

## **MSc Computing modules 2012-13**

### **Computational Systems**

This module aims to provide an overview of the fundamental operations of a modern computing environment. It will provide a grounding in computer architecture, networks and operating systems that will enable students to understand the underlying functions that support software. Students will learn about the fundamental principles involved in the efficient use and performance of a computer, and advance to consider recent technological innovations, particularly multi-core architectures and ubiquitous and pervasive aspects of computing.

### **Distributed and Cloud Computing**

The aim of this module is to familiarise students with a wide range of distributed systems, from truly decentralised peer-to-peer environments such as Gnutella and Jxta, to brokered Web Services and modular co-operating services supported by Jini through to centrally coordinated structures such as social networking sites and Clouds. The module studies the organisation of distributed systems, focusing on various architectural styles used in their development; core technologies to implement distributed systems; various models and infrastructures to support Cloud computing – such as virtualisation; and emerging themes in distributed computing, such as fault tolerance and policy driven autonomic self-management.

### **E-Commerce and Innovation**

This module will develop your understanding of the new business opportunities afforded by the Internet. You will examine the concept of innovation and the techniques and underpinning technology associated with electronic commerce via case studies of companies both large and small. Group work will be used to develop your practical skills and will include the development of a business plan.

### **Human Centric Computing**

This module is concerned with how systems can deliver information effectively to end users, and how end users can interact with computing. Beyond the traditional desktop GUIs (Graphic User Interfaces) this module explores the next generation of interaction mechanisms (3D displays, gestures, tactile feedback, Augmented Reality, etc) in context and from a human centric perspective. This is considered with reference to theory from Human Computer Interaction (HCI), Visualisation and Pervasive Computing. Students will deconstruct, explore and evaluate case-based examples - including a state-of-the-art minimally invasive surgical simulation system - in order to understand and apply human centric system design methodologies.

### **Information Modelling and Database Systems**

This module introduces the theoretical and practical issues relating to the design and use of database management systems. These extend to the latest types of technologies including object oriented, extended relational, non-relational and issues of their usage in contemporary settings such as the Cloud. Students will

design and code information-rich web sites, and explore the role of XML and Semantic Web technologies in creating a “Web of data”. Systems for data mining and business intelligence will be discussed.

### **Information Processing in Python**

This module provides an accelerated introduction to computer programming. It introduces techniques to extract, store and process information using the Python programming language. To achieve this, students will be introduced to fundamental data structures and algorithms, the design and use of databases, regular expressions and the basics of HTML. The module uses a range of exemplars and exercises to rapidly develop high levels of skill and competency in this area.

### **Object-Oriented Development with Java**

This module builds upon the skills learnt in 'Information Processing in Python' to develop new programming skills. It aims to provide a sound foundation in programming using the Java language, and to give an understanding of the main concepts, tools and techniques used in the development of object-oriented systems. Creation of Graphical User Interfaces, network programming and multithreaded programming are introduced. Students will be taught principles of good object-oriented programming style. The relationship between object-oriented design and implementation is considered in depth, enabling students to be effective in re-use of artefacts such as designs, components, etc.

### **Software Engineering**

This module introduces the principles and practices of professional Software Engineering including software design, modelling, programming, testing and validation. The complexity of engineering large systems is considered and students will receive an appreciation of the challenges and effective methods for resolving these. In particular students will learn and practice project management skills and work to deliver a software development project involving both team and individual tasks.