Module Code	CHS2546
Module Title	Distributed and Client Server Systems
Schools involved in delivery	Computing and Engineering
Name of Pathway(s)	BSc Software Development, BSc SD with ..., MEng Software Engineering, BSc Secure and Forensic Computing, BSc Internet Systems Development, BSc Computing. Option on various top up degrees.
Module Leader	Dr Gary Allen
Location for delivery	Queensgate
Module Type	Core to Software development courses. Option on various top up degrees.
Credit Rating	20 Credits
Level	H - Honours
Learning Methods	Supervised Learning: 44 hours, Unsupervised Learning: 156 hrs
Pre-requisites	None
Recommended Prior Study	Knowledge of Computer Hardware and Networks, OO programming skills (Java), or equivalent
Co-requisites	None
Professional Body Requirements	None
Barred Combinations	None
Graded or Non Graded	Graded

Synopsis

This module is designed to develop an understanding of the principles and characteristics of distributed and client/server systems, and of the problems inherent in the implementation and use of distributed and client/server systems.

This module introduces the concepts of distributed systems (in particular distributed information systems). Learners develop an understanding of the advantages, disadvantages and purpose of distributed systems. The disadvantages are addressed, and tools and methods for solving them are introduced. The primary vehicle for this will be distributed object architectures and will necessitate the development of advanced object based techniques.

Outline Syllabus

Introduction: The evolution of distributed information systems. Centralised and distributed systems.
Characteristics of distributed information systems. Transparency. Coordination.
Classes of support services (naming etc.).
Distributed processing. Processes and threads. Synchronisation. Inter-process communication.
Models of coordination (e.g. JavaSpaces, TSpaces).
Building distributed services. Scalability, performance, reliability etc.
Distributed Object Technology (CORBA, COM, .net)
Web Services.
Decentralised management and control. Organisational design and information systems.
Distributed systems management.
Open systems and standards selection. Open distributed processing. Strategy, architecture and infrastructure.
Security. Mechanisms, technology and security levels.

Learning Outcomes

Knowledge and Understanding Outcomes

Upon completion of this module the student will:

1.1 Be able to describe the structure of distributed systems.

1.2 Assess developments in the area and understand their impact on the software development process

1.3 Be able to describe the design issues relating to the development of distributed information systems.

1.4 Be familiar with the range of products and frameworks available to aid in the development of distributed software.

Ability Outcomes

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

2.1 Analyse a problem, identifying client applications, services and distributed structures to satisfy the requirements.

2.2 Design, implement and test the components which have been derived.

2.3 Use proprietary solution frameworks and services.

Assessment Strategy

Formative assessment

Formative assessment will be via a set of increasingly complex practical exercises which lead the students towards the knowledge and skills required to undertake the courseworks. The tutors will provide feedback on the exercises at the practical sessions, and model answers will be provided where appropriate.

Summative Assessment

Assessment tasks (including assessment weightings)

There will be two equally weighted components:

1. A coursework which involves the analysis, design, implementation, and testing of a distributed information system. This work assesses learning outcomes 1.3,1.4,21,2.2,2.3.

2. A coursework which involves the design, development, and evaluation of a client-server system, utilising an object broker architecture such as CORBA. This assignment will also involve a written report containing a critical evaluation of the chosen architecture, and a analysis of at least one alternative solution to the given problem, identifying the advantages and disadvantages of each. This work assesses all learning outcomes.

Assessment Criteria

The software systems will be assessed on:

The quality of the chosen design and the accompanying design documentation.
The quality, completeness, and correctness of the code developed.
The quality of the testing carried out, in terms of breadth, depth, and relevance.

The written reports will be evaluated on:

The breadth and depth of the analysis carried out, the quality of the discussion, and the contemporary nature of the chosen technology.

Learning Strategy

The sessions will be used to develop the more theoretical aspects of the subject. Practical time will concentrate on the implementation and use of distributed information systems. Contact time typically consists of lectures, seminars or studio but is context specific.

Appendix

Indicative Reading

Primary sources:

Boger, M, Distributed Systems with Java, Addison Wesley, 2001
Colouris, Dollimore and Kindberg, Distributed Systems, Addison-Wesley, 2001
Pope, CORBA Reference Guide, Addison Wesley, 1998

Secondary sources:

Simon, Errol, Distributed Information Systems, McGraw Hill, 1996
Tanenbaum, A S, Distributed Operating Systems, Prentice-Hall, 1995
Orfali & Harkey, Client/Server Programming with Java and CORBA, Wiley, 1998
Orfali, Essential Client/Server Survival Guide, Wiley, 1996