coordinator:	Stephen Hole
Staff delivering module:	Stephen Hole Beverley Holland

Module Title:	Data-Centric Windows Programming
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8621
Module Value:	20
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Visual Programming or Introduction to Programming

AIMS:

The module will provide the student with the major concepts involved in the implementation, testing and debugging of distributed data-centric Windows Form and Web Service applications.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Critically analyse the major concepts, principles and practice to design a distributed data-centric Windows Form applications.

2. Demonstrate a sound knowledge and critical understanding of essential concepts, principles and tools to build and consume a Web service.

INDICATIVE CONTENT:

- Databases
- Database connectivity
- Connected data environment
- Disconnected data environment
- Reading and writing XML
- Binding Windows forms to data sources
- Using components in a Windows application
- Calling win32 API's
- Validating User Input
- Transactions
- Stored Procedures
- Adding Help features to an application
- Windows Form applications security
- Building and consuming a Web service

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse the major concepts, principles and practice to design a distributed data-centric Windows Form applications.	• Design a Windows application that incorporates the major concepts and principles necessary to provide a data-centric application. • Write a report that critically analyses the design of the application with respect to the major concepts, principles and good practice.
2. Demonstrate a sound knowledge and critical understanding of essential concepts, principles and tools to build and consume a Web service.	• Construct a Windows application that interfaces with both databases and web services. • Test and debug a Windows application that interfaces with both databases and web services.

Outcome 1 will be assessed by a mid year assignment (50% weighting). Outcome 2 will be assessed by an end of year assignment (50% weighting).

Coursework 100%

READING LIST:

Essential Texts:

Papazoglou, M. (2007)	Web Services: Principles and Technology, Prentice Hall
Sceppa, D. (2006)	Programming ADO .NET 2.0 Core Reference, Microsoft Press

Background Reading:

Hamilton, B. (2008)	ADO .NET 3.5 Cook Book, O'Reilly
Johnson, G.	Programming Microsoft ADO .NET 2.0 Applications: Advanced Topics, Microsoft Press
Lowy, J. (2008)	Programming WCF Services, O'Reilly

Useful Websites

www.vbnetadvisor.com
www.vb2themax.com
www.vbwm.com
www.msdn.microsoft.com/msdnmag
www.visualbasic.ittoolbox.com
www.fawcette.com/vsm
www.developer.com
www.programmersheaven.com
www.vbnet.mvps.org
www.vbdotnetheaven.com
www.a1vbcode.com
www.devarticles.com
www.developfusion.com
www.abstractvb.com

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Access, SQL Server, Oracle, Windows Integrated Development Environment.

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

STAFF RESOURCES:

Staff coordinator:	Stephen Hole
Staff delivering module:	Stephen Hole Mike Dacey

Module Title:	E-Commerce
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8622
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module will provide students with an understanding of the various business and technological issues that should be considered when setting up a commercial presence online.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate a systematic understanding of the underlying concepts & principles necessary to establish an e-Commerce company.

2. Analyse marketing and law in the context of e-commerce.

3. Evaluate and apply the appropriate methods, techniques and technologies to rapidly build an e-Commerce application.

INDICATIVE CONTENT:

- E-Commerce and E-Business models;
- The role of technology in the marketing function, including the benefits and limitations to stakeholders, particularly customers, of Internet technologies.
- Understanding on-line customers, the buying process & segmenting Internet markets.
- Web marketing techniques and their use within the marketing mix.
- Electronic commerce: contract formation on the Internet, software transactions and contract law, legal barriers to e-contracts: formal requirements and digital signatures.
- B2C e-Commerce infrastructure: marketing presence, e-Procurement, on-line catalogue and shopping cart, on-line payment, e-fulfillment, e-CRM, e-law, I-marketing.
- E-Commerce solutions: out-of-the-box, server based and bespoke development for example Dreamweaver, open source solutions;
- Globalisation including internationalization of site design;
- Electronic trading: merchant services, credit card processing and methods for securing transactions (SSL and SET).
- Hardware and hosting requirements to support an e-Commerce web application;

LEARNING AND TEACHING STRATEGY:

To develop both the conceptual understanding and necessary technical skills for the production of an e-Commerce web application, the module will be delivered using a small number of lectures and discussion based seminars (max. 25 students) with an emphasis on practical laboratory sessions.

The course will be augmented by online demonstrations/reviews, journal articles, videos and discussions as appropriate.

Hours	
Lectures:	5
Tutorials/Seminars:	15
Laboratory/workshop:	40
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of the underlying concepts & principles necessary to establish an e-Commerce company.	• Define the B2C e-Commerce infrastructure; • Identify and evaluate the varying methods required for an e-Commerce monetary transaction on the web.
2. Analyse marketing and law in the context of e-commerce.	• Apply analysis of e-marketing to an e-commerce example and make suitable recommendations. • Analyse the legal issues facing an e-commerce operation. • Present the above in a written document.
3. Evaluate and apply the appropriate methods, techniques and technologies to rapidly build an e-Commerce application for a SME	• Identify and evaluate the main technical requirements that underpin e-Commerce applications. • Review, select and implement appropriate e-Commerce platform and development methods. • Determine the metrics required to evaluate site performance.

The assessment consists of one practically based coursework assignment assessing all outcomes.

Coursework 100%

READING LIST:

Essential Texts:

Chaffey, D. (2006)	E-Business and E-Commerce Management 3rd Ed , Pearson

Background Reading:

Zhao, J.J. (2003)	Web Design and Development for E-Business, Prentice Hall
Todd, P (2005)	E-Commerce Law, Routledge Cavendish
Zhao, J. J. (2006)	Entrepreneurship and Innovations in E-business, IGI
Chaffey, D (2006)	Internet Marketing, Prentice Hall
Siegel, C. (2004)	Internet Marketing: Foundations and Applications, Houghton Mifflin

Useful Websites:

www.opportunitywales.org.uk
www.bized.ac.uk
www.businesseye.co.uk
www.LearnE-Commerce.net
www.FT.com
www.businessweek.com
www.zdnet.com
www.dac.neu.edu/soa/j.hosseini/bizmodls.htm
www.businessconnect.org.uk
www.jshop.co.uk
www.quickcart.com
www.actinic.co.uk
www.webreview.com
www.ukonlineforbusiness.gov.uk
eCommerce-guide.com
ecommercetimes.com
www.dti.gov.uk
www.itwales.com

Journals

Business Law Reviews
Financial Times Business Law
Harvard Business Review
International Journal of Electronic Commerce

Marketing
Marketing Week
Marketing Business

ROOM REQUIREMENTS:

PC laboratory

PHYSICAL RESOURCES:

Hardware:
PC Lab
Internet access.

Software:
Macromedia Dreamweaver
Web Browser

STAFF RESOURCES:

Staff co-ordinator:	Sue Maw
Staff delivering this module:	James Williams Sue Maw

Module Title:	End User Computing
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8623
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module encourages the students to critically appraise the concept of End-User Computing as a means of overcoming the systems development backlog. By understanding the control issues involved in End-User Computing application development in a business environment they are encouraged to apply underlying concepts and principles of end-user application development and building a system using an appropriate fourth generation language.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Show a critical understanding of the end-user computing environment and where and when it is appropriate.

2. Demonstrate a sound understanding of the essential programming concepts of a fourth generation language used to create software applications.

INDICATIVE CONTENT:

- End-User Computing: why it is relevant to organisations and where it may be applied/used.
- Investigation of the concepts and problems associated with end user computing.
- Good operational practice.
- Fourth generation language facilities and application domains.
- Design an appropriate control strategy for a given situation.
- Design appropriate standards for end-user application development.
- Demonstrate competence in the use of applications software and its customisation to meet user needs.
- Design and implement an end-user application from a given case study.

LEARNING AND TEACHING STRATEGY:

Formal lectures together with accompanying handouts/slide presentations will be used to impart key ideas and concepts. Tutorials will enable students to develop technical skills in the development of end-user application software through use of fourth generation language.

	Hours
Lecture	30
Laboratory/workshop	30
Student private study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Show a critical understanding of the end-user computing environment and where and when it is appropriate.	critically evaluate the theoretical aspects on the module in the context of a small case study
2. Demonstrate a sound understanding of the essential programming concepts of a fourth generation language used to create software applications.	Create an end-user software application via a fourth generation language.

Coursework 100%

Assignment 1 will encourage the student to evaluate EUC for a given business case. They will be expected to critically evaluate the current business scenario and rdemonstrate their understanding of EUC as a business solution (Weighting 40%)
Assignment 2 will allow the students to demonstrate their understanding of EUC in a practical sense by building a solution using a 4GL for the given business problem.

READING LIST:

Essential Texts:

Regan, Elizabeth et al (2001) — End-user Information Systems, Prentice Hall

Patricia Cardoza, Teresa Hennig, Graham Seach, Armen Stein (2007) — Access 2007 VBA Programmer's Reference, John Wiley & Sons, Ltd.

Paul T. Kimmel, Stephen Bullen, John Green, Rob Bovey, Robert Rosenberg, Brian Patterson (2007) — Excel 2007 VBA Programmer's Reference , John Wiley & Sons, Ltd

Background Reading:

Steve Clarke(2007)	End User Computing Challenges and Technologies: Emerging Tools and Applications, Information Science Reference
Maureen Sprankle (2001)	Problem Solving for Information Processing Prentice Hall
Capron & Johnson (2006)	Computers: Tools for an Information Age, 8/E Prentice Hall

Journals

Application Development Advisor
Communications of the ACM
Journal of End-User Computing
MIS Quarterly
Software Quality Journal

PHYSICAL RESOURCES:

PCs, Appropriate Fourth Generation Language e.g. Access, Excel, VBA, Visual Basic

ROOM REQUIREMENTS:

- Lecture theatre.
- Computer Laboratory.

STAFF RESOURCES:

Staff Co-ordinator:	Beverley Holland
Staff delivering this module:	Beverley Holland Steve Hole

Module Title:	Entrepreneurship
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8624
Module Value:	20
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will develop in students a systematic understanding of issues relevant to innovation and entrepreneurship. It will encourage and develop the student's entrepreneurial skills, self-motivation and analytical abilities through an investigation of a specific market, and the production of a professional business plan.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Demonstrate an ability to create, recognise and exploit a business opportunity and pitch the idea to a high level audience.

2. Devise and justify a realistic and professional business/venture plan to take forward an opportunity, based on a critical evaluation of a given competitive scenario

INDICATIVE CONTENT:

- The impact on society of entrepreneurs and intrepreneurs (creativity, innovation and market/economic value)
- The skills, attributes and behaviours of the entrepreneur including ethical considerations
- Commercial exploitation and protection
- The business planning process – analysis, choice and implementation – mainly as relevant to micro business and SMEs
- Business description: business ownership/legal formats, mission and objectives
- The market and competitors: analysis of the macro/micro environment using frameworks such as SWOT, SLEPT, Porter's 5 forces, frameworks and techniques to investigate competitors and understand customers including industry analysis and market research.
- The marketing plan (segmentation and targeting, product, price, promotion, business premises/distribution, service issues)
- Management and human resources plan: people/staffing issues
- Operations and production plan: production facilities, IT requirements, and intellectual property rights issues such as copyright, trademarks and patents.

- Financial plan: e.g. sources of finance to start-up a business, costings, breakeven analysis, cash flow predictions, profit and loss accounts.
- Pitching the idea/plan: presentation techniques, documentation conventions

LEARNING AND TEACHING STRATEGY:

As the module aims to encourage and develop the student's entrepreneurial skills, self-motivation and analytical abilities, student-centred learning strategies are necessary. Therefore, lectures will be avoided but seminars and tutorials will allow a more interactive learning experience for the student. Students will be encouraged to lead class discussions into areas that are pertinent to the opportunities and ideas that they have generated (facilitated by the lecturer). Similarly, such strategies are suitable for the exploration of these topics and their application to case studies pertaining to IT and its use in industry. During tutorials, students will also have the opportunity to apply these issues to their chosen business/product plan, and gain individual, formative feedback regarding their work.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	0
Tutorials/Seminars	60
Student private study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate an ability to create, recognise and exploit a business opportunity and pitch the idea to a high level audience.	• Identify a business opportunity • Present/pitch the business opportunity idea to peers, potential investors and partners, and/or other professional people. • Present outline methods to take forward this opportunity in a market based on knowledge of the underlying concepts and principles associated with innovation and entrepreneurship. • Use audio visual aids to support the presentation • Be persuasive in the presentation and respond to questioning from the audience
2. Devise and justify a realistic and professional business /venture plan to take forward an opportunity, based on a critical evaluation of a given competitive scenario	• Produce a written business plan with appropriate sub sections for a self-selected business opportunity. • Write a focused business description section that states the trading name, type of organisation, legal format, mission and aims, products/services. • Create a market/industry plan based on secondary and/or primary research techniques that documents the investigation and evaluation of the business environment of a selected organisation/product/ industry. This should consider markets, competitors and customers. • Deploy business planning analytical techniques

	and frameworks appropriate to the task. • Produce a marketing plan that documents the specific activities to be used to price, promote and distribute products and services based on a systematic understanding of current theory and practice. • Generate a financial plan that costs all activities, manages cash flow. • Create a management and human resources plan

Coursework 100%

Both outcomes will be assessed via one case study/practically based coursework assignment, split into logical parts. The student will be required to present/pitch a business opportunity idea (25% weighting), which will be group-based, and devise a venture plan for an opportunity, product or service of the student's choice, or a given case study (75% weighting).

READING LIST:

Essential Texts:

Barringer, B. R. & Ireland, R.D. (2008) Entrepreneurship: Successfully Launching New Ventures, 2nd Ed., Prentice Hall: New Jersey, USA

Williams, S. (2009) FT Guide to Business Start Up 2009: The only annually updated guide for entrepreneurs, 4th Ed., Financial Times Press: Harlow

Zimmerer, T.W. & Scarborough, N.M. (2008) Essentials of Entrepreneurship and Small Business Management, 5th Ed., Pearson: New Jersey, USA

Background Reading:

Burns, P. (2006) Entrepreneurship and Small Business, 2nd Edition, Palgrave Macmillan: Basingstoke

Carter, S. & Jones-Evans, D. (2006) Enterprise and Small Business: Principles, Practice and Policy, 2nd Ed., Financial Times Press: Harlow

Covello, J.A. & Hazelgren, B.J. (2004) The Complete Book of Business Plans: Simple Steps to Writing a Powerful Business Plan, Small Business Sourcebooks

Kirby, D. (2003) Entrepreneurship, McGraw Hill: Maidenhead

Legge, J. & Hindle, K. (2004) Entrepreneurship: Context, Vision and Planning, Palgrave Macmillan: Basingstoke

Microsoft (2007) Software Entrepreneurship for Students, Agatavi

Rae, D. (2007) Entrepreneurship: from opportunity to action, Palgrave Macmillan: Basingstoke

Timmons, J. & Spinelli, S. (2008) New Venture Creation: Entrepreneurship for the 21st Century, McGraw Hill:Boston, Mass

Journals:

Entrepreneurship & Regional Development
Frontiers of Entrepreneurship Research
Journal of Business Venturing
Journal of Small Business Management
Small Business Economics
The Journal of Product Innovation Management
Venture Capital

Useful Websites

Business Link	http://www.businesslink.gov.uk
Business Learning and Support	http://www.bized.co.uk
Bytestart: the small business portal	http://www.bytestart.co.uk
Emerald Fulltext Journals and Abstract Reviews	http://juno.emeraldinsight.com
IT Wales	http://www.itwales.com
IT and Business web site	http://www.silicon.com
Online technology magazine	http;//zdnetweek.co.uk

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.
Computer laboratory with Internet access

STAFF RESOURCES:

Staff Co-ordinator: Karen Jones

Staff delivering this module: Karen Jones
Kathryn Penaluna

Module Title:	Local Area Networks
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8625
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	IP Internetworking

AIMS:

To study in depth the technical issues related to switching techniques, to have an in depth knowledge of VLANs and spanning tree and to understand the fundamental technical principles underlying multicast traffic.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate a detailed knowledge of the basic technological infrastructure of LANs using multi layer switching.

2. Demonstrate a systematic understanding of the technical details relating to VLANs and Spanning Tree Protocol.

3. Configure switches for multicasting IP traffic.

INDICATIVE CONTENT:

- Design and implementation of Local Area networks using advanced switching technologies.
- Virtual Local area Network (VLAN) configuration
- The use of trunking and VLAN Trunking Protocol in LAN design.
- Spanning Tree Protocol (STP) and its use with redundant links.
- Routing between VLANs.
- Hot Standby Routing Protocol (HSRP) and its use in network redundancy
- Using Multicasting techniques in advanced LAN design
- Practical Network Troubleshooting Skills

LEARNING AND TEACHING STRATEGY:

The use of case studies will be used to reinforce the basic theory underlying this subject. Practical work will be in the form of a detailed design and evaluation of a complex system using Cisco routers and switches.

	hours
Lectures	15
Laboratory/workshop	40
Tutorials	5
Self Study	140
TOTAL	**200**

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a detailed knowledge of the basic technological infrastructure of LANs using multi layer switching.	• Configure VLANs and VLAN Trunking Protocol (VTP) on all switches • Demonstrate and explain the impact of Layer 3 boundaries imposed by creating VLANs • Configure a router to support 802.1q trunking on a Fast Ethernet interface • Configure a router with subinterfaces corresponding to the configured VLANs • Demonstrate and explain inter-VLAN routing.
2. Demonstrate a systematic understanding of the technical details relating to VLANs and Spanning Tree Protocol.	• Configure switches for advanced VLAN capabilities, and troubleshoot a multi-configured VLAN environment.
3. Configure switches for multicasting IP traffic.	• Configure a switch for IP multicasting and document the results in a lab based report

Coursework	50%
Exam	50%

Outcome 1 and 3 will be assessed via a practical assignment while outcome 2 will be assessed by an examination.

READING LIST:

Essential:

Lewis, W (2008)	LAN Switching and Wireless, CCNA Exploration Companion Guide, Cisco Press

Background:

CISCO Academy Website	cisco.netacad.net (password access only)
Odom, Wendell, Healy, Rus, Mehta, Naren (2007)	CCIE Routing and Switching Exam Certification Guide, Cisco Press,
White, C. (2008)	Data Communications & Computer Networks, 5th Edition, Delmar Publishing
White, G. et al (2007)	Delivering Carrier Ethernet: Extending Ethernet Beyond the LAN, Osborne/ McGraw

PHYSICAL RESOURCES:

Network analysis and protocol analysis software, routers, switches, hubs, cables and connectors, PCs

ROOM REQUIREMENTS:

PC Laboratory, Network Laboratory

STAFF RESOURCES:

Staff Coordinator:	Gwynfor Higgins
Staff delivering this module:	Gwynfor Higgins Dr Ian Wells

Module Title:	Multimedia Web Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8626
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Web Design & Development

AIMS:

The aim of this module is to enhance the student's conceptual awareness and practical skills to meet societal requirements for interactive multimedia web applications. This will be accomplished by integrating industry standard guiding principles, best-practice techniques and professional environments in association with Human Computer Interface concepts.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Understand and apply essential concepts, principles and techniques required to create a dynamic multimedia website.

2. Demonstrate a critical understanding of the underlying concepts, principles and practical skills to construct an Interactive Multimedia Web application;

INDICATIVE CONTENT:

- Philosophy and infrastructure of Internet multimedia systems;
- Project planning, Web Analysis and Design specifications;
- Professional industry standard web multimedia development tools;
- The Creative process, Originality and Creativity;
- Visual Web Interface and Information Processing concepts;
- Usability and Accessibility guidelines, techniques and testing strategies;
- Graphic design techniques for both bitmap and vector formats;
- Audio and video integration;
- Animation techniques;
- User-centered, Marketing and Legal considerations;
- Content management techniques;
- Scripting and Object-oriented programming;
- Server-side technologies and database integration;

- Exploiting multimedia web technology in organisations: Multimedia Information systems and e-commerce development.

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to highlight best-practice.
All course material will be stored on the University's Virtual Learning Environment, allowing students to gain access to handouts/slides/tutorials both on and off campus. Students are required to keep a self-reflective progress blog, documenting their personal learning strategy and progress on a weekly basis. Guided by the tutor, this method ensures the most effective use of the 'Student private study' time and supports the student's professional and transformational learning and development. Collaborative learning is also supported by Social Networking tools.

	Hours
Seminar	10
Laboratory/workshop (tutorials)	50
Student private study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand and apply essential concepts, principles and techniques required to construct an interactive multimedia website.	• Document a conceptual analysis including key areas of user communication, accessibility, usability, simplicity, consistency and optimisation. • Review and document the latest developments, including both technologies and techniques, in the field of interactive multimedia web design. • Design and construct a Web interface using appropriate shaping tools, textures & patterns, interface elements, composition fx and content management techniques. • Produce a user-friendly and accessible interactive multimedia website.
2. Demonstrate a critical understanding of the underlying concepts, principles and practical skills to construct an Interactive Multimedia Web application;	• Evaluate and document the need for programming in building web multimedia applications. • Produce a project report including requirements specification, storyboards, site & information structure, colour schemes, page layouts, master templates, graphical and media elements and implementation and testing documentation. • Interface with database systems utilising client and server side technologies.

	• Construct an interactive multimedia web application.

Coursework 100%.

Outcome 1 (weighted 50%) will be assessed through a mid-year assignment that will be used to test the student's conceptual and technical ability in building a user-friendly and accessible interactive multimedia website.
Outcome 2 (weighted 50%) will be assessed through an end-of-year assignment that will test the student's conceptual and technical ability to develop an interactive multimedia web application.
Students will be required to demonstrate extensive background reading and record all sources accurately using an appropriate referencing system.

READING LIST:

Essential:

Allen, C (2008) — The Essential Guide to Open Source Flash Development, FRIENDS OF ED,1st edition

Stiller, D et. al. (2008) — The ActionScript 3.0 Quick Reference Guide: For Developers and Designers Using Flash CS4 Professional, Adobe Dev Library

Kelby, S (2009) — Photoshop CS4 Down and Dirty Tricks (Down & Dirty Tricks)
New Riders, 1st edition.

Background:

Webster, S et. al. (2008) — Foundation Actionscript 3.0 with Flash CS3 and Flex, FRIENDS OF ED.

Shupe, R & Rosser, Z (2007) — Learning ActionScript 3.0, Adobe Dev Library; First edition.

Babbage, J (2008) — Adobe Fireworks CS4 How-Tos: 100 Essential Techniques; Adobe; 1 edition.

Krug, S. (2005) — Don't Make Me Think!: A Common Sense Approach to Web Usability, 2nd Edition, Que.

Staples, T. (2005) — Adobe Photoshop CS2/ImageReady CS2 for the Web Hands-On Training, Peachpit Press

Wiedemann, J. (2006) — Web Design: Studios 2, Taschen.

Woolman, M. (2002) Digital Information Graphics, Thames and Hudson

Web Resources:

http://www.w3c.org
http://wdvl.internet.com/Multimedia
http://www.agocg.ac.uk
http://www.artifact.ac.uk
http://www.digitalthread.com
http://www.phong.com/tutorials
http://www.design-council.org.uk
http://www.deviantart.com
http://www.webstyleguide.com
http://www.tutorialoutpost.com
http://www.planetphotoshop.com
http://www.teamphotoshop.com
http://www.photoshopcafe.com
http://www.computerarts.co.uk
http://www.flashkit.com
http://www.websitetips.com/design/index.html
http://www.adobe.com
http://www.kirupa.com
http://www.w3.org/Consortium/#web-design
http://www.useit.com
http://webdesign.templatemonster.com

Journals

ACM Transactions on Internet Technology.
Visual Software Journal – the independent source for software developers.
Web Developers Journal (www.WebDevelopersJournal.com).
The Database Journal - the Knowledge centre for Database professionals (www.databasejournal.com).
The International World Wide Web Conference.
Future publishing: Computer Arts
Future publishing: Cre@te Online

ROOM REQUIREMENTS:

Lecture Room
PC Laboratory

PHYSICAL RESOURCES:

Hardware:
High specification PCs
Internet access.

Software:
Adobe Flash CS3+
Adobe Photoshop CS3+
Adobe Dreamweaver CS3+
Adobe Fireworks CS3+
Internet Web browser

STAFF RESOURCES:

Staff co-ordinator: James Williams

Staff delivering this module: James Williams
Michael Dacey

Module Title:	Network Operating Systems and Security
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8627
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Prerequisites:	Computer and Network Architecture

AIMS:

The aim of this module is to provide learners with the essential principles, concepts and techniques in the design, deployment and security of Network Operating Systems.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Critically appraise features provided by modern operating systems.

2. Demonstrate a systematic understanding of operating system principles through OS configuration.

3. Identify and evaluate network security principles and apply the appropriate techniques in given network scenarios.

INDICATIVE CONTENT:

- Evolution of operating systems from early primitive systems to present-day powerful multi-user systems.
- Processes and threads, CPU scheduling modes in the OS. E.g. High Level scheduling (long term scheduling) and Dispatching (short term scheduling).
- Resource management, including processor management, memory management (e.g. paging), storage management and peripheral allocation.
- Concepts of multi-threading, concurrency, mutual exclusion, thrashing and OS design challenges (e.g. deadlock).
- Network Security Services. E.g. CIA model.
- Identify potential threats to the security of data and investigate countermeasures.
- Risk Assessment

- Deployment and Administration of NOS. E.g. Install and configure Windows/Linux clients and servers, process/resource management, armouring OS with service configuration.
- Implementing directory services and network authentication. E.g. Active Directory, Kerberos.
- Network operating system management tools. E.g. NetMon, Wireshark, Group Policy Management Console etc.
- Network security technologies. Permissions, authentication, Intrusion detection systems, VPNs, Firewalls, Virus checking, Vulnerability assessment etc. (e.g. Netfilter, TCP Wrappers, Nessus, etc).
- Securing network infrastructure resources against disaster. E.g. disaster recovery, data restoration, UPS, clusters, RAID Servers, active directory services domain controller restore modes, inter/intra site replication etc.

LEARNING AND TEACHING STRATEGY:

Formal lectures together with appropriate handouts/slide presentations will outline the module material. Tutorials will focus on practical activities in this unit. These could be achieved in (as an example) groups, each learner developing a different department in an organization.

	Hours
Lectures	30
Tutorials	30
Student private study	140
TOTAL	200

ASSESSMENT:

Outcomes	Assessment criteria **To achieve each outcome a student must:**
1. Critically appraise features provided by modern operating systems.	In a formal examination: • Illustrate a knowledge of the main modules which make up a functional operating system • Show a conceptual understanding of processes, threads, scheduling, synchronization, etc • Demonstrate a systematic understanding of resource and memory management functionality e.g. paging, segmentation, caching, etc. Optionally including principles and concepts of administration, security, network services, etc.
2. Demonstrate a systematic understanding of operating system principles through OS configuration.	Through a series of practical worksheets, complete a number of tasks associated with: • Deploy and configure NOS in a simulated network infrastructure. • Evaluate and utilize NOS technologies in given scenarios.
3. Identify and evaluate network security principles and apply the appropriate	Through a written assignment based on a fictitious scenario: • Identify and illustrate a range of network security

techniques in given network scenarios.	threats and design and implement countermeasures. • Deploy and configure network security technologies.

Outcomes will be assessed by one exam in the form of an in class test and one assignment of equal weighting.

Outcome 1 will be assessed by an end of semester exam. Outcomes 2 & 3 will be assessed by an assignment at the end of the year.

Coursework 50%
Examination 50%

READING LIST:

Essential:

Silberschatz A, Galvin PB, et al (2008) Operating System Concepts, 8th Edition John Wiley & Sons

Minasi M, et al (2003) Mastering Windows Server 2003 Sybex International,

BACKGROUND READING:

Adelstein T., Lubanovic B (2007) Linux System Administration O'Reilly Media Inc

Stallings W (2008) Network Security Essentials: Applications & Standards Pearson Education

Adelstein T, Lubanovic B (2007) Linux System Administration O'Reilly Media Inc

Englander I (2003) The Architecture of Computer Hardware and Systems Software; An Information Technology approach. John Wiley & Sons

Rash M (2007) Linux Firewalls: Attack, Detection and Response with Iptables, Psad and Fwsnort, NO STARCH PRESS.

Dennis A (2002) Networking in the Internet Age John Wiley & Sons

Siever E, Webber A, et al (2005) Linux in a Nutshell O'Reilly Media Inc

JOURNALS:

ACM Transactions
Computer Networks
Data Communications

USEFUL WEB SITES:

Business Link | Network security issues www.businesslink.gov.uk/bdotg/action/detail?type=RESOURCES&itemId=1073791297
NACS Security Information www.nacs.uci.edu/security/
Microsoft Windows security site: intrusion detection, anti-virus ...
www.windowsecurity.com/
www.nacs.uci.edu/security/
www.more.net/security/presentations/pgp/tsld005.htm
www.sans.org/top20/
www.comptechdoc.org/os/linux/
www.networkcomputing.com/unixworld
www.opensource.org/
www.reallylinux.com
sourceforge.net/
freshmeat.net/
www.dwheeler.com/oss_fs_why.html
www.gnu.org/philosophy/free-software-for-freedom.html
GFI Network security www.gfi.com/languard/
Network Security Issues www.more.net/security/presentations/pgp/tsld005.htm
SANS Top 20 Vulnerabilities - The Experts Consensus www.sans.org/top20/ -

PHYSICAL RESOURCES:

A dedicated network laboratory needs to be available.
At least one networked printer, network monitoring software and all relevant network documentation should be accessible to learners.
Windows 2003/2008 Server, Client software (XP Professional SP2);
Linux NOS (e.g. Fedora Core 8).
Appropriate open source & Windows network applications/utilities (software).

ROOM REQUIREMENTS:

Lecture theatre.
Network Laboratory.

STAFF RESOURCES:

Staff Co-ordinator: L. Cobley / M. Dacey

Staff delivering this module: L. Cobley /M. Dacey

Module Title:	Network Services and Web Technology.
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8628
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Prerequisites:	Computer and Network Architecture

AIMS:

The aim of this module is to provide learners with the essential principles, concepts and techniques in the design and configuration of network services including web servers. This module will also enable students to develop and deploy a website utilizing a common web development framework.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Demonstrate a systematic understanding of the principles and concepts behind network services.

2. Design and Deploy network services and web technologies in given network scenarios.

3. Evaluate the concepts, principles, technologies and techniques in deploying an application platform in the development of web based applications.

INDICATIVE CONTENT:

- Investigate and deploy clustering technologies.
- Appreciate the role of server farms and packs. E.g. using NLB & Server Clusters implement server/web farms.
- Introduction to web application server platforms & services (e.g. Component Load Balanced Clusters, ASP.NET, web services).
- Deploy, configure and manage Domain Name Servers. E.g. Windows Server Domain Name Services Server, Name Resolution Zones.
- Network Administration Services. E.g. DHCP Servers.
- Open Source development platforms and tools. E.g. LAMP Framework
- Installing, configuring and managing OS Data Sources (e.g. MySQL). Integrating data sources into open source applications (e.g. 3 tier web development using PHP 5).
- Open source services such as WWW, Proxy, FTP and News, etc. Database administration using open source tools.
- Essential differences and uses between Internet and Intranet sites

- Implementation of an Intranet-based, open source, interactive application using e.g. Apache web server, PHP programming and MySQL database.

LEARNING AND TEACHING STRATEGY:

	Hours
Lectures	30
Laboratory/workshop	30
Student private study	140
TOTAL	200

Lectures, academic debate and directed reading of relevant information sources will be the main methods of acquiring knowledge. During tutorials students will be expected to complete theoretical and practical exercises aimed at demonstrating a systematic understanding of up-to-date technologies inherent in current operating systems, with a divide in emphasis on open source and Microsoft software and related services.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of the principles and concepts behind network services.	Create a written report that demonstrates the following: • Develop knowledge of the underlying concepts and principles and technologies associated with network management and administration services. • Appreciate the name resolution process within network infrastructures.
2. Design and Deploy networkservices and web technologies, in given network scenarios.	Through a series of practical worksheets, complete a number of tasks associated with: • Deploy, configure and manage Routing/Firewall service, DNS and DHCP Servers and related technologies. • Evaluate and utilise intrinsic NOS services. • Analyse and implement suitable web servers.
3. Evaluate the concepts,principles, technologies and techniques in deploying an application platform in the development of web based applications.	Implement a web application according to the following criteria: • Design, write and test a client-server interactive application within a suitable language & development environment. E.g. LAMP environment. Produce a written report that documents the following • Determine security requirements & configurations for web based application platforms. • Manage and Manipulate data sources using Open Source Database Server Tools to produce responses to server side client requests. • Appreciate processes involved in TCO e.g. Acquiring, Maintaining, Supporting, Managing and Security of equipment.

ASSESSMENT

Outcomes will be assessed by two assignments. **Outcomes 1 & 2** are assessed by an end of semester Assignment with a 50% weighting in the module.

Outcome 2 & 3 are assessed by an end of year assignment with a 50% weighting in the module.

Coursework: 100%

READING LIST:

Essential:

Minasi M, et al (2003) Mastering Windows Server
Sybex International.

Gilmore, J (2006) Beginning PHP and MySQL 5: From Novice to Professional, Second Edition, APRESS.

BACKGROUND:

Wandschneider M (2005) Core Web Application Development with PHP and MySQL, Pearson Education.

Gerner J, et al (2005) Professional LAMP: Linux, Apache, MySQL and PHP Web Development (Wrox Professional Guides), John Wiley & Sons.

Denoncourt D, Kline B (2002) Understanding Web Hosting on Linux
MC Press

Sklar D. (2004) Learning PHP5
O'Reilly Media Inc

Adelstein T, Lubanovic B (2007) Linux System Administration
O'Reilly Media Inc

J. Cobley et al (2004) Practical Intranet Development, Glasshaus

JOURNALS:

ACM Transactions
Computer Networks

USEFUL WEB SITES:

www.windownetworking.com
www.dns.net/dnsrd/servers/windows.html
support.microsoft.com
www.linux.org
www.linux.com
www.opensource.org/
sourceforge.net/
freshmeat.net/
www.dwheeler.com/oss_fs_why.html
www.gnu.org/philosophy/free-software-for-freedom.html
www.w3.org/Status
www.apache.org/
www.oss-institute.org/
www.gnu.org/philosophy/free-sw.html
www.businesslink.gov.uk/bdotg/action/ detail?type=RESOURCES&itemId=1073791297
www.php.net/
www.phpbuilder.com/
www.mysql.com/
dev.mysql.com/doc/
www.devshed.com/Server_Side/MySQL
www.phpmyadmin.net/

PHYSICAL RESOURCES:

IIS/Apache web servers
Client software; Linux NOS

ROOM REQUIREMENTS:

Lecture theatre.
Networked laboratory with Linux based web servers.

STAFF RESOURCES:

Staff Co-ordinator: L. Cobley/ M. Dacey

Staff delivering this module: L. Cobley/ M. Dacey

Module Title:	Project Management and IT Consultancy
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8629
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module requires students to evaluate techniques and standards for undertaking activities required in managing projects. It develops the concept of quality and quality management, and analyses the role quality plays in project development. The module allows the student to develop and acquire the well-established principles of professional conduct. The student will be able to critically appreciate the importance of ethical and legal issued facing IT personnel.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Evaluate techniques and standards for undertaking activities required in managing projects,

2. Develop the concept of quality and quality management, and analyse the role quality plays in project development.

3. Initiate, plan and manage a project, from initial idea through to implementation and ultimately project closure.

INDICATIVE CONTENT

- History of project management (to include a review of project failures/delays).
- Life cycle models: Waterfall (classic), Spiral, Prototyping, V-model.
- Planning, Estimating, Scheduling, Costing and Monitoring.
- Function Point Analysis (FPA), Critical path Analysis (PERT, CPM), Gantt Charts, Work Breakdown Structures (WBS).
- Quality: Quality Assurance, Quality Metrics, Quality Standards: ISO-9000, ISO-9001, ISO-9001-3
- Codes of Practice (BCS)
- Legal Framework
- Contracts

- Project Management Methodologies (e.g. PRINCE 2).
- Risk Management, Health and Safety.
- Understanding the role of project teams and organisational consultancy.
- Understanding the Organisational framework.
- Project roles and responsibilities, finance, intellectual property, data protection.
- The project manager, Human and Ethical issues.
- Selection of appropriate tools for project implementation.

LEARNING AND TEACHING STRATEGY:

Lectures, academic debate and directed reading of the texts and relevant articles will be the main methods for acquiring knowledge.

The theoretical aspects will be supported by the use of tutorials and seminars to provide the opportunity for the application of the discussion theoretical issues. Students will be expected to complete theoretical and practical exercises to demonstrate an understanding of current practices. Use of a case study should be made to provide additional support.

	Hours
Lectures	20
Tutorials/Seminars	40
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Evaluate techniques and standards for undertaking activities required in managing projects.	• Evaluate and select appropriate project management techniques • Apply appropriately the project management techniques
2. Develop the concept of quality and quality management, and analyse the role quality plays in project development.	• Demonstrate a critical understanding of quality concepts • Analyse the role of software quality assurance in a case study
3. Initiate, plan and manage a project, from initial idea through to implementation and ultimately project closure.	• Use Project Initiation Documentation developed in assignment 1 to build a solution to the project using appropriate implementation measures as a member of a group.

Coursework 100%

Assignment 1 will allow the student to demonstrate his/her understanding of the theoretical concepts when considering the ethical and legal requirements necessary for IT project management. (Weighting 40%)

Assignment 2 will be a group based assessment where student will work on a project idea from initiation to project close. (Weighting 60%)

READING LIST:

Essential Texts:

Yeates, D, Cadle (2007)	Project Management for Information Systems, Prentice Hall

Background Reading:

Brooks, F.P. (1995)	The Mythical Man-Month: Essays on Software Engineering (2nd Edition), Addison-Wesley
Hughes, B. and Cotterell, M. (2002)	Software Project Management: (3rd Ed.), McGraw-Hill
Jalote, P. (2002)	Software Project Management in Practice, Addison-Wesley
Meredith, J R, Mantel, S J (2003)	Project Management: A Management Approach (5th Ed.), Wiley
Wysocki, R K, (2003)	Effective Project Management (3rd Edition), Wiley

Journals

Communications of the ACM
Journal of Object Oriented Programming
Project Management
Software Engineering Journal

Useful Websites

http://projectmanagement.ittoolbox.com/
http://www.michaelgreer.com/
http://www.ics.ltsn.ac.uk/resources/projman/index.html
http://www.niwotridge.com/Resources/PM-SWEResources/PMResources.htm
http://www.tickit.org/international.htm

PHYSICAL RESOURCES:

Project Management Software (MS Project)
Windows Environment
Blackboard or other suitable VLE

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Beverley Holland
Staff delivering this module:	Beverley Holland Karen Jones

Module Title:	Research and Development Methods
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8630
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module underpins computing research and the dissertation/project, and will provide students with a comprehensive and systematic understanding of the knowledge and skills needed to collect, interpret, analyse, synthesise and present data using appropriate research methods. The module will extend the student's technical expertise in information systems development such that s/he is able to evaluate the suitability of different development methods for different situations.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Review critically the current research literature pertinent to a research topic and communicate the results of the research to specialist and non-specialist audiences.

2. Produce a dissertation/project proposal that plans appropriately the research and development strategies to be applied for the achievement of the objectives of the study.

INDICATIVE CONTENT:

- Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity, generalisability)
- Research design strategies, (e.g. action research, experiments, surveys, case studies, ethnography), their advantages and limitations, and their suitability to a variety of research contexts.
- Data collection & sampling methods (e.g. interviews, questionnaires, observation), and their advantages and limitations in a variety of contexts.
- Data analysis of both qualitative and quantitative information, including the use of appropriate computer software.
- General approaches to information systems development (e.g. process-oriented, data-driven, integrated, rapid, object-oriented, people/organisational-oriented)

- The philosophies, stages, techniques and tools associated with a range of information systems development methods (e.g. lifecycle models, DSDM, XP, RUP, SSM, prototyping).
- Frameworks for evaluating and comparing methodologies, for example, Avison and Fitzgerald's framework, NIMSAD.
- Developing and structuring a research proposal: problem identification, formulating aims/hypotheses, sampling, ethical issues and the practicalities of design.
- Referencing conventions (e.g. the Harvard system, numeric system).
- Critical, analytical thinking and writing
- Looking and behaving like an IT professional: presentation techniques/skills.

LEARNING AND TEACHING STRATEGY:

Students are required to self-select a topic for group research and presentation to an audience of their peers and staff, and produce a dissertation/project proposal based on a self-selected topic. This module, therefore, requires that students demonstrate a high level of self-direction and initiative, and take responsibility for the direction of their own learning. This is reflected in the teaching and learning strategy implemented. Introductory lectures will introduce conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. However, for the exploration of these topics and their application to practical, pathway-specific situations and case studies, tutorials are the most appropriate strategy. During tutorials, a flexible, student-led approach will be taken; students will discuss and develop individual dissertation/project ideas, and will be given the opportunity to consult with topic specialists amongst the teaching team. During seminars, student teams will develop and manage their group activities, then disseminate to their peers the findings of their research, which further enhances their transferable skills of team working, and presentation techniques.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Review critically the current research literature pertinent to a research topic and communicate the results of the research to specialist and non-specialist audiences.	• Work as a team member to write and structure a seminar paper that documents the evaluation of secondary research of a self-selected contemporary computing related theme. • Present the findings of self-selected research to an audience of peers and respond to their questions. • Work as a team member to present the evaluation of secondary research of an allocated systems development related theme and respond to peer questioning.

	• Employ an appropriate referencing system to evidence literature sources. • Employ an appropriate presentation style to communicate effectively • Deploy effectively audio-visual aids that support seminar presentations.
2. Produce a dissertation/project proposal that plans appropriately the research and development strategies to be applied for the achievement of the objectives of the study.	• Produce a written research proposal that proposes a topic suitable for computing research and documents briefly the literature to justify exploration of the topic. • Document the selection and justification for the research methods to be used in the study that reflects current research methodology/design theory and practice, incorporating problem identification, formulating aims/hypotheses, sampling, professional/ethical issues and the practicalities of design. • Document the selection and justification for any systems development method/process to be used in the proposed study, based on an evaluation of current systems development methodology /design theory and practice. • Produce a chart that plans the timescales and milestones of the research.

Coursework 100%

The module will be assessed via two coursework assignments. Outcome 1 will involve group work tasks and presentations based on two secondary research themes (one self-selected by the team and one allocated by the lecturer) (50% weighting, equivalent to 3,000 words). Outcome 2 will be assessed via an individually written academic dissertation or project proposal of approximately 3,000 words (50% weighting).

READING LIST:

Essential Texts:

Avison, D. and Fitzgerald, G. (2007) Information Systems Development: Methodologies, Techniques and Tools, 4th Edition, McGraw-Hill: Maidenhead.

Saunders, M., Lewis, P. and Thornhill, A. (2007) Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow

Weaver, P. (2004) Success in Your Project: a Guide to Student System Development Projects, Prentice Hall: Harlow

Background Reading:

Baase, S. (2008)	A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY
Collis, J. and Hussey, R. (2009)	Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke
Cornford, T. and Smithson, S. (2006)	Project Research in Information Systems: a Student's Guide, 2nd Ed., Palgrave/Macmillan: Basingstoke
Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	Projects in Computing and Information Systems: a Student's Guide, Addison Wesley: Harlow
Fitzgerald, B., Russo, N.L. and Stolterman, E. (2002)	Information Systems Development: Methods-in-Action, McGraw Hill: Maidenhead
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY
Wood, M. (2003)	Making Sense of Statistics: A Non-mathematical Approach, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Yin, R K, (2008)	Case Study Research: Design and Methods, 4th Ed., Sage: Beverly Hills.

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Computer/projector
Internet access
SPSS for Windows v. 16

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Glenn Jenkins

Module Title: Software Engineering Principles

Date of Validation: SEPTEMBER 14TH 2009

Module Number: M2X8631

Module Value: 20

Level: 5

Faculty Responsible for Delivery: Applied Design and Engineering

Pre-requisites:

AIMS:

To provide students with the ability to deploy software engineering principles and to expose them to the dynamics of group working in a cross-disciplinary environment in order to develop a product.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Understand and apply essential Software Engineering concepts, principles and practice in the implementation of a group project;

2. Justify their selection of a suitable development methodology for a given problem scenario and plan the implementation of this methodology.

3. Work under guidance as a team member, manage a team and communicate their ideas to an audience of their peers.

INDICATIVE CONTENT:

- Time-tabling and setting of interim and final objectives
- Team management, Role selection and the task assignment
- Agile programming methods
- XP – eXtreme Programming
- The Software Engineering process
  - requirements analysis e.g. use cases
  - software design principles e.g. object oriented methods, structural and architectural design, cohesion, coupling, models, notations, sequence diagrams, state charts, etc
  - implementation strategies
  - software testing e.g. test specifications, black box, white box, etc
- Software design documentation
- Software design methods and approaches (e.g. object-oriented analysis and design)
- Software design models e.g. Waterfall model, spiral model
- Software Configuration Management i.e. Version Control, Releases, etc
- Ethical and Professional Issues (including codes of conduct)

LEARNING AND TEACHING STRATEGY:

The conceptual issues will be delivered via lectures. The groups of students involved in the module will normally be drawn from level 5 of the BSc Software Engineering, though interaction with students from the BSc Computer Games Development program will be encouraged. The progression of the group work will be monitored by scheduled group tutorials during which students will be required to provide evidence of progress through log books and/or minutes of meetings. The assessment of the work will also involve a consideration of peer assessment.

	Hours
Lectures	30
Tutorials	15
Laboratory/Workshop	15
Student Private Study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand and apply essential Software Engineering concepts, principles and practice in the implementation of a group project;	• Develop a product as a member of a group. • Provide a written report describing the design of the product demonstrating the application of Software Engineering principles and the selection of design methods and techniques. • Produce a documented design to meet specified requirements to a professional standard.
2. Justify the selection of a suitable development methodology for a given problem scenario.	• Select and detail a suitable development methodology based for a project or research proposal. • Produce a document detailing their planned implementation of their chosen development methodology.
3. Work under guidance as a team member, manage a team and communicate their ideas to an audience of their peers.	• Participate as a member of a development team, which will include giving an oral and/or visual presentation of a component of a project which evidences effective interaction with others, through collaboration, collective endeavour and negotiation • Exercise self and group management skills in managing their workloads and meeting deadlines.

Outcome 1 will be assessed through a group project (weighted at 40%) and a written report (weighted at 30%). The group project will be based on a suitable scenario with a member of staff acting the client in the scenario. The written report will document the techniques applied during the group project. The written and group courseworks will run in parallel with students individual reports detailing the techniques applied to each stage of the group project.

These will be submitted at intervals thought year while the oral/visual presentation will take place at the end of the year. Outcome 2 will also be assessed though a written report and will account for 25% of the marks. There is an opportunity for integrated assessment between this Software Engineering Principles module and the Academic Seminar module: both modules require the student provide a plan for a project (software development methods and research methods respectively), so both tasks could be incorporated into one coherent assignment (a project proposal document). Outcome 3 will be assessed through an oral or visual presentation of the project at the end of the year and will account for 5% of the overall mark.

Coursework 100%

READING LIST:

Essential Texts:

Sommerville, I. (2006) — Software Engineering (8th Edition), Addison - Wesley

Pender, T. (2003) — UML Bible, Wiley

Background:

Hazzan, O., Dubinsky, Y. (2008) — Agile Software Engineering, Springer

Pressman, R. S. (2003) — Software Engineering: A Practitioners Approach (6th Edition), McGraw-Hill

Fowler, M. (2003) — UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition), Addison-Wesley

Van Villet, H., (2008) — Software Engineering: Principles and Practice (3rd Edition), Wiley

Bowden J. (2008) — Writing a Report: How to Prepare, Write and Present Effective Reports, (8th Edition) How To Books

Rosen A. (2004) — Effective IT Project Management: Using Teams to Get Projects Completed on Time and Under Budget, AMACOM

Turner (2008) — The handbook of Project-based Management:

Leading Strategic Change in Organizations
(3rd Edition)
McGraw-Hill Professional

Graham, I. (2008) Requirements Modelling and Specification for Service Orientated Architectures
Wiley

Forurnier, G. (2008) Essential Software Testing
Auerbach Publications

Journals:

ACM Transactions on Software Engineering & Methodology
Software Engineering Journal

Useful websites:

http://www.rspa.com/spi/
http://mingo.info-science.uiowa.edu/soft-eng/
http://www.sei.cmu.edu/sei-home.html

RESOURCES:

Presentation equipment.
Blackboard or other suitable VLE
PCs of appropriate specification

ROOM REQUIREMENTS:

Lecture room/Seminar room
Computer Lab
Appropriate software:
- Development IDE
- CASE tools
- Version control software

STAFF RESOURCES:

Staff co-ordinator: Glenn L. Jenkins

Staff delivering this module: Glenn L. Jenkins,
Gordon Dickers

Module Title:	Systems Software and Multi-User Applications Engineering
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8632
Module Value:	20 credits
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Introduction to Programming, Computer and Network Architecture

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AIMS:

This module provides students with a sound knowledge of the design and implementation of applications using appropriate system software and engineering principles. It includes operating systems theory and a synthesis of more specialized software engineering concepts, programming paradigms and techniques.

LEARNING OUTCOMES:

Upon successful completion of this module the student will be able to:

1. Demonstrate a critical understanding of the principles and concepts of system software and the design & architecture of multi-user applications.

2. Deploy system software in the implementation of multi-user/networked applications

3. Critically evaluate the architecture, infrastructure provided by the system software and the software principles, concepts and techniques used in application development.

INDICATIVE CONTENT:

- Operating systems principles e.g. process, threads, scheduling, etc
- Inter process communication, multi-threading, process synchronization e.g. semaphores, mutexes, etc.
- Systems tools e.g. cross-compilers, debuggers, linkers, etc
- Networked multi-user architectures and development e.g. client server architecture, peer-to-peer, N-tier architectures, etc.
- Server architecture, performance analysis and optimization e.g. compression, etc.
- Application development for single and/or multi-core systems e.g. Intel's Threading Building Blocks

- Networked application development and multi-user networked server/service development e.g. building web/streaming/data servers.
- Server security issues, encryption, user authentication, etc. Transmission error detection and correction.
- Software development concepts and techniques for high-performance multi-user systems. Including appropriate abstract data structures, algorithms, programming paradigms, etc.

LEARNING AND TEACHING STRATEGY:

Key ideas and concepts will be delivered through lectures, which will allow students to gain the knowledge applicable to the module. The students will be encouraged to further study these topics and apply their findings in course-works and weekly programming exercises which will encourage the students to develop their technical skills and reinforce their learning. There will also be a number of seminar-style tutorials (discussion groups) for the more theoretical parts of this module and the dissemination of student research.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Laboratory	20
Tutorials	10
Student Private Study	140
TOTAL	200

ASSESSMENT:

This course will primarily have a practical focus, with most tutorials used to develop programming systems and application engineering concepts delivered through lectures.

Outcomes	**Assessment Criteria**: **To achieve each outcome a student must:**
1. Demonstrate a critical understanding of the principles and concepts of system software and the design & architecture of multi-user applications.	• Write a report describing the principles and concepts of multi-user systems software and evaluating their architecture, design and application using suitable criterion
2. Deploy system software in the implementation of multi-user/networked applications	• Implement multi-user/networked applications utilizing systems software programming techniques
3. Critically evaluate the architecture, infrastructure provided by the system software and the software principles, concepts and techniques used in application development.	• Provide a written evaluation of the architecture and infrastructure provided by the system software and any principles, concepts or techniques used in their implementation/s

Outcome 1 and 2 will be tested by a mid-year assignment (50% weighting); students will investigate and report on elements of system software and other programming techniques utilised in the development and implementation of high performance networked/multi-user applications (for example components of a file server). Outcome 3 will be assessed by a major end-of-year practical assignment (50% weighting), here students will develop multi-user/networked applications, (for example client server software) and evaluate both the techniques they have applied and those they could have applied.

Coursework 100%

READING LIST:

Essential Texts:

Tanenbaum, A. S. (2008)	Modern Operating Systems (3rd Edition) Pearson Education
Johnon, M. K., Troan, E. W. (2008)	Linux Application Development (2nd Edition), Addison Wesley
Campione, M., Walrath, K., Huml, A. (2001)	The Java Tutorial (3rd Edition) Addison-Wesley
Blanchette, J., Summerfield, M. (2008)	C++ GUI Programming with Qt 4 (2nd Edition),Prentice Hall

Background Reading:

Johnon, M. K., Troan, E. W. (2008)	Linux Application Development (2nd Edition) Addison Wesley
Tanenbaum, A., S. (2002)	Computer Networks (4th Edition) Pearson Education
CodeSourcery LCC, Mitchell, M. L. Samuel, A., Oldham, J. (2001)	Advanced Linux Programming SAMS
Bovet, D., Cesati, M. (2005)	Understanding the Linux Kernel (3rd Edition) O'Reilly Media Inc
Love, R., (2007)	Linux System Programming O'Reilly Media Inc.
Tanenbaum, A., S., Woodhull, A., S. (2006)	Operating Systems Design and Implementation Prentice Hall
Donahoo, M., J., Calvert, K., L. (2002)	TCP/IP Sockets in C: A Practical Guide for Programmers, Morgan Kaufmann
Calvert (2008)	TCP/IP Sockets in JAVA: A Practical Guide

	for Programmers (2nd Edition) Morgan Kaufmann
Silberschatz, A., Galvin, P. B., Gagne, G. (2005)	Operating Systems Concepts (7th Edition) John Wiley & Sons
Campione, M., Walrath, K., Huml, A., Zakhour, S. (2001)	The JFC Swing Tutorial (2nd Edition) Addison-Wesley

Useful websites:

www.linuxjournal .com
www.windowsxpmagazine.co.uk
www.freeos.com
http://www.osdata.com/

Useful journals:

ACM Transactions on Computer Systems
ACM Symposium on Operating Systems Principles
ACM Transactions on Computer Systems
IEEE/ACM Transactions on Networking

RESOURCES:

Lecture room
Computer Laboratory
Blackboard or other suitable VLE.

ROOM REQUIREMENTS:

PCs with appropriate specification
Appropriate software IDE

STAFF RESOURCES:

Staff coordinator: Glenn L. Jenkins

Staff delivering this module: Glenn L. Jenkins
Mike Dacey
Gordon Dickers

Module Title:	Wireless Networks and Protocol Design
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M2X8633
Module Value:	20
Level:	5
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Computer Programming Computer and Network Architecture IP Internetworks

AIM:

To develop a technical knowledge of the issues related to the theory, design, simulation and implementation of network protocols and wireless LANs.

LEARNING OUTCOMES:

Upon the successful completion of this module, the student will be able to:

1. Demonstrate knowledge and critical understanding of the basic technologies needed to design and implement a wireless LAN.

2. Design and simulate simple network protocols

INDICATIVE CONTENT:

- Wireless Networking technologies: IEEE802.11a,b,g,e etc
- IEEE802.16 and other emerging technologies.
- Mac and Physical layer specifications
- Basic signals and modulation, radio waves and wave propagation
- Wireless hardware including client adapters, access points, bridges and antennas
- Wireless security
- Wireless design and topologies
- Mobile IP and other mobile technologies
- Simple queuing theory
- Protocol Design
- Characterisation of network traffic
- Simulation and Modelling of networks

LEARNING AND TEACHING STRATEGY:

The use of case studies will be used to reinforce the basic theory underlying this subject.

Tutorial classes will concentrate on the technical calculations needed for network design and analysis.

Practical work will be in the form of detailed design and evaluation of wireless systems using wireless hardware and the simulation of network protocols using advanced simulation tools such as Opnet Modeller.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Laboratory/workshop	30
Student private study	140
TOTAL	200

ASSESSMENT:

Coursework	50%
Exam	50%

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate knowledge and critical understanding of the basic technologies needed to design and implement a wireless LAN.	• demonstrate both theoretically and practically a knowledge of the technologies needed to create a wireless LAN. Evidence of design skills and theoreticsal knowledge will be tested in an examination.
2. Design and simulate simple network protocols	• Design and model network protocols using advanced network simulation software such as OPNET and present the results in a written report.

The module outcomes will be assessed with a formal examination comprising 50% of the total module mark, which will be used to test the academic content of the outcomes. Some of this element may be in the form of practical examinations taken under exam conditions. The remaining 50% will be assignment based work possibly comprising of one extended piece of work.

Outcomes 1 will be largely theoretical in nature and will be assessed by examination; outcome 2 will involve the use of network simulation software and will be assessed via a formal laboratory report.

READING LIST:

Essential Texts

Gast M (2005)	'802.11 Wireless Networks the Definitive Guide', O'Reilly

Background Reading:

Blank A (2002)	TCP/IP JumpStart: Internet Protocol Basics , (Sybex)
Chandra M, Raab S, (2004)	'Cisco Mobile IP Networks in Action', Cisco Press

Journals:

IEEE/ACM, IEEE/ACM Transactions on Networking
IEEE, IEEE Network Magazine

Useful Websites:

CISCO Academy Website, cisco.netacad.net (password access only)

PHYSICAL RESOURCES:

Network analysis software, protocol analysis software, routers, switches, hubs, cables and connectors. PCs, wireless access points, client adaptors, wireless bridges and a selection of antennae. Network simulation software such as Opnet Modeller

ROOM REQUIREMENTS:

PC Laboratory
Network Laboratory

STAFF RESOURCES:

Module co-ordinator:	Dr. Ian Wells
Staff delivering the module:	Dr. Ian Wells Dr. Xianhui Che

Module Title:	**Academic Seminar (Games)**
Date of Validation:	
Module Number:	M2X
Module Value:	10
Level:	5 (Core)

Faculty Responsible for Delivery: Applied Design & Engineering

Pre-requisites: None

AIMS:

This module underpins computing research and the final year Project, and will provide students with a comprehensive and systematic understanding of the knowledge and skills needed to collect, interpret, analyse, synthesise and present data using appropriate research methods.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

3. Prepare and present to specialist and non-specialist audiences an academic seminar paper that reviews critically the current research literature pertinent to a research topic.

4. Propose and justify a suitable project for research and the research strategies to be applied for the achievement of the objectives of the study.

INDICATIVE CONTENT:

- Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity, generalisability)
- Research design strategies, (e.g. action research, experiments, surveys, case studies, ethnography), their advantages and limitations, and their suitability to a variety of research contexts.
- Data collection & sampling methods (e.g. interviews, questionnaires, observation), and their advantages and limitations in a variety of contexts.
- Data analysis techniques.
- Ethical and professional considerations
- Referencing conventions (e.g. the Harvard system, numeric system).
- Critical, analytical thinking and writing
- Academic writing convention (e.g. the structure and format of a seminar paper and a research proposal).
- Looking and behaving like an IT professional: presentation techniques/skills.

LEARNING AND TEACHING STRATEGY:

Students are required to *self-select* a computing topic for group research, write their findings in the format of an academic paper and present their findings to an audience of their peers and staff. Individually, students will also *self-select* a topic suitable for their own research in the final year Project module and produce a research plan that identifies how they will achieve the objectives of the research. This module, therefore, requires that students demonstrate a high level of self-direction and initiative, and take responsibility for the direction of their own learning. This is reflected in the learning and teaching strategy

implemented. Lectures will introduce conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. However, for the exploration of these topics and their application to practical, pathway-specific situations and case studies, tutorials are the most appropriate strategy. During tutorials, a flexible, student-led approach will be taken; students will discuss and develop individual project ideas, and will be given the opportunity to consult with topic specialists amongst the teaching team. During academic seminars, student teams will develop and manage their group activities, then disseminate to their peers the findings of their research and respond to peer questioning; such activity further enhances their transferable skills of team working, and presentation techniques.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	15
Tutorials/seminars	15
Practical Work	0
Student Private Study	70
TOTAL	100

ASSESSMENT:

The students are expected to research and present their findings during the course of the module. Therefore, this module is best assessed by coursework only.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
3. Prepare and present to specialist and non-specialist audiences an academic seminar paper that reviews critically the current research literature pertinent to a research topic.	• Work as a team member to write and structure a seminar paper that documents the evaluation of secondary research of a self-selected contemporary computing related theme. • Employ an appropriate referencing system to evidence literature sources. • Present the findings of the research to an audience of peers and respond to their questions.
4. Propose and justify a suitable project for research and the research strategies to be applied for the achievement of the objectives of the study.	• Produce a written research proposal that proposes a topic suitable for computing research and documents briefly the literature to justify exploration of the topic. • Document the selection and justification for the research methods to be used in the study that reflects current research methodology/design theory and practice, incorporating problem identification, formulating aims/hypotheses, sampling, professional/ethical issues and the practicalities of design. • Produce a chart that plans the timescales and milestones of the research.

Coursework 100%

To achieve outcome 1, the student will be required to work as part of a team to prepare a written seminar paper of approximately 2,000 words based on secondary research and present the paper to his/her peers (50% weighting). Outcome 2 requires that the student produce a research plan for study during the final year of the programme (50% weighting).

There is an opportunity for integrated assessment between this Academic Seminar module and the Software Engineering Principles module: both modules require the student to plan for the final year Project (research methods and software development methods respectively), so both tasks could be incorporated into one coherent assignment.

READING LIST:

Essential:

Saunders, M., Lewis, P. and Thornhill, A. (2007)	*Research Methods for Business Students, 4th* Edition, FT/Prentice Hall: Harlow

Background:

Baase, S. (2008)	*A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed*., Pearson: NY
Collis, J. and Hussey, R. (2009)	*Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition*, Palgrave Macmillan: Basingstoke
Cottrell, S.(2005)	*Critical Thinking Skills: Developing Effective Analysis and Argument*, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	*Doing a Successful Research Project*, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	*Projects in Computing and Information Systems: a Student's Guide*, Addison Wesley: Harlow
Quinn, M. J. (2009)	*Ethics for the Information Age: International Edition, 3rd Ed.*, Pearson: NY

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php

http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Computer/projector
Internet access

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Glenn Jenkins

Module Title:	**Casual Games Development (Games)**
Date of Validation:	
Module Number:	M2X
Module Value:	20
Level:	4 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Introduction to Programming

AIMS:

To provide the student with an understanding of the principles and practices (multimedia design and programming skills,) required to build casual games for a variety of platforms and devices.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Understand appropriate principles, methods, languages and professional standard design and development tools.

2. Apply the principles, methods and techniques to design & develop casual games for several platforms and devices.

INDICATIVE CONTENT:

- History and Philosophy of Casual Games;
- Planning, Analysis and Design specifications;
- Casual game development strategies for multiple platforms and devices;
- Overview of Web Standards such as xHTML, CSS, JavaScript and XML;
- Professional standard design and development environments;
- Design themes, content management and layout techniques;
- Scripting and Object-oriented programming (e.g. Ajax, Actionscript or Java);
- Casual game development techniques;
- Concepts, strategies and techniques for building multi-platform Games for mobile devices;
- Usability and accessibility guidelines, techniques and testing strategies;
- Multimedia asset management including bitmap & vector graphics, audio & video, and components;
- Commercial Marketing and Legal considerations in the casual game industry.

LEARNING AND TEACHING:

	Hours
Lectures	10
Tutorials	0
Practical Work	50
Student Private Study	140
TOTAL	200

IMPLEMENTATION:

As the module develops, emphasis will progress from conceptual analysis, planning and application of fundamental technique, to the design and implementation issues required to build a variety of casual games for various frameworks and user-agents.

Key concepts will be introduced and illustrated through the medium of small (maximum 25 students) lab based seminars directed by the Lecturer whereby students will be required to complete research and team based exercises. Students from both BSc/BA degree pathways are required to complete collaborative research and team based design/ development exercises. Collaborative learning is supported by Social Networking tools. Case-study industry based examples will be explored in detail to accentuate the application of conceptual issues and best-practice techniques. The tutorial sessions will allow the student to progress through a structured series of exercises, intended to improve the student's understanding of the seminar content and develop proficiency in the practical application of the required technologies and techniques.

All course material will be stored on the Universities Virtual Learning environment, allowing students to gain access both on and off campus. Students will be required to keep a self-reflective research and development blog, documenting work undertaken during ‘Student private study’ time.

ASSESSMENT:

Given that this module is highly practical in nature, the assessment is best achieved by coursework only to allow the students to directly apply the concepts.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Understand appropriate principles, methods, languages and professional standard design and development tools.	• Evaluate and document the fundamental concepts and principles associated with casual game development. • Evaluate and document best practice casual game development technologies and techniques. • Review latest industry developments and evaluate emerging technologies and languages. • Design and construct a Casual Game using suitable standards, programming and media assets.
2. Apply the principles, methods and techniques to design & develop casual games for several platforms and devices.	• Evaluate casual game development strategies for Web enabled devices and Game Consoles; • Apply conceptual and practical knowledge necessary to construct several casual games for various platforms and devices. • Build a device independent game for multiple web-enabled devices. • Produce a project report including requirements specification, storyboards, colour schemes, layouts, assets, implementation, evaluation and testing documentation.

Coursework 100%
The assessment is coursework, reflecting the need to assess both the theoretical concepts and their application.

Outcome 1 (weighted 50%) will be assessed through a mid-year assignment focusing on the principles, methods, languages and professional design and development software tools.

Outcome 2 (weighted 50%) will be assessed through an end of year assignment focusing on applying the principles, methods and techniques used to design & develop casual games for several platforms and devices. To achieve this outcome the student will also need to utilize the appropriate technologies to develop a game of a ubiquitous nature for a desktop, mobile and console device.

For each assignment, in addition to the practical aspect, an accompanying report will be submitted that outlines all background research, associated conceptual analysis and the practical development process. Students are expected to demonstrate background reading using a standard referencing system.

READING LIST:

Essential:

Dimarzio, J (2008) — Android : a programmers Guide, McGraw-Hill Osborne.

Rosenzweig, G (2007) — ActionScript 3.0 Game Programming University, QUE, 1 edition

Perkins, T (2008) — Nintendo Wii Flash Game Creator's Guide: Design, Develop, and Share Your Games Online, McGraw-Hill Osborne.

Ladd, B. C. (2008) — Intro to Java with Games, John Wiley & Sons.

Spuy, R (2009) — Foundation Game Design with Flash, FRIENDS OF ED; New edition.

Background:

Burnette, Ed (2008) — Hello, Android: Introducing Google's Mobile Development Platform, Pragmatic Bookshelf

Partridge, A (2007) — Creating Casual Games for Profit and Fun, Charles River Media; 1st edition.

Harbour, J (2008) — Beginning Java Game Programming, 2nd Edition, Delmar,

Hamer, C (2007) — Creating Mobile Games: Using Java ME Platform to Put the Fun into Your Mobile Device & Cell Phone, APRESS ACADEMIC.

Deitel & Deitel (2007) — Internet and World Wide Web: How to Program, 4th Edition, Prentice Hall.

Suri, H(2007) — Beginning Game Programming with

Flash, Delmar; 1 Pap/Com edition.

Journals:

Games Developer Magazine
Journal of Game Development
ACM: Queue
ACM: SIGMOBILE Mobile Computing and Communications Review
ACM: Technical Symposium on Computer Science Education
Develop

Websites:
http://www.adobe.com
http://www.sun.com
http://www.acm.org
http://www.gamedev.net
http://www.w3c.org
http://www.sitepoint.com
http://www.webstyleguide.com
http://www.useit.com

RESOURCES:

1. Adobe Web Standard Suite CS3+
2. Java EE, IDE Netbeans or Eclipse
3. J2ME Wireless Toolkit

ROOM REQUIREMENTS:

- PC laboratory

STAFF RESOURCES:

Staff co-ordinator: James Williams

Staff delivering this module: James Williams

Module Title:	**Game Content Engineering (Games)**
Date of Validation:	
Module Number:	M2X
Module Value:	20
Level:	5 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Introduction to Programming Game Design and History

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AIMS:

To provide the student with a systematic understanding of cross-platform and rapid application development concepts applied to games content development.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Conceptualise the architecture of a games engine and the integration of technologies used in the application of games content.

2. Critically evaluate the techniques used in the creation and integration of games content. Deploy a RAD language to create tools and applications for producing/integrating games content.

3. Critically appraise the design and functionality of games tools and applications, including cross platform considerations.

INDICATIVE CONTENT:

- Games Engine/Script interface i.e. Game Engine SDKs and events
- Games scripting environments e.g. development tools, virtual machines, compilers, interpreters, advantages of scripting, etc
- Compare languages used for games scripting e.g. Lua, Python, C/C++, etc.
- Importing game resources e.g. graphics, textures, audio, 3D models, etc
- Programming concepts and techniques used in the development of common game development applications and tools e.g. game level and terrain editors.
- Types and formats of content required for PC and Game Consoles
- Cross platform game development for games consoles e.g. XBOX, PlayStation, etc
- Syntax, semantics, libraries and/or components of a RAD programming language used for game development tools e.g. C (Win32), C++ (MFC), C#, etc.

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	0
Practical Work	60
Student Private Study	110
TOTAL	200

IMPLEMENTATION:

The module will have a strong practical focus, with most of the teaching taking the form of demonstrations and practical exercises. The lectures will involve the use of a games development lab. For assignments, students will be provided with appropriate graphics and other game resources as required.

ASSESSMENT:

Given that this module is highly practical in nature, the assessment is best achieved by coursework only to allow the students to directly apply the concepts.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Conceptualise the architecture of a games engine and the integration of technologies used in the application of games content.	• Implement an in-game SDK, library or module for loading and/or using appropriate content that would be suitable for use within a game e.g. a game scripting environment.
2. Critically evaluate the techniques used in creating games content. Deploy a RAD language to create tools and applications for producing games content.	• Produce a report evaluating the features and techniques used in the creation and integration of games content using a typical games tool • Develop an application(s) that creates/modifies/integrates content for a computer game.
3. Critically appraise the design and functionality of games tools and applications, including cross platform considerations.	• Produce a written report and/or oral presentation to evaluate the tools, SDKs, etc, produced by the student.

Coursework 100%

The assessment is coursework, reflecting the need to assess both the theoretical concepts and their application. Outcome 1 will be assessed though the development of a game or game component along with a review of the technologies used. Outcome 2 will be assessed though the development of a tool for the viewing/modification/integration of games content (models, artwork and other assets) and an evolution of the techniques used. Outcome 3 will be assessed by a report and/or presentation in which students will be asked to evaluate the tools, SDKs etc. they have produced and the techniques utilised.

READING LIST:

Essential:

Jung, K., Brown, A. (2007) Beginning Lua Programming, John Wiley & Sons

Liberty, J. (2007) Programming C#3.0, O'Reilly

Eberly, D., H. (2006) 3D Game Engine Design: A Practical Approach to Real-Time Computer Graphics, Morgan Kaufman

Wihlidal, G. (2006) Game Engine Toolset Development, Course Technology

Background:

Habour, J., S. (2008) Advanced 2D Game Development, Course Technology

McCuskey, M. (2003) Game Audio Programming, Course Technology Inc.

Wilde, M., (2004) Audio Programming for Interactive Games Focal Press

DeLoura, M., (2008) Best of Game Programming Gems, Charles River Media

Pipho, E. (2002) Focus On 3D Models, Course Technology

Lengyel, E. (2006) OpenAL Programming Guide, Charles River Media

Arnaud, R., Barnes M., (2006) Collada: Sailing the Gulf of 3D Digital Content Creation, A K Peters

Gutschmidt, T. (2003) Game Programming with Python, Lua, and Ruby Premier Press

Sherrod, A. (2006) Ultimate 3D Game Engine Design and Architecture, Charles River Media

Goodwin, S. (2005) Cross-Platform Game Programming Charles River Media

Schutyema, P., Manyen, M. (2005) Game Development With LUA, Charles River Media

Rautenbach, P. (2008) 3D Game Programming Using DirectX10 and OpenGL, Course Technology

Journals
Game Developer Magazine
Journal of Games Development
Journal of Computer Games Design

Useful websites:

www.acm.org
www.gamasutra.com
www.discreet.com/products/gmax
www.gamesdev.net
www.lua.org

RESOURCES:

-PC's of appropriate specification.
-Integrated Development Environment.
- Blackboard or other suitable VLE

ROOM REQUIREMENTS:
-Computer Lab.

STAFF RESOURCES:

Staff coordinator:	Glenn L. Jenkins
Staff delivering this module:	Glenn L. Jenkins, Mike Dacey

Module Title:	**Games Programming and Graphics (Games)**
Date of Validation:	
Module Number:	M2X
Module Value:	30
Level:	5 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Introduction to Programming, Games Physics and Maths

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AIMS:

To introduce computer graphics concepts related to games development. Students will achieve a requisite understanding of games programming principles and techniques including the requirements and architecture of a typical games engine. They will also become competent in the use of graphics APIs and the associated mathematical principles used to create graphical scenes.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Develop games using industry standard development tools and Software Development Kits (SDKs).

2. Devise and sustain arguments for the selection of algorithms to address important problems and performance issues that arise within video games.

3. Evaluate and deploy mathematical techniques and algorithms used in computer games and graphics software.

INDICATIVE CONTENT:

- Development tools
- Game platform SDKs e.g. DirectX, OpenGL
- Games Engine SDKs e.g. games physics, games AI, etc
- Games Engine SDK scripting and game development
- Apply Collision Detection
- Basic Games Engine Functionality
  - 2D Games
  - 3D Games
- Input e.g. mouse, keyboard, joystick, etc
- Loading and Caching Game Resources
- Mathematical principles underpinning games and graphics, Math Engines
- Physic Engines

- AI Engines
- Code Optimisation techniques e.g. optimising use of the cache memory.
- Graphics hardware/terminology and games platforms
- Hardware acceleration and the graphics pipeline
- 2D images. Lines, circles, curves, clipping, filling, interpolation
- 3D images. Primitives, transformations, perspective, hidden surfaces, lighting models, user interaction.
- Textures, bump mapping and realistic rendering methods
- Sprites, bill boarding
- Animation and Scene management
- Importing animations and tools

LEARNING AND TEACHING:

	Hours
Lectures	45
Tutorials	0
Practical Work	60
Student Private Study	195
TOTAL	300

IMPLEMENTATION:

The module will have a strong practical focus, with most of the teaching taking the form of demonstrations and practical exercises. Students will be provided with an existing games engine and graphics APIs in order to familiarise them with the programming techniques and SDKs used in commercial engines.

ASSESSMENT:

Given that this module is highly practical in nature, the assessment is best achieved by coursework only to allow the students to directly apply the concepts.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Develop games using industry standard development tools and Software Development Kits (SDKs) .	• Develop a game using the SDKs provided by a games engine.
2. Devise and sustain arguments for the selection of algorithms to address important problems and performance issues that arise within video games.	• Produce a written report outlining the problems encountered during development and including an evaluation of the solution(s) developed.
5. Evaluate and apply mathematical techniques and algorithms used in computer games and graphics software.	• Develop or complete parts of a basic games engine, using appropriate algorithms and coding techniques.

Coursework 100%

The assessment is coursework, reflecting the need to assess both the theoretical concepts and their application. Outcomes 1, 2 and 3 will be assessed through the submission of three assignments throughout the module.

Coursework: Outcome 1: 35%
Outcome 2 :30%
Outcome 3: 35%

READING LIST:

Essential:

Van Verth, J and Bishop, L. M. (2008) Essential Mathematics for Games and Interactive Applications, 2nd edition, Elsevier

Maurina, E (2008) Multiplayer Gaming and Engine Coding for the Torque Game Engine

Hearn, D. and Baker, M.D. (2004) Computer Graphics, 3nd edition, Prentice-Hall.

Background:

Woo, M and Neider, J et al (2007)	Open GL Programming Guide,6th Edition Addison Wesley
Angel, E (2002)	Interactive Computer Graphics (3rd edition) Addison Wesley
Foley, J D and van Dam, A et al (1995)	Computer Graphics, 2nd edition Addison-Wesley
LaMothe, A (2002)	Tricks of Windows Game Programming Gurus: (2nd Edition) Sams
Hill, F.S. (2008)	Computer Graphics using OpenGL, 3nd Edition, Prentice Hall International Inc.
Snook, G. (2003)	Real-Time 3D Terrain Engines using C++ and Direct X Charles River Media
Walsh P. (2003)	Advanced 3D Game Programming with DirectX 9.0 Wordware Publishing

Journals:

ACM Queue
ACM Transactions on Graphics
Journal of Game Development
International Journal of Intelligent Games and Simulation
SIGGRAPH: International Conference on Computer Graphics and Interactive Techniques (Proceedings)

Useful websites:

http://www.acm.org
www.flipcode.com
www.gamedev.net
www.blueparrots.com
www.gamastura.com

RESOURCES:

- PCs' of appropriate specification
- Games Development Environment.
- Graphics API, e.g. OpenGL or DirectX

ROOM REQUIREMENTS:

- Lecture room
- Computer Lab

STAFF RESOURCES:

Staff co-ordinator: Gordon Dickers

Staff delivering this module: Gordon Dickers
Mike Dacey

Module Title:	**Introduction to Games A.I. (Games)**
Date of Validation:	
Module Number:	M2X
Module Value:	20
Level:	5 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Introduction to Programming

AIMS:

To provide the student with a conceptual understanding of the ideas under-pinning artificial intelligence problems, with particular emphasis to solutions relevant to the games programming community. It will also provide students with an ability to deploy A.I. data structures and algorithms relevant to games programming.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Critically analyse and develop solutions to A.I. problems associated with games program development.

2. Evaluate and deploy A.I. techniques to solve problems relevant to games development.

INDICATIVE CONTENT:

- Definition of Artificial Intelligence, General History, and Games AI.
- Search methods and planning techniques; including path finding
- Trigger systems, terrain analysis, obstacle evasion, movement
- Methods for controlling and implementing behaviour of agents (bots):
  - including fuzzy logic, state machines, knowledge representation, rule based systems, decision trees, etc.
- Statistical Learning, e.g neural networks, Bayesian networks
- Emergent Behaviour e.g. flocking, formations, particle systems
- Genetic Algorithms and bio-inspired algorithms
- Conclusion concerning future developments

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	15
Practical Work	30
Student Private Study	125
TOTAL	200

IMPLEMENTATION:

Lectures will be used to deliver the concepts underpinning AI elements of games. Tutorial work will be used to develop A.I. techniques used in games programming. This will include group discussions or implementation of algorithms and the development of A.I. scripts using a suitable game Software Development Kit.

ASSESSMENT:

Although this module contains a significant coursework component, the theory covered involves complex concepts that cannot be effectively assessed in a coursework due to the diversity and complexity of the algorithms. Therefore, this module is assessed by a mixture of practical coursework and examination/test where appropriate.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse and develop solutions to A.I. problems associated with games program development.	• Complete an in-class test or exam to assess their ability to devise and sustain arguments for the selection of appropriate algorithms to solve AI problems.
2. Evaluate and deploy A.I. techniques to solve problems relevant to games development.	• Use a programming language/scripting tool and SDK to develop the capabilities of a game's A.I. engine.

Coursework 50%
Exam 50%

Outcome 1 is theory-related and will therefore be assessed through an end-of-year examination. Outcome 2 requires application of theoretical concepts and is better suited to assessment through a mid- year assignment.

READING LIST:

Essential:

Russell, S and Norvig, P (2003)	Artificial Intelligence: A Modern Approach (2nd edition) Prentice Hall
Mat Buckland (2004)	Programming Game AI by Example Wordware Publishing, Inc.
Brian Schwab (2008)	AI Game Engine Programming (2nd Edition) Charles River Media

Background:

Champandard, Alex J (2003)	AI Game Development New Riders
Rabin, S et al (2002)	AI Game Programming Wisdom 1 Charles River Media
Rabin, S et al (2003)	AI Game Programming Wisdom 2 Charles River Media
Rabin, S et al (2006)	AI Game Programming Wisdom 3 Charles River Media
Rabin, S et al (2008)	AI Game Programming Wisdom 4 Charles River Media

Journals:

Journal of Games Development
Artificial Intelligence
International Journal of Intelligent Games and Simulation

Useful websites:

www.acm.org
www.aigamedev.com
www.fear.sourceforge.net

RESOURCES:

- PCs' of appropriate specification
- C++ Compiler
- Appropriate Games SDK e.g.Torque

ROOM REQUIREMENTS:

- Lecture Room
- Computer Lab

STAFF RESOURCES:

Staff co-ordinator: Gordon Dickers

Staff delivering this module: Gordon Dickers
Sue Maw

Module Title:	Software Engineering Principles (Games)
Date of Validation:	DOV
Module Number:	M2X
Module Value:	20
Level:	5 (Core)
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Introduction to Programming

AIMS:
To provide students with the ability to deploy software engineering principles and to expose them to the dynamics of group working in a cross-disciplinary environment in order to develop a product.

OUTCOME STATEMENTS:

On successful completion of this module students will be able to: -

4. Understand and apply essential Software Engineering concepts, principles and practice in the implementation of a group project;

5. Justify their selection of a suitable development methodology for a given problem scenario and plan the implementation of this methodology.

6. Work under guidance as a team member, manage a team and communicate their ideas to an audience of their peers.

INDICATIVE CONTENT:

- Time-tabling and setting of interim and final objectives
- Team management, Role selection and the task assignment
- Agile programming methods
- XP – eXtreme Programming
- The Software Engineering process
  - requirements analysis e.g. use cases
  - software design principles e.g. object oriented methods, structural and architectural design, cohesion, coupling, models, notations, sequence diagrams, state charts, etc
  - implementation strategies
  - software testing e.g. test specifications, black box, white box, etc
- Software design documentation
- Software design methods and approaches (e.g. object-oriented analysis and design)
- Software design models e.g. Waterfall model, spiral model
- Software Configuration Management i.e. Version Control, Releases, etc
- Ethical and Professional Issues (including codes of conduct)

LEARNING AND TEACHING STRATEGY:

The conceptual issues will be delivered via lectures. The groups of students involved in the module will normally be drawn from level 5 of the BSc Software Engineering, though interaction with students from the BSc Computer Games Development program will be encouraged. The progression of the group work will be monitored by scheduled group tutorials during which students will be required to provide evidence of progress through log books and/or minutes of meetings. The assessment of the work will also involve a consideration of peer assessment.

	Hours
Lectures	30
Tutorials	30
Laboratory	0
Student Private Study	140
TOTAL HOURS	200

ASSESSMENT:

Given that teamwork is an important component of this module, the most appropriate form of assessment is coursework(s) that assess the ability to apply the engineering techniques in the context of a team.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
4. Understand and apply essential Software Engineering concepts, principles and practice in the implementation of a group project;	• Develop a product as a member of a group. • Provide a written report describing the design of the product demonstrating the application of Software Engineering principles and the selection of design methods and techniques. • Produce a documented design to meet specified requirements to a professional standard.
5. Justify the selection of a suitable development methodology for a given problem scenario.	• Select and detail a suitable development methodology based for a project or research proposal. • Produce a document detailing their planned implementation of their chosen development methodology.
6. Work under guidance as a team member, manage a team and communicate their ideas to an audience of their peers.	• Participate as a member of a development team, which will include giving an oral and/or visual presentation of a component of a project which evidences effective interaction with others, through collaboration, collective endeavour and negotiation • Exercise self and group management skills in managing their workloads and meeting

	deadlines.

Outcome 1 will be assessed through a group project (weighted at 40%) and a written report (weighted at 30%). The group project will be based on a suitable scenario with a member of staff acting the client in the scenario. The written report will document the techniques applied during the group project. The written and group courseworks will run in parallel with students individual reports detailing the techniques applied to each stage of the group project. These will be submitted at intervals thought year while the oral/visual presentation will take place at the end of the year. Outcome 2 will also be assessed though a written report and will account for 25% of the marks. There is an opportunity for integrated assessment between this Software Engineering Principles module and the Academic Seminar module: both modules require the student provide a plan for a project (software development methods and research methods respectively), so both tasks could be incorporated into one coherent assignment (a project proposal document). Outcome 3 will be assessed through an oral or visual presentation of the project at the end of the year and will account for 5% of the overall mark.

Coursework 100%

READING LIST:

Essential Texts:

Sommerville, I. (2006) Software Engineering (8th Edition), Addison -Wesley

Pender, T. (2003) UML Bible, Wiley

Background:

Hazzan, O., Dubinsky, Y. (2008) Agile Software Engineering Springer

Pressman, R. S. (2003) Software Engineering: A Practitioners Approach (6th Edition), McGraw-Hill

Fowler, M. (2003) UML Distilled: A Brief Guide to the Standard Object Modeling Language (3rd Edition), Addison-Wesley

Van Villet, H., (2008) Software Engineering: Principles and Practice (3rd Edition) Wiley

Bowden J. (2008) Writing a Report: How to Prepare, Write and Present Effective Reports, (8th Edition) How To Books

Rosen A. (2004)	Effective IT Project Management: Using Teams to Get Projects Completed on Time and Under Budget, AMACOM
Turner (2008)	The handbook of Project-based Management: Leading Strategic Change in Organizations (3rd Edition) McGraw-Hill Professional
Graham, I. (2008)	Requirements Modelling and Specification for Service Orientated Architectures Wiley
Forurnier, G. (2008)	Essential Software Testing Auerbach Publications

Journals:

ACM Transactions on Software Engineering & Methodology
Software Engineering Journal

Useful websites:

http://www.rspa.com/spi/
http://mingo.info-science.uiowa.edu/soft-eng/
http://www.sei.cmu.edu/sei-home.html

RESOURCES:

Presentation equipment.
Blackboard or other suitable VLE
PCs of appropriate specification

ROOM REQUIREMENTS:

Lecture room/Seminar room
Computer Lab
Appropriate software:
- Development IDE
- CASE tools
- Version control software

STAFF RESOURCES:

Staff co-ordinator: Glenn L. Jenkins

Staff delivering this module: Glenn L. Jenkins
Gordon Dickers

LEVEL 6 MODULES

Module Title:	Advanced Routing
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP7
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Prerequisites:	IP Internetworking

AIMS:

To study in depth the technical issues related to advanced routing protocols, to have a detailed knowledge of internal and external routing protocols and to understand the fundamental technical principles underlying autonomous systems.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate comprehensive and detailed knowledge of routing infrastructure within the internet.

2. Demonstrate a critical understanding of technical details relating to advanced routing protocols.

3. Implement and test complex routing protocols over WAN and LAN internetworks.

INDICATIVE CONTENT:

- Routing infrastructure and routing protocols including route summarisation and default static routes.
- Advanced interior gateway routing protocols including OSPF and EIGRP
- Multi area autonomous systems using OSPF
- The Internet as a collection of autonomous systems
- Exterior gateway routing using Border Gateway Protocol version 4 (BGP4)
- Network design using Variable Length Subnet Masks (VLSMs)
- Classless Interdomain Routing (CIDR),
- Helper Addresses
- Issues relating to IPv6 and migration of existing IPvs4 infrastructure
- Network Address Translation and its use in IP address conservation.

LEARNING AND TEACHING STRATEGY:

	hours
Lectures	20
Laboratory/workshop	35
Tutorials	5
Self Study	140
TOTAL	200

The use of case studies will be used to reinforce the basic theory underlying this subject. Practical work will be in the form of a detailed design and evaluation of a complex system using routers and switches.

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate comprehensive and detailed knowledge of routing infrastructure within the internet.	- implement advanced routing protocols in a practical laboratory based environment
2. Demonstrate a critical understanding of technical details relating to advanced routing protocols.	- implement advanced routing protocols in a practical laboratory based examination
3. Implement and test complex routing protocols over WAN and LAN internetworks.	- practically implement WANs via the use of autonomous systems in a laboratory environment and to present the findings in a well documented laboratory report

Outcome 1 and 3 will be assessed in the network laboratory through the use of laboratory exercises and outcome 2 will be assessed by a formal lab based examination.

Coursework	50%
Exam	50%

READING LIST:

Essential:

R Graziani, A Johnson (2007)	Routing Protocols and Concepts, CCNA Exploration Companion Guide Pearson
Antoon Rufi, Priscilla Oppenheimer, Belle Woodward, Gerlinde Brady (2008)	Network Fundamentals, CCNA Exploration Labs and Study Guide, Pearson

Background:

Conlan , P J (2009)	Cisco Network Professional's Advanced Internetworking Guide, Sybex
White, C (2008)	Data Communications & Computer Networks, 5th Edition, Delmar Publishing

Journals

IEEE Network Magazine
IEEE Transactions on Networking
IEEE Communications Magazine
IEEE Transactions on Communications
IEEE Transactions on Wireless Communications

Useful Websites

www.cisco.com
cisco.netacad.net
http://www.wi-fiplanet.com/tutorials/

PHYSICAL RESOURCES:

Network analysis and protocol analysis software, routers, switches, hubs, cables and connectors, PCs

ROOM REQUIREMENTS:

- PC Laboratory
- Network Laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Gwynfor Higgins
Staff delivering the module:	Gwynfor Higgins Dr. Ian Wells

Module Title:	Advanced Web Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP12
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Application Design and Development Data Centric Windows Programming

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AIMS:

This module aims to extend the student's web programming skills, knowledge of current web technologies and enhance their understanding of the concepts, principles and techniques involved in deploying Advanced Web Development frameworks and/or application platforms in the construction of web applications using appropriate languages and tools.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Develop a systematic understanding of the syntax, semantics and capabilities of a web programming framework and/or application platform and its deployment.

2. Deploy appropriate server and client side web programming frameworks and/or application platform, in the implementation of interactive data driven web applications.

3. Critically evaluate the principles, techniques and technology used in the design and development of both the server and client side of web applications

INDICATIVE CONTENT:

- Employing visual programming tools to develop web database applications e.g. Visual Studio.
- Introduce the syntax and semantics of a server side web application language, and the appropriate use of web server software components for dynamically generating web page content and providing client/server side interaction. Web programming frameworks e.g. ASP.Net, ASP.Net MVC and Ruby on Rails.
- N-tier application logic e.g. developing application components in ASP.Net. Design patterns e.g. Model-View-Controller (MVC) and developing applications using ASP.Net MVC.
- Design patterns and system architecture.

- Document engineering, the design of document workflows including methodologies such as Business Process Modelling Notation (BPMN). Implementation of workflows in web applications and web services e.g. Microsoft Workflow Framework
- Integrating web services into web applications to produce Service Oriented Applications (SOA) e.g. Representational State Transfer (REST) & Plain Old XML (POX) services
- Service Oriented Architecture, design and implementation e.g. a web server farm using virtual server, etc.
- Application platforms and service development e.g. Microsoft SharePoint, Biztalk, etc.
- Web form data entry and validation using web server software components. Document engineering, the design of document workflows.
- Web database connectivity using the database components provided by a web application framework e.g. ADO.Net, including creating data sources, data sets, etc. Alternative approaches such as Language integrated query e.g. LINQ, Entity Frameworkm LINQ to Entities, etc
- An appreciation of the web programming frameworks used in creating dynamic client side content (e.g. AJAX.Net)
- Third party components (Mashups) e.g. Google maps.
- Dynamic creation of personalised structure, content and style e.g. Web Parts, and team collaboration services e.g. SharePoint services.

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Seminars will be punctuated with examples designed to underpin the ideas and techniques introduced, reducing the conceptual leap from theory to practice.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

This module focuses on the development of web applications using a mix of current web development techniques and technologies. Therefore, the most appropriate assessment for this module is coursework only, with a significant element being implementation based.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Develop a systematic understanding of the syntax, semantics and capabilities of a web programming framework and/or application platform and its deployment.	• Document an evaluation of the concepts behind the use of web programming frameworks and/or an application platform • Implement a web application(s) using the software components provided by the common web application framework and/or platform. This may include client side and server side technologies, and

	where appropriate the application of design patterns e.g. MVC. This may take the form of a series worksheets
2. Deploy appropriate server and client side web programming frameworks and/or application platform in the implementation of interactive data driven web applications.	• Implement a data driven web application using more advanced concepts and techniques e.g. a web portal. Students will produce an appropriate architecture and any associated services for this application e.g. n-tier architecture, creating and integrating REST web services, Share Point, Workflow Foundation, etc. Students will explore applications of current web client and server side technology.
3. Critically evaluate the principles and techniques used in the design and development of both the server and client side of web applications.	• Write a report that devises and sustains arguments for the use of given web technologies and programming techniques in various scenarios • Document the evaluation of the design, principles and techniques used in the implementation of the web applications • Document the evaluation of the principles of delivering data and/or services to an interactive web application e.g. ADO.Net, REST, etc

The assessment comprises of two equally weighted practically-based coursework assignments. Assignment one will assess outcome 1 to test the student's knowledge of web programming concepts, methods & techniques. Assignment two will assess outcomes 2 and 3, which tests the student's practical implementation skills in the development a web application demonstrating the use of both client and server-side frameworks.

Coursework 100%

READING LIST:

Essential Texts:

Walther, S. (2006) ASP.NET 2.0 Unleashed**,** Sams

Gallo, A., Barkol, B., Vavilala, R. (2007) ASP.Net Ajax in Action, Manning

Flanders, J. (2008) RESTful .NET, O'Reilly

Holliday, J. (2007) Professional SharePoint 2007 Development, Wrox

Background Reading:

Mitchell, S. (2006) Sams Teach Yourself ASP.NET 2.0 in 24 Hours, Complete Starter Kit, Sams

Pattison, T., Larson, D. (2007) Inside Microsoft SharePoint Services 3.0 Microsoft Press

Wenz, C. (2007)	Programming ASP.NET AJAX: Build rich, Web 2.0-style UI with ASP.NET AJAX, O'Reilly
Esposito, D. (2007)	Introducing Microsoft ASP.NET AJAX, Microsoft
Zakas, N., McPeak, J., Fawcett, J. (2007)	Professional Ajax, 2nd Edition, Wrox
Horovitz, A. (2008)	Programming ASP.NET MVC, O'Reilly
David Flanagan (2006)	JavaScript: The Definitive Guide, O'Reilly
Zabir, O. (2007)	Building a Web 2.0 Portal with ASP.Net 3.5, O'Reilly
Shahram, K. (2008)	Professional Microsoft SharePoint 2007 Workflow Programming, Sams
Neimke, D. (2006)	ASP.Net 2.0 Web Parts in Action: Building Dynamic Web Portals, Manning
White, S. Miers, D. (2008)	BPMN Modelling and Reference Guide, Future Strategies Inc.

Useful Websites:

http://www.w3c.org
http://www.wdvl.com
http://www.w3schools.com
http://www.ws-i.org/
http://www.onlamp.com/
http://www.omg.org/uml/
http://www.codeproject.com/
http://www.theserverside.com/
www.xml101.com
http://www.xmlspy.com

Journals

ACM Transactions on Internet Technology
Visual Software Journal – the independent source for software developers.
Web Developers Journal (on-line resource – http://www.WebDevelopersJournal.com)
The Database Journal - the Knowledge centre for Database professionals (on-line resource – http://www.databasejournal.com)
The International World Wide Web Conference

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

PHYSICAL RESOURCES:

Appropriate development tools e.g. Visual Studio

STAFF RESOURCES:

Staff co-ordinator:	Mike Dacey
Staff delivering this module:	Mike Dacey James Williams

Module Title:	Data Warehousing for Business Intelligence
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP4
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Database Management Systems

AIMS:

This module provides students with a comprehensive and systematic understanding of the Data Warehousing for Business Intelligence concepts that are currently prevalent through the use of Data Warehousing. The student's technical knowledge will be extended such that they will be able to critically appraise current system concepts and algorithms.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Display a detailed knowledge and systematic understanding of the current trends in data warehousing, business intelligence and data mining.

2. Show a systematic understanding and knowledge of conceptual modelling for data warehouse applications, business intelligence and data mining techniques.

3. Demonstrate a comprehensive knowledge and systematic understanding of essential concepts, principles and tools to build, test and debug a data warehousing and data mining application that provide business intelligence to its users.

INDICATIVE CONTENT:

- Requirements, Realities, and Architecture
    - Defining business requirements
    - Dimensional modelling
    - Development environment, tools, and interface
- Develop and Populate Databases
    - Setup and physical design
    - Designing Extraction, Transformation, and Load System
- Online analytical processing (OLAP)
    - OLAP structures

    - Aggregations
- Data Mining
    - Defining data mining
    - Data mining architectures
    - Data mining algorithms
    - Data mining process
- Business Intelligence Reporting

LEARNING AND TEACHING STRATEGY:

Conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. However, for the exploration of these topics and their application to practical, pathway-specific situations and case studies, workshops based in a computer laboratory are the most appropriate strategy. During tutorials, a flexible, student-led approach will be taken. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Display a detailed knowledge and systematic understanding of the current trends in data warehousing, business intelligence and data mining.	• Write a report to evaluate the changes that have taken place since the beginning of data warehousing as a tool to generate competitive advantage via business intelligence.
2. Show a systematic understanding and knowledge of conceptual modelling for data warehouse applications, business intelligence and data mining techniques.	• Design a small scale data warehouse for a given problem domain through the use of conceptual modelling techniques. • Evaluate the effectiveness of data mining algorithms by using appropriate test data and techniques.
3. Demonstrate a comprehensive knowledge and systematic understanding of essential concepts, principles and tools to build, test and debug a data warehousing and data mining application that provide business intelligence to its users.	• Produce a small scale prototype Data Warehouse to solve a case study based problem. • Produce business intelligence reports using appropriate tools and techniques.

Coursework 100%

To achieve outcome 1, the student will be required to prepare a written report of approximately 2,000 words based on secondary research (35% weighting). Outcomes 2 and 3 require the student to deliver a design, build and test a small scale data warehouse for a given case study (65% weighting).

READING LIST:

Essential Texts:

Mundy, J., Thornthwaite, W. and Kimball, R. (2006)	Microsoft Data Warehouse Toolkit: with SQL Server 2005 and the Microsoft Business Intelligence Toolset, John Wiley
Larson, B. (2006)	Delivering Business Intelligence with Microsoft SQL Sever 2005, Microsoft Press

Background Reading:

Jacobson, R. and Misner, S. (2006)	Microsoft SQL Server 2005 Analysis Services Step by Step, Microsoft Press
Kimball, R., Ross, M., Thornthwaite, W., Mundy, J. and Becker, B. (2008)	The Data Warehouse Lifecycle Toolkit, John Wiley
Tan, P., Steinbach, M. and Kumar, V. (2006)	Introduction to Data Mining, Pearson Education
Tang, Z. and MacLennan (2005)	Data Mining with SQL Server 2005, John Wiley

Journals:

Communications of the ACM
Journal of Very Large Databases

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Oracle, SQL Server
Development Tools such as Visual Studio 2008, Analysis Services

ROOM REQUIREMENTS:

PC laboratory, Lecture Room, Visual

STAFF RESOURCES:

Staff coordinator:	Stephen Hole
Staff delivering module:	Stephen Hole Beverley Holland

Module Title:	Dissertation
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP2
Module Value:	40 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Research and Development Methods Project Management and IT Consultancy

AIMS:

This module provides an opportunity for students to identify, formulate and conduct a systematic study of a topic related to business information technology through the implementation of a suitable and appropriate dissertation proposal. The study will be based upon a sound research methodology and will demonstrate academic rigour through the use of analytical and interpretive skills.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Appraise critically the literature pertaining to a problem domain.
2. Evaluate, select and apply relevant research techniques in both primary and secondary fields.
3. Analyse rigorously the evidence gathered.
4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.
5. Produce an organised and structured document that adheres to academic convention.
6. Present the findings of the study to a specialist audience.

INDICATIVE CONTENT:

- Overview of research methodology including design, data collection methods and analytical processes.
- Project planning.
- Development of documentation for academic dissertations.
- Subject-specific content as required.

LEARNING AND TEACHING STRATEGY:

Students should commence their level 6 studies with a dissertation proposal. For continuing students, this proposal will normally be generated as an outcome of the level 5 module Research and Development Methods. (Direct entrants to level 6 of the degree will receive guidance to help them generate a suitable proposal before the commencement of the academic year.) All proposals will be reviewed with the Dissertation tutor to allow for amendments and, when acceptable, consequently formally agreed. Based upon the proposal each student will be allocated an individual supervisor who will meet with the student each week for the remainder of the academic year.

A series of five lectures during the academic year will provide the general support for the development of the student's proposal and structure of his/her dissertation and documentation.

The student will be required to work on his/her own initiative in the production of the dissertation and all associated documentation. The supervisor and a dissertation handbook will provide support and guidance to the student.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	5
Tutorials	10
Student private study	385
TOTAL	400

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Appraise critically the literature pertaining to a problem domain.	• Describe clearly the aim of the research. • State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed. • Define the relationship between the current and previous research in related topic areas, stressing similarities and differences. • Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation. • Demonstrate an ability to make critical use of published work and source materials. • Reference literature pertinent to the research • Avoid criticism of insufficiency or excessiveness with general reference to the literature. • Give due credit to previous workers for ideas and techniques used by the authors. • Display evidence of the ability to identify key items in the literature and to compare, contrast and critically review them. • Appreciate the relationship of the special theme to the wider field of knowledge. • Attempt to present previous work within an overall conceptual framework and in a systematic way.
2. Evaluate, select and apply relevant research techniques in both primary and secondary fields.	• Demonstrate competence in independent work or experimentation. • Employ an appropriate research methodology that incorporates both secondary and primary research. Justify and describe comprehensively its application (e.g. the research design, data collection methods, research process and the sample selected for study). • Recognise variables that might influence the study and either control them in the research design or properly measure them. • Use valid and reliable instruments to collect the data. • Demonstrate evidence of care and accuracy in recording and summarising the data. • Display evidence of knowledge of, and the ability to use, all relevant data sources. • Consider ethical risks and how they will be controlled. • Recognise and state the limitations inherent in the study.

3. Analyse rigorously the evidence gathered.	• Report coherently the results of the research. • Report new material. • Relate the findings to the aims and objectives of the study • Compare the findings with the findings of similar studies and the literature • Demonstrate skills of interpretation and analysis.
4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.	• Synthesise theoretical and new material to generate critique and justify valid conclusions and recommendations. • Justify conclusions reached in the light of the data and the way they are analysed. • Consider the extent that the conclusions overturn or challenge previous beliefs. • Appreciate the realism and practicalities of the situation. • Consider the achievement of the specified objectives. • Delimit the new contribution and identify prospects for further work
5. Produce an organised and structured document that adheres to academic convention.	• Organise the document logically. Clearly delineate sections, and ensure that they contain appropriate content. • Create an attractive layout. • Write in an appropriately academic style. • Ensure that the submission is structured not disjointed, indicating a systematic approach. • Employ accurately a suitable referencing system with bibliography. • Write a fluent, coherent submission, with correct spelling and grammar
6. Present the findings of the study to a specialist audience.	• Present information in a variety of forms. • Demonstrate selectivity of topics for discussion. • Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic.

ASSESSMENT STRATEGY

The module will be assessed through coursework only. One aspect of that coursework will be a *viva voce* at the end of the module.

The student's supervisor and one other member of the academic staff who has knowledge of the dissertation's problem domain will assess the work (see assessment form).

The proposed arrangements for marking Dissertations are:

- The Supervisor will act as the first marker of all Dissertations for which s/he has supervisory responsibility;
- A different member of the Academic Staff of the University will second-mark Dissertations;
- If the two markers cannot agree, a third marker will be assigned. All markers will need to agree a final mark;
- All Dissertations to be made available to External Examiners;
- All third-marked Dissertations will be seen by the External Examiners.
- The student will be required to undertake a *viva voce* at the time of submission of their Dissertation. This will normally take place during week 14 of Semester 2 of the final year of the student's degree. Present at the *viva voce* will be the student's supervisor plus at least one other member of Academic Staff. The viva voce will consist of a fifteen minute presentation by the student on his/her Dissertation, followed by fifteen minute question and answer session where the student will have the opportunity to demonstrate his/her knowledge of the work undertaken, and to identify issues that may have been omitted from the final submitted document. Non-attendance at the *viva voce* will normally result in failure of the module.

Awarding of Marks

Outcome Statement		**Max. Awarded**
1	Review of Literature	20%
2	Research Methods	20%
3	Presentation and Analysis of Results	20%
4	Conclusions/Recommendations	20%
5	Quality of Documentation	10%
6	*Viva Voce*	10%
	TOTAL	100%

Coursework (Documentation) 90%
Examination (Viva) 10%

READING LIST:

Essential Texts:

Collis, J. and Hussey, R. (2009)	Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke
Saunders, M., Lewis, P. and Thornhill, A. (2007)	Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow

Background Reading:

Baase, S. (2008)	A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY
Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY
Wood, M. (2003)	Making Sense of Statistics: A Non-mathematical Approach, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Yin, R K, (2008)	Case Study Research: Design and Methods, 4th Ed., Sage: Beverly Hills.

Other titles dependent upon the research topic

Journals

Appropriate journals dependent upon the subject of the dissertation.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Due to the varied nature of the possible dissertations, it is not practical to specify in advance what resources will be required. It is a pre-requisite of any agreement to a dissertation proposal that the necessary resources will be available to the student.

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones Computing School staff as appropriate to the topic under research

SWANSEA METROPOLITAN UNIVERSITY

School of Applied Computing
B.Sc. Computing Portfolio
DISSERTATION ASSESSMENT FORM

Name of Student:
Title of Dissertation:
First Marker:
Second Marker:

	Marking Scheme	**Marks available**	**Mark Awarded**
1	Introduction and Literature Review	20	
2	Research Methodology	20	
3	Analysis of Results/Findings	20	
4	Conclusions/Recommendations	20	
5	Quality of Documentation	10	
6	*Viva Voce*	10	
	TOTAL	**100**	

	Mark %
First Marker's General Comments and Original Mark	
Second Marker's General Comments and Original Mark	
Comment After Consultation With Other Marker & Final Agreed Mark	

Signature: …… Date: ……..

1. Introduction and Review of Literature (20%)

To include evidence of breadth, currency & relevance of reading, theoretical models and clear aim and objectives, demonstration of knowledge & comprehension of topic.

Comment:

2. Research Methodology (20%)

To include the justification and adequate description of the application of an appropriate research methodology (e.g. the research strategy, data collection methods, research process, the sample selected for study and the methods of data analysis).

Comment:

3. Analysis of Findings (20%)

To include clear identification and evaluation of the relationship of the findings to the objectives & the literature, appropriate analytical methods, inferences from findings.

Comment:

4. Conclusions/Recommendations (20%)

To include drawing dissertation together, critical and analytical aspects, consideration of the specified objectives, limitations of research, and relevant recommendations.

Comment:

5. Quality of Documentation (10%)

To include style, fluency, clarity, organisation, word limit, grammar, spelling, adherence to academic convention, referencing (including bibliography).

Comment:

6. *Viva Voce* (10%)

To include the presentation to a specialist audience of selected topics drawn from the study, using a variety of media, and with appropriate responses to questioning.

Comment:

Assessment Criteria To achieve each outcome a student must demonstrate the ability to:
1. Appraise critically the literature pertaining to a problem domain. • Describe clearly the aim of the research. • State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed. • Define the relationship between the current and previous research in related topic areas, stressing similarities and differences. • Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation. • Demonstrate an ability to make critical use of published work and source materials. • Reference literature pertinent to the research • Avoid criticism of insufficiency or excessiveness with general reference to the literature. • Give due credit to previous workers for ideas and techniques used by the authors. • Display evidence of the ability to identify key items in the literature and to compare, contrast and critically review them. • Appreciate the relationship of the special theme to the wider field of knowledge. • Attempt to present previous work within an overall conceptual framework and in a systematic way.
2. Evaluate, select and apply relevant research techniques in both primary and secondary fields. • Demonstrate competence in independent work or experimentation. • Employ an appropriate research methodology. Justify and describe adequately its application (e.g. the research design, data collection methods, research process and the sample selected for study). • Recognise variables that might influence the study and either control them in the research design or properly measure them. • Use valid and reliable instruments to collect the data. • Demonstrate evidence of care and accuracy in recording and summarising the data. • Display evidence of knowledge of, and the ability to use, all relevant data sources. • Recognise and state the limitations inherent in the study. • Consider ethical risks and how they will be controlled.
3. Analyse rigorously the evidence gathered. • Report coherently the results of the research. • Report new material. • Relate the findings to the aims and objectives of the study • Compare the findings with the findings of similar studies and the literature • Demonstrate skills of interpretation and analysis.
4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research. • Synthesise theoretical and new material to generate critique and justify valid conclusions and recommendations. • Justify conclusions reached in the light of the data and the way they are analysed. • Consider the extent that the conclusions overturn or challenge previous beliefs. • Appreciate the realism and practicalities of the situation. • Consider the achievement of the specified objectives. • Delimit the new contribution and identify prospects for further work
5. Produce an organised and structured document that adheres to academic convention. • Organise the document logically. Clearly delineate sections, and ensure that they contain appropriate content. • Create an attractive layout. • Write in an appropriately academic style. • Ensure that the submission is structured not disjointed, indicating a systematic approach. • Employ accurately a suitable referencing system with bibliography. • Write a fluent, coherent submission, with correct spelling and grammar
6. Present the findings of the study to a specialist audience. • Present information in a variety of forms. • Demonstrate selectivity of topics for discussion. • Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic.

ETHICS APPROVAL FORM

Before you complete this form, please take time to carefully consider the following questions:

Have you considered yet whether there are any problematic ethical issues in your proposed research project? If you have not you should talk to your Course Tutor or Supervisor.

Have you already completed an Ethics Approval Form? Yes – *then you do not need to complete this form*

No – please complete this form in as much detail as you can

Name:			
Project/Research Title:			
Name of Supervisor:			
School/Dept.			
Faculty:			
Proposed Start Date:		End Date:	

1. Summary of planned research *(please indicate below the purpose of your planned project/research, together with your aims, main research questions and research design – you should continue onto a separate sheet if necessary)*

2. Methodology *(You need to be clear about the methodology you intend to use in your study; this could include any number of methods, so either tick those shown below (where appropriate) or put the details in the box marked *)*

☐ Interviews	☐ Participant Observation	☐ Use of personal data
☐ Focus groups	☐ Questionnaire	☐ Literature Review
☐ Performance	☐ Presentation	☐ Other *(state below)* *

*

3. Participants - Does your proposed project/research involve human participants?

☐ 1. Yes, as a primary source* ☐ 2. Yes, as a secondary source* ☐ No- go to section 4

If you have ticked yes, it is likely you will need an Advanced CRB check before undertaking your study

If yes, indicate who your participants are:

☐ Early years/Pre-School children	☐ Adults - *give details below*
☐ School age children	☐ Vulnerable people - *give details below*
☐ Young People aged 17-18	
☐ Unknown at this stage	

4. Ethical issues *- you should tick all that apply*

☐	Administration of drugs incl. alcohol	☐	Deprivation
☐	Unpleasant stimuli in any manner or form	☐	Active deception or withholding information
☐	Collection of highly personal information	☐	Payment

5. Are there any ethical concerns other than those listed above? *(continue onto a separate sheet if necessary)*

6. If there are any ethical concerns, please state how you intend to minimise any risk of harm or distress that could be caused *(continue onto a separate sheet if necessary)*

You should enclose any materials (e.g. questionnaire, interview schedule), plus the Consent Form, and the Debriefing Sheet when submitting the Ethics Approval Form to your supervisor.

Student Signature

_____Date_____

****

☐ **Advanced CRB check required**

☐ **CRB confirmation received - Date:-** _____

☐ **Recommendation of approval given at Faculty Level**

☐ **Approval not given at Faculty level – forwarded for discussion at the next meeting of the University Ethics Committee**

Comments:

Signature: (Assistant Dean/Head of School) _____ Date: _____

Faculty recommendation endorsed by the Ethics Committee *Chair's Initials* ☐ *Date* ☐

Module Title:	Distributed Enterprise Applications
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP10
Module Value:	20
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Data-Centric Windows Programming

AIMS:

The module will provide the student with the major concepts involved in the implementation, testing and debugging of scalable, distributed applications.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Critically analyse the major concepts, principles and practice to design distributed software components for use in enterprise services.

2. Demonstrate a comprehensive knowledge and systematic understanding of essential client/server concepts, principles and tools to build, test and debug software components in a scalable, distributed application.

INDICATIVE CONTENT:

- Distributed system components for windows- and/or a web-based application (for example, DCOM, JavaBeans, Windows Communication Foundation, Web Services).
- Remote method execution between components and an application front-end (for example, RMI interface).
- Service Oriented Architectures (SOA)
- XML Web services (for example, XML standards).
- Use of threads within distributed components.
- Messaging and message queues for passing information
- Enterprise applications
- Distributed programming principles, concepts and techniques

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to accentuate best-practice & commercial issues.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse the major concepts, principles and practice to design distributed software components for use in enterprise services.	• Design the components for a distributed application that incorporates the major concepts and principles of good practice. • Write a report that critically analyses the design of the software components with respect to the major concepts, principles and good practice.
2. Demonstrate a comprehensive knowledge and systematic understanding of essential client/server concepts, principles and tools to build, test and debug software components in a scalable, distributed application.	• Construct a scalable component based distributed application. • Test and debug a scalable component based distributed application

Outcome 1 will be assessed by a mid year assignment (50% weighting). Outcome 2 will be assessed by an end of year assignment (50% weighting).

Coursework 100%

READING LIST:

Essential Texts:

Erl, T. (2007) SOA Principles of Service Design, Prentice Hall

Papazoglou, M. (2007) Web Services: Principles and Technology, Prentice Hall

Resnick, S., Gane, R., Bowen,C. (2008) Essential Windows Communication Foundation (WCF) For .NET 3.5, Addison Wesley

Background Reading:

Bustamante, M. (2007)	Learning WCF: A Hands on Guide, O'Reilly
Erl, T. (2005)	Service Oriented Architecture: Concepts, Technology and Design, Prentice Hall
Lowy, J (2008)	Programming WCF Services, O' Reilly
Smith, J. (2007)	Inside Windows Communication Foundation, Microsoft Press

Useful Websites

www.vbnetadvisor.com
www.vb2themax.com
www.vbwm.com
www.msdn.microsoft.com/msdnmag
www.visualbasic.ittoolbox.com
www.fawcette.com/vsm
www.developer.com
www.programmersheaven.com
www.vbnet.mvps.org
www.vbdotnetheaven.com
www.a1vbcode.com
www.devarticles.com
www.developfusion.com
www.abstractvb.com

PHYSICAL RESOURCES:

PCs, Appropriate DBMS e.g. Access, SQL Server, Oracle, Windows Integrated Development Environment.

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

STAFF RESOURCES:

Staff coordinator:	Stephen Hole
Staff delivering module:	Stephen Hole Michael Dacey

Module Title:	Geographical Information Systems
Date Of Validation:	SEPTEMBER 14TH 2009
Module Number	M3XCP5
Module Value:	20
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module aims to develop the students' conceptual understanding of data collection and presentation in spatial terms. The student should develop an understanding of the underlying theories of GIS through examination of the origins of GIS and critical evaluation of current GIS software trends. A coherent understanding of visualisation is regarded as a key concept and will be developed throughout the module.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Evaluate and critically appraise a variety of application areas, which could benefit from a GIS solution.

2. Demonstrate a conceptual understanding of visual perception and communications.

3. Accurately identify spatial databases and devise thematic mapping solutions.

INDICATIVE CONTENT:

- Investigating the fundamentals of visual perception, cartographic visualisation and the map as a visual information system.
- Exploring the origins of GIS and cartographic representation.
- Identifying types of data involved in Geo-information systems.
- Fundamental theories of spatial databases and spatial analysis.
- Investigating attribute data management and attributes of spatial data sets.
- Analytical modelling in GIS.
- The principles of thematic mapping and data visualisation.
- Evaluating GIS within the organisation.
- Using GIS software for data analysis.
- Implementation of End-user software solutions using GIS add-ons.

LEARNING AND TEACHING STRATEGY

Key concepts and theoretical issues will be delivered through a formal mechanism such as lectures, which will allow the students to gain the knowledge applicable to this module. Students will be encouraged to explore these issues during tutorials and apply them to appropriate case studies pertaining to GIS and its use in industry. The development of workable solutions to problems encountered will encourage the student to develop their technical skills in developing practical GIS solutions.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures:	15
Seminar / Tutorial	10
Laboratory/workshop	35
Student private study hours:	140
TOTAL HOURS:	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Evaluate and critically appraise a variety of application areas, which could benefit from a GIS solution.	• Write a research report on current trends in GIS evaluating end users perception of the software. • Study and appraise a current major application of GIS.
2. Demonstrate a conceptual understanding of visual perception and communications.	• Compare and contrast visual and non visual database solutions. • Build and compare spatial and non spatial datasets.
3. Accurately identify spatial databases and devise thematic mapping solutions.	• Build a prototype GIS application on a given theme, using appropriate software. • Discuss the merits of using GIS software in contrast to non spatial solutions.

Coursework 100%

Outcome 1 will be assessed through a mid term assignment looking at the theoretical issues of socio-economic data analysis and the map as a visual tool. 50%
Outcome 2 & 3 will be assessed by an end of module practical assignment. 50%

READING LIST:

Essential Texts:

Longley, P, Goodchild, M, Maguire, D, Rhind, D (2005) Geographical Information Systems and Science, Wiley

Daniel, L., Loree, P. & Whitener, A. (2002) Inside MapInfo Professional, Onward press,

Heywood, I., Cornelius, S. & Carver, S. (2006) An Introduction to Geographical Information Systems, Prentice Hall

Background Reading:

Michael N. DeMers (2008) Fundamentals of Geographical Information Systems John Wiley & Sons

Cassettari, S. (1994) Introduction to Integrated Geo-information Management, Chapman & Hall

Whitener, A. (1997) MapBasic Developers Guide, Onword Press

Worboys, M. & Duckham, M. (2004) GIS: A Computing Perspective, 2nd Edition Taylor & Francis

Journals

Mapping Awareness -1999
GI Europe

Useful websites

www.mapinfo.co.uk
http://www.agi.org.uk/
http://www.ordnancesurvey.co.uk/oswebsite/

PHYSICAL RESOURCES:

PCs, Appropriate GIS software

ROOM REQUIREMENTS:

PC laboratory, Lecture Room

STAFF RESOURCES:

Staff coordinator: Beverley Holland

Staff delivering module: Beverley Holland
Chris House

Module Title:	Information Systems Strategy
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP3
Module Value:	20
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	

AIMS:

This module will require students to evaluate critically the strategic role and impact of organisational information systems, and recognise that the effective and innovative management of information can create and sustain competitive advantage.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Demonstrate a systematic understanding of current and emerging themes in information system development and the organisational impact of the use of information systems.

2. Evaluate critically the issues associated with the management of information systems and the information systems strategy.

INDICATIVE CONTENT:

- The evolving role of information systems in organisations, leading to the strategic uses of IS/IT.
- The information systems strategy/business strategy relationship (strategic alignment and impact, Ward and Peppard's categories of strategic IS and critical success factors).
- The strategic IS planning process (e.g. Nolan's stages of growth, Earl and Gallier's frameworks)
- Frameworks for devising and/or assessing an information systems strategy within an organisation (e.g., Porter and Millar's 5 forces, Porter's generic strategies, Porter's value chain analysis, Porter and Millar's Information Intensity Matrix).
- Managing the information systems application portfolio (e.g. Ward *et al* matrix, Parsons' Generic Strategies, outsourcing).
- Current information systems development issues/themes (e.g. enterprise systems such as ERP, CRM and SCM, e-Business issues such as e-Marketing, e-HRM, e-Procurement, e-Learning, e-Government, mobile commerce).
- Security, privacy and ethical issues in information systems management.
- IS strategy and the organisational environment.

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. These topics and frameworks necessitate exploration and application to case studies pertaining to IT and its use in industry, for which tutorials are the most appropriate strategy. Students will be expected to read widely within the literature relevant to the subject area; during seminars, students will have the opportunity to disseminate to their peers the results of their research.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of current and emerging themes in information system development and the organisational impact of the use of information systems.	• Work as a team member to prepare an evaluation of secondary research of a team-selected contemporary information system/e-Business related theme (e.g. ERP, CRM, SCM, e-Marketing, e-HRM, e-Procurement, e-Learning, e-Government, mobile commerce) (negotiated with lecturer). • Present the findings of team-selected research to an audience of peers/staff and respond to their questions. • Write and structure an individually written report that documents the evaluation of current research of a self-selected contemporary information systems/e-Business related theme. • Document the application of the selected information system/e-Business theme within an organisation or set of organisations, recognising the characteristic benefits/limitations and impact in particular contexts. • Incorporate into the discussion environmental drivers for the chosen application.
2. Evaluate critically the issues associated with the management of information systems and the information systems strategy.	• Write essays based on a critical evaluation of IS management issues such as: categories of strategic IS and critical success factors; the strategic IS planning process; frameworks for devising and/or assessing an information systems strategy within an organisation; the information systems application portfolio; outsourcing. • Deploy analytical frameworks systematically and consistently.

	• Synthesise theoretical material with practical case study based information to generate critique.

Coursework 50%
Exam 50%

Outcome 1 will be assessed via two pieces of research-based coursework in which students will be encouraged to self-select (with some negotiation) appropriate contemporary themes for investigation and analysis. The first coursework assignment involves group based research and a presentation of the results to class peers and staff (25% weighting). The second assignment requires the student to produce an individually written report of approximately 2,000-2,500 words (25% weighting). Outcome 2 will be assessed via an examination (50% weighting). The examination will be based on a pre-released case study.

READING LIST:

Essential Texts:

Applegate, L.M., Austin, R.D. & McFarlan, F.W. (2007) — Corporate Information Strategy and Management, 7th McGraw-Hill: NY

Piccoli, G. (2008) — Information Systems for Managers: Text and Cases, Wiley: New Jersey, USA

Turban, E., Leidner, D., McLean, E. and Wetherbe, J. (2008) — Information Technology for Management, 6th Ed., John Wiley and Sons: New Jersey, USA

Background Reading:

Avison, D. and Fitzgerald, G. (2007) — Information Systems Development: Methodologies, Techniques and Tools, 4th Edition, McGraw-Hill: Maidenhead

Boddy, D., Boonstra, A. and Kennedy, G. (2005) — Managing Information Systems: an Organisational Perspective, 2nd Ed., FT/Prentice Hall: Harlow.

Chaffey, D. (2007) — E-Business and E-Commerce, 3rd Edition, Pearson: Harlow

Fitzgerald, B., Russo, N.L. and Stolterman, E. (2002) — Information Systems Development: Methods-in-Action, McGraw Hill: Maidenhead

Galliers, R.D., Leidner, D.E. and Baker, B.S.H. (Eds.) (2003) — Strategic Information Management: Challenges and Strategies in Managing Information Systems, 3rd Ed., Butterworth Heinemann: Oxford.

Jessup, L. & Valacich, J. (2008) — Information Systems Today: Managing in the Digital World, 3rd Ed., Pearson: New Jersey, USA

Laudon, K.C. & Laudon, J.P. (2007) — Management Information Systems: Managing the

Digital Firm, 10th Ed., Pearson: New Jersey, USA

Laudon, K.C. & Traver, C.G. (2007) E-Commerce: business, technology, society, 3rd Ed., Pearson: New Jersey, USA

McKeen, J.D. & Smith, H.A. (2003) Making IT Happen: Critical Issues in IT Management, John Wiley: Chichester

Ward, J. and Peppard, J. (2002) Strategic Planning for Information Systems, 3rd Ed., Wiley: Chichester.

Journals

ACM Transactions on Information Systems
Information Age
Information Management Journal
Information & Management
Information Systems Journal
Information Systems Management
International Journal of Electronic Commerce
Journal of Strategic Information Systems
Journal of Systems Management

Useful Websites

Business Link	http://www.businesslink.gov.uk
Business Learning and Support	http://www.bized.co.uk
Emerald Fulltext Journals and Abstract Reviews	http://juno.emeraldinsight.com
IT Wales	http://www.itwales.com
IT and Business web site	http://www.silicon.com
Online technology magazine	http;//zdnetweek.co.uk

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.

STAFF RESOURCES:

Staff Co-ordinator: Karen Jones

Staff delivering this module: Karen Jones
James Williams

Module Title:	Interactive Graphics Programming
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP13
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Algorithms and Data Structures

AIMS:

The module will develop the students' conceptual understanding of the principles and techniques used in interactive computer graphics. It seeks to equip students with current ideas and practice in this field and emphasises the development of three dimensional, animated, graphical images and scenes using an appropriate programming language and APIs.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Demonstrate a systematic understanding of techniques and algorithms used in generating 3D graphical images.

2. Deploy accurately an appropriate programming language and graphics library to develop three dimensional, interactive animated graphical scenes.

INDICATIVE CONTENT:

- 2D and 3D graphics primitives and object representation, supporting data structures
- Transformations and projections.
- Determining visibility, hidden line/surface removal and clipping
- Local and global illumination including shading, colour models, material properties, shadows, reflection.
- Interpolation
- Texture mapping
- Modelling
- Ray tracing, Ray Casting
- Representation of curves
- Rasterization
- Vision
- User interaction
- Animation, object picking, collision detection and response

LEARNING AND TEACHING STRATEGY:

Key ideas and concepts will be delivered through a formal mechanism such as lectures, which will allow students to gain the knowledge applicable to the module. Additionally, the development of workable solutions to the problems encountered will encourage the students to develop their technical skills of design and development during practical workshop sessions. This will involve programming using suitable software, SDKs and APIs.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures:	30
Laboratory/workshop	30
Student Private Study:	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of current techniques and algorithms used in generating 3D graphical images.	Produce a written report that will :- • Critically evaluate techniques and algorithms used to generate a graphical image. • Devise and sustain arguments for the selection of particular techniques and algorithms used to generate graphical images
2. Deploy accurately an appropriate programming language and graphics library to develop three dimensional, animated, interactive graphical scenes.	• Produce a report detailing the design of appropriate software that renders an interactive, animated graphical image or scene containing multiple objects. • Produce a software application using an appropriate programming language and APIs to implement the scene. • Debug, test and document the testing of the software for correct operation.

Assessment of outcome 2 will involve practical work. Assessment of outcome 1 will involve written justification for using relevant techniques.

Coursework:100%
Outcome 1 weighted at 50%;Outcome 2 weighted at 50%.

READING LIST:

Van Verth, J and Bishop, L. M. (2008)	Essential Mathematics for Games and Intertactive Applications, 2nd edition, Elsevier
Hill, F.S. (2008)	Computer Graphics using OpenGL, 3nd Edition, Prentice Hall International Inc.

Background Reading:

Foley, J. D. and Van Dam, A. et al (1995),	Computer Graphics, 2nd edition, Addison-Wesley.
Hearn, D. and Baker, M.D. (2004)	Computer Graphics, 3nd edition, Prentice-Hall.
Rost, R.J. (2004)	Open GL ® Shading Language, Addison-Wesley Professional
Woo, M. and Neider, J. et al (2005),	Open GL Programming Guide, 5th Edition, Addison Wesley.

Journals:

ACM SIGGRAPH Computer Graphics
ACM Queue
ACM Transactions on Graphics
Journal of Game Development
International Journal of Intelligent Games and Simulation
SIGGRAPH: International Conference on Computer Graphics and Interactive Techniques (Proceedings)

Useful websites:

www.acm.org
www.flipcode.com
www.gamedev.net
www.siggraph.org
www.gamastura.com

PHYSICAL RESOURCES

Computer Lab with machines supporting current hardware graphics capabilities, C++ and appropriate Graphics APIs (for example OpenGL with GLUT utility).

STAFF RESOURCES:

Staff co-ordinator:	Gordon Dickers
Staff delivering this module:	Gordon Dickers Mike Dacey

Module Title:	Internet Security
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP15
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module will require students to analyse the security of a networked systems, including the transmission of data, with regard to internal and external threats. Students will develop an Internet/intranet security policy suitable to protect systems and data.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Protect network users from hostile applications and viruses.

2. Reduce susceptibility to an attack during data transmission by deploying data encryption and decryption and other countermeasures.

3. Recommend necessary security features for a diverse range of security scenarios.

INDICATIVE CONTENT:

- Security threats - hackers, counterfeiters, eavesdropping, Trojan horses etc.
- Security policy - availability, integrity, privacy and authenticity.
- Operating systems- login, passwords, access permission, security gaps etc.
- Overview of TCP/IP
- Data encryption - public and private key technology
- Digital certificates - standards, certificate authorities, SSL, SET
- Stateless and stateful protocols
- Security weaknesses - e-mail, system logs etc.
- Bastions and firewalls
- Identifying security issues
- Reducing attack “surface”
- Access control lists
- Hardware and Software Firewalls e.g. Smoothwall, Zone Alarm, Cisco PIX
- Intrusion Detection Systems

- Identifying security issues
- Implementing appropriate security measures
- Implementing access control lists on routers and configuring various types of firewall

LEARNING AND TEACHING STRATEGY:

The use of case studies in tutorials will reinforce the basic theory underlying this subject delivered through lectures. Students will evaluate different security requirements and make decisions regarding the protection of networks in accordance with the resources available. Through assignment work, students will be offered the chance to research more deeply into an interesting area of their choice (chosen in consultation with the lecturer)

	Hours:
Lectures:	30
Laboratory/workshop	30
Student private study hours:	140
TOTAL HOURS:	200

ASSESSMENT:

Coursework	50%
Exam	50%

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Protect network users from hostile applications and viruses	• produce an oral presentation which focuses on a specific area of network security of their choice. This presentation will be delivered to the class group and will be accompanied by a written report.
2. Reduce susceptibility to an attack during data transmission by deploying data encryption and decryption and other countermeasures.	• Implement various security measures, e.g. ACL, encryption etc. in a simulated network environment. • assess appropriate means of encryption and decryption and their associated advantages/disadvantages.
3. Recommend necessary security features for a diverse range of security scenarios.	• produce written security policy(ies) for various scenarios. These will contain appropriate recommendations suitable to the requirements of a specific network configuration.

Outcome 1 (40% presentation and accompanying written report). Students will choose a topic of interest in conjunction with the lecturer. This topic will normally be one covered in the lecture material, which the student will then research in greater depth. The results of the research will be presented to the class via an oral presentation to allow the rest of the class to benefit from the research undertaken. The presentation will be accompanied by a written report documenting the research presented.

The first point of Outcome 2 (10% timed practical assessment) will be assessed using relevant network equipment. Students will be given a network scenario and will then be

required to implement appropriate security techniques (eg ACLs, encryption etc) to secure this network.

The second point of Outcome 2 and Outcome 3 will be assessed jointly by formal written examination. (50%). The examination questions will require the student to apply the knowledge they have gained from the lecture material and apply it to various security scenarios. This will include topics such as encryption, firewalls (and others from the Indicative Content)

READING LIST:

Essential Texts:

Schneier, B (2007)	Cryptography Classics Library: Applied Cryptography, Secrets and Lies, and Practical Cryptography, John Wiley & Sons
Stallings, W (2008)	Network Security Essentials: Applications and Standards, Pearson Education

Background Reading:

Hucaby, D (2007)	Cisco ASA, PIX, and FWSM Firewall Handbook, Cisco Press
McClure, S. et al, (2009)	Hacking Exposed, Sixth Edition: Network Security Secrets& Solutions, McGraw-Hill Osborne
Barman, S (2007)	Writing Information Security Policies, Sams

Journals

IEEE Network Magazine
IEEE Transactions on Networking
IEEE Communications Magazine
IEEE Transactions on Communications

PHYSICAL RESOURCES:

Routers, Switches, Firewalls (Hardware and Software), PCs

ROOM REQUIREMENTS:

Lecture Room
Network laboratory
PC laboratory

STAFF RESOURCES:

Staff coordinator:	Gaynor Thomas
Staff delivering module:	Gaynor Thomas Ian Wells Gwynfor Higgins

Module Title:	Managing People and Change
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

Technology is changing organisations and the jobs that people do. Business and IT managers must initiate and/or respond appropriately to change for the improvement of the organisation. However, managers must also consider the human dimension in organisations. This module requires students to evaluate the issues involved in the management of people and change initiatives. The student will consider the management of people in the workplace for the improvement of organisational and individual efficiency and effectiveness, with particular emphasis on the management of change as a consequence of IT and IS implementations.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Evaluate strategies to implement organisational change initiatives, and tactics to minimise resistance to change.

2. Analyse critically human resource issues and initiatives deployed by contemporary managers.

INDICATIVE CONTENT:

- Stimulants/drivers for change: for example, technology, nature of the workforce, social trends, competition, etc.
- Sources of individual and organisational resistance to change and tactics to overcome the resistance.
- Approaches to managing change: for example, planned versus emergent change, Lewin's force field analysis and three step model, action research, organisational development.
- Contemporary change issues for today's managers: for example, stimulating organisational innovation, building a learning organisation, creating knowledge management systems.
- Structure, culture and human resource policies and their impact on change initiatives.
- Work design and technology: for example, business process re-engineering, work redesign options such as job rotation, job enlargement, job enrichment.

- Work schedule options such as flexible working, job sharing, home working/ telecommuting.
- Human resource initiatives: for example, work-life balance, managing diversity, training and continuing professional development, performance evaluation, recruitment/selection, working with trades unions.
- Management ethics and corporate social responsibility.

LEARNING AND TEACHING STRATEGY:

The conceptual, theoretical issues are suited to delivery during weekly lectures. However, for the exploration of these topics and their application to organisational case studies pertaining to management of people and change, tutorials are the most appropriate strategy. It is envisaged that the learning environment will be highly interactive and participative, seeking to use and build on students' experiences of the change process. Discussions, simulations, case studies and video materials will be used to develop conceptual, analytical and decision making skills.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Evaluate strategies to implement organisational change initiatives, and tactics to minimise resistance to change.	• Identify drivers for change for a case organisation. • Appraise change initiatives in organisation/s and document the evaluation. • Suggest and evaluate strategies for change management. • Produce a set of recommendations to minimise resistance to change. • Use analytical frameworks systematically and consistently
2. Analyse critically human resource issues and initiatives deployed by contemporary managers.	• Write a report that evaluates the rationale for, and benefits and limitations associated with selected human resource management policies and initiatives. • Apply the evaluation in the context of a case organisation. • Evaluate and document the effects of alternative human resource management policies and initiatives on individual, group and/or organisational performance.

Coursework 100%

Each outcome will be assessed by its own case study/practically based coursework assignment of approximately 2,000 to 2,500 words (50:50 weighting).

READING LIST:

Essential reading:

Balogun, J., Hope Hailey, V., Johnson, G. and Scholes, K. (2008)	Exploring Strategic Change, 3rd Ed., FT Press: Harlow
Millmore, M., Saunders, M., Lewis, P., Thornhill, A. & Morrow, T. (2007)	Strategic Human Resource Management: Contemporary Issues, FT Press : Harlow
Mullins, L. J. (2007)	Management and Organisational Behaviour, 8th Edition, Financial Times/Pitman Publishing: London

Recommended Reading:

Beardwell, J. & Claydon, T. (2007)	Human Resource Management: a contemporary approach, 5th Edition, FT Press : Harlow
Brooks, I. (2009)	Organisational Behaviour: Individuals, Groups and Organisation, 4th Ed., Financial Times/Prentice Hall: London
Burnes, B (2004)	Managing Change, 4th Edition, FT Press : Harlow
Carnall. C. A. (2007)	Managing Change in Organisations, 5th Edition, FT Press : Harlow
Foot, M. & Hook, M. (2008)	Introducing Human Resource Management, 5th Edition, FT Press : Harlow
Huczynski, A. & Buchanan, D. (2007)	Organisational Behaviour, 6th Edition, FT/Prentice Hall: Harlow
Marchington, M. and Wilkinson, A. (2005)	Human Resource Management at Work, CIPD: London
Redman, T. & Wilkinson, A. (2009)	Contemporary Human Resource Management: Text and Cases, 3rd Edition, FT Press : Harlow
Rollinson, D. (2008)	Organisational Behaviour and Analysis, 4th Ed., Pearson: London

Journals

Human Resource Management Journal
Incomes Data Services
IRS Employment Trends
Journal of Management Studies
Journal of Organisational Behaviour
Journal of Organisational Change Management
Management Review
Management Today
People Management
Personnel Review
Personnel Today

Useful Websites

http://www.acas.org.uk
http://www.business.com/directory/changemanagement
http://www.cbi.co.uk
http://www.cipd.co.uk
http://www.eoc.org.uk
http://www.employment-studies.co.uk
http://www.managementofchange.com
http://www.missouri.edu/?csoc/
http://www.netec.mcc.ac.uk
http://www.parliament.uk
http://www.squarewheels.com
http://www.statistics.gov.uk
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.

STAFF RESOURCES:

Staff Co-ordinator:	Karen Jones
Staff delivering this module:	Karen Jones James Williams

Module Title:	Network Management
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP9
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Network Operating Systems and Security Local Area Networks

AIMS:

To provide students with an in-depth knowledge of the techniques, strategies, and tools available to IT managers for the design, implementation, and maintenance of a corporate IT infrastructure. The module will also develop students' independent research capability, especially in the areas of network planning, design, and management for corporate environments.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Critically analyse strategic planning, design and management issues relating to the corporate IT network infrastructure.

2. Research likely future trends in network management provision.

INDICATIVE CONTENT:

- Backbone network architecture design; Flat, hierarchical and collapsed backbone structures, as well as their evaluations.
- Proactive analysis and reactive analysis for the performance management, and their implications and procedures.
- Performance metrics e.g. delay, throughput, reliability, utilization, etc; Setting up threshold for acceptable performance for a given network scenario.
- Distributed computing; Introduction to network issues related to parallel computing and grid computing.
- Architecture models, e.g. peer-to-peer, client/server, thin client, terminal server, three tier structure, and network deployment.
- In-depth view of standardizations for wireless technologies, such as WLAN, WiMAX, etc; Evaluations of these network technologies.
- Network documentation; Management of network devices.
- Evaluation and selection techniques for procurement of hardware/software components e.g. benchmarking, checklists, case history, formal methods.

- Fault management; Disaster prevention and recovery methods.
- Network management aids e.g. SNMP based tools; network management model based on SNMP and its components.
- The implications of VLANS, VPNs on network design and management.
- IP address resource management; Network scalability based on NAT and its limitations.
- Network congestion control schemes, such as TCP window-based congestion control.
- Control of network links via software protocols e.g. facilities provided by ARP, TCP/IP stack, UDP, ICMP, Sub-net Masking.
- Issues related to optical network management, e.g. wavelength allocations.
- Layered optical transport network model; dynamic and static routing; standardisation and recommendations of optical networks.
- Using virtual machine tools to build virtual network environment for testing and management purposes.

LEARNING AND TEACHING STRATEGY:

Formal lectures will be accompanied by handouts and slide presentations to impart key ideas and concepts. Case studies and real-world scenarios will be used to help students develop technical and analytical skills, as well as to improve their knowledge of network functionality by applying knowledge using contemporary hardware and software. Weekly tutorials will be delivered to facilitate students' application of knowledge in potential scenarios relevant to corporate environments, and their ability to formally conduct independent research, as well as evaluate and present key findings to peers. The module will also require students to engage in self-study to evidence background research into relevant topics.

	Hours
Lectures	30
Laboratory/Tutorials	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse strategic planning, design and management issues relating to the corporate IT network infrastructure.	• Analyse strengths and weaknesses of architectural models in a given scenario using measurement metrics and tools. • Deploy appropriate selection, evaluation and management strategies for the resources of given IT specifications. • Produce judgements on various network design scenarios and adoption of architectural models and justify the choices.
2. Research likely future trends in network management provision.	• Build virtual network management environment for trial and research purposes. • Critically review the techniques associated with VLANs, VPNs, as well as the up-to-date standards for wireless networks.With the aids of statistical results, analyse in-depth emerging developments in

	network management tools e.g. SNMP, MIB, and related security issues.

Outcome 1 will be assessed through an end-of-year examination. Outcomes 2 will be assessed through a mid-year assignment; students need to deliver and formally present a research paper that addresses the assessment criteria. The paper should be 4~6 pages in length as well as adhere to the IEEE template.

Examination 50%
Coursework 50%

READING LIST:

Essential Texts:

Clemm, A. (2006) Network Management Fundamentals, 1st Ed., Cisco Press: Indianapolis

Aguinis, H. (2008) Performance Management, 2nd Ed., Prentice Hall: Harlow

McCabe, J. D. (2007) Network Analysis, Architecture and Design, 3rd Ed., Morgan Kaufmann: Amsterdam

Background Reading:

Lee, B. G. (2008) Broadband Wireless Access and Local Networks: Mobile WiMax and WiFi, Artech House: Boston

Olifer, N. & Olifer, V. (2005) Computer Networks: Principles, Technologies, and Protocols for Network Design, John Wiley: Chichester

McCain C. (2008) Mastering VMware Infrastructure 3, Illustrated Ed., John Wiley & Sons: Chichester

Bernstein, G. (2004) Optical Network Control, Addison Wesley: Boston

Mauro, D. R. (2005) Essential SNMP, 2nd Ed., O'Reilly: Sebastopol

Olifer, V. (2007) Different Flavours of VPN : Technology and Applications, JNT Association: Didcot

Sugano, A. (2005) The Real-World Network Troubleshooting Manual: Tools, Techniques, and Scenarios, Charles River Media: Hingham

Journals

IEEE Network Magazine
IEEE Transactions on Network and Service Management
IEEE Transactions on Networking
IEEE Communications Magazine
IEEE Transactions on Communications
IEEE Internet Computing Magazine
IEEE Transactions on Wireless Communications

Useful Websites

http://www.microsoft.com
http:// communities.vmware.com
http://www.cisco.com
http://www.snmplink.org
http://www.simpleweb.org/

PHYSICAL RESOURCES:

A dedicated network laboratory; network monitoring and management software and all relevant network documentation should be accessible to learners.

ROOM REQUIREMENTS:

Lecture theatre.
Network Laboratory.

STAFF RESOURCES:

Staff Co-ordinator:	Dr. Xianhui Che
Staff delivering this module:	Dr. Xianhui Che Robert Grove

Module Title:	Project
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP1
Module Value:	40 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Research and Development Methods/Project Management and IT Consultancy or Academic Seminar/Software Engineering Principles

AIMS:

This module provides an opportunity for the student to develop and demonstrate their ability to manage a significant project of their own choice related to the major themes of their chosen course. The study will be based upon a sound research and development methodology and will demonstrate academic rigor through the use of analytical and technical skills to implement a suitable and appropriate project proposal.

LEARNING OUTCOMES:

Upon the successful completion of this module the student will be able to:

1. Appraise critically the literature pertaining to a problem domain.

2. Evaluate, select and apply relevant research and development techniques.

3. Analyse rigorously the practical and theoretical evidence gathered and design and develop a solution to the problem situation.

4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.

5. Produce an organised and structured document that adheres to academic convention.

6. Present the findings of the study to a specialist audience.

INDICATIVE CONTENT

- Overview of research and development techniques.
- Project planning.
- Development of documentation for academic projects.
- Subject-specific content as required.

LEARNING AND TEACHING STRATEGY:

Students should commence their level 6 studies with a project proposal. For continuing students, this proposal will normally be generated as an outcome of the level 5 module Research and Development Methods(or Academic Seminar/Software Engineering Principles). (Direct entrants to level 6 of the degree will receive guidance to help them generate a suitable proposal before the commencement of the academic year.) All proposals will be reviewed with the Project tutor to allow for amendments and, when acceptable, consequently formally agreed. Based upon the proposal each student will be allocated an individual supervisor who will meet with the student each week for the remainder of the academic year.

A series of five lectures during the academic year will provide the general support for the development of the student's proposal and structure of his/her project and documentation.

The student will be required to work on his/her own initiative in the production of the project and all associated documentation. The supervisor and a project handbook will provide support and guidance to the student.

	Hours
Lectures	5
Tutorials	10
Student private study	385
TOTAL	400

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Appraise critically the literature pertaining to a problem domain.	• Describe clearly the aim of the research. • State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed. • Define the relationship between the current and previous research in related topic areas, stressing similarities and differences. • Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation. • Demonstrate an ability to make critical use of published work and source materials. • Reference literature pertinent to the research • Avoid criticism of insufficiency or excessiveness with general reference to the literature. • Give due credit to previous workers for ideas and techniques used by the authors. • Display evidence of the ability to identify key items in the literature and to compare, contrast and critically review them. • Appreciate the relationship of the special theme to the wider field of knowledge. • Attempt to present previous work within an overall conceptual framework and in a systematic way.
2. Evaluate, select and apply relevant research and development techniques.	• Demonstrate competence in independent work or experimentation. • Employ an appropriate research methodology. Justify and describe adequately its application. • Recognise variables that might influence and limit the study. • Consider ethical risks and how they will be controlled. • Demonstrate evidence of care and accuracy in recording and summarising the data. • Display evidence of knowledge of, and the ability to use, all relevant data sources. • Employ an appropriate development methodology. Justify and describe adequately its application.

3. Analyse rigorously the practical and theoretical evidence gathered and design and develop a solution to the problem situation.	• Report coherently the results of the research. • Apply the chosen development methodology to the development of the proposed system, including the techniques of analysis and design used. • Create a working system that meets the requirements identified. • Evaluate the system through the application of test data. • Relate the findings to the aims and objectives of the study. • Compare the findings with the findings of similar studies and the literature • Demonstrate skills of analysis.
4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.	• Synthesise theoretical and new material to generate critique and justify valid conclusions and recommendations. • Consider the extent that the conclusions overturn or challenge previous beliefs. • Appreciate the realism and practicalities of the situation. • Consider the achievement of the specified objectives. • Delimit the new contribution and identify prospects for further work
5. Produce an organised and structured document that adheres to academic convention.	• Organise the document logically. Clearly delineate sections, and ensure that they contain appropriate content. • Create an attractive layout. • Write in an appropriately academic style. • Ensure that the submission is structured not disjointed, indicating a systematic approach. • Employ accurately a suitable referencing system with bibliography. • Write a fluent, coherent submission, with correct spelling and grammar
6. Present the findings of the study to a specialist audience.	• Present information in a variety of forms. • Demonstrate selectivity of topics for discussion. • Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic.

ASSESSMENT STRATEGY

The module will be assessed through coursework only. One aspect of that coursework will be a *viva voce* at the end of the module.

The student's supervisor and one other member of the academic staff who has knowledge of the project's problem domain will assess the work (see assessment form).

The proposed arrangements for marking Projects are:

- The Supervisor will act as the first marker of all Projects for which s/he has supervisory responsibility;
- A different member of the Academic Staff of the University will second-mark Projects;
- If the two markers cannot agree, a third marker will be assigned. All markers will need to agree a final mark;
- All Projects to be made available to External Examiners;
- All third-marked Projects will be seen by the External Examiners.
- The student will be required to undertake a *viva voce* at the time of submission of their Project. This will normally take place during week 14 of Semester 2 of the final year of the student's degree. Present at the *viva voce* will be the student's supervisor plus at least one other member of Academic Staff. The viva voce will consist of a fifteen minute presentation by the student on his/her Project, followed by fifteen minute question and answer session where the student will have the opportunity to demonstrate his/her knowledge of the work undertaken, and to identify issues that may have been omitted from the final submitted document. Non-attendance at the *viva voce* will normally result in failure of the module.

Awarding of Marks

Outcome Statement		Max. Awarded
1	Review of Literature	20%
2	Research & Development Methods	15%
3	Analysis, Design and Development	35%
4	Conclusions/Recommendations	10%
5	Quality of Documentation	10%
6	*Viva Voce*	10%
	TOTAL	100%

Coursework (Documentation) 90%
Examination (Viva) 10%

READING LIST:

Essential Texts:

Avison, D. and Fitzgerald, G. (2007)	Information Systems Development: Methodologies, Techniques and Tools, 4th Edition, McGraw-Hill: Maidenhead.
Saunders, M., Lewis, P. and Thornhill, A. (2007)	Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow
Weaver, P. (2004)	Success in Your Project: a Guide to Student System Development Projects, Prentice Hall: Harlow

Background Reading:

Baase, S. (2008)	A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY
Collis, J. and Hussey, R. (2009)	Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke
Cornford, T. and Smithson, S. (2006)	Project Research in Information Systems: a Student's Guide, 2nd Ed., Palgrave/Macmillan: Basingstoke
Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	Projects in Computing and Information Systems: a Student's Guide, Addison Wesley: Harlow
Fitzgerald, B., Russo, N.L. and Stolterman, E. (2002)	Information Systems Development: Methods-in-Action, McGraw Hill: Maidenhead
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY
Wood, M. (2003)	Making Sense of Statistics: A Non-mathematical Approach, Palgrave Study

Guides, Palgrave Macmillan: Basingstoke

Yin, R K, (2008) Case Study Research: Design and Methods, 4th Ed., Sage: Beverly Hills.

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Due to the varied nature of the possible projects, it is not practical to specify in advance what resources will be required. It is a pre-requisite of any agreement to a project proposal that the necessary resources will be available to the student.

STAFF RESOURCES:

Staff Co-ordinator: Karen Jones

Staff delivering this module: Karen Jones
Stephen Hole
Computing School staff as appropriate to the topic under research

SWANSEA METROPOLITAN UNIVERSITY

School of Applied Computing
B.Sc. Computing Portfolio
PROJECT ASSESSMENT FORM

Name of Student:
Title of Project:
First Marker:
Second Marker:

	Marking Scheme	**Marks available**	**Mark Awarded**
1	Introduction and Literature Review	20	
2	Research & Development Methodology	15	
3	Practical Outcomes	35	
4	Evaluation and Recommendations	10	
5	Quality of Documentation	10	
6	Viva Voce	10	
	TOTAL	**100**	

	Mark %
First Marker's General Comments and Original Mark	
Second Marker's General Comments and Original Mark	
Comment After Consultation With Other Marker & Final Agreed Mark	

Signature: …… Date: ……..

ASSESSMENT:	Marks available	Mark awarded
Research and Analysis (Introduction and Literature Review)	20	
Research and Development Methodology	15	
Practical Outcomes	35	
Evaluation and Recommendations	10	
Quality of Documentation	10	
Viva voce Presentation (5%) Q & A (5%):	10	
Total	100	

Outcomes and Assessment Criteria
To achieve each outcome a student must demonstrate the ability to:

1. Appraise critically the literature pertaining to a problem domain.

- Describe clearly the aim of the research.
- State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed.
- Define the relationship between the current and previous research in related topic areas, stressing similarities and differences.
- Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation.
- Demonstrate an ability to make critical use of published work and source materials.
- Reference literature pertinent to the research
- Avoid criticism of insufficiency or excessiveness with general reference to the literature.
- Give due credit to previous workers for ideas and techniques used by the authors.
- Display evidence of the ability to identify key items in the literature and to compare, contrast and critically review them.
- Appreciate the relationship of the special theme to the wider field of knowledge.
- Attempt to present previous work within an overall conceptual framework and in a systematic way.

2. Evaluate, select and apply relevant research and development techniques.

- Demonstrate competence in independent work or experimentation.
- Employ an appropriate research methodology. Justify and describe adequately its application.
- Recognise variables that might influence and limit the study.
- Demonstrate evidence of care and accuracy in recording and summarising the data.
- Display evidence of knowledge of, and the ability to use, all relevant data sources.
- Employ an appropriate development methodology. Justify and describe adequately its application.
- Consider ethical risks and how they will be controlled.

3. Analyse rigorously the practical and theoretical evidence gathered and design and develop a solution to the problem situation.

- Report coherently the results of the research.
- Apply the chosen development methodology to the development of the proposed system, including the techniques of analysis and design used.
- Create a working system that meets the requirements identified.
- Evaluate the system through the application of test data.
- Relate the findings to the aims and objectives of the study.
- Compare the findings with the findings of similar studies and the literature
- Demonstrate skills of analysis.

4.Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.

- Synthesise theoretical and new material to generate critique and justify valid conclusions and recommendations.
- Consider the extent that the conclusions overturn or challenge previous beliefs.
- Appreciate the realism and practicalities of the situation.
- Consider the achievement of the specified objectives.
- Delimit the new contribution and identify prospects for further work

5.Produce an organised and structured document that adheres to academic convention.

- Organise the document logically. Clearly delineate sections, and ensure that they contain appropriate content.
- Create an attractive layout.
- Write in an appropriately academic style.
- Ensure that the submission is structured not disjointed, indicating a systematic approach.
- Employ accurately a suitable referencing system with bibliography.
- Write a fluent, coherent submission, with correct spelling and grammar

6.Present the findings of the study to a specialist audience.

7. Present information in a variety of forms.

- Demonstrate selectivity of topics for discussion.
- Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic.

ETHICS APPROVAL FORM

Before you complete this form, please take time to carefully consider the following questions:

Have you considered yet whether there are any problematic ethical issues in your proposed research project? If you have not you should talk to your Course Tutor or Supervisor.

Have you already completed an Ethics Approval Form? Yes – *then you do not need to complete this form*

No – please complete this form in as much detail as you can

Name:			
Project/Research Title:			
Name of Supervisor:			
School/Dept.			
Faculty:			
Proposed Start Date:		End Date:	

1. Summary of planned research *(please indicate below the purpose of your planned project/research, together with your aims, main research questions and research design – you should continue onto a separate sheet if necessary)*

2. Methodology *(You need to be clear about the methodology you intend to use in your study; this could include any number of methods, so either tick those shown below (where appropriate) or put the details in the box marked *)*

☐ Interviews	☐ Participant Observation	☐ Use of personal data
☐ Focus groups	☐ Questionnaire	☐ Literature Review
☐ Performance	☐ Presentation	☐ Other *(state below)* *

*

3. Participants - Does your proposed project/research involve human participants?

☐ 1. Yes, as a primary source* ☐ 2. Yes, as a secondary source* ☐ No- go to section 4

If you have ticked yes, it is likely you will need an Advanced CRB check before undertaking your study

If yes, indicate who your participants are:

☐ Early years/Pre-School children	☐ Adults - *give details below*
☐ School age children	☐ Vulnerable people - *give details below*
☐ Young People aged 17-18	
☐ Unknown at this stage	

4. Ethical issues *- you should tick all that apply*

☐	Administration of drugs incl. alcohol	☐	Deprivation
☐	Unpleasant stimuli in any manner or form	☐	Active deception or withholding information
☐	Collection of highly personal information	☐	Payment

5. Are there any ethical concerns other than those listed above? *(continue onto a separate sheet if necessary)*

6. If there are any ethical concerns, please state how you intend to minimise any risk of harm or distress that could be caused *(continue onto a separate sheet if necessary)*

You should enclose any materials (e.g. questionnaire, interview schedule), plus the Consent Form, and the Debriefing Sheet when submitting the Ethics Approval Form to your supervisor.

Student Signature

_____Date_____

****

☐ **Advanced CRB check required**

☐ **CRB confirmation received - Date:-** _____

☐ **Recommendation of approval given at Faculty Level**

☐ **Approval not given at Faculty level – forwarded for discussion at the next meeting of the University Ethics Committee**

Comments:

Signature: (Assistant Dean/Head of School) _____ Date: _____

Faculty recommendation endorsed by the Ethics Committee *Chair's Initials* ☐ *Date* ☐

Module Title:	Real-Time Systems Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP14
Module Value:	20
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Software Engineering Principles

AIMS:

To provide students with a comprehensive understanding and knowledge of real-time systems, their applicability, including in the domain of safety critical systems, and methods utilised in their development and representation.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Demonstrate a systematic understanding of the concepts of real-time systems and the role they play in the design of such systems.

2. Represent a real-time system using established software engineering methodologies

3. Discuss critically the principles of formal specifications and the practical issues relating to their application in the development of real-time systems.

4. Undertake an informed discussion on the concepts related to the development of safety critical systems.

INDICATIVE CONTENT:

- Hard/Soft real-time, Timing, Uniprocessor, Multiprocessor, Concurrency
- Processes, multi-tasking, threads, synchronisation and communication, semaphores, deadlock.
- Concurrency control mechanisms: two phase locking, time stamp ordering, resource matrices
- Scheduling, clocks, embedded systems
- Design Approaches for Real-Time Systems (e.g. UML, Ward-Mellor, JSD, HOOD, CSP, MASCOT, etc.)
- Formal logic, algebraic concepts and specifications; approaches to developing formal specification: Petri Nets, Z, …
- Safety Critical Systems Development (e.g. Safety Analysis, Hazard Analysis, Risk Analysis, Hazard Reduction, Development methods for Safety Critical Systems)

LEARNING AND TEACHING STRATEGY:

Key ideas and concepts will be delivered through a formal mechanism such as lectures, which will allow students to gain the knowledge applicable to the module. Students will be encouraged to further research these and present their findings to groups of peers and the module tutor. Additionally, the use of case studies and the development of workable solutions to the problems encountered will encourage the students to develop their technical skills of design and development during practical workshop sessions.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	40
Seminars	15
Laboratory/workshop	5
Student Private Study	140
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of the concepts of real-time systems and the role they play in the design of such systems.	• Discuss the key concepts of real-time and provide examples of how they are incorporated into the design of real-time systems. • Produce written work that reflects current research into real-time systems design.
2. Represent a real-time system using established software engineering methodologies	• Produce, using established techniques, a set of models that reflect the requirements and/or design of a real-time system.
3. Discuss critically the principles of formal specifications and the practical issues relating to their application in the development of real-time systems.	• Produce an evaluation of the strengths and weaknesses of applying formal methods in the production of specifications for a real-time system. • Produce written work that considers and reflects upon research into the application of formal methods in system specification.
4. Undertake an informed discussion on the concepts related to the development of safety critical systems.	• Debate the role of systems safety in the development of real-time software. • Evaluate the techniques for undertaking hazard analysis for a small component of a real-time system.

Coursework 100%

The coursework will allow the student to demonstrate his/her ability to implement design techniques/models through the development of a proposed set of models for both requirements and design to a given set of specifications (outcomes 1 and 2). Additional coursework will require the student to research given subject areas and provide 'papers' that demonstrate an informed discussion into the topic areas (outcome 3 and outcome 4).

READING LIST:

Essential Texts:

Burns, A. & Wellings, A. (2001). Real-Time Systems and Programming Languages (3rd Edition), Addison-Wesley

Storey, N. (1996) Safety Critical Computer Systems, Addison-Wesley

Williams, R (2006) Real-Time Systems Development, Butterworth-Heinemann

Background Reading:

Blaha, M.J. & Rumbaugh, J.R. (2005) Object-Oriented Modeling and Design (2nd Edition), Prentice Hall

Budgen, D. (2003) Software Design, Addison-Wesley.

Buttazzo, G.C. (2004) Hard real-time computing systems, Springer

Buttazzo, G.C. (2004) Soft real-time systems, Springer

Cooling, J. (2002) Software Engineering for Real-Time Systems, Addison-Wesley

Douglass, B.P. (2004) Real-Time UML: Advances in the UML for Real-Time Systems 3rd Edition, Addison-Wesley

Girault, C. and Valk R. (2002) Petri Nets for Systems Engineering: A Guide to Modelling, Verification and Applications Springer,

Gomaa, H. (2000) Designing Concurrent, Distributed, and real-Time Applications with UML, Addison-Wesley

Laplante, P. (2004) Real-Time Systems Design and Analysis, IEEE

Liu, J (2000) Real-Time Systems, Prentice Hall

Monin, J. and Hinchey, M. (2003) Understanding Formal Methods, Springer

Siewert, S (2007) Real-Time Embedded Components and Systems, Charles River Media

Journals:

ACM Transaction on Programming Languages and Systems
ACM Transactions on Software Engineering and Methodology
Communications of the ACM
IEEE Transactions on Computers
IEEE Transactions on Industrial Applications
Software Engineering Journal

Useful websites:

http://www.sei.cmu.edu/
http://www.acm.org/sigsoft/
http://www.computer.org/
http://sel.gsfc.nasa.gov/
http://vl.fmnet.info/safety/
http://mingo.info-science.uiowa.edu/soft-eng/
http://www.fmeurope.org/

RESOURCES:

- PCs of appropriate specification
- CASE tool for producing models of systems.

ROOM REQUIREMENTS:

- Lecture room/Seminar room
- Computer Lab

STAFF RESOURCES:

Staff co-ordinator: Dave Rees

Staff delivering this module: Dave Rees

Module Title:	Rich Internet Application Development
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP6
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Multimedia Web Development

AIMS:

The module will provide students with a comprehensive understanding of the concepts, technologies and techniques required to design and develop Rich Internet Applications that combine the interactive richness and responsiveness of desktop applications with the accessibility, reach and connectivity of the web.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate a critical understanding of the underlying concepts and principles of Rich Internet Application development and evaluate emerging industry developments;

2. Analyse critically the various RIA frameworks and technologies;

3. Demonstrate a systematic understanding of the appropriate methods and techniques required to produce a database driven Rich Internet Application.

INDICATIVE CONTENT:

- Developing RIA based systems for organisational use
- RIA core concepts and frameworks;
- Innovative, interactive and synthesizing nature of RIA development including Web 2.0 technologies (mash-ups) and media types;
- Integrated development environments such as Adobe Flex and Microsoft Silverlight;
- Ubiquitous device independent RIA development strategies and technologies for desktop and mobile devices;
- Project solutions combining web standard, proprietary and open source technologies;
- Cross-platform runtime environments for building rich Internet applications (e.g. Adobe AIR);
  User Interface design, best practices and design patterns for RIA development;
- Usability and Accessibility guidelines for RIA development and specific frameworks;
- Portability and Interoperability of media objects including Meta based multimedia

languages (e.g. VRML, SMIL, SVG, MXML, XAML);
- Streaming media, compression and transmission techniques;
- Web 2.0 application and widget development.

LEARNING AND TEACHING STRATEGY:

Essential concepts and principles will be delivered formally in tutorials supported by concurrent practical laboratory exercises, which will allow students to deploy appropriate theory, practices and tools. Case-study industry based examples will be explored in detail to highlight best-practice.
All course material will be stored on the Universities Virtual Learning environment, allowing students to gain access to handouts/slides/tutorials both on and off campus. Students are required to keep a self-reflective progress blog, documenting their personal learning strategy and progress on a weekly basis. Guided by the tutor this method ensures the most effective use of the 'Student private study' time and supports the student's professional and transformational learning and development. Collaborative learning is also supported by Social Networking tools.

	Hours
Lectures	0
Tutorials/seminars	30
Laboratory/workshop	30
Student private study:	140
TOTAL HOURS	100

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a critical understanding of the underlying concepts and principles of Rich Internet Application development and evaluate emerging industry developments;	• Evaluate and document emerging RIA technologies, standards and best practice techniques. • Define and diagram the appropriate use of RIA technologies; • Undertake extensive background reading and record all sources accurately using a suitable referencing system.
2. Analyse critically the various RIA frameworks and technologies;	• Conceptually and practically compare and contrast various RIA development frameworks. • Use appropriate criteria to document the analysis and findings.
3. Demonstrate a systematic understanding of the appropriate methods and techniques required to produce a Rich Internet Application.	• Apply conceptual and practical knowledge necessary to plan and construct a Rich Media Internet Application utilising appropriate web development technologies and associated web standards;

Coursework 100%

Students will be required to submit 2 assignments (of equal weighting). The first assignment will be used to assess Outcomes 1 and 2 to test the student's ability to evaluate emerging RIA

technologies, standards and best practice techniques. Students will be expected to build several prototype applications, an important aspect of this comparative evaluation.
The second assignment will be used to assess Outcome 3. This assignment will be used to test the student's mastery of a chosen RIA framework, their ability to synthesise design, development and multimedia skills to construct an innovative and interactive Rich Internet Application.
In both assignments students are required to provide a written report documenting the analysis, design, implementation and evaluation process.

READING LIST:

Essential Texts:

Kazoun C & Lott J (2008)	Programming Flex 3: The Comprehensive Guide to Creating Rich Internet Applications with Adobe Flex; Adobe Dev Library; 1 edition
Moore, D et. Al. (2007)	Professional Rich Internet Applications: AJAX and Beyond, John Wiley & Sons; New title edition
Steven, A Smith, R Palenshus & C Enrick, B (2009)	Silverlight 2 Web Development: Problem, Design, Solution, John Wiley & Sons

Background Reading:

Arana, B (2008)	Creating Flash Widgets with Flash CS4 & ActionScript 3, FirstPress; New edition.
Papa, J (2009)	Data-Driven Services with Silverlight 2 , O'Reilly Media, Inc.
Horn, S (2009)	Microsoft Silverlight 2.0 A Beginner's Guide, McGraw-Hill Osborne
Herrington, S Elrom, J Mostafa, E Tiwari, J (2008)	AdvancED Flex 3, FRIENDS OF ED; New edition
Stamou, G. (2005)	Multimedia Content & Semantic Web - Methods, Standards & Tools, John Wiley and Sons Ltd

Useful Websites:

http://www.richinternetapps.com
http://www.w3c.org
http://wdvl.internet.com/Multimedia/
http://www.adobe.com/
http://www.microsoft.com/silverlight/
http://www.nwfusion.com/research/streaming.html
http://www.agocg.ac.uk/
http://www.artifact.ac.uk
http://www.dba.org.uk/home.html
http://www.design-council.org.uk
http://www.digitalthread.com/
http://www.phong.com/tutorials/
http://www.flashkit.com/
http://www.kirupa.com/
http://www.useit.com/
http://www.acm.org
http://www.wdvl.com

Journals

ACM Transactions on Internet Technology
Visual Software Journal – the independent source for software developers.
Web Developers Journal (on-line resource – http://www.WebDevelopersJournal.com)
The Database Journal - the Knowledge centre for Database professionals (on-line resource – http://www.databasejournal.com)
The International World Wide Web Conference

ROOM REQUIREMENTS:

A fully equipped laboratory will be required with sufficiently high specification machines.

PHYSICAL RESOURCES:

Hardware:
High specification PCs
Internet access.

Software:
Adobe Flex 3+.
Adobe Flash CS$+
Silverlight2.0, VS-2008, Expression Blend, Asp.Net
Web Servers: Apache and IIS

STAFF RESOURCES:

Staff co-ordinator: James Williams.

Staff delivering this module: James Williams.
Michael Dacey.

Module Title:	Usability Engineering
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP11
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	None

AIMS:

This module aims to build upon students' interface design skills to give the ability to use and analyse techniques of usability engineering.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate a systematic understanding of cognitive and social information processing
2. Select, apply and analyse critically techniques of interface evaluation
3. Synthesize usability engineering and software development
4. Critically analyse input and output hardware appropriate for specialised applications, for example for use by disabled people, and for three-dimensional modelling applications

.

INDICATIVE CONTENT

- Cognitive aspects of information: perception: sensory inputs and the human memory system; concept formation and knowledge representation; cognitive processing: attention, reasoning,
- The social aspect of information: semiotics and language; verbal and non-verbal languages
- Interface evaluation methods (for example, observation, verbal protocol analysis, structured expert reviewing).
- The scope and role of usability engineering methods (for example, task analysis, GOMS, communicating sequential processes).
- Usability engineering methodologies to create a suitable interface and their relation to the software design process.
- I/O devices for specialised design needs (for example, 3-dimensional interfaces and interfaces for users with disabilities).

LEARNING AND TEACHING STRATEGY:

The course will be delivered by a one-hour lecture each week to present key ideas. Students will be expected to read widely papers relevant to the subject area, and to build on their skills using hardware and software. Weekly tutorials will be used to discuss papers and case studies, and to introduce the use of appropriate hardware and software.

	Hours
Lectures	30
Tutorials/Seminars	30
Student private study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Demonstrate a systematic understanding of cognitive and social information processing	• Apply analysis of cognitive processing in interface design scenarios. • Demonstrate the ability to make judgements in the application of cognitive and social psychology to a given interface design scenario. • Produce a paper prototype with explanation of the application of cognitive and social theories to the scenario
2. Select, apply and analyse critically techniques of interface evaluation	• Select and justify appropriate interface evaluation techniques. • Apply the techniques within a case study • Analyse appropriate evaluation techniques for the examination case study
3. Synthesize usability engineering and software development	• Demonstrate a critical awareness of usability engineering issues. • Synthesise usability engineering and software issues within a particular context. • Apply these techniques to the development of a software prototype following from the scenario in Outcome 1, also taking the role of usability analyst for another student's work
4. Critically analyse input and output hardware appropriate for specialised applications, for example for use by disabled people, and for three-dimensional modelling applications	• Analyse specialised interfaces within given scenarios. • Frame appropriate questions to achieve solutions in the context of specialised interfaces. • Apply this in the design of a specialised interface in the examination case study

Outcomes 2 and 4 will be assessed via an examination. Outcomes 1 and 3 will be assessed via a case-study based assignment.

Assignment 50%
Examination 50%

READING LIST:

Essential Texts:

Dix, A et al (2005)	Human Computer Interface and User Interface Design, Prentice Hall

Background Reading:

Moggridge, B (2006)	Designing Interactions, MIT Press
Holzinger, A (2008)	HCI and Usability for Education and Work, Springer
Spool. J et al (2008)	Handbook of Usability Testing, Wiley

Journals

Communications of the ACM
Human-Computer Interaction
Journal of Man-Machine Studies

PHYSICAL RESOURCES:

Lecture room
PCs, Windows environment

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room
Computer laboratory

STAFF RESOURCES:

Staff Co-ordinator: Sue Maw

Staff delivering this module: Sue Maw

Module Title:	Wide Area Networks
Date of Validation:	SEPTEMBER 14TH 2009
Module Number:	M3XCP8
Module Value:	20 credits
Level:	6
Faculty Responsible for Delivery:	Applied Design and Engineering
Pre-requisites:	Wireless Networks and Protocol Design

AIMS:

This module will provide students with an in depth knowledge of the technical issues related to different types of Wide Area Network (WAN) technologies, the associated protocols, and a critical understanding of the technical principles of packet switched networks. Students will be able to use this knowledge to simulate and perform tests for a variety of common WANs.

LEARNING OUTCOMES:

Upon successful completion of this module, the student will be able to:

1. Demonstrate a detailed knowledge of WAN technologies and protocols, and critical analysis and comparisons of different WAN types.

2. Simulate and test common WAN types using proper tools, and develop critical evaluations in terms of the network traffic control, usability and performance.

INDICATIVE CONTENT:

- Wide area network architecture; Core network, edge network; User-to-Network interface (UNI), Network-to-Network Interface (NNI) and relevant specifications.
- Multiplexing technologies, e.g. TDM, FDM, WDM, as well as the case study of their implementations.
- Switching techniques, i.e. circuit switching, packet switching, connection-oriented packet switching, and their associated applications in the network.
- Network technologies based on the utilization of the legacy network (i.e. PSTN/POTS) such as xDSL technologies, and ISDN.
- Networking principles of ISDN; Out-of-band signalling; Basic Rate Interface (BRI) and Primary Rate Interface (PRI); Dial-up-on demand.
- Different types of DSL technologies and related network devices.
- Frame Relay technology, switched/permanent Virtual Circuits, DLCI; parameters of UNI interface of FR network.
- Point to Point Protocol; Leased lines including T1/E1, T3/E3.

- ATM technologies as used in the internet core and MANs; Common features and differences between ATM and other packet switching technologies.
- Introduction to MPLS/GMPLS; benefits of the emergence of label switching technologies in the backbone core network.
- Introduction to SONET/SDH; Specification of OC and STM links; Structure of IP-over-WDM networks.
- Evolution of optical networks; the new protocol stack structure involving Optical Transport Network (OTN), and the challenges of designing optical networks;
- Wide area network design; Considerations of choosing WAN technologies.
- WAN modelling and simulations using OPNET.

LEARNING AND TEACHING STRATEGY:

Formal lectures will be delivered with accompanying handouts and slide presentations to introduce and develop key ideas and concepts. Lectures will be assisted by regular practical tutorials to help students develop a critical understanding of the theoretical elements of the module, and apply the knowledge using relevant and contemporary hardware and software. Due to the comprehensive nature of this module, students will be expected to be engaged in self study and independent research to enhance their background knowledge of relevant topic areas.

	Hours
Lectures	30
Laborotary/tutorials	30
Self study	140
TOTAL HOURS	200

ASSESSMENT:

Outcomes	**Assessment Criteria To achieve each outcome a student must:**
1. Demonstrate a detailed knowledge of WAN technologies and protocols, and critical analysis and comparisons of different WAN types.	• Critically analyse the performance of protocols that are widely used in wide area networks. • Compare and evaluate different WAN technologies. • Produce in-depth discussions on emerging network protocols and technologies in the wide area networks.
2. Simulate and test common WAN types using proper tools, and develop critical evaluations in terms of the network traffic control, usability and performance.	• Design WANs based on the requirements and specifications of a given case study scenario. • Model specialised WAN networks with accuracy and efficiency using simulation tools. • Evaluate the designated WAN in terms of performance and usability of the chosen technology and related protocol, as well as the traffic control scheme.

Outcome 1 will be assessed through an end-of-year examination. Outcome 2 will be assessed through a mid-year assignment.

Exam	50%
Coursework	50%

READING LIST:

Essential Texts:

Stallings, W. (2006)	Data and Computer Communications, 8th Ed., Prentice Hall: Upper Saddle River
P. Regan (2003)	Wide Area Networks, Prentice Hall

Background Reading:

Kasera, S. (2007)	ATM Networks : Concepts and Protocols, McGraw-Hill: New York
De Ghein, L. (2007)	MPLS Fundamentals, Cisco Press: Indianapolis
LinkChao, H. (2001)	Broadband Packet Switching Technologies: A Practical Guide to ATM Switches and IP Routers, Wiley: New York
Helvoort, H. (2005)	Next Generation SDH/SONET : Evolution or Revolution?, Wiley: Chichester
Hills, T. (2006)	Naked DSL : challenges and opportunities, Analysys: Cambridge
Olifer, N. & Olifer, V. (2005)	Computer Networks: Principles, Technologies, and Protocols for Network Design, John Wiley: Chichester
S. V. Kartalopoulos (2007)	Next Generation Intelligent Optical Networks: From Access to Backbone, Springer

Journals

IEEE Network Magazine
IEEE Transactions on Networking
IEEE Communications Magazine
IEEE Transactions on Communications
IEEE Internet Computing Magazine
IEEE Transactions on Wireless Communications

Useful Websites

http://www.opnet.com
http://www.cisco.com
http://www.microsoft.com
http://www.ieee.org

PHYSICAL RESOURCES:

Network analysis and protocol analysis software, routers, switches, hubs, cables and connectors, PCs

ROOM REQUIREMENTS:

Lecture Theatre, Network Laboratory

STAFF RESOURCES:

Staff Co-ordinator:	Dr. Xianhui Che
Staff delivering the module:	Dr. Xianhui Che Dr. Ian Wells

Module Title:	**Advanced Games A.I. (Games)**
Date of Validation:	
Module Number:	M3X
Module Value:	20
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Introduction to Games A.I.

AIMS:

To develop students' systematic understanding of advanced principles and techniques used in Games related Artificial Intelligence, emphasizing the development and construction of algorithms used in game strategy and character simulation.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

3. Critically analyse sophisticated gaming environments and scenarios and identify single or multiple A.I. methods which can improve the gaming experience.

4. Evaluate, synthesise and deploy advanced A.I. techniques to solve problems relevant to games development.

INDICATIVE CONTENT:

- Definition and review of Artificial Intelligence, General History, and Games AI.
- Trigger systems, terrain analysis, obstacle evasion, movement
- Decision making and the development of methods for controlling and implementing behaviour of agents (bots) . For example, fuzzy logic, knowledge representation, rule based systems, decision trees, etc.
- Statistical Learning, e.g Bayesian networks
- Evolutionary computing, further neural networks
- Complexity and Emergent Behaviour including swarming, flocking and particle systems

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	15
Practical Work	30
Student Private Study	125
TOTAL	200

IMPLEMENTATION:

This module will build upon the work covered in the pre-requisite level 5 module "Introduction to Games A.I." Lectures will be used to deliver the concepts and more advanced ideas underpinning AI elements of games. Tutorial work will be used to develop specific A.I. techniques used in games programming. This will include group discussions and the implementation of algorithms using appropriate game Software Development Kits and Applications.

ASSESSMENT:

Although this module contains a significant coursework component, the theory covered involves complex concepts that cannot be effectively assessed in a coursework due to the diversity and complexity of the algorithms. Therefore, this module is assessed by a mixture of practical coursework and examination/test where appropriate.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse sophisticated gaming environments and scenarios and identify single or multiple A.I. methods which can improve the gaming experience.	• Complete an exam or in-class test which assesses their ability to devise and sustain arguments for the selection of appropriate algorithms to solve AI problems.
2 Evaluate, synthesise and deploy advanced A.I. techniques to solve problems relevant to games development.	• Use a programming language/scripting tool and SDK to develop advanced A.I. techniques used in a game's A.I. engine.

Exam/Test 50%
Coursework 50%

Outcome 1 is theory based and will therefore be assessed through an end-of-year examination or test. Outcome 2 requires practical application of theory so is suited to assessment via a mid- year assignment.

READING LIST:

Essential:

Russell, S and Norvig, P (2003)	Artificial Intelligence: A Modern Approach (2nd edition) Prentice Hall
Mat Buckland (2004)	Programming Game AI by Example Wordware Publishing, Inc.
Brian Schwab (2008)	AI Game Engine Programming (2nd Edition) Charles River Media

Background:

Champandard, Alex J (2003)	AI Game Development New Riders
Rabin, S et al (2002)	AI Game Programming Wisdom 1 Charles River Media
Rabin, S et al (2003)	AI Game Programming Wisdom 2 Charles River Media
Rabin, S et al (2006)	AI Game Programming Wisdom 3 Charles River Media
Rabin, S et al (2008)	AI Game Programming Wisdom 4 Charles River Media
Millington, I (2006)	Artificial Intelligence for Games Morgan Kaufmann

Journals:

Journal of Games Development
Artificial Intelligence
International Journal of Intelligent Games and Simulation

Useful websites:

www.acm.org
www.aigamedev.com
www.fear.sourceforge.net

RESOURCES:

- PCs' of appropriate specification
- C++ Compiler
- Appropriate Games SDK e.g. Torque

ROOM REQUIREMENTS:

- Lecture Room
- Computer Lab

STAFF RESOURCES:

Staff co-ordinator: Gordon Dickers

Staff delivering this module: Gordon Dickers
Sue Maw

Module Title:	**Advanced Graphics (Games)**
Date of Validation:	
Module Number:	M3X
Module Value:	20
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Games Programming and Graphics

AIMS:

To develop students' systematic understanding of the principles and techniques used in two and three dimensional computer graphics, emphasizing the construction of algorithms required to animate and render graphical images used in games programming.

LEARNING OUTCOME:

On successful completion of this module students will be able to: -

1. Critically analyse techniques and algorithms used in computer graphics and animation.

2. Evaluate and apply appropriate graphical techniques and algorithms in the development of games engines.

INDICATIVE CONTENT:

- Mathematics for Graphics: co-ordinate systems, vectors, geometry, trigonometry, matrices, quarternions, Euler angles
- Graphics hardware/terminology and games platforms
- Advanced Graphics API features, hardware acceleration and the graphics pipeline.
- Algorithms used in transformations, perspective, hidden surfaces, lighting models, user interaction, interpolation, rendering and rasterizing
- Textures, bump mapping, mipmapping.
- Special effects, e.g. lens flare, particle systems, fire, billboarding, reflections, shadows
- Environmental effects, e.g. fog, water, rain
- Emerging methods and techniques used in generating realistic scenes
- Animation of graphical objects and characters
- Use of fractals in graphics, e.g. landscapes, compression
- Representing curves and surfaces

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	15
Practical Work	30
Student Private Study	125
TOTAL	200

ASSESSMENT:

Although this module contains a significant coursework component, the theory covered involves complex concepts that cannot be effectively assessed in a coursework due to the complexity of the algorithms and the need to be able to justify the use of the algorithms in different scenarios. Therefore, this module is assessed by a mixture of practical coursework and examination/test where appropriate.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Critically analyse techniques and algorithms used in computer graphics and animation.	• Devise and sustain the argument for the selection of graphic algorithms to be used in computer games. This outcome will be assessed through exam or in-class test.
2. Evaluate and apply appropriate graphical techniques and algorithms in the development of games engines.	• Design and implement software that renders an animated graphical image or scene using appropriate algorithms and APIs.

Exam/Test 50%
Coursework 50%

Outcome 1 is theory based and will therefore be assessed through an end-of-year examination or test. Outcome 2 requires practical application of theory so is suited to assessment via a mid- year assignment.

READING LIST:

Essential:

Hill, F.S. (2008) Computer Graphics using OpenGL, 3nd Edition, Prentice Hall International Inc.

Van Verth, J and Bishop, L. M. (2008) Essential Mathematics for Games and Interactive Applications, 2nd edition, Elsevier

Hearn, D. and Baker, M.D. (2004)	Computer Graphics, 3rd edition, Prentice-Hall.

Background:

Foley, J. D. and Van Dam, A. et al (1995),	Computer Graphics, 2nd edition, Addison-Wesley.
Angel, E (2002)	Interactive Computer Graphics ,3rd edition, Addison – Wesley
Hill, F.S. (2008)	Computer Graphics using OpenGL, 3rd Edition, Prentice Hall International Inc.
Rost, R.J. (2004)	Open GL ® Shading Language, Addison-Wesley Professional
Woo, M. and Neider, J. et al (2008),	Open GL Programming Guide, 6th Edition, Addison Wesley.
LaMothe, A (2002)	Tricks of Windows Games Programming Gurus 2nd Edition SAMS
LaMothe, A (2003)	Tricks of 3D Game Programming Gurus SAMS

Journals:

ACM QUEUE
ACM SIGGRAPH Computer Graphics
ACM SIGGRAPH: International Conference on Computer Graphics and Interactive Techniques (Proceedings)
ACM Transactions on Graphics

Useful Websites:

www.gamedev.net
www.gamasutra.com
www.flipcode.com
www.blueparrots.com

RESOURCES:

- PCs with appropriate specification

- C++ and appropriate Graphics APIs (for example OpenGL with GLUT utility or DirectX, Torque).

ROOM REQUIREMENTS:

- Computer Lab
- Lecture room

STAFF RESOURCES:

Staff co-ordinator: Gordon Dickers

Staff delivering this module: Gordon Dickers
Mike Dacey

Module Title:	**Entrepreneurship (Games)** (Honours Only)
Date of Validation:	
Module Number:	M3X
Module Value:	20
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

This module will develop in students a systematic understanding of issues relevant to innovation and entrepreneurship. It will encourage and develop the student's entrepreneurial skills, self-motivation and analytical abilities through an investigation of a specific market, and the production of a professional business plan.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

3. Create, recognise and exploit a business opportunity and pitch the idea to a high level audience.

4. Devise and justify a realistic and professional business/venture plan to take forward an opportunity, based on a critical evaluation of a given competitive scenario

INDICATIVE CONTENT:

- The impact on society of entrepreneurs and intrepreneurs (creativity, innovation and market/economic value)
- The skills, attributes and behaviours of the entrepreneur including ethical considerations
- Commercial exploitation and protection
- The business planning process – analysis, choice and implementation – mainly as relevant to micro business and SMEs
- Business description: business ownership/legal formats, mission and objectives
- The market and competitors: analysis of the macro/micro environment using frameworks such as SWOT, SLEPT, Porter's 5 forces, frameworks and techniques to investigate competitors and understand customers including industry analysis and market research.
- The marketing plan (segmentation and targeting, product, price, promotion, business premises/distribution, service issues)
- Management and human resources plan: people/staffing issues
- Operations and production plan: production facilities, IT requirements, and intellectual property rights issues such as copyright, trademarks and patents.

- Financial plan: e.g. sources of finance to start-up a business, costings, breakeven analysis, cash flow predictions, profit and loss accounts.
- Pitching the idea/plan: presentation techniques, documentation conventions

LEARNING AND TEACHING STRATEGY:

As the module aims to encourage and develop the student's entrepreneurial skills, self-motivation and analytical abilities, student-centred learning strategies are necessary. Therefore, lectures will be avoided but seminars and tutorials will allow a more interactive learning experience for the student. Students will be encouraged to lead class discussions into areas that are pertinent to the opportunities and ideas that they have generated (facilitated by the lecturer). Similarly, such strategies are suitable for the exploration of these topics and their application to case studies pertaining to IT and the Games industry. During tutorials, students will also have the opportunity to apply these issues to their chosen business/product plan, and gain individual, formative feedback regarding their work.

The table below provides a suggested allocation of teaching hours to deliver the module:

	Hours
Lectures	0
Tutorials/seminars	60
Practical Work	0
Student Private Study	140
TOTAL	200

ASSESSMENT:

This module requires the students to develop a business idea throughout the course of the module. Therefore, coursework only assessment is the most appropriate for this module.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
3. Create, recognise and exploit a business opportunity and pitch the idea to a high level audience.	• Identify a business opportunity • Present/pitch the business opportunity idea to peers, potential investors and partners, and/or other professional people. • Present outline methods to take forward this opportunity in a market based on knowledge of the underlying concepts and principles associated with innovation and entrepreneurship. • Use audio visual aids to support the presentation • Be persuasive in the presentation and respond to questioning from the audience
4. Devise and justify a realistic and professional business /venture plan to take forward an opportunity, based on a critical evaluation of a given competitive scenario	• Produce a written business plan with appropriate sub sections for a self-selected business opportunity. • Write a focused business description section that states the trading name, type of organisation, legal format, mission and aims, products/services. • Create a market/industry plan based on secondary and/or primary research techniques that documents

	the investigation and evaluation of the business environment of a selected organisation/product/ industry. This should consider markets, competitors and customers. • Deploy business planning analytical techniques and frameworks appropriate to the task. • Produce a marketing plan that documents the specific activities to be used to price, promote and distribute products and services based on a systematic understanding of current theory and practice. • Generate a financial plan that costs all activities, manages cash flow. • Create a management and human resources plan

Coursework 100%

As the tasks require the real-life application of theory, the module is assessed via coursework. Both outcomes will be assessed via one case study/practically based coursework assignment, split into logical parts. The student will be required to present/pitch a business opportunity idea (25% weighting) and devise a venture plan for an opportunity, product or service of the student's choice, or a given case study (75% weighting).

READING LIST:

Essential:

Barringer, B. R. & Ireland, R.D. (2008) Entrepreneurship: Successfully Launching New Ventures, 2nd Ed., Prentice Hall: New Jersey, USA

Williams, S. (2009) FT Guide to Business Start Up 2009: The only annually updated guide for entrepreneurs, 4th Ed., Financial Times Press: Harlow

Zimmerer, T.W. & Scarborough, N.M. (2008) Essentials of Entrepreneurship and Small Business Management, 5th Ed., Pearson: New Jersey, USA

Background:

Burns, P. (2006) Entrepreneurship and Small Business, 2nd Edition, Palgrave Macmillan: Basingstoke

Carter, S. & Jones-Evans, D. (2006) Enterprise and Small Business: Principles, Practice and Policy, 2nd Ed., Financial Times Press: Harlow

Covello, J.A. & Hazelgren, B.J. (2004) The Complete Book of Business Plans: Simple Steps to Writing a Powerful Business Plan, Small Business Sourcebooks

Kirby, D. (2003) Entrepreneurship, McGraw Hill: Maidenhead

Legge, J. & Hindle, K. (2004) Entrepreneurship: Context, Vision and Planning, Palgrave Macmillan: Basingstoke

Microsoft (2007) Software Entrepreneurship for Students, Agatavi

Rae, D. (2007) Entrepreneurship: from opportunity to action, Palgrave Macmillan: Basingstoke

Timmons, J. & Spinelli, S. (2008) New Venture Creation: Entrepreneurship for the 21st Century, McGraw Hill:Boston, Mass

Journals:

Entrepreneurship & Regional Development
Frontiers of Entrepreneurship Research
Journal of Business Venturing
Journal of Small Business Management
Small Business Economics
The Journal of Product Innovation Management
Venture Capital

Useful Websites

Business Link	http://*www.businesslink.gov.uk*
Business Learning and Support	http://www.bized.co.uk
Bytestart: the small business portal	http://www.bytestart.co.uk
Emerald Fulltext Journals and Abstract Reviews	http://juno.emeraldinsight.com
IT Wales	http://www.itwales.com
IT and Business web site	http://www.silicon.com
Online technology magazine	http;//zdnetweek.co.uk

PHYSICAL RESOURCES:

Computer/projector.

ROOM REQUIREMENTS:

Lecture Theatre
Tutorial room.
Computer laboratory with Internet access

STAFF RESOURCES:

Staff Co-ordinator: Karen Jones

Staff delivering this module: Karen Jones
Kathryn Penaluna

Module Title:	**Implementation Project (Games)** (Ordinary Only)
Date of Validation:	
Module Number:	M3X
Module Value:	20
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Academic Seminar/Software Engineering Principles

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AIMS:

This module provides an opportunity for the student to develop and demonstrate their ability to manage a project related to the major themes of their course. The study will demonstrate academic rigour through the use of analytical and technical skills to implement a pre-defined project proposal.

This module is only available to Ordinary degree students.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

7. Appraise critically the literature pertaining to a problem domain.

8. Evaluate, select and apply development techniques to implement a solution to a pre-defined problem or scenario.

9. Produce an organised and structured document that adheres to academic convention.

10. Present the findings of the study to a specialist audience.

INDICATIVE CONTENT

- Overview of research and development techniques.
- Project planning.
- Development of documentation for academic projects.
- Subject-specific content as required.

LEARNING AND TEACHING STRATEGY:

A pre-defined project proposal will be provided to the student at the beginning of the academic year. Based upon the proposal each student will be allocated an individual supervisor who will meet with the student each week for the remainder of the academic year.

A series of five lectures during the academic year will provide the general support for the development of the student's proposal and structure of his/her project and documentation.

The student will be required to work on his/her own initiative in the production of the project and all associated documentation. The supervisor and a project handbook will provide support and guidance to the student.

	Hours
Lectures	5
Tutorials	10
Practical Work	0
Student Private Study	185
TOTAL	200

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Appraise critically the literature pertaining to a problem domain.	• Describe clearly the aim of the project. • State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed. • Define the relationship between the current and previous research in related topic areas, stressing similarities and differences. • Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation. • Demonstrate an ability to make critical use of published work and source materials. • Reference literature pertinent to the research • Avoid criticism of insufficiency or excessiveness with general reference to the literature. • Give due credit to previous workers for ideas and techniques used by the authors. • Display evidence of the ability to identify key items in the literature and to compare, contrast and critically review them. • Appreciate the relationship of the special theme to the wider field of knowledge. • Present previous work within an overall conceptual framework and in a systematic way.

2. Evaluate, select and apply development techniques to implement a solution to a pre-defined problem or scenario.	• Demonstrate competence in independent work or experimentation. • Consider ethical risks and how they will be controlled. • Display evidence of knowledge of, and the ability to use, all relevant data sources. • Employ appropriate development techniques. • Create a working system that meets the requirements identified. • Evaluate the system through the application of test data. • Relate the findings to the aims and objectives of the study.
3. Produce an organised and structured document that adheres to academic convention.	• Review the literature on a specified topic and write up the findings in a logically organised document. • Clearly delineate sections, and ensure that they contain appropriate content. • Create an attractive layout. • Write in an appropriately academic style. • Ensure that the submission is structured not disjointed, indicating a systematic approach. • Employ accurately a suitable referencing system with bibliography. • Write a fluent, coherent submission, with correct spelling and grammar
4. Present the findings of the study to a specialist audience.	• Present information in a variety of forms. • Demonstrate selectivity of topics for discussion. • Demonstrate the project deliverable, outlining the associated design and implementation issues. • Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic and design decisions.

ASSESSMENT STRATEGY

The module will be assessed through coursework only. One aspect of that coursework will be two *viva voce* at the midpoint and end of the module.

The student's supervisor and one other member of the academic staff who has knowledge of the project's problem domain will assess the work (see assessment form).

The proposed arrangements for marking Projects are:

- The Supervisor will act as the first marker of all Projects for which s/he has supervisory responsibility;
- A different member of the Academic Staff of the University will second-mark Projects;
- If the two markers cannot agree, a third marker will be assigned. All markers will need to agree a final mark;
- All Projects to be made available to External Examiners;
- All third-marked Projects will be seen by the External Examiners.
- The student will be expected to undertake an end of year *viva voce* after submission of their Project. These will take place during the final weeks of the final year of the student's degree. The student's supervisor plus at least one other member of Academic Staff will attend the *viva voce*. It will consist of a presentation which will last fifteen minutes and will be followed by a fifteen minute question and answer session. The presentation requires the student to demonstrate their project, provide an overview of the completed project and describe the results achieved. While the question and answer session gives the student the opportunity to demonstrate his/her knowledge of the work undertaken, and to identify issues that may have been omitted from the final submitted document. Time allocated to these aspects may vary according to need and complexity of the project undertaken. Non-attendance at the *viva voce* will normally result in failure of the module.

Awarding of Marks

Outcome Statement		**Max. Awarded**
1	Review of Literature	40%
2	Analysis, Design and Development	40%
3	Quality of Documentation	10%
4	*Viva Voce*	10%
	TOTAL	100%

Coursework 90%
Examination (Viva) 10%

READING LIST:

Essential:

Avison, D. and Fitzgerald, G. (2007)	Information Systems Development: Methodologies, Techniques and Tools, 4th Edition, McGraw-Hill: Maidenhead.
Saunders, M., Lewis, P. and Thornhill, A. (2007)	Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow
Weaver, P. (2004)	Success in Your Project: a Guide to Student System Development Projects, Prentice Hall: Harlow

Background:

Baase, S. (2008)	A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY
Collis, J. and Hussey, R. (2009)	Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke
Cornford, T. and Smithson, S. (2006)	Project Research in Information Systems: a Student's Guide, 2nd Ed., Palgrave/Macmillan: Basingstoke
Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	Projects in Computing and Information Systems: a Student's Guide, Addison Wesley: Harlow
Fitzgerald, B., Russo, N.L. and Stolterman, E. (2002)	Information Systems Development: Methods-in-Action, McGraw Hill: Maidenhead
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY
Yin, R K, (2008)	Case Study Research: Design and Methods,

4th Ed., Sage: Beverly Hills.

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Due to the varied nature of the possible projects, it is not practical to specify in advance what resources will be required. It is a pre-requisite of any agreement to a project proposal that the necessary resources will be available to the student.

STAFF RESOURCES:

Staff Co-ordinator:	Mike Dacey
Staff delivering this module:	Andy Baker, Mike Dacey, Gordon Dickers, Glenn Jenkins

Module Title:	**Networked Multiplayer Games (Games)**
Date of Validation:	
Module Number:	M3X
Module Value:	20
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	None

AIMS:

To provide a requisite understanding of the key principles and techniques of networked multiplayer game programming, and the development of game clients and servers. Students will gain an appreciation of networking principles, technology, protocols, services and the performance limitations of networking. In addition, the concepts and techniques of multi-processing/threading and web development will be covered.

LEARNING OUTCOMES:

On successful completion of this module students will be able to: -

1. Conceptualise the architecture, technology and protocols used in networking and analyse multithreading concepts for performance enhancement of a networked service.

2. Critically evaluate the principles, concepts and techniques applied to the development of real-time networked multi-user and web applications.

3. Deploy appropriate methods and techniques in the development of an aspect of a multiplayer game and/or management tool.

INDICATIVE CONTENT:

- Architecture of a networked multiplayer game
- Networking principles and technology e.g.
    - OSI 7 layers, TCP, UDP
    - LAN & WAN
    - Routers, bridges, hubs, collision and broadcast domains
- Network programming e.g. BSD sockets. Including UDP/TCP clients and servers, byte ordering, etc.
- Optimization of multiplayer games including performance issues and dead reckoning.
- Real-time multiplayer/multiuser development with particular focus on multithreading and processing, including critical regions, mutexes, semaphores, etc
- Web development for remote access and management e.g. web based management tools for game server
- Web services and database management e.g. database storage of player details

LEARNING AND TEACHING:

	Hours
Lectures	30
Tutorials	0
Practical Work	60
Student Private Study	110
TOTAL	200

IMPLEMENTATION:

The theoretical component of this course will be delivered through the lectures, which will include appropriate demonstrations. Supervised laboratory sessions will allow the student to put into practice these theoretical aspects through the use of software packages. In order for the assignment to be undertaken by the students, all game artwork, design and levels will be provided, whilst existing game software may also be provided where appropriate.

ASSESSMENT:

This module focuses on the development of multiplayer networked games using appropriate technologies. The assessment is coursework with in-class tests, reflecting the need to assess both the theoretical concepts and their application.

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
1. Conceptualise the architecture, technology and protocols used in networking and analyse multithreading concepts for performance enhancement of a networked service.	• Discuss and evaluate the concepts of network theory, networking technology, multithreading and web development.
2. Critically evaluate the principles, concepts and techniques applied to the development of real-time networked multi-user and web applications.	• Document the software design and the techniques used to produce a networked game or game tool. The report will include an evaluation of the design through comparison with the theoretical concepts that have been discussed.
3. Deploy appropriate methods and techniques in the development of an aspect of a multiplayer game and/or management tool.	• Implement any given aspect of a multiplayer game.

Exam/Test 50%
Coursework 50%

Outcomes 1 will be assessed by an end of module exam or in-class tests (50% weighting). Outcomes 2 and 3 will be assessed at the end of the module by a project developed by the

student and an associated written report (50% weighting). The students will be required to demonstrate and explain their solutions to the provided assignment.

READING LIST:

Essential:

Barron, T. (2001)	Multiplayer Game Programming, Premier Press
Mulholland, A. et al (2001)	Programming Multiplayer Games, Wordware
Tanenbaum, A. (2003)	Computer Networks, Prentice Hall
Walther, S. (2008)	ASP.NET 3.5 Unleashed, Sams

Background:

Alexander, T. (2003)	Massively Multiplayer Game Development, Charles River Media
Bartle, R. (2003)	Designing Virtual Worlds, New Riders
Mulholland A. et al (2001)	Developers Guide to Multiplayer Games, Wordware
Mulligan, J. et al (2003)	Developing Online Games: An Insiders Guide, New Riders
Silberschatz et al. (2003)	Operating Systems Concepts, John Wiley
Stevens, W. (1998)	UNIX Network Programming, Prentice Hall
Penton, R. (2003)	MUD Game Programming, Premier Press

Journals:

ACM: Computers in Entertainment
ACM: Workshop Proceedings on Network and System Support for Games
Journal of Games Development
Journal of Virtual Environments

Useful websites:

www.gamasutra.com
www.flipcode.com
www.unreal.epicgames.com
www.winsock.com

RESOURCES:

- PC's of appropriate specification
- Game development platform, networked computers and game servers.

ROOM REQUIREMENTS:

- Lecture Room
- Computer Lab
- AV facilities required for demonstrations.

STAFF RESOURCES:

Staff co-ordinator: Mike Dacey
Staff delivering this module: Mike Dacey, Gordon Dickers, Glen Jenkins

Module Title:	**Major Project (Games)** (Honours Only)
Date of Validation:	
Module Number:	M3X
Module Value:	60
Level:	6 (Core)
Faculty Responsible for Delivery:	Applied Design & Engineering
Pre-requisites:	Academic Seminar/Software Engineering Principles

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AIMS:

This module provides an opportunity for the student to develop and demonstrate their ability to manage a significant project of their own choice related to the major themes of their course. The study will be based upon a sound research and development methodology and will demonstrate academic rigor through the use of analytical and technical skills to implement a suitable and appropriate project proposal.

This module is only available to Honours degree students.

LEARNING OUTCOME:

On successful completion of this module students will be able to: -

1. Appraise critically the literature pertaining to a problem domain.

2. Evaluate, select and apply relevant research and development techniques.

3. Analyse rigorously the practical and theoretical evidence gathered and design and develop a solution to the problem situation.

4. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.

5. Produce an organised and structured document that adheres to academic convention.

6. Present the findings of the study to a specialist audience.

INDICATIVE CONTENT:

- Overview of research and development techniques.
- Project planning.
- Development of documentation for academic projects.
- Subject-specific content as required.

LEARNING AND TEACHING STRATEGY:

Students should commence their level 6 studies with a project proposal. For continuing students, this proposal will normally be generated as an outcome of the level 5 module Academic Seminar/Software Engineering Principles. (Direct entrants to level 6 of the degree will receive guidance to help them generate a suitable proposal before the commencement of the academic year.) All proposals will be reviewed with the Project tutor to allow for amendments and, when acceptable, consequently formally agreed. Based upon the proposal each student will be allocated an individual supervisor who will meet with the student each week for the remainder of the academic year.

A series of five lectures during the academic year will provide the general support for the development of the student's proposal and structure of his/her project and documentation.

The student will be required to work on his/her own initiative in the production of the project and all associated documentation. The supervisor and a project handbook will provide support and guidance to the student.

	Hours
Lectures	5
Tutorials	10
Practical Work	0
Student Private Study	585
TOTAL	600

ASSESSMENT:

Outcomes	**Assessment Criteria** **To achieve each outcome a student must:**
8. Appraise critically the literature pertaining to a problem domain.	• Describe clearly the aim of the research. • State clearly and precisely the hypotheses to be tested, questions to be answered or objectives to be addressed. • Define the relationship between the current and previous research in related topic areas, stressing similarities and differences. • Demonstrate knowledge of the underlying concepts and principles associated with the topic under investigation. • Demonstrate an ability to make critical use of published work and source materials. • Reference literature pertinent to the research • Avoid criticism of insufficiency or excessiveness with general reference to the literature. • Give due credit to previous workers for ideas and techniques used by the authors. • Display evidence of the ability to identify key items in the literature and to compare, contrast

	and critically review them. • Appreciate the relationship of the special theme to the wider field of knowledge. • Present previous work within an overall conceptual framework and in a systematic way.
9. Evaluate, select and apply relevant research and development techniques.	• Demonstrate competence in independent work or experimentation. • Employ an appropriate research methodology. Justify and describe adequately its application. • Recognise variables that might influence and limit the study. • Consider ethical risks and how they will be controlled. • Demonstrate evidence of care and accuracy in recording and summarising the data. • Display evidence of knowledge of, and the ability to use, all relevant data sources. • Employ an appropriate development methodology. Justify and describe adequately its application.
10. Analyse rigorously the practical and theoretical evidence gathered and design and develop a solution to the problem situation.	• Report coherently the results of the research. • Apply the chosen development methodology to the development of the proposed system, including the techniques of analysis and design used. • Create a working system that meets the requirements identified. • Evaluate the system through the application of test data. • Relate the findings to the aims and objectives of the study. • Compare the findings with the findings of similar studies and the literature • Demonstrate skills of analysis.
11. Generate and justify appropriate conclusions based on the previous analyses, demonstrating awareness of the limitations of the research.	• Synthesise theoretical and new material to generate critique and justify valid conclusions and recommendations. • Consider the extent that the conclusions overturn or challenge previous beliefs. • Appreciate the realism and practicalities of the situation. • Consider the achievement of the specified objectives. • Delimit the new contribution and identify prospects for further work
12. Produce an organised and structured document that adheres to academic convention.	• Organise the document logically. Clearly delineate sections, and ensure that they contain appropriate content. • Create an attractive layout. • Write in an appropriately academic style.

	• Ensure that the submission is structured not disjointed, indicating a systematic approach. • Employ accurately a suitable referencing system with bibliography. • Write a fluent, coherent submission, with correct spelling and grammar
13. Present the findings of the study to a specialist audience.	• Present information in a variety of forms. • Demonstrate selectivity of topics for discussion. • Respond appropriately to questioning, demonstrating comprehensive knowledge of the topic.

ASSESSMENT STRATEGY

The module will be assessed through coursework only. One aspect of that coursework will be two *viva voce* at the midpoint and end of the module.

The student's supervisor and one other member of the academic staff who has knowledge of the project's problem domain will assess the work (see assessment form).

The proposed arrangements for marking Projects are:

- The Supervisor will act as the first marker of all Projects for which s/he has supervisory responsibility;
- A different member of the Academic Staff of the University will second-mark Projects;
- If the two markers cannot agree, a third marker will be assigned. All markers will need to agree a final mark;
- All Projects to be made available to External Examiners;
- All third-marked Projects will be seen by the External Examiners.
- The student will be expected to undertake an intermediate *viva voce* and end of year *viva voce* after submission of their Project. These will take place during the final weeks of the first term and the final weeks of the final year of the student's degree respectively. The student's supervisor plus at least one other member of Academic Staff will attend the *viva voce*. Both will consist of a presentation which will last fifteen minutes and will be followed by a fifteen minute question and answer session. During the first presentation the student will be required to explain their current progress against their project plan, any problems encountered and describe the work completed. They will also be given an opportunity to demonstrate any software produced. The final presentation requires the student to demonstrate their project, provide an overview of the completed project and describe the results achieved. While the question and answer session gives the student the opportunity to demonstrate his/her knowledge of the work undertaken, and to identify issues that may have been omitted from the final submitted document. Time allocated to these aspects may vary according to need and complexity of the project undertaken. Non-attendance at the *viva voce* will normally result in failure of the module.

Awarding of Marks

Outcome Statement		Max. Awarded
1	Review of Literature	20%
2	Research & Development Methods	10%
3	Analysis, Design and Development	35%
4	Conclusions/Recommendations	20%
5	Quality of Documentation	5%
6	*Intermediate Viva Voce*	5%
	Viva Voce	5%
	TOTAL	100%

Coursework (Documentation) 90%
Examination (Viva) 10%

READING LIST:

Essential Texts:

Avison, D. and Fitzgerald, G. (2007) Information Systems Development: Methodologies, Techniques and Tools, 4th Edition, McGraw-Hill: Maidenhead.

Saunders, M., Lewis, P. and Thornhill, A. (2007) Research Methods for Business Students, 4th Edition, FT/Prentice Hall: Harlow

Weaver, P. (2004) Success in Your Project: a Guide to Student System Development Projects, Prentice Hall: Harlow

Background Reading:

Baase, S. (2008) A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 3rd Ed., Pearson: NY

Collis, J. and Hussey, R. (2009) Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, Palgrave Macmillan: Basingstoke

Cornford, T. and Smithson, S. (2006) Project Research in Information Systems: a Student's Guide, 2nd Ed., Palgrave/Macmillan: Basingstoke

Cottrell, S.(2005)	Critical Thinking Skills: Developing Effective Analysis and Argument, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Davies, M. B. (2007)	Doing a Successful Research Project, Palgrave Macmillan: Basingstoke
Dawson, C.W. (2005)	Projects in Computing and Information Systems: a Student's Guide, Addison Wesley: Harlow
Fitzgerald, B., Russo, N.L. and Stolterman, E. (2002)	Information Systems Development: Methods-in-Action, McGraw Hill: Maidenhead
Quinn, M. J. (2009)	Ethics for the Information Age: International Edition, 3rd Ed., Pearson: NY
Wood, M. (2003)	Making Sense of Statistics: A Non-mathematical Approach, Palgrave Study Guides, Palgrave Macmillan: Basingstoke
Yin, R K, (2008)	Case Study Research: Design and Methods, 4th Ed., Sage: Beverly Hills.

Other titles dependent upon the research topic

Journals

Appropriate journals from the core subject areas.

Useful Websites

http://www.socialresearchmethods.net/kb/contents.php
http://www.intute.ac.uk/
http://www.acm.org
http://juno.emeraldinsight.com

PHYSICAL RESOURCES:

Due to the varied nature of the possible projects, it is not practical to specify in advance what resources will be required. It is a pre-requisite of any agreement to a project proposal that the necessary resources will be available to the student.

ROOM REQUIREMENTS:

- As required by student.

STAFF RESOURCES:

Staff co-ordinator: Mike Dacey
Staff delivering this module: Members of the programme team

HEALTH AND SAFETY BRIEFING NOTES

The Institute is very proud of its achievement in providing a safe place for you to study and has achieved the Gold Award in Occupational Safety.

Student Health and Safety Responsibilities

Whilst studying at the Institute you have a responsibility – under Health and Safety Legislation – to:

- take reasonable care of your own health and safety;
- consider the safety of others who may be affected by your actions;
- report any hazards that you might come across, such as a tripping hazard, to your Year Tutor;
- report any accidents and complete an accident report form, obtainable from Reception or a First Aider.

Fire Emergency Procedures

The Institute places major emphasis on fire safety. It is therefore important that you are aware of what is expected of you if you discover a fire or what to do when the fire alarms are sounding.

If you discover a fire:

- Sound the fire alarm;
- Dial 9 (to get an outside line) then 999;
- Do not attempt to tackle the fire yourself.

If you hear the Fire Alarm:

- Leave the building by the nearest available exit;
- Close windows and doors behind you as you leave;
- If in class at the time of the alarm, follow the instructions given by the lecturer and report to the Fire Assembly Point. The Fire Assembly Point is located in the car park below the Owen Library.

Do not:

- stop to collect person belongings;
- use the lift;
- take risks;
- re-enter the building until authorised to do so.

First Aid

The names of the First-Aiders in the Business Block are Maureen Turner, Dr Roger Geary, Peter Ball and Bob Lewis. Contact Reception to request the presence of a First-Aider.

Smoking Policy

All areas are NO SMOKING areas unless clearly marked otherwise. Smoking just inside the entrances to buildings is prohibited.

Cigarette bins are provided outside building entrances – please use them.

Eating and Drinking

Eating and drinking in classrooms and corridors is not allowed.

Meningitis Information

As some of you may be aware, the Government has introduced legislation to make available the Meningitis vaccine to all students entering Higher and Further Education. If you have not yet been immunised, go and see your own G.P. It is important to note that, to the best of our knowledge, there are no cases of Meningitis within the Institute.

LIBRARY & LEARNING RESOURCES

The Institute Libraries will become an important part of your time at the Applied Computing School. You will discover the information that you need to support your studies amongst the stock of around 140,000 books, covering the range of subjects taught. Daily newspapers are taken and the library subscribes to some 1000 current journals and periodicals – all intended to keep you up-to-date.

Location

There are three libraries within the Institute, two on the Mount Pleasant Campus and one on the Townhill Campus. Once enrolled as a student of the Institute, students are able to use the facilities of all three libraries.

The Applied Computing School is served mainly by the Owen Library, but certain subjects are also covered by books and periodicals stocked in the Thompson Library.

Opening Hours

Current opening times of the Mount Pleasant libraries are as follows:

Owen Library (Tel. No. – 01792 481221)

	Mon – Thurs	**Fri**	**Sat**
Term Time	08:45 – 21:00	08:45 – 16:30	10:00 – 16:00
Vacations	08:45 – 17:00	08:45 – 16:30	Closed

Thompson Library (Tel. No. – 01792 481141)

	Mon – Thurs	**Fri**	**Sat**
Term Time	08:45 – 21:00	08:45 – 16:30	10:00 – 13:00 14:00 – 16:00
Vacations	08:45 – 17:00	08:45 – 16:30	Closed

The Owen Library will be open on Sundays for reference purposes only – please see the Library web site (http://apollo.sihe.ac.uk/library) for details. You will be able to use books for reference, but will not be able to borrow or renew books or renew printer credits. There are currently no plans to open the Thompson Library on Sundays.

Joining

Following enrolment, you will be issued with an identification card. Please inform the library staff immediately if your identification card is lost, stolen or damaged. A

charge will be made for replacement. Also, please inform the library staff if you change your address.

Borrowing

Once registered, students may borrow to 12 items including books, audio-visual items or computer software from any Institute library. If a book is not available but in the library's stock, it can be reserved at the issue desk. Books must be returned when recalled by the Librarian.

Loan Periods:

Ordinary Loan	3 weeks
Limited Loan	1 week short loan
Overnight Loan	To be returned the next working day
Reference	Cannot be removed from the Library

Fines

Fines are charged for overdue items at a rate displayed in the Library. If an item is required for longer than the loan period, please return or renew it to avoid paying fines. You can renew books in person, by telephone or via the World-Wide-Web access to OPAC.

Inter-Library Loans

If a book, journal or thesis is needed which is not in Library stock, it can be obtained through the British Library by completing an Inter-Library loan request form. A charge will be made at the time of request.

Institute Computing Facilities

Groups of computer workstations are available in each Faculty. Some of these are for teaching purposes only. As a Computing student, most of your classes will be held on the Third Floor of the Business Block on the Mount Pleasant Campus. In addition, computing facilities are available in both the Thompson and Owen libraries during normal working hours. These have access to the high-speed Institute-wide data network which provides access to file servers, application servers which hold a large collection of software packages, and printing facilities. Library services, including CD-ROM access and on-line catalogues, can be accessed over the network, which is also connected to the South Wales Metropolitan Area Network. This South Wales network is, in turn, connected to the SuperJanet Network which serves the entire UK higher education community and provides connection to the Internet.

Other Services

Students have access through Faculties to audio-visual equipment and film and television viewing rooms. Students may also borrow video cameras and other equipment for use in their project work at the Institute.

Card-operated photocopiers are available in each Library, and each student has an account set up when they enrol. Cards may be purchased from dispensers located in the Owen Library.

If any other services connected with the Library are required, then please let the Library staff know. Assistance will be given wherever possible.

APPENDICES

APPENDIX 1 UNDERGRADUATE ASSESSMENT REGULATIONS

(for University of Wales awards)

CONTENTS

1. Principles of assessment
2. Responsibilities of the Institute
4. Transfer credit
5. Accreditation of prior experiential learning (APEL)
6. Maximum credit
7. Examining Boards
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9. Module marking scheme
10. Module marking
11. Late submission of coursework
12. Absence from an examination
13. Progression
14. Compensation and condonement
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17. Withdrawal
18. Awards
19. Degree determination
20. Re-assessment
21. Posthumous awards
22. Students with special needs
23. Welsh language
24. Assessment offences

Appendix 1 Two-Tier Examining Boards – Constitution and Terms of Reference

For University of Wales programmes, these regulations must be read in conjunction with the University of Wales Regulations for Modular Initial Degrees contained within the University Regulations for Associated Institutions and Standing Orders and the Institute's Modular Regulations. In the event of any variance between the Institute's regulations and the University's regulations, the University of Wales regulations shall be authoritative.

Individual programmes may have more specific regulations and encompass accrediting/professional body requirements.

1. Principles of assessment

1.1 Assessment may have 2 purposes:

i) *formative*: to provide supportive feedback and encouragement to students on their performance and progress.

ii) *summative*: to enable students to demonstrate that they have met the objectives of their programme of study and have achieved the standard for the award they seek.

It is the latter context which is the focus of these regulations.

1.2 Specific assessment requirements will relate, therefore, to the objectives of programmes and of individual modules.

1.3 Assessment involves judgement as well as computation. Marks and grades are not absolute values but indicators of examiners' judgements on different aspects of a student's work.

1.4 Since modules are of a standard size and credit value, the assessment workload should be comparable. Examining Boards should have regard to ensuring this in their oversight of assessment practice.

1.5 Where more than one element of assessment is used (for example, coursework and examinations), each carries a published weighting, agreed at validation, which is used to arrive at a single final grade or mark for the module.

1.6 The normal expectation is that students will satisfy assessment requirements at the first attempt, but provision is made for re-assessment where appropriate.

1.7 In order to achieve parity of assessment where modules are taught in more than one programme, a two tier Examining Board structure is necessary: a Module Examining Board and an Award/Progression Examining Board.

2. Responsibilities of the Institute

2.1 It is the responsibility of the Institute:

a) to ensure that learners are fully aware of the nature of the learning outcomes and all related assessment requirements which need to be met in order to achieve the qualification for which they are enrolled;

b) to assess students fairly in accordance with the assessment scheme and regulations of the programme;

c) to provide invigilation of examinations undertaken in the Institute, in accordance with approved procedures;

d) to publish results of students' assessments affecting progression or awards;

e) to investigate allegations of assessment offences, in accordance with approved procedures;

f) to consider applications for review of decisions of Examining Boards, according to approved procedures.

3. Responsibilities of students

It is the responsibility of the student:

a) to attend examinations and submit work for assessment as required;

b) to provide the Examining Board, before its meeting, with any relevant information on personal circumstances which may have affected performance or attendance and which they wish the Examining Board to take into account;

c) to undertake assessments in a manner which does not attempt to gain an unfair advantage;

d) to ascertain his/her results;

e) to inform the Programme Director and Registry of a decision to withdraw from a module or from a programme of study.

4. Transfer credit

4.1 Where credit gained at higher education level in another institution (or in another programme at Swansea Institute of Higher Education) is directly relevant to the student's programme of study, it may be allocated a mark and credited towards the award.

4.2 It is the responsibility of Programme Team to delegate to one of its members, responsibility for evaluating a student's previous record and decide on the amount of credit that can be transferred, within the overall limits prescribed by the Regulations.

5. Accreditation of prior experiential learning (APEL)

5.1 The Institute recognises that it is possible for a student to have undertaken learning at higher education level outside an academic institution.

5.2 A student seeking credit for APEL towards an approved programme of study, shall be required to present evidence of such learning in order that its credit value may be assessed and a mark awarded as detailed in the Institute Quality Handbook.

6. Maximum credit

6.1 The maximum number of credit points that can be transferred and/or granted to an undergraduate degree is 240 at levels 4 or 5. No credit is allowed at level 6. Where full credit exemption has been permitted, the remaining credit must be taken at level 6 or above.

7. Examining Boards

7.1 The structure, function and membership of Examining Boards will be as detailed in the Institute Quality Handbook (and outlined in the Modular Structure, Procedures &

Regulations document March 1998). The terms of reference and the constitution of these boards is given in Appendix 1 of this document.

7.2 The performance of each student will be considered in two stages

a) by module;

b) by overall performance for the semester / year / award.

7.3 Each faculty will establish Examining Boards in accordance with one of the following;

(i) Single Board: where one Examining Board is exclusively responsible for all modules within the programme;

(ii) Two-tier Board: where a module is taught in more than one Examining Board area, the managing Faculty will establish a Module Examining Board to review progress and to make recommendations to the appropriate Award/Progression Examining Boards. The second tier, Award/Progression Examining Board, will be responsible for progression and final awards, but cannot change the marks already agreed by the Module Examining Board apart from applying compensation in appropriate exceptional cases.

The single board of 7.3 (i) would perform the function of the two-tier system but within a single board.

8. Assessment methods

8.1 The methods of assessment relate to the learning objectives/outcomes of the programme of study, and are specified in the validated programme document.

8.2 Changes in assessment methods can only be made with the approval of the Module Examining Board.

8.3 Standard nomenclature used within the Institute is as follows:

a) Coursework assignments

Coursework assignments include all assignments in an assessment schedule (other than written and practical examinations) which contribute to the final mark/grade. Coursework assignments may include, inter alia, essays, projects, dissertations, theses, design portfolios, log books and non-invigilated examinations.

b) Practical examinations

Practical examinations include all examinations in a programme of study which require a demonstration of practical skills, normally under time-constrained, invigilated conditions.

c) Written examinations

Written examinations are invigilated, time-restrained assessments of a type agreed at validation.

8.4 Candidates must not take into the examination room any book, manuscript or other aid, unless it is specifically allowed in the examination rubric or the Institute's examination procedures.

8.5 Periods of work placement will be assessed in accordance with the procedures prescribed in the validated documents for the programme.

9. Module marking scheme

9.1 Modules will be assessed in accordance with a marking scheme reflecting the final award scheme, (see 19.3 below). The assessment instructions and associated marking schemes must be agreed by the Module Examining Board.

9.2 Weightings of elements of assessment will be agreed at validation and included in the module specification.

9.3 Where two or more elements contribute to the mark of a module (e.g. coursework and an examination; two examinations; two pieces of coursework) the marks (weighted where appropriate) are combined to give the module mark, excepting that if the mark for any one element falls below 30%, the module will be deemed a failure, irrespective of the overall mark achieved.

10. Module marking

10.1 Major projects and dissertations contributing at least one module worth to the final award will be double-marked.

10.2 Coursework assignments and examinations will be marked anonymously, wherever possible, and will be double-marked or moderated, wherever practicable.

11. Late submission of coursework

11.1 Details of the assessment schedule will be published at the beginning of each module. This will include information on the number of pieces of coursework required, their nature and quantity, and where and when they are to be submitted.

11.2 In mitigating circumstances (such as illness or family bereavement), the Programme Director, in consultation with the module tutor concerned, may agree an appropriate extension of time, subject to the following procedure:

a) an extension must be requested, in writing, normally before the deadline date;

b) the request should normally be accompanied by supporting evidence (e.g. a medical certificate produced by a G. P.);

c) the extension will be for a specific time, and a new submission date will be indicated, in writing, to the student.

Extensions will normally be reported to Module Examining Board.

11.3 Where work has been submitted late, and no extension has been granted, the following applies:

a) for work submitted up to one week (i.e. the same day the following week) after the deadline, a maximum mark of 40% is awarded;

b) for work submitted more than one week after the deadline, a zero mark is given.

11.4 Where a piece of coursework is not submitted by the end of the module, the student shall be deemed to have failed the module.

12. Absence from an examination

12.1 A student who is absent from the examination without good cause shall be deemed to have failed the module.

12.2 In serious mitigating circumstances, where a student fails to attend or to complete an examination, s/he must write immediately to the Programme Director, indicating the nature of the circumstances and including appropriate documentary evidence (e.g. medical certificates). This evidence will then be placed before the Award/Progression Examining Board for consideration.

12.3 If an Award/Progression Examining Board is satisfied that a candidate is absent with good cause from a final examination/assessment following his/her presentation to the University, provided that the Examining Board is satisfied that there are reasonable grounds, it may:

i) permit the candidate to sit a supplementary examination or a special oral examination, before the next meeting of the Award/Progression Examining Board; or

ii) award the qualification without further examination/assessment provided that at least two thirds of the modules have been completed which count towards the final award; or

iii) recommend that the candidates receives an aegrotat award.

The provisions described at (ii) and (iii) above may be made only if (a) the external examiner agrees that the supporting evidence is satisfactory, (b) if the candidate's performance in other examinations or assessed work justifies such action and (c) if the authorisation of the Senior Vice-Chancellor of the University of Wales has been obtained.

13. Progression

13.1 Where a student, after any compensation and condonement, has obtained credits for all the modules attempted, s/he will be allowed to proceed.

13.2 Where a student has failed one, two or three modules s/he may be reassessed at the next assessment point.

13.3 Where a student has failed more than three modules, the Award/Progression Examining Board shall have the discretion to decide whether the first reassessment shall be delayed and whether the student will be required to be examined as an internal or as an external candidate.

13.4 At the discretion of the Award/Progression Examining Board, a student may be permitted to progress, carrying a maximum of two failed modules subject to the requirement of successfully completing all relevant pre-requisites.

13.5 Module results will be published as soon as practicable after the Examining Board. Semester One results will be published after the Module Examining Board, with the caveat that the marks are subject to approval by the Award/Progression Examining Board.

14. Compensation and condonement

14.1 Where a student has marginally failed (35-39%) up to three modules in any level, but has presented mitigating circumstances to support poor performance, the Award/Progression Examining Board may, on the basis of the student's overall performance, compensate for the failure. Consideration must be given to the strength of the grounds presented, the student's profile and the significance of the modules(s) concerned in the programme and award.

Bereavement or such circumstances are considered as mitigating circumstances. Reasons of financial hardship are not considered as mitigating circumstances.

14.2 If failure is compensated, the mark is raised to 40%.

Where a module is awarded a pass by compensation, this will be recorded on the student's record as 40PC.

14.3 The Award/Progression Examining Board may also, based on the student's overall performance, condone a failure in up to two modules in any level. The student is allowed to continue the programme without re-assessment. If failure is condoned, credit is given for passing the module, but the actual mark achieved is carried forward for the calculation of the final award if appropriate, and recorded on the transcript (i.e. 38C).

14.4 In cases of both compensation and condonement, the student is awarded credit as if the module had been passed.

14.5 In core modules, major projects and dissertations, compensation or condonement will only be permitted in exceptional circumstances.

14.6 Compensation and condonement can be applied at the first and at subsequent reassessments.

14.7 Compensation and condonement will normally not be permitted where the mark in any element is less than 30% or where the overall mark for the module is less than 35%.

14.8 No more than two modules or their equivalent may be condoned at any one level, and the maximum number of condoned modules permissible in a degree scheme shall be four. The maximum number of modules which may be condoned or compensated, is three per level and six overall.

15. Failure

15.1 At the discretion of the Award/Progression Examining Board, students who have failed any modules which have not been compensated or condoned may be permitted up to three further attempts to redeem their failure in each module. The resits of any assessed elements taken prior to the Examining Board must be reported to the Board.

15.2 The maximum mark a student may be awarded at a second or subsequent attempt at an element of assessment is 40%.

15.3 If a student has failed a module, but has passed one or more of the elements of assessment, the Module Examining Board may decide that only failed elements need to be re-assessed. In this case, the mark attained in the re-assessed element(s) will be combined with the marks from the passed element(s), weighted appropriately, to give the overall mark.

16. Deferral

16.1 Where a student presents documentary evidence of serious mitigating circumstances, the Award/Progression Examining Board has discretion to defer a student, giving him/her the opportunity to complete the assessment at a subsequent assessment point. This will be considered a first assessment of the module(s).

17. Withdrawal

17.1 Where a student withdraws from a module before the end of the third week of that module, and informs the Programme Director and Registry by that date, s/he will be deemed not to have enrolled on the module.

18. Awards

18.1 Subject to validation, the following exit points may be available to students:

a)	Certificate of Higher Education	where a minimum of 120 credits has been achieved at level 4 or above;
b)	Diploma of Higher Education	where a minimum of 240 credits has been achieved, at least 120 of which are at level 5 or above;
c)	Ordinary Degree	where a minimum of 300 credits has been achieved, at least 60 of which are at level 6 or above;
d)	General or Honours Degree	where a minimum of 360 credits has been achieved, at least 120 of which are at level 6 or above.

(NB. An Ordinary Degree may only be awarded, if it has been previously approved through the recognised validation processes. It is not a fall back for a failed Honours award.)

19. Degree determination

19.1 Assessment at level 4 will be for qualifying purposes only; normally no marks from level 1 will be carried forward.

19.2 The relative weightings of level 5 and level 6 assessments will normally be 30% level 5 + 70% level 6. For professional body exemptions or other similar good reason, an exception may be granted to this weighting through the validation process.

(b) Assessment Regulations G2.23.2.2 (minute AB52/09-10)

CONSIDERED

(i) On the recommendation of Regulations and Special Cases Committee that the classification of Honours Degrees be determined by using 100% of the final year marks or 70%/30% split of level 6 and level 5 marks, whichever favours the student, and that the regulation G2.23.22 be modified accordingly.

(ii) The year in which this begins to apply.

RESOLVED

That the amendment be approved for introduction in the 2011/12 session whilst retaining the statement that exemptions are permitted for programmes carrying professional body exemption.

19.3 The aggregate marks, weighted according to para 19.2, will be used to determine the award according to the following table:

Honours	
First Class	70% or higher
Second Class Division One	60% - 69%
Second Class Division Two	50% - 59%
Third Class	40% - 49%

At the discretion of the Award/Progression Examining Board, a student who has achieved a mark of 35% - 39% may be eligible for the award of a degree at Pass level.

19.4 Marking scales

Grades, scales or points may be used in marking or in informing students of their performance in assessments, but percentage marks must be used in the calculation of degree classifications. Where marking other than percentage marks are used, they must be in accordance with the following table of equivalencies:

Grade	Point	Percentage	Scale	Comments on Performance	Honours Classification for Degree Performance
A	16 15 14	90-100 80-89 70-79	5	Work of exceptional performance	1
B	13 12 11	67-69 64-66 60-63	4	Work of very good performance	2(i)
C	10 9 8	57-59 54-56 50-53	3	Work of average performance	2(ii)
D	7 6 5	47-49 44-46 40-43	2	Work of satisfactory performance	3
E	4	35-39	1	Marginal fail	Pass
F	3 2 1	31-34 16-30 0-15	0	Fail	Fail

19.5 Notwithstanding paragraph 19.3 above, the Examining Boards shall have discretion to use the classification scheme as a guide rather than an obligation.

19.6 The Award/Progression Examining Board shall have the right to require a viva voce examination or any reassessment procedure to confirm an award and its classification.

19.7 Where there is insufficient evidence of a student's performance to confer the award for which the student was a candidate, but the Award/Progression Examining Board is satisfied that, but for illness or other valid reason, the student would have reached the standard required, the Board may recommend an Aegrotat Award. This recommendation will be put before the University of Wales Senior Vice-Chancellor for approval.

19.8 An Aegrotat award carries no classification and may only be conferred upon written confirmation from the student that s/he accepts the Aegrotat award and foregoes the right to be reassessed subsequently.

19.9 Where a student is eligible for, and wishes to receive, a Pass degree but an Award/Progression Examining Board has offered the opportunity to resit elements of assessment which might provide eligibility for an Honours award, the Pass degree may only be conferred upon written confirmation from the student that s/he accepts this award and foregoes the right to be reassessed subsequently.

19.10 Award results will be published as soon as practicable after they have been determined by the Award/Progression Examining Board. It is the responsibility of the student to ascertain his/her result.

20. Re-assessment

20.1 Candidates on an Honours degree scheme who fail to reach the standard required for the award of a degree, but who subsequently redeem that failure in reassessments under paragraph 13 above, shall be eligible for consideration of the award of a degree at the Pass or Honours level as appropriate.

20.2 Excluding preliminary or foundation years, all degree examinations must be completed within the following periods:

a) Full-time mode:
three-year scheme: not more than five years from the beginning of the scheme
four-year scheme: not more than six years from the start of the scheme

b) Other modes of study:
not less than four and not more than ten years from the start of the scheme.

21. Posthumous awards

21.1 An award may be conferred posthumously, and accepted on the student's behalf by a parent, spouse or other appropriate individual.

21.2 The normal conditions of award, including Aegrotat where appropriate, must be satisfied. These are specified in the appropriate University of Wales regulations.

22. Students with special needs

22.1 If a student is unable, through disability or specific learning difficulty, to be assessed by the normal methods, the Module Examining Board shall vary the methods as appropriate, having regard to the objectives of the programme and the need for fairness.

22.2 Where a student requires special facilities at examination, application must be made (with supporting medical evidence) through the Programme Director normally no less than eight weeks before the examination. The arrangements must be approved by the Module Examining Board.

23. Welsh language

23.1 Where a student wishes to be examined through the medium of Welsh, s/he must request this in writing to the Superintendent of Examinations by week three of Semester One.

24. Assessment offences

24.1 The agreed Institute and awarding body's procedures will be used for investigating allegations of assessment offences, including cheating, collusion, plagiarism and other breaches of regulations or attempts to gain unfair advantage in assessment.

Appendix 1 Two-Tier Examining Boards – Constitution and Terms of Reference

Module Examining Board (Tier 1)

Module Examining Boards meet to review students' progress on individual modules. The meetings will normally be held after the end of each semester. It may be possible to hold one Board for inter-related modules.

Terms of Reference:

a) to approve assessment instruments;

b) to determine the mark for each student on the module, for onward transmission to the appropriate Award/Progression Examining Board;

c) to confirm all results;

d) to confirm any exemptions for the module and to note credit transfer and/or APL/APEL;

e) to make recommendations to the appropriate Award/Progression Examining Board concerning reassessment of any failures;

f) to note any reported extenuating /mitigating circumstances relating to the student in question and to forward to the appropriate Award/Progression Examining Board for consideration;

The Board does not have the authority to condone or compensate the mark of any student within a module but may make recommendations and forward evidence to the Award/Progression Examining Board.

Constitution

Dean of Faculty or his/her nominees (who shall be Chair);

All teaching staff responsible for the setting, marking and moderation of assessments of the modules to be considered by the Board;

External Examiner(s)
All members should attend
The quorum is 50% + 1
Secretariat – accountable to Registry

Award/Progression Examining Board (Tier 2)

An Award/Progression Examining Board will meet at the end of the academic year and whenever necessary to determine issues of progression.

Terms of Reference

a) to ensure that academic integrity of the award has been upheld;

b) to determine whether a candidate has complied with the assessment requirements of the award including a consideration of condonement and/or compensation;

c) to receive the agreed module marks and review the overall performance of the student;

d) to consider individual student performance and agree the status of individual students with regard to progression and/or award;

e) to receive information on individual extenuating/mitigating circumstances;

f) to ensure parity of treatment across the award/programme.

No body other than an Award/Progression Examining Board may assess or recommend progression for an award. Chair's action is strictly limited to implementing specific decisions of the Board. Any student who is not presented for consideration at the appropriate Examining Board will not be considered until the next meeting of the relevant Board.

Constitution

Dean of Faculty responsible for the award or his/her nominee (who shall be Chair);

Programme Director (who cannot be Chair of the Award/Progression Examining Board);

A representative from each Module Examining Board contributing to the award; (i.e. if a two tier system exists) or (if no Tier 1) all teaching staff responsible for the setting and marking and moderation of assessments of the modules to be considered by the Board.

External Examiner(s);
Secretariat accountable to Registry
All members should attend
The quorum is 50% + 1

No student shall be a member of any Board for his/her programme or attend an examiner's meeting for such a programme other than as a candidate for assessment.

External Examiners must be associated with all award and progression decisions, and should normally be present at all meetings considering awards.

Approved Academic Board Institute Modular Structure, Procedures and Regulations 25 March 1998.
Amended Regulations approved Academic Board 20 September 2000

APPENDIX 2 PLAGIARISM/UNFAIR PRACTICE

Procedure G4c: Dealing with allegations of Assessment offences including Plagiarism (Unfair Practice)

1. Scope of this Procedure

This Procedure shall apply to allegations of unfair practice arising from students for all award types (i.e. taught or research schemes, degree awards, certificates or diplomas).

2. Definition of Unfair Practice

1.1 It is an unfair practice to commit any act whereby a person may obtain for himself/herself or for another, an unpermitted advantage, which may or may not lead to a higher mark or grade than his/her abilities would otherwise secure. In particular, but without prejudice to the generality of the foregoing, it is unfair practice to:

a) introduce into an examination room any unauthorised form of materials such as a book (including mathematical tables), manuscripts or loose papers or any kind or any source of unauthorised information;

b) communicate with any other person in the examination room, except as authorised by an invigilator;

c) copy or use in any other way unauthorised materials or the work of any other student/candidate;

d) copy or use in any other way, work that has been previously submitted for assessment for any other qualification

e) impersonate an examination student or allow oneself to be impersonated;

f) engage in plagiarism by using other people's work and submitting it for examination as though it were one's own work;

g) claim either to have carried out experiments, observations, interviews or any form of research which one has not in fact carried out or to claim to have obtained results which have not in fact been obtained;

h) present evidence of special circumstances to Examining Boards which is false or falsified or which is, in any way, intended to mislead Examining Boards

2. **Unfair Practice in Work Completed Under Non-Examinable Conditions (including Taught Master's Dissertations and Research Degree Theses)**

2.1 If a member of staff considers, or suspects that unfair practice has occurred in relation to work submitted as a piece of coursework, a taught Master's dissertation or a research degree thesis, or any other work completed under non-examination conditions, s/he shall report the matter in writing to the Chair of the relevant Examining Board and the Academic Registrar as soon as possible.

The Chair of the Examining Board can require that the student concerned should attend a *viva voce* in order to establish the veracity of the submitted work. The *viva voce* must be conducted appropriately and a permanent record must be retained by the Faculty.

2.2 The Chair of the Examining Board shall first decide whether there is a *prima facie* case for

treating the matter as a case of unfair practice. If s/he considers that *a prima facie* case has been established s/he shall inform the Academic Registrar, who shall take the actions prescribed by paragraph 4 below.

3. **Unfair Practice in a Formal Examination**

3.1 **Unfair Practice in the Examination Room**

An invigilator who considers, or suspects that a student is engaging in an unfair examination practice shall inform such a student, preferably in the presence of a witness, that the circumstances will be reported and that the student may continue that, and any subsequent examination(s) without prejudice to any decision which may be taken. Failure to give such a warning shall not however prejudice subsequent proceedings.
Where appropriate, the invigilator shall confiscate and retain evidence relating to any alleged unfair examination practice, so that it is available to any subsequent investigation. The invigilator shall as soon as possible report the circumstances in writing to the Chair of the relevant Examining Board and to the Academic Registrar.

3.2 **Suspected Unfair Practice Detected During or Subsequently to the Marking Period**

An internal or external examiner who, whether in the course of the marking period or subsequently, considers or suspects that a student has engaged in an unfair practice, shall report the matter in writing to the Chair of the relevant Examining Board as soon as possible. The Chair shall retain any relevant evidence and shall forthwith report the matter in writing to the Academic Registrar. The Academic Registrar shall then take the action prescribed in paragraph 4, below.

4. **Further Action to be taken by the Academic Registrar**

4.1 On receipt of a report concerning an allegation of unfair practice, the Academic Registrar or nominated person shall commence an investigation into the allegation. On completion of the investigation the Academic Registrar will discuss the matter with the Chair of the relevant Examining Board to determine whether, in the light of all the circumstances, a *prima facie* case has been established. If satisfied that such a case exists, the Academic Registrar shall report the case in writing to the Vice-Chancellor, sending copies of any relevant supporting evidence. The procedure shown below in paragraphs 5.2 to 5.6 shall then operate as described.

4.2 The candidate shall be informed of the allegation, and that a Committee of Enquiry will be constituted to consider the case (see paragraphs 5 - 8 below).

Where the allegation concerns alleged unfair practice in work totalling less than 20 credits, the candidate shall be informed by the Academic Registrar that he/she may elect either (i) for the matter to be dealt with by the Examining Board, which may approve such adjustment as may be considered appropriate (and which may also delegate responsibility to a member of the Board for explaining to the student the cause of the action) or (ii) for the matter to be heard by a Committee of Enquiry (see paragraphs 5 - 8, below). Where a candidate elects for the matter to be dealt with by the Examining Board (option (i)), he/she need be aware that there is no mechanism for subsequent appeal against the action of the Board.

However, if the allegation is that there was possible unfair practice in more than one piece of work and those pieces of work relate to more than one module, then even if the total is 20 credits or less the allegation must be considered by a

Committee of Enquiry.

In addition if the candidate is a possible repeat offender or demonstrates or a pattern of behaviour associated with unfair practice, these cases should be referred to a Committee of Enquiry.

4.3 If it is decided not to report the case to the Vice-Chancellor, no further action against the student shall be taken and the Chair of the relevant Examining Board shall, where appropriate, inform the student in writing that the matter is closed.

5. **Appointment of Committee of Enquiry**

5.1 The Academic Board shall establish a Standing Panel of Enquiry for the purpose of investigating allegations of unfair practice in examinations/assessment. The Panel shall consist of six members of the full-time academic staff of the University, chosen so as to be representative of the Faculties/Schools at the University.

5.2 On receipt of an allegation of unfair practice, the Academic Registrar, or nominee, shall arrange for an appropriate committee of enquiry to be convened as soon as possible and for the Academic Registrar, (or nominee), to act as Secretary to the Committee. The Compliance Officer, who shall present the case against the candidate, shall not act as Secretary to the Committee.

5.3 Each Committee of Enquiry shall consist of three members with no interest in the case selected by the Academic Registrar (or nominee), from the Standing Panel. The Chair of the Committee of Enquiry shall be designated by the Academic Registrar from amongst the six members of the Standing Panel.

5.4 As soon as reasonably practicable after the appointment of the Committee of Enquiry the Secretary shall:

send to the student copies of statements of witnesses and of documents to be placed before the Committee of Enquiry, and request the student to indicate which statements or documents are agreed and which are in dispute;

notify the Compliance Officer and members of the Committee of Enquiry of the date, place and time of the meeting and supply them with copies of the allegations and of any agreed statements or documents.

5.5 The Secretary shall, at the same time, inform the student of the date, place and time when the Committee of Enquiry intends to meet and that s/he shall have the right to be represented or accompanied, to hear all the evidence, to call and question witnesses and to submit other evidence. The student is required to inform the Secretary whether or not s/he intends to attend the meeting of the Committee of Enquiry. If the student indicates that s/he does not wish to attend the meeting, the Committee of Enquiry shall proceed in his/her absence.
A student who intends to be accompanied and/or represented shall be required to inform the Secretary in writing in advance and shall state whether or not the person representing or accompanying him/her has legal qualifications. The University may also obtain legal representation.
Should a student not attend the meeting of the Committee of Enquiry, having previously indicated to the Secretary that he/she would attend, and provided that all reasonable means have been taken to contact the candidate, the meeting shall proceed in his/her absence.

6. **Functions of the Committee**

6.1 The functions of the Committee of Enquiry shall be:
to consider the evidence submitted to it on the allegation of unfair practice;
to determine whether the allegation has been substantiated;
to determine, in appropriate cases, the penalty which should be imposed.

6.2 The Committee of Enquiry shall not normally be informed, before reaching its verdict on the allegation under consideration, of any evidence of previously substantiated allegations of unfair practice; the Committee should be so informed before determining the penalty in appropriate cases.
However, in exceptional cases, evidence of previous allegations of unfair practice may be disclosed prior to the verdict of the Committee where such evidence:
rebuts a claim of previous good character made by the candidate;
is relevant to the allegation under consideration (other than merely showing that the candidate had a disposition to commit the facts alleged) and its prejudicial effect does not outweigh its probative value.

7. Procedure during the Meeting

7.1 The Compliance Officer, or the legal representative acting for the University, shall present the case against the student, calling such witnesses and presenting such evidence as the Compliance Officer thinks fit. The Compliance Officer may question both the student and witnesses.

7.2 The student shall have the right to be represented or accompanied, to hear all the evidence brought against him/her, to call and question witnesses, and to submit other evidence.

7.3 Witnesses can only be concerned with evidence relating directly to the allegation and shall withdraw after questioning.

7.4 When the submission of evidence and the questioning of witnesses are completed, all persons, other than the members of the Committee and the secretary shall withdraw.

7.5 The Committee of Enquiry shall then consider whether the allegation has been substantiated.

If the case has been substantiated, the Committee shall then consider the penalty to be imposed.

8. Penalties Available to the Committee

The penalties available to the Committee of Enquiry shall be:

1. verbal or written reprimand may be given to the student. A record of the reprimand so given should be kept on the student's file. In addition, the Committee may recommend that the student should receive advice from a member of the Examining Board, in order to make clear the reasons for the Committee's decision and to ensure that the cause of the action (e.g. unintentional plagiarism) is discussed with the student to ensure that any future repeat offence by him/her cannot then be classed as 'inadvertent'.

2. the cancellation of the student's marks for the whole paper or other assessment component in question;

3. the cancellation of the student's marks for the whole paper or other assessment component in question and the postponement of the student's qualification until one year after the date on which s/he would have qualified had the allegation of unfair practice not been substantiated;

4. the cancellation of the student's marks in the examination as a whole;

5. the cancellation of the student/candidate's marks in the examination as a whole and the disqualification of the student from any examination/ assessment of the awarding body.

6. An alternative penalty to be decided upon by the Committee of Enquiry.

Note: Where the Committee chooses to implement any of the penalties shown above under 8.b, 8.(3), or 8.(4), the student concerned may be allowed, where the regulations for the scheme of study so permit, to retake the work(s)/assessment(s) in question, retaining eligibility for the bare pass-mark only.

9. **Action to be taken following the Committee of Enquiry**

9.1 When the Committee of Enquiry has investigated the facts of the alleged unfair practice it shall, in its report, state whether or not the allegation has been substantiated and shall determine any penalty to be imposed. The report shall be submitted to the Vice Chancellor as soon as possible after the Enquiry has been completed.

9.2 If the finding of the Enquiry is that a case has **not** been substantiated, the Chair of the Committee of Enquiry may inform the student verbally. Irrespective of whether or not the student is informed verbally, the Academic Registrar shall notify the student formally in writing of the Enquiry's findings and that the matter is therefore closed.

9.3 If the finding of the Enquiry is that the allegation has been substantiated, the Chair of the Committee of Enquiry may inform the student verbally, but there shall be no discussion of the Committee's decision with the student. Irrespective of whether or not the student is informed verbally, the Academic Registrar shall inform the candidate of the findings and the penalty imposed as soon as possible. At the same time the University Academic Registrar shall convey this information to the Vice Chancellor and the Chair of the Examining Board concerned.

9.4 The Academic Registrar shall further inform the student of his/her right of appeal to the Vice-Chancellor. Any such appeal shall be sent, in full, in writing to the Academic Registrar and must reach him/her not later than ten days after despatch of the Committee's decision to the student by the University. The address to which any such correspondence shall be sent is shown in paragraph 2 of the Appendix in the Procedure.

9.5 Where the allegation has been substantiated, the Academic Registrar shall require the Examining Board concerned to re-determine the student's overall examination result in the light of the penalty imposed by the Committee of Enquiry.

9.6 If the Committee of Enquiry has decided that the mark obtained for the unit of assessment in which unfair practice has occurred shall be cancelled, the Examining Board shall award a mark of zero for the unit and shall then re-determine the student's overall result.

10. **Degree Examination Pass-Lists**

10.1 The Academic Registrar, in consultation with the Chair of the Examining Board, shall arrange for the publication of such supplementary pass-list, as may be necessary.

10.2 If a case of alleged unfair practice is under investigation at the time of the meeting of the relevant Examining Board, the Board shall defer consideration of the student's work until the Committee of Enquiry has made a decision on the case and the decision has been conveyed to the Chair of the Examining Board.

10.3 Should a case be under investigation when a pass-list is due for completion and publication, the name of the student concerned shall be withheld from the pass-list and a supplementary pass-list issued as appropriate.

10.4 An Examining Board shall also have authority to cancel a result previously published and to publish a supplementary pass-list should a case of unfair practice arise subsequently to the publication of the original pass-list.

11. **Appeals by students found guilty of unfair practice**

The following procedure does not apply in the case of candidates who have elected to have their case dealt with by the Examining Board concerned (under paragraph 4.2 of the Unfair Practice Procedure, above) rather than by a Committee of Enquiry. Such candidates are advised that, instead, they may have recourse to appeal against the decision of the Examining Board under the University's separate Verification and Appeals Procedure. Copies of this procedure are available upon request from the Academic Registry, or may be accessed through the University's website (www.sihe.ac.uk).

11.1 The University is only prepared to consider appeals which are based on one or both of the following grounds:

a) Irregularities in the conduct of the unfair practice procedure, which are of such a nature as to cause reasonable doubt whether the Committee would have reached the same decision had they not occurred;

b) Exceptional personal circumstances which were not known to the Committee of Enquiry when the student's case was considered and which can be shown to be relevant to the unfair practice. (In appeals based on these grounds, the appellant must show good reason why such personal circumstances were not made known to the Committee of Enquiry before its meeting. Where a student could have reported exceptional personal circumstances to the Committee of Enquiry prior to its meeting, those circumstances cannot subsequently be cited as grounds for appeal).

11.2 Any appeal against a decision of a Committee of Enquiry shall be sent in full, in writing, to the Academic Registrar (Ref. Appeals) to arrive not later than **ten days** after despatch of the Committee's decision to the student by the University. Simple notice of appeal given in writing by a student within the above deadline shall not be deemed to constitute an appeal proper and shall not be accepted. The Chair shall, at an Appeal Board meeting, have discretion to declare inadmissible any matter introduced by the appellant, or by any member of staff or student accompanying the appellant, if s/he deems it not directly related to the contents of the appeal previously lodged in writing within the stipulated deadline.

11.3 On receipt of an appeal, the Academic Registrar (or nominee) shall, where appropriate to the circumstances of the case, consult the Chair of the Committee

of Enquiry. The appellant shall be provided with a written progress report **within 25 days**.

11.4 The University Vice-Chancellor (or nominee)* is required to disallow an appeal:

a) which is based on factors which were known to the Committee of Enquiry when the penalty was imposed;

b) which introduces information which was known to, and could have been divulged by, the student prior to the meeting of the Committee of Enquiry.

* An officer in the University Academic Registry may be nominated by the Vice-Chancellor to act on his/her behalf.

11.5 If it is decided by the University Vice-Chancellor (or nominee) that there is *a prima-facie* case to be considered, it shall be referred normally within 3 months of its receipt, to a University Appeal Board consisting of three persons.
The University Appeal Board shall comprise the Vice-Chancellor or nominee and two members of the University Standing Panel (or their alternates). The Appeal Board shall have delegated powers to act on behalf of the University Academic Board;

11.6 An appellant shall be offered a personal hearing by the University Appeal Board and shall accordingly be informed in advance of the time and date of the meeting. The appellant may be accompanied by a member of the academic or welfare or advisory staff of the University or by a student or officer of the Students' Union at the University, but not by any other individual. The appellant may not send any other person to an Appeal Board in his/her stead.

11.7 The Faculty/School shall be invited to send a member of staff to attend the hearing and, at the invitation of the Chair of the Appeal Board, to contribute to the hearing. The University Academic Registry shall accordingly be informed in advance of the time and date of the meeting and shall be provided with a copy of the student's application for appeal.

11.8 The Appeal Board shall base its decision on the evidence of the appellant's submission and the testimony of the Chair of the Committee of Enquiry concerned, together with any further evidence which it considers relevant, including medical evidence where this is appropriate.

11.9 The decision of the University Appeal Board shall be conveyed by the University Academic Registrar (or nominee) as soon as possible to the appellant, the Chair of the Committee of Enquiry and the Dean of Faculty.

11.10 The Appeal Board shall be empowered to take one of the following decisions:

a) reject the appeal and uphold the original decision of the Committee of Enquiry;

b) revise the original penalty imposed;

c) to allow the appeal and make recommendations as to the appropriate action to be taken.

11.11 The decision of the University Appeal Board shall be final, and the matter shall, therefore, be regarded as closed. There shall be no discussion of the decision of the Appeal Board with the appellant or any other person.

11.12 If an appeal is upheld, the University Academic Registrar (or nominee), in consultation with the Chair of the Examining Board, shall then arrange for the publication of such supplementary pass-list as may be necessary.

11.13 If, as a consequence of a successful appeal, a student is regarded as having qualified for a degree/award, such a student shall be admitted to his/her degree/qualification at the next succeeding Degree/Award Congregation. Alternatively, the University Vice-Chancellor shall have authority to deem such a student to have been admitted to his/her degree/qualification provided all other necessary conditions for his/her admission have been met.

11.14 The University Vice-Chancellor shall also have authority to deem a student, who has already been admitted to a degree/qualification, to have been admitted to a different class of degree/qualification if, following a successful appeal, the Examining Board decides that the student's degree/qualification classification shall be amended. In such cases, the University Academic Registrar (or nominee) shall issue a replacement certificate upon the return by the student/candidate of the original certificate.

11.15 Where applicable, appropriate arrangements will be made in respect of students who, following successful appeal, are deemed by an Examining Board to have qualified for the award of a certificate or diploma.

11.16 The Appeal Board may make recommendations for consideration by the Committee on Academic Audit, Quality and Standards as appropriate on any matters arising from the consideration of appeals.

11.17 **Independent Review of Student Complaints and Appeals**

The Swansea Metropolitan University will, normally, be subject to the Office of an Independent Adjudicator (OIA) for the redress of student complaints and appeals. Once all the relevant University's internal procedures have been exhausted, and a case remains unresolved, or the student is still dissatisfied, a student may apply to the OIA for an independent review of whether the correct procedures have been followed in arriving at a decision and whether there have been any breaches in the rules of natural justice. The Academic Registrar will inform the student of the application procedures when notifying the student, by means of the 'Completion of Procedures' letter, of the outcome of the final internal stage.

12. **Report to Academic Board**

The University Academic Registrar shall submit a report on a case of unfair practice considered in accordance with the procedures outlined above to the next available meeting of the University's Academic Board.

Procedure G4d: Disclosing Assessment Marks and Grades

1. This procedure applies to assessment marks recorded in any form, whether or not they are held on equipment capable of automatic processing. The procedure incorporates the requirements of the Data Protection Act 1984/1988 in respect of assessment marks. For the purpose of this procedure, assessments are defined as examinations, coursework, assignments, projects or such other tests of academic ability as required by the regulations for the programme.

2. **Release of marks or grades to all students**

2.1 The Dean of Faculty, or his or her nominee, shall issue students individually with the following quantitative feedback on their achievement:

a) for coursework, assignments or other continuous assessment and phase tests; provisional numerical marks or alphabetical grades (according to the assessment scheme) shall be given soon after the work is marked, and normally before the meeting of the Examining Board; the marks or grades are therefore still subject to moderation and to approval by the Examining Board. The student should be warned that the results are still subject to moderation by the Examining Board and may go up or down;

b) for examinations, end of unit tests, projects and other forms of assessment: numerical marks or alphabetical grades (according to the assessment scheme) shall be given as soon as practicable after the publication of results; the marks or grades issues shall be those agreed by the Examining Board. Where an Examining Board allows compensation for a failed mark or grade, that failed mark or grade shall not be amended; the record of the student's achievement will therefore show a weakness;

c) for aggregations of marks of coursework, coursework and examinations or overall assessment: numerical marks or alphabetical grades shall be given as in (b) above.

2.2 Examining Boards are empowered to exercise discretion, in a fair and reasonable manner, in the interests of students, in accordance with the academic standards of the programme. The exercise of such discretion shall be minuted. The relationship between marks and result, or the moderation of marks, shall not, in itself, be grounds for review of a decision of an Examining Board.

3. Requests by students for access to marks

3.1 If a student wishes to have access to his or her provisional marks or grades before their normal release, he or she may submit a written request to the Academic Registrar specifying the marks or grade concerned. The Academic Registrar, or his or her nominee, shall supply the marks to the student, as far as possible in the format in which they will appear on the final transcript of results. The authenticity of the request may be verified before any disclosure. The marks shall be disclosed within forty days of receipt of the request (plus any days for verification of the request) and shall be the marks held on the day of compliance with the request. If the request is received within thirty days of the meeting of the Examining Board the student shall be informed of the University's practice regarding the release of marks or grades; the normal process or release of such data shall constitute the response to the request.

The University reserves the right to make a charge for complying with a request for disclosure of marks or grades before their normal release.