



Department of
Computer Science
Postgraduate Diploma/MSc
Internet and Distributed Systems
(Advanced)
Starting September 2008

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Introduction

This Booklet

This booklet is intended for students on the Postgraduate Diploma/MSc in Internet and Distributed Systems (Advanced) in Aberystwyth. It applies to students who **start** the course during the 2008-2009 academic session.

The first part describes the aims and objectives of the course, the structure, how it is assessed, and the relevant regulations. The second part describes the individual modules in some detail.

This booklet should be read in conjunction with the department's Student Handbook for 2008-2009, with the relevant regulations of the Aberystwyth University, and with the Aberystwyth University *Enabling Regulations for Modular Master's Degrees*. Those regulations specify minimal criteria that must be satisfied by any Modular MSc programme. Individual institutions within the University normally adopt regulations that are stricter than the minimum in certain respects but which are appropriate to the academic content of their courses and the context in which their students are studying. These are the regulations that are described in this handbook.

Aims and Objectives - MSc in Internet and Distributed Systems (Advanced)

A large proportion of software developed today is distributed in nature, where parts of an application system are partitioned across multiple computers each interacting to solve some problem in a distributed fashion. A user's web browser interacting with a travel-agent booking application running on a travel agent's server machine is an example. Ever increasing amounts of trade occurs across the Internet both between businesses and between customers and retailers. The aim of the MSc in Internet and Distributed Systems is to provide an intensive program of study that covers the principles of such distributed systems and their implementation and use on the Internet.

This scheme is designed for students with a Computer Science or Software Engineering first degree (Min: 2:2).

An applicant with no formal academic qualification will be accepted if the applicant is deemed by the Department's MSc Coordination Panel to have suitable professional experience. In addition, under some circumstances, it may be possible for students to transfer into this degree by first taking appropriate undergraduate modules in Programming, Databases and Computer Architecture (contact the admissions tutor).

Specifically, students who have successfully completed the course should:

- demonstrate a comprehensive understanding of design principles used in distributed systems to meet security, performance, quality of service and reliability requirements;
- show an understanding of important standards, best practices and legal issues that govern the construction, operation and use of communication networks;
- have a knowledge of how the Internet operates;
- understand important architectural frameworks; for example, Enterprise Java and .NET;
- use several development methodologies that might be employed when developing complex systems;
- read, understand, debate and effectively communicate current research resources.

The course demands a high level of commitment. Many students find that they need to spend some 50 to 60 hours per week on the course and that, from time to time, they need to be in the University in the evenings and at weekends. A 20-credit module requires 200 hours of study: lectures, workshops and practical sessions, tutorials, self study, completion of coursework, revision and examinations. Those who, for whatever reason, cannot give this level of commitment should not embark on the course. **Note that this course begins on 4th September 2008.**

Diploma/MSc Course Content and Structure

In order to qualify for the award of an MSc in Computer Science, a student must obtain 180 credits. These credits will normally be obtained by studying the modules prescribed by the department, i.e. those described in the second part of this booklet. In exceptional circumstances, and with the agreement of the Head of Department, equivalent credits from other modules may be substituted.

On successful completion (see later for details) of 120 credits students may elect to receive a diploma in Computer Science, rather than continuing to pursue the dissertation with **the view to being awarded the MSc**.

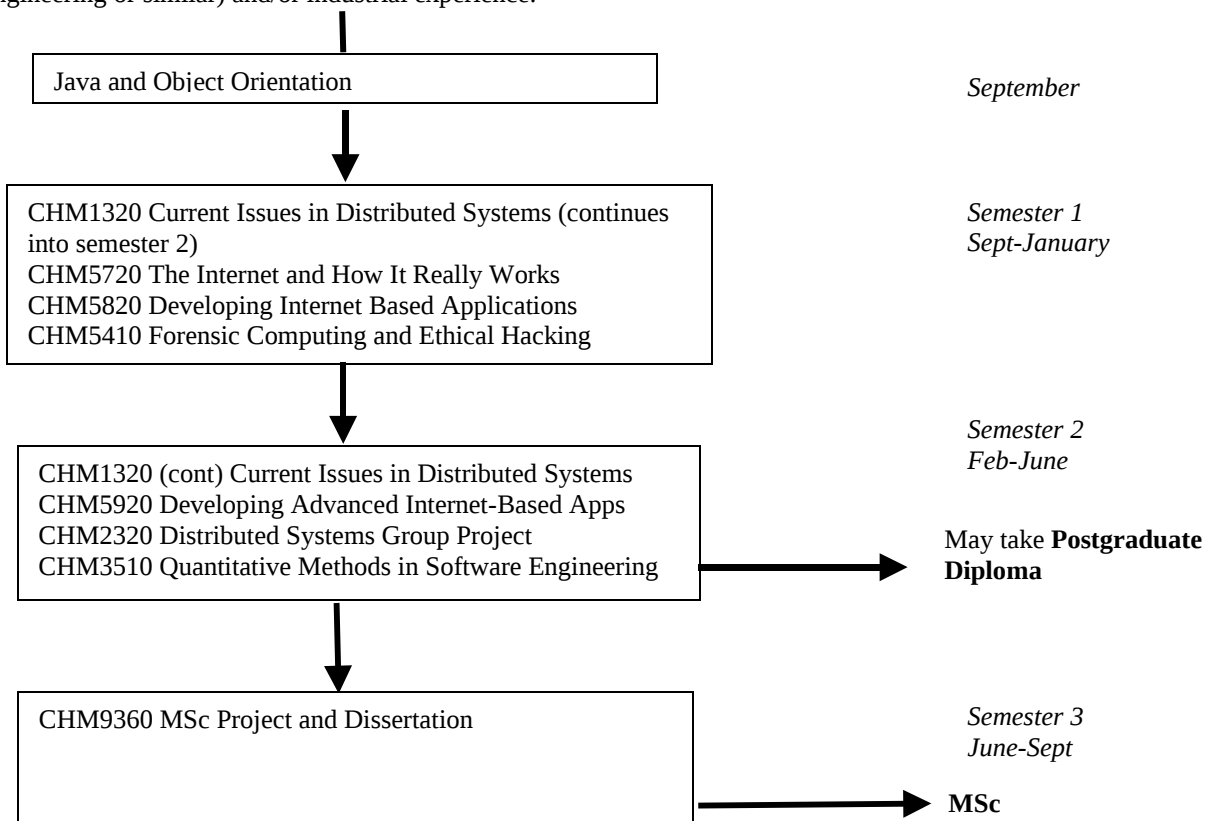
The course, as a whole, begins early in September 2008. For any applicant it is important that, from prior experience, he/she can already design and implement programs and relational databases and can employ suitable data structures and algorithms when solving a computing problem. In particular, given that the main teaching language within the scheme is Java, the applicant will need to be able to program in Java and design using object-oriented principles. If the applicant is missing one or more of these abilities he/she, prior to joining the scheme, will be required to attend one or more undergraduate modules, or gain the experience from similar modules offered elsewhere.

The course has the following structure:

Introduction	September 2008	Java and Object Orientation, 10 credits
Part 1	Semester 1 and Semester 2 (i.e. end September 2008 to early June 2009)	Conventional modules, 120 credits
Part 2	Early June 2009 to end of September 2009	Major project and dissertation (only for the MSc)

It is possible to follow the course on a part-time basis; this is described later in this document.

Entry: sufficient academic experience (BSc/BEng/MEng in Computer Science or Software Engineering or similar) and/or industrial experience.



Assessment

1. To qualify for **progression to Part Two (the dissertation/project phase)** a candidate must obtain:
 - i. an average of at least 50 overall;
 - ii. marks of 50 or above in at least 80 credits of the modules taken in Part One, including any of the scheme's core modules which have been specified by the Department as having to be passed with a minimum of 50.
2. To achieve **Distinction level in Part One** (the taught part of the course) a candidate must obtain:
 - i. an average of at least 70 overall;
 - ii. marks of 50 or above in at least 80 credits of the modules taken in Part One, including any core requirements as specified by Departments.
3. In order to **gain a Master's degree** a candidate must pass Part One and Part Two.
4. In order to **gain a Master's Degree with Distinction**, a candidate shall achieve an overall mark of not less than 70%, having achieved not less than 65% in Part One and not less than 70% in Part Two. [In calculating the overall mark, Part One and Part Two are equally weighted].

Candidates who have failed Part One or Part Two at the first attempt shall not be eligible for the award of Distinction.

5. To qualify for the award of a **Postgraduate Diploma** a candidate must obtain:
 - i. an average of at least 50 overall over 120 taught credits;
 - ii. marks of 50 or above in at least 80 credits' worth of modules in Part One including any modules which have been specified as core for the Postgraduate Diploma.

A candidate who has attained an overall mark of 70% or above shall be eligible for the mark of Distinction.

A candidate who has qualified to progress to Part Two may, if they wish, elect to take a Diploma.

A Diploma may also be awarded to a candidate who fails to submit a dissertation within the approved time limit; or submits a dissertation that is judged not to be of sufficient quality to merit the award of the MSc and fails to submit a revised dissertation of suitable standard within the approved time limit.

6. To qualify for the award of a **Postgraduate Certificate** a candidate must obtain:
 - i. an average of at least 50 overall over 60 taught credits;
 - ii. marks of 50 or above in at least 40 credits' worth of modules in the 60 taught credits assessed for the Certificate, including any modules which have been specified as core for the Certificate.
7. Candidates resitting failed modules shall be eligible for a maximum of 50 in each.

The way in which individual modules are assessed is described under the detailed description of each module, in the second part of this booklet.

Resits

At the discretion of the Examining Board, candidates who have failed to achieve the marks necessary for the award of an MSc, or of a Postgraduate Diploma, at the end of Part One may be allowed to resit all or part of the assessment of these modules, once only, during the Supplementary Examination period, in order to reach the standard required either for the award of the diploma or to be allowed to proceed to the dissertation phase of the MSc. The maximum mark that may be obtained when resitting failed modules is 50%, and these candidates are no longer able to gain a distinction.

Submission dates

Full-time students who begin the MSc in Internet and Distributed Systems in September 2008 should normally aim to submit their dissertations by 30th September 2009. After that date, the department cannot guarantee to provide any support or assistance. In particular, students cannot expect any help from their supervisors after that date. If the dissertation is not submitted by 31 March 2010, the dissertation will be treated as having failed by non-submission.

Resubmissions

If a dissertation is submitted on time but fails on first submission, the candidate may re-present once only, not more than twelve months from the date of the official communication to the candidate of the result by the University Registry.

If a dissertation is deemed to have failed as a result of non-submission by the due date, it may be resubmitted on one occasion only, no more than twelve months after the date by which the first submission was formally due, for a mark of at most 50%

Note that a distinction cannot be awarded if the dissertation has been resubmitted.

Part-time students

It is possible to take the courses in part-time mode but this is only likely to be practicable for students whose timetable is flexible and who can easily get to the campus during the day. The structure of the courses in part-time modes is as follows:

Postgraduate Diploma/MSc in Internet and Distributed Systems (Advanced)

Introduction	September 2008 (full time)	Java and Object Orientation
Part 1	Semester 1 and Semester 2 of the next two years (i.e. October 2008 to early June 2010)	Conventional modules, 120 credits
Part 2	June 2010 to 31 August 2011	Major project and dissertation (only for MSc)

Students are encouraged to submit their dissertations by 31st August 2011, but may negotiate a different deadline with their supervisor.

If the dissertation is not submitted by 31st August 2012, that is, within four years of the student starting the taught part of the course, the dissertation will be treated as having failed by non-submission.

If a dissertation is submitted but fails on first submission, the candidate may re-present once only, not more than twelve months from the date of the official communication to the candidate of the result by the University Registry.

If a dissertation is deemed to have failed as a result of non-submission by the due date, it may be resubmitted on one occasion only, no more than twelve months after the date by which the first submission was formally due, for a mark of at most 50%.

Note that a distinction cannot be awarded if the dissertation has been resubmitted.

Modules

The rest of this booklet reproduces module descriptions (as found on the web) for each module offered by the department as part of this scheme. These descriptions are provided to help you understand what each module will entail. The numbers of lectures given against each item in the syllabus give an idea of the relative weight of the topic in the module as a whole. Lecturers will sometimes vary the number of lectures to respond to the needs of the class or to accommodate an alternative presentation of the topic. We would suggest that you do NOT purchase the recommended textbooks before the course begins, unless told otherwise, since sometimes better texts become available.

In addition to the classes associated with each module, you will be assigned to a project group, in connection with module CHM2320. Attendance at group meetings, as well as at the lectures, seminars, workshops and practicals associated with each module, is compulsory unless clearly stated otherwise.

Module Title **Introduction: Java and Object-orientation**
 Academic Year **2008-2009**
 Co-ordinator **Dr Edel M Sherratt**
 Semester **September 2008**
 Other staff **Dr Lynda A Thomas, Mr Richard C Shipman, Mr. D.E Price**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Computer Science scheme at Aberystwyth. Must have prior programming experience.**

Course delivery **Lecture 20 hours**
Other Workshop. 14 hours
Practical Up to 30 hours

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Assessment	Assignment: Three practical assignments	75%
	Semester Assessment	Assignment: Final written assignment	25%
	Supplementary Exam	There is no provision for supplementary examinations or resits.	

Learning outcomes

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

1. develop non-trivial Java programs to operate in the environment they have studied
2. demonstrate an understanding of the nature and need for testing by being able to test the programs they have written
3. understand the concept of an algorithm demonstrated through an ability to design simple algorithms.
4. demonstrate how software components are combined to form complete systems.
5. demonstrate an understanding of the idea of the software life cycle and the stages within it.

Brief description

An understanding of programming and, more generally, of the software development process is an important part of the education of anyone who wishes to be an IT professional. While it is assumed that students who enter the diploma/MSc have background in this area, this module reviews what is involved in software development and the basic skills necessary to develop well-structured, non-trivial programs in a well-designed object-oriented programming language using a modern environment.

In order to have a common language for the MSc, this module introduces java in the context of object-orientation. It also introduces students to the computing environment and other information services available to them in Aberystwyth.

Content

1. Computer System appreciation - 4 hours workshop
Introduction to the basic computer organisation. Emphasis is placed on the relationships between hardware, architecture and software, with reference to the computer systems at Aberystwyth. Using the computing facilities at Aberystwyth.
2. Programming in the large - An introduction to Java and OO programming - 20 Lectures and workshop
Software crisis, abstraction, algorithms and programs. The design of algorithms, object oriented programming and an introduction to Java. Programming constructs, expressions, primitive types, classes and objects. Information hiding. Further object oriented design; inheritance. Robust programs; exceptions, testing, persistent data, Graphical interfaces.

Reading List

Ivor Horton (December 2004) Beginning Java 2 - JDK 5 Edition
 ISBN: 978-0-7645-6874-9

It is considered essential that students buy a general text on Java. Exactly which is left to your own personal preference. Advice will be offered in lectures.

Module Identifier	CHM1320
Module Title	CURRENT ISSUES IN DISTRIBUTED SYSTEMS
Academic Year	2008-2009
Co-ordinator	Dr Edel M Sherratt
Semester	Semester 2 (taught over two semesters)
Pre-Requisite	Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced) scheme.
Course delivery	Seminars / Tutorials Up to 10 2-hour seminars plus one poster session

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Assessment	Participation and contribution	15%
	Semester Assessment	Poster presentation: any current topic in distributed systems	25%
	Semester Assessment	Course Work: A survey paper of approximately 8000 words	60%
	Supplementary Assessment	Resubmission of a survey paper, under the terms of the Department's policy	100%

Learning outcomes

On successful completion of this module, students should:

1. be able to identify and use the main research resources that are available to software engineers ;
2. constructively participate in advanced technical debate in the field;
3. have a general overview of the Internet and Distribution fields and be aware of focused areas of research interest within them;
4. be able to produce a survey paper on some current area of Internet or distributed systems research;
5. be able to present current Internet or distributed systems research at an appropriate level of detail to a technical audience.

Brief description

This module focuses on current issues in the field of Internet and distributed systems. The module will involve students in an examination of current research literature of interest to software developers in this field. Significant emphasis is placed on student discussion and peer review.

Content

The content will vary from year to year, but will be based on a selection of current and relevant literature from academic articles, the Web and other sources. Examples include: search engines, semantic webs, data mining, video conferencing, web graphics, peer-to-peer distribution, GRID, OMG Model Driven Architecture, mobile agents etc. The module is run as a series of tutorials during which students present papers to their peers and where other students are required to prepare and ask relevant questions. Students are required to write a survey-style paper that necessitates an extensive literature and web search. Students participate in a conference organized by the Department of Computer Science where they present papers to peers and staff. The aim is to simulate a real academic conference with plenary and technical sessions.

Reading List

Students will be directed to the primary literature and will be expected to search for additional material themselves.

Module Identifier **CHM5720**
 Module Title **THE INTERNET AND HOW IT REALLY WORKS**
 Academic Year **2008-2009**
 Co-ordinator **Dr Edel M Sherratt**
 Semester **Semester 1**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced)**
 Course delivery **Lecture 40 lectures**
Practical Up to 6 x 2hr.

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Exam	2 Hours Written Examination	60%
	Semester Assessment	1 Assignment. 2000 word essay	40%
	Supplementary Assessment	Supplementary assessment will take the same form under the terms of the Department's policy	100%

Learning outcomes

On successful completion of this module, students should be able to:

1. participate in planning networks that are cost effective and realistic in terms of products and services currently available;
2. critically assess proposed networking solutions;
3. assess the effect of likely technological developments on existing network applications;
4. make decisions and provide guidance to others in the choice of appropriate communications technologies to deploy, to solve real world requirements;
5. demonstrate extensive knowledge of the internal operation of the Internet and its protocols;
6. demonstrate an appreciation of the problems that appear in the management of routing and naming in large networks;
7. exercise judgment in the choice of appropriate protocols and services to address the real needs of Internet operators and users;
8. investigate, and propose solutions to problems of quality of service;
9. demonstrate an appreciation of the security issues that surround the Internet and its applications and how these can be mitigated;
10. explain the need for a new generation of the Internet and describe current progress towards it.

Brief description

The Internet is a complex, multi-organisation network reaching nearly all parts of the world. The functioning of this network and the applications running upon it depend on a complex set of protocols. This module addresses the fundamental aspects of the most important issues that permit the network and its applications to operate successfully. The module also addresses the current threats to the Internet and topics still emerging from R&D studies around the world.

Content

1. Introduction.
2. Revision of basic issues in Data Communication
3. Local Area Networks. A detailed study of variants of the technologies collectively known as Ethernet.
4. Other Network Technologies. A brief look at fast and wireless network technologies.
5. Standards. The ISO OSI Model.
6. Unicast Network Level Protocols in use in today's Internet. Including further study of protocols such as IPv4, ICMP, ARP, RARP used in unicast applications and IPv4 and IGMP used in multicast applications.
7. Unicast Routing in the Internet. Example routing "problems". Interior and exterior routing protocols. Protocols covered will include RIP, OSPF and BGP.
8. Multicast Routing in the Internet. Example routing "problems". Protocols covered will include PIM-DM, PIM-SM and MSDP. We will also cover the role of the Rendezvous Point, Anycast IP, and issues still under debate in the technical community.
9. Transport Level Protocols. An in-depth study addressing the behaviour of TCP and UDP. Connection establishment and termination, flow control under various load conditions, timeouts and retransmission, newer features and performance.
10. Naming and Directory Services. Including the DNS and LDAP and their use.
11. Quality of Service. The need for and the provision of Quality of Service (QoS) within packet based networks such as the Internet which are inherently best efforts at heart.
12. Security Issues. The inherent risks within networks such as the Internet, hacking, viruses, trojans, worms and denial of service attacks. The role of the Firewall and the problems it can bring.
13. Current and Future Issues. The (still) emerging IPv6 protocol and other active issues.

Reading List

** Recommended Text

B.A Forouzan and T. Hicks. (2003) *TCP/IP Protocol Suite*. McGraw-Hill ISBN: 0071199624

Module Identifier **CHM3510**
 Module Title **Quantitative Methods in Software Engineering**
 Academic Year **2008-2009**
 Co-ordinator **Dr Edel M Sherratt**
 Semester **Semester 2**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced) scheme.**

Course delivery **Lecture 20 hours**

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Exam	2 Hours	80%
	Semester Assessment	one piece of coursework	20%
	Supplementary Exam	Will take the same form, under the terms of the department's policy	100%

Learning outcomes

On successful completion of this module students should:

1. know enough measurement theory to understand the properties that any useful software metric must have;
2. be familiar with the commonly used software metrics, be able to determine them in simple cases, and understand their limitations;
3. understand the principles of statistical process control and be able to apply them to the process of software development;
4. be familiar with the principles used in performance prediction and measurement and able to apply them in simple cases.

Brief description

"If you can't measure it you can't manage it." This statement, while not universally true, has become a cliché in modern management. It is certainly true that our inability to manage many characteristics of software systems leads to great difficulty in managing them. This module introduces the basic ideas of measurement theory and describes the different approaches that have been tried in attempts to measure the characteristics of software systems. The way that these approaches have been used in practice and their limitations are also discussed.

Content

Measurement Theory - 4 Lectures,
 Size and Complexity Metrics - 2 Lectures, 1 x 2 hr seminar
 Data Gathering and Analysis - 2 Lectures, 1 x 2 hr seminar
 Improving the software process – 2 Lectures, 3x2hr seminar

Reading List

Norman E. Fenton (2000) Software Metrics: a Rigorous and Practical Approach 2nd. Brooks/Cole Publishing
 Barbara Kitchenham (1996) Software metrics: Measurement for Software Process Improvement NCC Blackwell
 Students will also be directed to read papers from the primary literature.

Module Identifier **CHM5410**
 Module Title **Forensic Computing and Ethical Hacking**
 Academic Year **2008-2009**
 Co-ordinator **Mr. Richard Shipman**
 Semester **Semester 1**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced) scheme.**

Course delivery **Lecture 40 lectures**
Practical 20 hours

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Exam	2 Hours	50%
	Semester Assessment	Laboratory Notebook and report	50%
	Supplementary Exam	Will take the same form, under the terms of the department's policy	100%

Learning outcomes

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

1. Analyze a computer for deleted and hidden information
2. Detect vulnerabilities in a computer system using appropriate tools, and secure against attacks
3. Demonstrate a critical understanding of threats to computer systems and computer networks
4. Demonstrate a critical understanding of the ethical concerns involved in forensics
5. Distinguish between relevant and irrelevant materials at a crime scene.
6. Develop a strategy for defending a computer system against attack.

Brief description

The course will provide a practical and in-depth view of security of machines and networks, an overview of the tools available to monitor and analyse such machines and networks before the systems have been compromised, and also to analyse the forensic evidence left behind to trace culprits.

Content

- Legal and ethical issues surrounding forensic computing and ethical hacking. (1 Lecture)
- Footprinting and Scanning (1 lecture + 1 practical)
- Viruses, Trojans and Backdoors (1 lecture + 1 practical)
- Denial of Service (1 lecture + 1 practical)
- Social Engineering (1 lecture)
- IDS, Firewalls and Honeypots (1 lecture + 1 practical)
- Cryptography (1 lecture + 1 practical)
- Buffer Overflows & Web application vulnerabilities (4 practicals)
- The use of forensic computing software (eg. EnCase, Penguin Sleuth, Knoppix STD) (4 practicals)
- Hacking wireless networks (1 lecture)
- Scene of crime analysis (1 lecture + 1 practical)

Reading List

Handbook of Computer Crime Investigation: Forensic Tools and Technology: Eoghan Casey (2001)
 Computer Forensics: Incident Response Essentials: Warren G. Kruse, Jay G. Heiser (2001)

Module Identifier **CHM5820**
 Module Title **DEVELOPING INTERNET-BASED APPLICATIONS**
 Academic Year **2008-2009**
 Co-ordinator **Dr Edel M Sherratt**
 Semester **Semester 2**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced) scheme.**

Course delivery **Lecture 40 lectures**
Practical Up to 4 x 2hr.
Worksheets Will be issued to support lecture material

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Exam	2 Hours Written Exam	50%
	Semester Assessment	Assignment (60 hours)	50%
	Supplementary Assessment	Supplementary examination will take the same form, under the terms of the Department's policy	100%

Learning outcomes

On successful completion of this module, students should be able to:

1. demonstrate knowledge of basic Internet and communications concepts;
2. analyse existing distributed systems in terms of architectures and reference frameworks;
3. produce an outline design for a distributed system;
4. demonstrate knowledge of a range of critical issues associated with the design of telematic applications;
5. describe a range of contrasting facilities for the design and construction of distributed applications and assess their relative applicability to real world problems;
6. use a multi-media programming interface and identify the critical issues in specific multi-media applications;
7. build a distributed application using technologies presented during the module.

Brief description

An introduction to communications concepts. An overview of major distribution architectures and frameworks. Design and construction of multi-tier Internet applications. Developing multi-media applications. Java APIs for Internet protocols. Java communication protocols. The Java security model. Introduction to server-side software development.

Content

1. An introduction to communications. Basic issues in Data Communication, including, Analogue and digital data transmission; Synchronous and Asynchronous transmission; Parallel and Serial transmission; Modems and the PSTN, concentrators, multiplexors; Co-ax, twisted pair, fibre optic media; Speed, distance, error rates of various transmission media, Local Area Network topologies such as Bus, Ring and Star topologies, media access and sharing strategies, N-ISDN, examples of WANs such as the UK JANET academic network.
2. The Internet. An introduction to the Internet, its applications and their history and evolution. Internet standards, control and regulation. Introduction to protocols used on the Internet such as: IP, ICMP, TCP, UDP, FTP, Telnet, etc including Internet addressing.
3. An overview of major distribution architectures and frameworks. Multi-tier architectures, the Object Management Group's Model Driven Architecture, J2EE platform overview, .NET platform overview, the GRID concept.
4. Telematics Systems Creation for the Internet. Introduction and multifunctional workstations.
5. Java's Support for Internet Communications. Java RMI (Remote Method Invocation), Java socket access, Java's support for directory and naming services.
6. Java Applet Construction. Applet construction and related issues of the Java security model.
7. Network based Multimedia Applications. Issues in audio/video application construction and the characteristics of appropriate protocols, the Java media classes such as JMF.
8. Web Development. A brief introduction to the design and construction of web applications using HTML, HTTP, Java Servlets and Java Server Pages (JSP).

Reading Lists

Books:

David Geary, Cay Horstmann (May 2007). *Core Java Server Faces*. Prentice Hall ISBN:978-0131738867

Scott Oaks. (June 2001) *Java Security*. O'Reilly ISBN: 0596001576

Jim Farley et al. (May 2002) *Java Enterprise in a Nutshell*. O'Reilly ISBN: 0596001525

Web Page/Sites : Sun Microsystems Inc.. (19/11/1999) *Java Media Framework, API Guide*

<http://java.sun.com/products/java-media/jmf/2.1.1/guide/>

Articles: Andy Richardson, David Price, Jean Dorleans. (30/09/1992) *The Multifunctional Desktop Environment: A User Specification*. European ISDN User Forum

Module Identifier **CHM5920**
 Module Title **DEVELOPING ADVANCED INTERNET-BASED APPLICATIONS**
 Academic Year **2008-2009**
 Co-ordinator **Dr Edel M Sherratt**
 Semester **Semester 2**
 Pre-Requisite **CHM5820. Available only to students taking the Diploma/MSc in Internet and Distributed Systems (Advanced) scheme.**

Course delivery **Lecture 40 lectures**
Practical Up to 6 x 2hr

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Exam	2 Hours Written Examination	50%
	Semester Assessment	1 programming assignment (60 hours)	50%
	Supplementary Assessment	Supplementary assessment will take the same form, in accordance with the Department's stated policy	100%

Further details <http://www.aber.ac.uk/compsci/ModuleInfo/CHM5920>

Learning outcomes

On successful completion of this module, students should be able to:

1. demonstrate the ability to reuse design expertise through the application of software design patterns in the context of designing distributed applications;
2. build a substantial, multi-tier distributed application;
3. critically explain the relative merits of alternative server-side technologies;
4. demonstrate a critical appreciation of design issues encountered when developing multi-tier, distributed applications;
5. demonstrate a critical appreciation of a range of software development methodologies, and their relative advantages and disadvantages in the context of building distributed systems.

Brief description

This module examines development processes, techniques and technologies for constructing Internet-based, distributed software systems. The majority of modern applications are now distributed. Students will learn about the nature of such applications, and techniques and technologies for constructing them.

Content

1. Introduction to module. Module road-map, with a brief overview of main concepts and how they interrelate.
2. Distribution and issues. Discusses distribution challenges, and technologies and techniques for addressing them. Compares and contrasts the options, such as J2EE and .NET.
3. Construction technologies.
Students will learn how to build multi-tier Internet/intranet applications. Organizations are increasingly making their systems accessible over the Internet, or internally across organizational intranets. Access is often from web browser clients and increasingly from other web applications (web service oriented architectures). Typically, these applications comprise a client tier, server-side web tier, business logic tier and enterprise information system tier. Students will learn how to use two major technologies that can be used to develop such applications, namely J2EE and .NET.
4. Designing multi-tier applications, and the use of design patterns.
Building multi-tier applications requires developers to know more than just technologies, they must also know and use design techniques suited to their development. Students will learn about reusable design patterns, and in particular those used for the development of distributed, multi-tier applications.
5. Agile methodologies.
Many Internet-based applications must reach the market in a timely manner and must adapt to changing market requirements. The application of agile methodologies in such projects to achieve rapid time-to-market and flexibility will be examined.

Reading List

John Crupi. (2003) *Core J2EE patterns*. Prentice Hall ISBN: 0130648841
 David Geary, Cay Horstmann (May 2007). *Core Java Server Faces*. Prentice Hall ISBN:978-0131738867
 Bill Burke (2006), *Enterprise Java Beans 3.0*, O'Reilly ISBN: 059600978X
 Rima Patel Srugaesh (2006), *Mastering Enterprise Java Beans 3.0*, John Wiley and Sons ISBN:047185415;
 available from www.theserverside.com
 Also texts on .NET

Module Identifier **CHM2320**
 Module Title **DISTRIBUTED SYSTEMS GROUP PROJECT**
 Academic Year **2008-2009**
 Co-ordinator **[Dr Edel M Sherratt](#)**
 Semester **Semester 2**
 Pre-Requisite **Available only to students taking the Diploma/MSc in Internet and Distributed Systems scheme in Aberystwyth.**

Co-Requisite
 Mutually
 Exclusive

Course delivery **Seminars / Tutorials 20 hours of tutorial**

Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Assessment	Programming Project and Report	100%
	Supplementary Assessment	There is no provision for supplementary assessment.	

Further details **<http://www.aber.ac.uk/compsci/ModuleInfo/CHM2320>**

Learning outcomes

On completion of this module, students should be able to.

1. Analyze a complex problem in the area of distributed systems
2. Design and implement a solution to the problem
3. Test and critically evaluate their solution
4. Apply the prescribed software development methodology

Brief description

This project builds on the MSc students' experience gained in CHM5820. The students will analyze a situation needing a distributed solution and construct a program to provide a solution. A novel software engineering methodology, such as XP, will be prescribed.

Content

1. Tutorials.

Tutorials will be undertaken at the start of the project to set out the content of the project, and the terms on which it will be developed and assessed. Further tutorials will be undertaken where students are able to complete their project with the help and advice of teaching staff.

2. Written material.

Various written material giving guidance on carrying out the project, assessment issues, and the project submission is provided by the Department.

Reading List

John Hunt, Chris Loftus, Guide to J2EE: Enterprise Java, Springer-Verlag, March 2003, ISBN 1852337044

Martin Fowler, UML Distilled, Addison Wesley, October 2003, ISBN 0321193687

Mark Grand, Patterns in Java: a catalog of reusable design patterns illustrated with UML / Mark Grand. Volume 1, John Wiley & Sons, 2002, ISBN 0471227293

Books suitable for the methodology prescribed will be announced at the start of the module.

Module Identifier	CHM9360		
Module Title	MSC PROJECT		
Academic Year	2008-2009		
Co-ordinator	Dr Edel M Sherratt		
Semester	Available all semesters		
Pre-Requisite	Successful completion of Part One; see regulations.		
Mutually Exclusive	Available only to students taking the MSc in Internet and Distributed Systems (Advanced) scheme.		
	Work Breakdown 600 hours of private study and assessment.		
Assessment	Assessment Type	Assessment Length/Details	Proportion
	Semester Assessment	Dissertation:	100%
	Supplementary Assessment	Resubmission under University Regulations	
Further details	http://www.aber.ac.uk/compsci/ModuleInfo/CHM9360		

Learning outcomes

On completion of the project, students will have demonstrated that they can:

1. identify and document user requirements for a distributed system in a specific context;
2. use the professional and academic literature to survey possible approaches to the construction of a specific distributed system and select the most suitable;
3. develop a substantial piece of distributed software to meet identified requirements;
4. design and carry out a set of validation, verification and testing activities to demonstrate that the software produced does indeed meet the identified requirements;
5. critically reflect on the choice of techniques and the manner of their use, in the light of the experience gained from developing the software;
6. identify weaknesses and lacunae in the available techniques;
7. document all of the above to a professional standard.

Brief description

The purpose of the project, on which the dissertation is based, is to demonstrate that the student has acquired the ability to undertake and satisfactorily complete a major piece of work in computing and research in the field of Internet and distributed systems.

Aims

The aim of the MSc project is to demonstrate that students can:

- bring together the knowledge acquired from the various modules in the programme and apply it to a major task;
- use the professional and academic literature to extend their knowledge to meet the challenges of the project;
- critically evaluate other people's work and their own.

Reading Lists

Articles

** Recommended Text

Frank Bott (1999) *MSc in Computer Science: Guidelines for Projects and Dissertations* Computer Science Dept, UWA

Books

** Recommended Background

J A Sharp and K Howard (1996) *The Management of a Student Research Project* 2nd. Gower, Aldershot
[ISBN: 056607706X](#)