LONDON SCHOOL OF COMMERCE

Programme Specification
for the

Cardiff Metropolitan University

Master of Science (MSc) in
Information Technology

Contents

LONDON SCHOOL OF COMMERCE

MSc in Information Technology

Aims and Objectives

The programme, which is at an academic level equivalent to a UK Postgraduate Diploma, that is, Level 7 is designed for those who hold the equivalent of a UK Honours Bachelors degree and who wish to enhance their career opportunities. The programme includes topics, which will develop students` understanding of a range of topics in IT, which will help them to develop careers in the development and applications of IT, especially in the fields of communications and information technologies (CITs) and management information systems.

The principal aim of the programme is to produce post-graduates with the theoretical knowledge, analytical skills and personal capabilities to become successful in the development and application of IT systems.

More specifically the programme aims to:
- provide students with the skills and knowledge which will place them on the forefront of a specific academic or professional discipline
- enable students to critically analyse received knowledge through independent research
- provide students with a platform wherein they can display originality in tackling and solving problems;
- enable students to become reflective practitioners – able to make practical decisions based on an understanding of academic content and processes as well as practical experience;
- encourage students to objectively analyse their personal competencies and opportunities for self development and thus build in the learning arising out of the programme;
- endow students with the qualities needed for employment in circumstances requiring sound judgment, personal responsibility and initiative, in complex and unpredictable professional environments.

Objectives:
The above aims will be met by students developing their:
- ability to implement new ideas and strategies for the benefit of organisations,
- skills in students enabling them to deal with complex issues both systematically and creatively;
- originality in the application of knowledge;

Programme Structure
The programme design is based on the following *Trimester* structure:-

1. The MSc *Principles stage* (Trimester 1) designed to consider particular areas of focus and study

The curriculum *Principles* trimester, located at the commencement of the programme, is designed to provide an introductory period of study for those students who require an extended engagement with Level 7 studies within the Information Technology Discipline. The *Principles* stage enhances student opportunities for greater engagement with the requirements of Level 7 study and in this sense provides a bridging and foundation period in the curriculum leading to the *Core* studies in Trimester 2.

In particular entry at the *Principles* stage accommodates those learners who would benefit from the congruent learning experience provided by a four trimester programme and the introductory opportunities provided in the first trimester. Entry at this stage also enhances the learning experience of students who would benefit from structured study opportunities which facilitate transition into Postgraduate UK based learning.

The Principles trimester also provides opportunities for a clear consolidation of previous experience; a focus for understanding of the principles underpinning Masters Level Information Technology Studies; and a period for cultural adjustment to the rigours of UK Higher Education.

2 The *Core Subject Stage,* (Trimester 2) designed to provide study in three Core Subject Modules

3 The *Pathway of Study (Electives) Stage,* (Trimester 3) which provides the opportunity for students to study one compulsory core Module plus two Elective Modules

4 The *Dissertation Stage* (Trimester 4), which enables students to undertake and complete:-
    (i)   a sustained piece of research/applied research which leads to-
    (ii)   the production and completion of a significant Dissertation .

The MSc four trimester programme therefore provides a solid introduction to, and grounding in, the key areas of Information Technology including:- Mathematics for Computing & Introduction to Programming; Concepts and Databases; Networking Essentials; Programming Methodology; Relational Database Systems; Data communications, networks and Digital Communications; Project Management and Research Methodology.

The electives offer students the opportunity of creating their own pathway of study emphasis with choices of study including: - Artificial Intelligence and Expert Systems; Software Systems Engineering; Strategic Information Systems; and Systems Analysis and Design.

Programme Outcomes:

A   Knowledge and Understanding
Students completing the programme will have a knowledge and critical awareness of:

A1   Current IT systems with an emphasis to those systems that integrate existing technologies and their applications in novel ways for increased organisational efficiency

A2   The analysis and design of data models for implementation in a relational database, with an understanding of various techniques for enhancing performance and operation

A3   Computer networks and the Internet as an enabling technology including the theoretical underpinnings of computer networks and their topologies

A4   The construction of Information Systems specifications using Systems theory and appropriate analysis and design methods, techniques and tools..

A5   The difference between the major types of AI applications in decision making and how to distinguish between decision support systems and other business information systems with particular reference to the managerial processes.

A6   The principles of making systems more usable, the ability to evaluate the usability of interactive systems and how user-centred design methods can be used to improve the usability of interactive computer systems

A7   The uses of different research methods in order to produce an independent research report.

B.   Cognitive (thinking) skills
Students completing the programme will be able to:

B1   Critically evaluate Information Technology needs in an organisational context.

B2   Apply modelling and analysis skills.

B3   Demonstrate knowledge of the commercial possibilities of the Internet and the Web and their social implications

B4   Identify the major management challenges to building and using Information Systems.

B5   Compare database performance-tuning options.

B6   Critically analyse case studies and recommend suitable decision support techniques.

C.   Practical/Professional skills
Students completing the programme will be able to:

C1   Apply IT techniques and solutions in an area pertinent to real problem situations.

C2   Critically evaluate IT product/system performance and recommend improvements supported with evidence/arguments and draw up a system requirements specification.

C3   Build usable systems with a 'toolkit' of user-centred methods
C4   Develop and evaluate an AI-based Decision Support System.

D.   Transferable skills
     Students completing the programme will be able to:

D1   Communicate effectively (in writing, verbally and through graphical notations).
D2   Work as a member of a team, where members come from different backgrounds.
D3   Transfer techniques and solutions from one field of Information Technology to another and from IT to the student's own work and application domain
D4   Effectively use Information and Communications Technology.
D5   Effectively manage resources and time.
D6   Learn independently in familiar and unfamiliar situations with open-mindedness and in the spirit of critical enquiry.

MSc in Information Technology

Module Title	Course Outcomes	Mathematics for Computing and Introduction to Programming	Networking Essentials	Concepts in Databases	Programming Methodology	Relational Database Systems	Data Communications, Networks & Digital Communications	Project Mgmt & Research Methodology	Artificial Intelligence & Expert Systems (Elective)	Software Systems Engineering (Elective)	Strategic Info Systems (Elective)	Systems Analysis & Design (Elective)	Dissertation
Knowledge and understanding	A1		X	X	X		X	X	X	X	X	X	
	A2		X	X	X	X							
	A3	X	X	X			X						
	A4			X	X			X	X	X	X	X	X
	A5								X				
	A6	X		X				X		X	X	X	X
	A7							X				X	X
Cognitive Skills	B1							X			X		X
	B2			X	X			X			X	X	X
	B3						X				X		
	B4	X	X	X	X		X	X			X	X	X
	B5			X		X							
	B6				X						X	X	
Practical / Professional Skills	C1			X	X			X			X	X	X
	C2							X		X		X	X
	C3	X	X	X				X		X		X	X
	C4	X							X	X			
Transferable Skills	D1	X	X	X	X		X	X					X
	D2							X					
	D3			X		X	X	X	X	X	X	X	X
	D4	X	X	X	X		X				X		
	D5			X				X	X	X	X	X	X
	D6	X	X	X	X	X	X	X	X	X	X	X	X

Teaching, Learning and Assessment

Teaching and learning methods
Students gain knowledge and understanding through a combination of traditional lecture delivery and resource based learning, small group discussions, small group and individual exercises, lab sessions, demonstration software, on-line examples and the research project. Throughout the programme all students are encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.

Students learn cognitive skills through a combination of traditional face-to-face sessions, resource based learning, small group discussions, peer assessment, self assessment small group and individual exercises, lab sessions, demonstration software, on-line examples and the individual/group research project. Analysis, design and problem solving skills are further developed through example case studies, computer laboratory sessions and through supervised small group teaching. Feedback is given to students on all assessed coursework.

Learning Strategies
Students are expected to take greater responsibility for their own learning as they progress through their courses. The programme structure and the proposed teaching strategies are designed to encourage this development. The student-centred approach will be encouraged through the use of specific teaching strategies; case studies; projects; practical exercises, supplemented by the use of appropriate support materials; videos; computer software; etc. Active engagement with the subject material enhances learning and many of the learning strategies used attempt to promote this.

In self-directed learning (SDL), the individual takes the initiative and the responsibility for what occurs. Individuals select, manage, and assess their own learning activities, which can be pursued at any time, in any place, through any means.

In essence, self-directed learning is seen as any study form in which individuals have primary responsibility for planning, implementing, and even evaluating the effort.

The process also involves "personal challenge" activities and developing the personal qualities to pursue them successfully. All modules within the programme have elements of self-directed learning within their teaching strategies. This will involve students in undertaking practical activities such as case studies, lab sessions, etc.

Assessment
Assessment of knowledge and understanding is achieved using written examinations (seen/unseen, open book, essays/short answers), essays, practical assessment, presentations and dissertations/project reports.

Assessment of cognitive skills is integrated throughout all modules. Students are encouraged to use a wide range of quality information sources as the evidence base

for assessments and in-class activities. Use of higher order skills of critique, analysis, evaluation and synthesis are a requirement of module assessment outcomes.

Module Title

Mathematics for Computing & Introduction to Programming

Aim(s)

The module aims to:-

- Provide students with knowledge of mathematics as it relates to information science.
- Introduce the concepts related to various discrete mathematics topics including set theory; logic; combinatorics; probability; graph theory; introducing algorithms; selected mathematical proof techniques including mathematical induction.
- Explain and discuss the relationship between mathematics and computing.
- Explain and discuss the relationship between logic and the use of analyses.
- Introduce students to the logic of programming and its application, use and interpretation within the logic of mathematics.
- Introduce the key concepts of flowcharts; decision making; programming logic; and constructions and their relationship; the concepts and basis for designing programs.

Module Title

Networking Essentials

Aim(s)

The module aims to:-

- Provide a broad and up-to-date introduction to, and knowledge of, networking fundamentals.
- Explain and discuss the basic concepts involved in the electronic transmission of business data within the Information Technology field.
- Introduce and discuss the theoretical and practical considerations that contribute to the creation of networked environments and applications
- Provide an overview of, and introduction to, foundation principles in current networking technology for local area networks (LANs), wide area networks (WANs), and the Internet.

Module Title

Concepts in Databases

Aim(s)

The module aims to:-

- Provide an in-depth study of database design and implementation principles and concepts including the database lifecycle.

- Describe and discuss information technology and its relationship to and use within contemporary freely available software.

- To describe and discuss the use of diagrams, introductions to tabular manipulation of data using spreadsheet systems, (for example Excel); and database systems, (for example Access).

- Provide and equip students with a range of skills particularly those required in the design and implementation of database systems.

Module Title

Programming Methodology

Aim(s)
Focuses on understanding and applying different data structures in the implementation of software, retrieval of data from relational databases using Java programming language The module covers the brief introduction to fundamentals of computer programming, covering topics such as using an integrated development environment (IDE), including editing, compiling, linking, and running programs using the Net Beans IDE.

Module Title

Relational Database Systems

Aim(s)
Database systems are ubiquitous, and they are essential to information systems. This aims to equip students with a knowledge and understanding of the fundamental concepts underlying database management systems (DBMSs), and the processes by which these systems are developed. Case studies of real-world examples are used throughout the course.

Module Title

Data Communications, Networks and Digital Communications

Aim(s)
This module will employ a research, reporting and presentation approach to examine and critically analyse a combination of technical and management issues in contemporary telecommunications. Data communications design and management examines new data communication technologies, protocols and issues in the context of the holistic corporate environment. It is suitable for combinations of students in information technology, business administration and electronic commence.

Module Title

Project Management and Research Methodology

Aim(s)
This module is specifically directed to software development (engineering) project management and thus is not a generic subject in project management. The module attempts not only to explain what might have gone wrong in the past but also what can be learned from past experience. It also promotes the best practices of consistently performing organisations. Each organisation has some approach to software project management, which it has either consciously embraced or adopted by default. The students will be better able to understand the strengths and weaknesses of various approaches taken by organisations and thus may be able to contribute ideas and practices for the improvement of the software development processes within their organisations.   The general goal of this basic research module is also to introduce and develop the skills needed to conceptualise a problem, make use of available literature, design a research strategy, evaluate, organise, and integrate relevant data (both existing and new), derive useful solutions based on knowledge, and communicate those solutions to clients and colleagues. It is expected that the attainment of this goal will serve to prepare students to continue their own professional education, contribute to the development of the profession as a whole, and maintain their service to clients at a standard commensurate with the current level of knowledge.

Module Title

Artificial Intelligence and Expert Systems

Aim(s)
The module starts by introducing the field of Artificial Intelligence and focuses on PROLOG, how it works, how programmes are developed, techniques to handle complex data structures, built-in procedures, techniques of good programming, and techniques used in artificial intelligence. It then delves into some central areas of artificial intelligence such as expert systems, natural language processing, machine learning, and game playing. Throughout the module, students will frequently be required to work with examples.

Module Title

Software Systems Engineering

Aim(s)
This module examines fundamental management theories and traditional managerial responsibilities in formal and informal organisational structures. Planning, organising, directing, controlling and staffing are explored. The principle focus of this course is on team-effort design and development of a software project. Each team will be given a statement of work for a software system. The team will be responsible for taking the proposed system through a thorough software development process. The process includes requirements analysis, design, implementation, test, and delivery. This module aims to provide students with an understanding of system integration and its necessity in the development of complex systems. It teaches the key concept in decomposing complex problems into smaller related problems and integration of the result into a solution to the original larger problem.

Module Title

Strategic Information Systems

Aim(s)
Strategic Information Systems is a 'capstone subject' that invites students to stand back from the technicalities of information systems and look at the field in a broader way. It attempts to give IT professionals a business awareness so they can determine how best to align technology with business needs. This subject allows the professional to get an overview of the organisational goals and to learn the usage of information technology to help achieve those goals.

Module Title

Systems Analysis and Design

Aim(s)

A full-semester course in systems analysis and design encompassing all relevant concepts, tools and techniques. Students acquire knowledge of both classical methods (structured analysis and information engineering) and emerging methods (object-oriented engineering and rapid application development). Additionally, students gain practical experience with systems analysis and design deliverables through analysis of real world scenarios. All fundamental principles of system analysis and design are reviewed in full. Assessment is both formative and summative and in the latter capacity including features to clearly rank student abilities and understanding.

Module Title

Dissertation

Aim(s)

The module aims to:-
- Provide a coherent research and development vehicle for the demonstration of higher cognitive skills
- Provide students with the opportunity to work independently in an area of an agreed specific interest and carry out a sustained body of work leading to the production of a Dissertation on an agreed topic
- Provide an opportunity for the undertaking of an intergrational body of work to be developed and carried to a final conclusion on an agreed topic.
- Provide an opportunity and vehicle for the demonstration of abilities and skills of independent working; original and critical thinking; methods of research design, data collection, analysis and presentation.