

HARROW SCHOOL OF COMPUTER SCIENCE

Recognised as a centre of excellence for advanced IT, Harrow School of Computer Science offers an extensive portfolio of courses covering artificial intelligence, advanced human-computer interfaces, creative multimedia, computer games, business applications, computer networks and communications and network security. All courses strive to create a new type of computing specialist who, as a technological entrepreneur, can understand and contribute to emerging technologies and your markets. Courses therefore demand creative individuals with the determination to succeed.

As well as the facilities on campus, you will also benefit from 25 computer laboratories equipped with more than 600 Windows/Unix workstations, five dedicated network development and testing rooms, a fully equipped advanced multimedia laboratory with state-of-the-art Graphic workstations which support full video streaming, video and audio editing and video-conferencing.

The School has a very strong international reputation supported through its academic and research collaborations in a number of countries including Bulgaria (Technical University of Sofia), China (with collaborations in Guanzhou, Shanghai, Deliang, Harbin, Hubei and Hong Kong), Germany, Greece, Holland, India, Italy, Macau (Macau Polytechnic Institution), Nigeria and Poland.

Recognising the importance of computing in almost every other academic discipline and business application, the School works closely with fellow academic schools to meet the demands of the industry in new and exciting areas such as cognitive science and applied neuroscience, business computing and e-business, computer games and animation, IT security and Internet multimedia communications.

The School hosts a number of active research groups working at the forefront of computing in areas such as cognitive science and perception, human-computer interaction, computational linguistics, computer networks and multimedia communications, distributed and high performance systems, educational technologies, machine learning, healthcare and business computing, image processing and machine vision, and new Internet technologies. Research activities attract national and European funding as well as industrial consultancy contracts.

Modules

Harrow School of Computer Science offers modules in the areas of Artificial Intelligence and Interactive Multimedia, Computer and Network Systems, and Information and Software Systems. Please note that because of the specific nature of these subjects, you must be prepared to demonstrate previous knowledge in the subject before they can undertake certain modules and pay great attention to any pre-requisites.

Please note that the University of Westminster is unable to guarantee the availability of the modules in this catalogue. All modules are subject to change, but are as accurate as possible at the time of going to print.

Pre-requisites

As explained earlier in the module catalogue, please be aware that some modules at Level 5 and Level 6 may have a pre-requisite requirement for you to have already completed specific modules or equivalents at a lower level. This is true of the Harrow School of Computer Science, however, few pre-requisites are listed below. The reason for this is that the specialist nature of all Level 4, Level 5 and Level 6 modules at the School requires all applicants to be approved by a relevant academic regardless of student self-approval of relevant experience. To facilitate this, **all applicants are advised to submit a profile statement providing evidence of such relevant experience in the subject area to accompany your academic transcript.**

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

Module Code	Title	Semester	Level	Credits
2COG403	Introduction to Neuroscience	1	4	15
2AIT501	Automated Reasoning	1	5	15
2AIT502	Logic Programming	1	5	15
2AIT515	Object-oriented Software Development	1	5	15
2MME503	Digital Media Tools	1	5	15
2MME513	Hypermedia Design and Tools	1	5	15
2MME514	Human Computer Interaction	1	5	15
2MME515	Introduction to 3D Graphics	1	5	15
2AIT601	Neural Networks and Applications	1	6	15
2AIT603	Natural Language Processing	1	6	15
2AIT607	Computational Vision	1	6	15
2COG609	Cognitive Neuroscience	1	6	15
2COG610	Music and the Mind	1	6	15
2MME606	Virtual Reality Environments	1	6	15
2MME608	Project Management for Multimedia and AI	1	6	15
2MME609	Web Applications Development	1	6	15
2MME611	Digital Video	1	6	15

DEPARTMENT OF COMPUTER NETWORK SYSTEMS

Module Code	Title	Semester	Level	Credits
2COS406	Computer Organisations and Systems Software	1	4	15
2COS501	Software Development	1	5	15
2CST502	Computer Systems Engineering	1	5	15
2CST551	Network and Communication Systems	1	5	15
2CST553	Enterprise Networking	1	5	15
2INS510	Systems Analysis 1	1	5	15
2INS512	Database Theory and Practice	1	5	15
2INS514	Computer Security 1	1	5	15
2CST604	Operating Systems Design	1	6	15
2CST605	Computer Architecture and Performance	1	6	15
2CST610	Design Project Management	1	6	15
2CST652	Secure System Planning	1	6	15
2CST656	Distributed Systems and Network Software	1	6	15

DEPARTMENT OF INFORMATION AND SOFTWARE SYSTEMS

Module Code	Title	Semester	Level	Credits
2COS405	Perspective of Computer Science	1	4	15
2COS407	Rapid Applications Development 1	Full Year	4	15
2EBU502	Browser Programming	1	5	15
2INS609	E-commerce Systems Implementation	1	6	15
2INS615	Internet Server Solutions	1	6	15

DEPARTMENT OF BUSINESS COMPUTING

Module Code	Title	Semester	Level	Credits
2COS404	Information Fundamentals	1	4	15
2COS503	Rapid Applications Development 2	1	5	15
2INS508	E-commerce and Intranet Systems	1	5	15
2INS605	Business Enabling Systems	1	6	15
2INS607	Decision Support and Data Mining Systems	1	6	15
2INS610	Project Management 2	1	6	15
2INS612	Comparative Information Systems Methodologies	1	6	15

ARTIFICIAL INTELLIGENCE

INTRODUCTION TO NEUROSCIENCE

Module Code 2COG403 Level 4 Credit 15 Semester 1

Using the human brain as a focus, this module introduces the structure and function of individual neurons, how they communicate chemically and how these building blocks are arranged to form a nervous system. This knowledge is then used to examine the systems underlying cognition and behaviour, disorders of the human nervous system, and the actions of psychoactive drugs.

AUTOMATED REASONING

Module Code 2AIT501 Level 5 Credit 15 Semester 1

This module introduces state of the art automated reasoning methods used, for example, in decision making based on knowledge bases, establishing correctness of the behaviour of software and hardware, intelligent processing of large ontologies. You will study Logic Engineering which provides the foundational framework for representing, analysing and implementing a wide range of computational systems.

LOGIC PROGRAMMING

Module Code 2AIT502 Level 5 Credit 15 Semester 1

The module introduces the techniques of logic programming and its use for symbolic processing. It introduces the logic programming language Prolog and its use for solving problems in areas such as search graph traversal, expert systems and natural language processing.

OBJECT-ORIENTED SOFTWARE DEVELOPMENT

Module Code 2AIT515 Level 5 Credit 15 Semester 1

The aim of this module is to provide a basic grounding in object-oriented programming using Java and lay a firm foundation, which other Java programming units may rely upon. Its treatment of the language gives emphasis to small programs that illustrate the basic concepts and building blocks of the language. However the overall philosophy of the language and its potential is discussed.

DIGITAL MEDIA TOOLS

Module Code 2MME503 Level 5 Credit 15 Semester 1

The module provides an overview of the different commercial tools employed for the production of media used within interactive multimedia applications. The focus is on the integration of the media forms within authoring packages while developing your ability to the benefit of a tool with respect to its specific purpose. The module looks at graphics, moving images, sounds, databases, and combining media.

HYPERMEDIA DESIGN AND TOOLS

Module Code 2MME513 Level 5 Credit 15 Semester 1

This module introduces you to the basic concepts of hypertext and internet, areas of growing interest. The issues involved in the design of hypertext documents will be presented in relation to human factors and a number of existing hypertexts will be discussed and compared.

HUMAN COMPUTER INTERACTION

Module Code 2MME514 Level 5 Credit 15 Semester 1

The module looks at the importance of Human Computer Interaction to develop new technology that is both usable and effective.

INTRODUCTION TO 3D GRAPHICS

Module Code 2MME515 Level 5 Credit 15 Semester 1

The module provides grounding in 3D graphics. You will learn to appreciate problems and the computer intensive nature of computer graphics. You will look at pipeline, hidden line elimination, transformations, simple modelling, shading and lighting.

NEURAL NETWORKS AND APPLICATIONS

Module Code 2AIT601 Level 6 Credit 15 Semester 1

This module covers a variety of models of neural networks by thoroughly investigating the theoretical analysis, design and implementation of the various learning algorithms related to real-life practical applications. In addition, the area of Genetic Algorithms is addressed with relation to neural networks.

NATURAL LANGUAGE PROCESSING

Module Code 2AIT603 Level 6 Credit 15 Semester 1

This module examines the goals, methods and applications of Natural Language Processing (NLP), with focus on grammatical formalisms for NLP applications. Theoretical Linguistics fundamentals are introduced, providing the grounds for NLP parsing, generation, machine translation and question-answering (Q-A) computer applications.

COMPUTATIONAL VISION

Module Code 2AIT607 Level 6 Credit 15 Semester 1

This module provides an overview of the problems encountered in vision research by looking at trends in computer vision.

COGNITIVE NEUROSCIENCE

Module Code 2COG609 Level 6 Credit 15 Semester 1

Pre-requisite: Some psychobiology or neuroscience at degree level

Brings together a range of different theoretical frameworks, namely cognitive, psychological, neuropsychological, neurobiological, philosophical and computer science, in an attempt to answer the question of how and whether the activity of the brain can create the mind. Examines memory, emotion, intelligence, creativity and consciousness.

MUSIC AND THE MIND

Module Code 2COG610 Level 6 Credit 15 Semester 1

Pre-requisite: Some psychology at degree level or reasonable formal musical training

Emphasis on cognitive theories, examines the essence and social worth of music in relation to the concept of mind. Includes a self-contained overview of auditory psychophysics and physiology of hearing and considers how cultural factors influence musical development. Links between music and perception, memory, emotion, language and creativity are also explored.

VIRTUAL REALITY ENVIRONMENTS

Module Code 2MME606 Level 6 Credit 15 Semester 1

This module provides a comprehensive and full insight of the concept of virtual environments by examining the underlying principles, the enabling technologies, the problem areas and the current applications in the field.

PROJECT MANAGEMENT FOR MULTIMEDIA AND AI

Module Code 2MME608 Level 6 Credit 15 Semester 1

This module provides you with an introduction to the main aspects for the successful management of multimedia based projects. The module deals with project lifecycle, planning, control, reporting, QA and more.

WEB APPLICATIONS DEVELOPMENT

Module Code 2MME609 Level 6 Credit 15 Semester 1

The module aims to provide you with an overview of the fundamental issues, methods and processes of dynamic client server based systems and further develop your knowledge towards practical deployment of solutions based on standard technologies. The module assumes prior knowledge of HTML, programming and an understanding of databases.

DIGITAL VIDEO

Module Code 2MME611 Level 6 Credit 15 Semester 1

The module provides an overview of the concepts of digital video technologies and further develops knowledge towards practical deployment of digital media technologies and a critical understanding of the issues and limitations of the field. This module covers topics such as digital media architectures, streaming, compression and programming techniques.

COMPUTER NETWORK SYSTEMS

COMPUTER ORGANISATION AND SYSTEMS SOFTWARE

Module Code 2COS406 Level 4 Credit 15 Semester 1

This module focuses on fundamental concepts of the organisation and the operational characteristics of SISD type computers, looking at basic hardware models, related software components and the role of operating system and system tools.

SOFTWARE DEVELOPMENT

Module Code 2COS501 Level 5 Credit 15 Semester 1

During this module, you will be introduced to a series of important issues in the provision of software tools, using a loosely typed imperative language. Problems arising in large scale software development will be investigated as well as the techniques commonly adopted to address them. Different designing & programming techniques will be presented and contrasted with emphasis on modularity and reusability of code.

COMPUTER SYSTEMS ENGINEERING

Module Code 2CST502 Level 5 Credit 15 Semester 1

The aim of this module is to introduce you to internal workings of a PC providing specific detail to various components comprising a specific system. It is intended that an overview of workings of each component be given and to provide knowledge of compatibility of each component with its neighbours. Formal lectures underpinned with lab work where a significant insight into the system as a whole may be gained.

NETWORK AND COMMUNICATION SYSTEMS

Module Code 2CST551 Level 5 Credit 15 Semester 1

The module aims to provide an understanding of the transmission techniques, protocols and error handling capabilities of systems used in networking and data communications. You will use the knowledge to design and set up a viable network.

ENTERPRISE NETWORKING

Module Code 2CST553 Level 5 Credit 15 Semester 1

This module examines the growth in networking and distributed computing environment. Reasons for the importance of middleware and its classification are covered, as is the architecture of the virtual LAN. The new and growing field of Asynchronous Transfer Mode (ATM) data comms is developed and contrasted with alternative architectures. Interoperability issues are considered.

SYSTEMS ANALYSIS 1

Module Code 2INS510 Level 5 Credit 15 Semester 1

The module aims to enable you to identify information systems requirements in a way that is sensitive to the needs of users and to the objectives of the organisation. The module will allow you to document and model information systems requirements, including the modelling of the data and processes that support these and looks at methods, techniques, and tools of information systems design with an emphasis on practical business systems analysis and design.

DATABASE THEORY AND PRACTICE

Module Code 2INS512 Level 5 Credit 15 Semester 1

The module provides a solid approach to Database Theory and its Practical perception. The module investigates the fundamental issues related to Conceptual Data Modelling, Logical Data Models, and Relational Information Retrieval.

COMPUTER SECURITY 1

Module Code 2INS514 level 5 Credit 15 Semester 1

The aim of the module is to introduce the concept of security within an IT/IS environment. You will be exposed to various security breaches, their effects, and how these could be minimised. You will study the cause of security breaches; the classification of security breaches' countermeasures available.

OPERATING SYSTEMS DESIGN

Module Code 2CST604 Level 6 Credit 15 Semester 1

TAUGHT AT CAVENDISH

This module is organised to provide an in depth practical experience in the study of design in operating system components, aspects of system administration and security. Work includes programming threads for secure applications, implementing inter-process communication techniques, targeting kernels for specific application environments and user access admin etc.

COMPUTER ARCHITECTURE AND PERFORMANCE

Module Code 2CST605 Level 6 Credit 15 Semester 1

This module presents the engineering methods and techniques for performance evaluation and analysis of software products and computer systems by benchmarking analytical methods and simulation. It emphasises the need for deep understanding of performance factors in the design, procurement, and use of computer systems. It introduces you to efficient programming styles & visualisation tools.

DESIGN PROJECT MANAGEMENT

Module Code 2CST610 Level 6 Credit 15 Semester 1

This module aims to provide you with an introduction to the principle elements of project management using typical approaches to describing and analysing projects. Emphasis throughout, will be placed on research and development type projects. Main elements dealt with are: planning, control and reporting, project and contract change control, structure and risk analysis.

SECURE SYSTEM PLANNING

Module Code 2CST652 Level 6 Credit 15 Semester 1

The module gives you an insight into the design of a network (components and associated software) with a view to making it secure. It shows the solutions available together with their cost and performance overheads.

DISTRIBUTED SYSTEMS AND NETWORK SOFTWARE

Module Code 2CST656 Level 6 Credit 15 Semester 1

The module provides knowledge of special features, capabilities and requirements of processes running in and benefiting from a distributed processing environment.

INFORMATION AND SOFTWARE SYSTEMS

PERSPECTIVES OF COMPUTER SCIENCE

Module Code 2COS405 Level 4 Credit 15 Semester 1

This module aims to provide you with an overview of your chosen subject and the skills required to study it efficiently. The rationale of the module is to provide lectures highlighting the main topics taught in the School, with tutorials that identify and develop key skills, honing your transferable skills and critical thinking. The module covers commercial Information Systems, Artificial Intelligence and Multimedia, Computer Networks and Systems, Learning Skills which includes University regulations, time management, organisation, study skills, and presenting work.

RAPID APPLICATIONS DEVELOPMENT 1

Module Code 2COS407 Level 4 Credit 15 Full Year

The module introduces the Rapid Apps Development paradigm and relates it to traditional software development techniques. Emphasis is placed on practical experience with a suitable programming language.

BROWSER PROGRAMMING

Module Code 2EBU502 Level 5 Credit 15 Semester 1

This module provides an introduction to programming for non-computer science students. It covers key elements of browser scripts, programme design, and standard data structures and algorithms. A particular emphasis is placed on developing examples related to HTML form objects. Procedural programming; Data structures and algorithms; Software development lifecycle; Problem solving; Incremental development; Good design principles; Use of debugging tools.

E-COMMERCE SYSTEMS IMPLEMENTATION

Module Code 2INS609 Level 6 Credit 15 Semester 1

Although some processing can be done on the browser, E-commerce systems mainly rely on server-side processing, which is generally implemented using Active Server Pages or CGI scripts. Consideration must also be given to the configuration of the Web servers, security issues, and data sharing standards (e.g. XML). This module will cover the analysis, design and implementation of these systems from a technical perspective.

INTERNET SERVER SOLUTIONS

Module Code 2INS615 Level 6 Credit 15 Semester 1

Components and techniques used in the development of systems based around contemporary internet servers (e.g. user management, security methods, data communications standards etc.). It will be suitable for participants with a background in web server scripting who wish to deepen their understanding of the advanced features used in internet-based server solutions.

BUSINESS COMPUTING

INFORMATION FUNDAMENTALS

Module Code 2COS404 Level 4 Credit 15 Semester 1

The purpose of this module is to give students the mathematical background and experience of relevant practical exercises to promote a better understanding of abstract and physical representation of information

RAPID APPLICATIONS DEVELOPMENT 2

Module Code 2COS503 Level 5 Credit 15 Semester 1

An extension of "Rapid Applications 1", this module includes advanced multimedia object control, object linking, multiple windowing techniques, advanced debugging techniques & usability evaluation.

E-COMMERCE AND INTRANET SYSTEMS

Module Code 2INS508 Level 5 Credit 15 Semester 1

E-commerce and intranet systems are being widely adopted throughout many organisations for supporting and enhancing business interaction. This module draws together the business and technical issues and covers both theory and practice. It presents core technologies, assesses alternatives, and explores business issues alongside technical design considerations.

BUSINESS ENABLING SYSTEMS

Module Code 2INS605 Level 6 Credit 15 Semester 1

Developments in technology have allowed organizations to change and take advantage of new business opportunities. The module analyses technical aspects in the design, implementation, use, and impact of contemporary business applications (groupware, information and knowledge management, and communication systems). It also provides practical experience with an industry standard groupware product.

DECISION SUPPORT AND DATA MINING SYSTEMS

Module Code 2INS607 Level 6 Credit 15 Semester 1

The module will introduce the concepts of data mining, data warehousing and OLAP. It will investigate the different approaches, techniques, components and solution frameworks, and evaluate the number of tools available.

PROJECT MANAGEMENT 2

Module Code 2INS610 Level 6 Credit 15 Semester 1

The aim of this module is to equip you with the ability to manage all stages of a Project. You will cover Project Management planning and control techniques, including risk analysis and managements, QA and configuration management.

COMPARATIVE INFORMATION SYSTEMS METHODOLOGIES

Module Code 2INS612 Level 6 Credit 15 Semester 1

The module explores alternative approaches to IS development by comparing and critically evaluating methods, techniques and tools for information systems development.