

School of Computer Science

Head of School Professor R Morrison

Programmes

Graduate Diploma: Information Technology

Postgraduate Diploma: Advanced Computer Science
Management & Information Technology

M.Sc.: Advanced Computer Science
Artificial Intelligence
Management & Information Technology
Networks & Distributed Systems
Software Engineering

Programme Requirements

Advanced Computer Science

Postgraduate Diploma: 60 credits from modules CS5011, CS5021, CS5031, 20 credits from CS5900 and 40 credits from CS5012, CS5013, CS5022, CS5023, CS5032, CS5033

M.Sc.: 60 credits from modules CS5011, CS5021, CS5031, 20 credits from CS5900, and 40 credits from CS5012, CS5013, CS5022, CS5023, CS5032, CS5033, plus 60 credits from CS5999

Artificial Intelligence

M.Sc.: 120 credits from modules CS5011, CS5021, CS5031, CS5012, CS5013, CS5900, plus 60 credits from CS5999, the dissertation topic being in Artificial Intelligence

Information Technology

Graduate Diploma : 120 credits in IS5002 and IS5003

Management & Information Technology

Postgraduate Diploma: 80 credits from modules IS5102, IS5103, BS5501, BS5502, 20 credits from BS5120, BS5130, BS5220 and 20 credits from IS5104, IS5105

M.Sc.: 120 credits from modules as for Postgraduate Diploma, 60 credits from IS5199 or BS5599.

Networks & Distributed Systems

M.Sc.: 120 credits from modules CS5011, CS5021, CS5031, CS5022, CS5023, CS5900 plus 60 credits from CS5999, the dissertation topic being in Networks & Distributed Systems

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Software Engineering

M.Sc.: 120 credits from modules CS5011, CS5021, CS5031, CS5032, CS5033, CS5900 plus 60 credits from CS5999, the dissertation topic being in Software Engineering

Modules

BS5501 Strategic Management in the Information Age

Credits: 20.0 Semester 1

Programme(s): Compulsory module for the M.Sc. in Management & Information Technology Programme.

Description: Over the last three decades one of the most significant global trends has been the rapid technical development of information technology and the parallel intensification in the commercial and administrative use of this technology by organisations. In this context this module will develop students' knowledge and understanding of the strategy process and develop an appreciation of organisational responses to the rapidly changing global economy. In addition to this, the module will develop a critical understanding of the challenges of operating in the information age and will also develop awareness of the range of approaches to organisational strategy; its purpose and the process of aligning corporate strategy with operational strategies in the knowledge economy. The module will challenge students to evaluate organisational processes, including marketing and promotion, logistics and supply chain management, in a rigorous manner and develop an understanding as to how organisational resources can be harnessed to respond to the organisational challenges of operating in an age of rapidly and easily accessible information.

Class Hour: To be arranged.

Teaching: One two-hour lecture and a one hour seminar.

Assessment: Continuous Assessment = 50%, Two Hour Examination = 50%

BS5502 Managing and Developing People

Credits: 20.0 Semester 2

Programme(s): Compulsory module for the M.Sc. in Management & Information Technology Programme.

Description: This module reviews the key theoretical and practical aspects involved in managing and developing people at work and explores the organisational requirements necessary to promote a culture of continuous learning and adaptation to change. The module content covers both organisational and individual issues relating to human resource development (HRD), change management, the management of talented individuals and the managing people in technological environments. From the organisation's point of view, the module considers factors that both promote and block learning and reviews strategies for developing sustained organisational learning. From the individual's perspective, the module considers learning styles and strategies, individual competencies and their links with career development, organisational development and the notion of lifelong learning.

Class Hour: To be arranged.

Teaching: One two-hour lecture and a one hour seminar.

Assessment: Continuous Assessment = 50%, Two Hour Examination = 50%

BS5599 Dissertation in Management & IT

Credits: 60.0 Semester: Summer

Anti-requisite: IS5599

Programme(s): Compulsory module for M.Sc. in Management & Information Technology Programme.

Description: This module provides students with the opportunity to undertake an in-depth investigation into issues within the fields of Management and Information Technologies. They are required to prepare a dissertation of not more than 15,000 words on an approved topic which shows appropriate competences in both fields. At least 25% of the work will involve IT and 25% will involve Management focus, Typically it comprises a related work review, extension of old or development of new ideas, their implementation and testing, summarised in a report, with the implementation based on sound theory and software engineering principles.

Class Hour: To be arranged

Teaching: Personal Supervision

Assessment: Dissertation = 100%

CS5011 Advanced Artificial Intelligence

Credits: 20.0 Semester 1

Programme(s): Compulsory module for Advanced Computer Science, Artificial Intelligence, Networks & Distributed Systems, and Software Engineering Taught Postgraduate Programmes.

Description: This module will cover foundational knowledge of Artificial Intelligence (AI). The module will give an overview of AI and its philosophy. It will cover basic topics in logic and using logic for representation of knowledge. It will show how search is used to solve combinatorial problems in AI. The fundamentals of machine learning, neural networks and robotics will be shown, together with their relation to cognitive science. A basic understanding of an Artificial Intelligence programming language such as Prolog will be provided. The notion of uncertainty in Artificial Intelligence will be covered. Finally, it will be shown how to implement AI ideas in software and how to evaluate such implementations.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 40%, Two-and-a-half Hour Examination = 60%

CS5012 Language & Perception

Credits: 20.0 Semester 2

Prerequisites: CS5011, CS5021 and CS5031

Programme(s): **Compulsory** module for Artificial Intelligence Taught Postgraduate Programme.
Optional module for Advanced Computer Science, Networks & Distributed Systems and Software Engineering Taught Postgraduate Programmes

Description: This module will cover the major aspects of natural language processing and speech understanding as well as parts from image and musical processing. It will cover computational syntax (in particular, stochastic parsing), computational semantics, discourse processing, machine translation, speech recognition, musical and visual processing. The difference between symbolic (logical, rule-based) approaches and sub-symbolic (statistical, neural-net) approaches will be shown, together with the various applications of these two paradigms and their evaluation. Combinations of the two approaches will be taught as well, in particular the integrative paradigm known as Data-Oriented Parsing. The module will emphasise a unifying view of language and perceptual processing.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 40%, Two-and-a-half Hour Examination = 60%

CS5013 Knowledge & Reasoning

Credits: 20.0 Semester 2

Prerequisites: CS5011, CS5021 and CS5031

Programme(s): **Compulsory** module for Artificial Intelligence Taught Postgraduate Programme.
Optional module for Advanced Computer Science, Networks & Distributed Systems and Software Engineering Taught Postgraduate Programmes.

Description: This module will build on some of the foundations covered in the core module (CS5011), as well as extending understanding to a research level in the areas of Knowledge Representation and Reasoning with knowledge. The module will cover advanced means of knowledge representation using logic. The notion of inference in logical systems will be introduced. Automated reasoning will be implemented using advanced AI programming techniques in a language such as Prolog. Constraint Satisfaction and Constraint Programming will be taught, with emphasis on modeling and propagation in constraint programming. It will be shown how the various models and techniques can be tested and evaluated.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 40%, Two-and-a-half Hour Examination = 60%

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CS5021 Advanced Networks and Distributed Systems

Credits:	20.0	Semester	1
Programme(s):	Compulsory module for Advanced Computer Science, Artificial Intelligence, Networks & Distributed Systems, and Software Engineering Taught Postgraduate Programmes.		
Description:	This module has two main themes: Networking and Distributed Systems. In the Networking theme it covers the networking protocol stack and related technologies, highlighting distributed systems issues such as concurrency and routing where appropriate. Topics include layered architectures; the protocol concepts; physical communication: wired and wireless; data link protocols; reliability; resource utilization; efficiency; LAN, MAN, WAN and PAN interfaces; Network tools: common commands and programming interfaces; security threats services and mechanisms. In the Distributed Systems theme, topics covered include: application level protocols: client-server; concurrency and causality; mutual exclusion; message passing; failure modes & recovery.		
Class Hour:	To be arranged.		
Teaching:	Lectures, seminars, tutorials and practical classes.		
Assessment:	Continuous Assessment = 100%		

CS5022 Distributed Systems Architecture

Credits:	20.0	Semester	2
Prerequisite:	CS5021		
Programme(s):	Compulsory module for Networks & Distributed Systems Taught Postgraduate Programme. Optional module for Advanced Computer Science, Artificial Intelligence and Software Engineering Taught Postgraduate Programmes		
Description:	This module will cover Distributed System Case Studies; Transparency in Distributed Systems; Principles of Middleware; Examples of Object-Oriented Middleware e.g. CORBA, RMI, .NET; Service oriented computing; Web Services stack; Grid computing; Message-Oriented-Middleware; Frameworks e.g. J2EE, Containers, Inversion of Control; Reflection e.g. Dynamic Invocation, Interface Repositories; P@P and Overlay Technologies e.g. KBR, DOL, DHT: Chord, Pastry, Napster, Gnutella, bitTorrent; Persistence: Principles of Persistence, Data Storage Technologies, Data binding, Distributed file systems (CDA).		
Class Hour:	To be arranged.		
Teaching:	Lectures, seminars, tutorials and practical classes.		
Assessment:	Continuous Assessment = 100%		

CS5023 Mobile & Multimedia Systems

Credits:	20.0	Semester	2
Prerequisite:	CS5021		
Programme(s):	Compulsory module for Networks & Distributed Systems Taught Postgraduate Programme. Optional module for Advanced Computer Science, Artificial Intelligence and Software Engineering Taught Postgraduate Programmes		
Description:	This module examines and analyses the way in which computing and communication are used to allow mobile systems to function across a heterogeneous environment, with variations in available network resources and diverse/intermittent network connectivity. Also, we examine and analyse the ways in which multimedia information is captured, processed, and rendered, to introduce multimedia quality of service (QoS) and to analyse the ways in which multimedia data is transmitted across networks. A key outcome of the module is for students to gain an appreciation for and to be able to critically assess the capabilities and constraints of mobile and multimedia systems. This will help to build a thorough understanding of working within today's fixed (wired) and wireless/mobile environments and technologies, with variable and often limited resources.		
Class Hour:	To be arranged.		
Teaching:	Lectures, seminars, tutorials and practical classes.		
Assessment:	Continuous Assessment = 40%, Two-and-a-half Hour Examination = 60%		

CS5031 Advanced Software Engineering

Credits: 20.0 Semester 1

Programme(s): Compulsory module for Advanced Computer Science, Artificial Intelligence, Networks and Distributed Systems, and Software Engineering Taught Postgraduate Programmes.

Description: This module will cover: Approaches to software reuse – System families, COTS, components, services. Reuse-oriented software processes. Understanding the environment where software will be installed. Construction by configuration – adapting and tailoring COTS to a specific environment. Component-based software engineering – principles and component models. Service-oriented architectures and the implementation of reusable web services.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 100%

CS5032 Critical Systems Engineering

Credits: 20.0 Semester 1

Prerequisites: CS5031

Programme(s): **Compulsory** module for Software Engineering Taught Postgraduate Programme.
Optional module for Advanced Computer Science, Artificial Intelligence and Networks & Distributed Systems Taught Postgraduate Programmes

Description: The aim of this module is to provide students with an understanding of the concepts and development techniques used for critical, socio-technical systems. When students have completed this module they will: understand the notion of system dependability and the key characteristics of dependable systems; understand the specialised software engineering techniques that may be used to ensure dependable system operation; have practical experience of applying some of these techniques in systems specification, design or implementation.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 100%

CS5033 Software Architecture

Credits: 20.0 Semester 2

Prerequisites: CS5031

Programme(s): **Compulsory** module for Software Engineering Taught Postgraduate Programme.
Optional module for Advanced Computer Science, Artificial Intelligence and Networks & Distributed Systems Taught Postgraduate Programmes.

Description: The aim of this module is to introduce students to the concept of software architecture, as an aid to software design, reuse and evolution. When students have completed this course, they will: have knowledge of the key elements of software architectures; recognize architectural styles of existing software systems; describe the software architecture of a non-trivial system accurately; be able to construct systems that satisfy an architectural description; understand how software architecture aids design, reuse and evolution of software.

Class Hour: To be arranged.

Teaching: Lectures, seminars, tutorials and practical classes.

Assessment: Continuous Assessment = 100%

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CS5900 Research and Professional Skills in Computer Science

Credits:	20.0	Semester	2
Prerequisites:	CS5011, CS5021 and CS5031		
Programme(s):	Compulsory module for Advanced Computer Science, Artificial Intelligence, Networks and Distributed Systems, and Software Engineering Taught Postgraduate Programmes.		
Description:	Readings in research topics in Artificial Intelligence, Software Engineering and Networks and Distributed Computing. A team debate based on these readings. Seminars by staff and outside speakers on these topics. Presentations by students and essays based on these topics. Lectures, seminars and practical on generic research skills: framing research hypotheses, designing and conducting experiments, gathering evaluating and presenting data, using data to test hypotheses, poster preparation, project planning, paper publishing, networking, teamwork and career management. Lectures and student presentations on social and professional aspects of computing, e.g. history, social context, methods and analysis tools, ethics, risk analysis, privacy and civil liberties, computer crime, economics of computing and philosophical frameworks.		
Class Hour:	To be arranged.		
Teaching:	Lectures, seminars, tutorials and practical classes.		
Assessment:	Continuous Assessment = 100%		

CS5999 Dissertation in Computer Science

Credits:	60.0	Semester	Summer
Prerequisites:	Admission to dissertation phase of M.Sc.		
Programme(s):	Compulsory module for Advanced Computer Science, Artificial Intelligence, Networks and Distributed Systems, and Software Engineering Taught MSc Postgraduate Programmes.		
Description:	This module is an individually supervised dissertation, not exceeding 15,000 words, on a topic in computer science. Typically it comprises a literature review, extension of old or development of new ideas, their implementation and testing, summarised in a report, with the implementation based on sound theory and software engineering principles. Students will be required to give an assessed presentation of their work.		
Teaching:	Weekly or fortnightly meetings with supervisor.		
Assessment:	Continuous Assessment = 100%		

IS5002 Vocational Information Technology

Credits:	60.0	Semester:	1
Prerequisites:	Entry to the Graduate Diploma in Information Technology		
Anti-requisites:	Any comparable programme of Information Technology Studies		
Programme(s):	Compulsory module for Graduate Diploma in Information Technology. Compulsory module for Graduate Certificate in Information Technology.		
Description:	This module is an intensive practically oriented introduction to information technology, covering The Internet, the World Wide Web, Databases, Multimedia, Word Processing, Spreadsheets, Graphics, Presentation Software, Electronic Publishing, Networks & Systems, Peripherals and Computers in Society.		
Class Hour:	Full-time		
Teaching:	Daily lectures and supervised laboratory sessions and weekly tutorials.		
Assessment:	Continuous Assessment = 100%		

IS5003 Vocational Information Technology Project

Credits:	60.0	Semester:	2
Prerequisite:	Pass in IS5002 at Grade 8 or better		
Co-requisites:	Available only as a component of the Graduate Diploma in Information Technology.		
Programme(s):	Compulsory module for Graduate Diploma in Information Technology.		
Description:	Elementary Software Engineering followed by a work-placement style major project, for a 'remote supervisor' elsewhere in the University or in a local enterprise, on an IT task of likely benefit to the remote supervisor.		
Class Hour:	Full-time		
Teaching:	Supervision, technical guidance and day-to-day support provided by the School of Computer Science; some supervision provided by the remote supervisor.		
Assessment:	Final assessment of work done and project report = 100%		

IS5101 Academic Project Planning

Credits: 5.0 Semester: 1 & 2

Programme(s): Compulsory module for M.Sc. in Management & Information Technology Programme.

Description: This module is designed to provide a streamlined progress path towards producing a personal academic project prior to carry out a major project and dissertation as part of a taught Masters programme. Students will be given the opportunity to submit and refine their plans in response to a series of lectures and workshops delivered over two semesters. Project management concepts and techniques will be introduced and reinforced by practical exercises using the capabilities of common software applications for planning. In addition generic skills will be covered which include research techniques, awareness of professional and ethical issues, document preparation, technical writing, evaluation and presentation.

Class Hour: To be arranged

Teaching: Combination of lectures, seminars and practical classes.

Assessment: Continuous Assessment = 100%

IS5102 Database Management Systems

Credits: 20.0 Semester: 1

Programme(s): Compulsory module for M.Sc. in Management & Information Technology Programme.

Description: It is important for managers to understand what a database is, when to use a database, and what differentiates database from spreadsheets. This module covers: different types of databases including Microsoft Access and MySQL; the most appropriate database to choose depending upon the requirements of a project; database design including critical analysis of database information management systems. Database theory will also be covered including: Rational schemas, tuples, normalization, field types, queries and reports.

Class Hour: To be arranged

Teaching: One two-hour lecture and a one-hour seminar.

Assessment: Continuous Assessment = 100%

IS5103 Web Technologies

Credits: 20.0 Semester: 2

Programme(s): Compulsory module for M.Sc. in Management & Information Technology Programme.

Description: A web application is a collection of web pages that interact with the user, with each other, and with various resources on a web server, including databases. It is important for managers to understand the different technologies that are used to develop web applications, not only to understand but to be able to discuss with web designers the needs of an organization when it comes to web sites. This module covers: Web accessibility, Cascading style sheets, and Web server technologies.

Class Hour: To be arranged

Teaching: One two-hour lecture and a one-hour seminar.

Assessment: Continuous Assessment = 100%

IS5104 Information Security Management

Credits: 20.0 Semester: 2

Programme(s): Optional module for M.Sc. in Management & Information Technology Programme.

Description: This module reviews key theoretical and practical aspects of Information Security Management. The module content covers higher level technical and theoretical issues as well as management issues such as organizational, planning, certification, auditing and governance. From the student's perspective the module introduces students to a topical field of business and IT concern via varied learning styles and in depth consideration of current issues, standards and scenarios. The module uses both block learning and individual self-learning.

Class Hour: To be arranged

Teaching: One two-hour lecture and a one-hour seminar.

Assessment: Continuous Assessment = 100%

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IS5105 IT Software Engineering Principles

Credits: 20.0 Semester: 1

Programme(s): Optional module for M.Sc. in Management & Information Technology Programme.

Description: This module reviews and summarises the key concepts in large scale software development. Personnel and skills management is explored along with the human centric processes involved in appropriating system requirements, functionality and high level descriptions necessary to guide the development of and finally assess a working system. From the student's perspective, the module does not require prior programming knowledge as the skills set developed covers process, organisational and management issues. The module uses various learning styles and strategies, including self directed learning and presentational skills.

Class Hour: To be arranged

Teaching: One two-hour lecture and a one-hour seminar.

Assessment: Continuous Assessment = 100%

IS5199 Dissertation in Management & IT

Credits: 60.0 Semester: Summer

Anti-requisite: BS5599

Programme(s): Compulsory module for M.Sc. in Management & Information Technology Programme.

Description: This module provides students with the opportunity to undertake an in-depth investigation into issues within the fields of Management and Information Technologies. They are required to prepare a dissertation of not more than 15,000 words on an approved topic which shows appropriate competences in both fields. At least 25% of the work will involve IT and 25% will involve Management focus, Typically it comprises a related work review, extension of old or development of new ideas, their implementation and testing, summarised in a report, with the implementation based on sound theory and software engineering principles.

Class Hour: To be arranged

Teaching: Personal Supervision

Assessment: Dissertation = 100%