UNIT INFORMATION

CM1005   Introduction to programming I

This module is focused on basic programming techniques. By taking this module, you will learn how to use the basic elements of computer programming such as variables, conditionals, functions and loops. You will also learn how to create interactive, graphical computer programs. You will also be introduced to basic object-oriented programming techniques.
Assessment: Coursework only.

CM1010   Introduction to programming II

This module builds on and extends the programming skill set you developed in Introduction to Programming I. You will study a collection of more extensive, case study programs and you will work on a larger programming project from a pre-existing code base.
Assessment: Coursework only.

CM1015   Computational mathematics

Understanding the manner in which computational systems represent and process numbers is critical to working effectively in the computational domain. Applied areas of computing which you will study in this programme such as graphics, data programming and signal processing depend upon a solid understanding of linear algebra and geometry.
Assessment: ONE three-hour unseen written examinations and coursework.

CM1020   Discrete mathematics

Discrete mathematics covers mathematical topics relating to discrete structures and processes that students of computer science will encounter throughout their study. It includes topics such as set theory, logic, functions, series, recursion and induction, graphs, and trees.
Assessment: ONE three-hour unseen written examinations and coursework.

CM1025   Fundamentals of computer science

This module covers the basic underpinnings of computer science that provide a foundation for degree level study. It will give a broad overview of the field that will support learning in other modules and will be expanded further within the degree.
Assessment: ONE three-hour unseen written examinations and coursework.

CM1030   How computers work

This module teaches a basic understanding of a range of different elements of computer systems. This is a fundamental understanding that underpins both professional use of computer systems and further study in computer science. The broad overview provided in this course will support learning in a large range of topics in the degree and later modules will expand upon the topics covered here.
Assessment: ONE three-hour unseen written examinations and coursework.

CM1035   Algorithms and data structures I

Algorithms and data structures are critical elements of the body of knowledge of computer science. Knowledge of a range of algorithms and data structures will allow you to solve common programming problems more rapidly. Within the programme, this module provides an introductory level treatment of algorithms and data structures in preparation for more advanced coverage later in the programme.
Assessment: ONE three-hour unseen written examinations and coursework.

CM1040   Web development

This module provides you with a foundational web development skill set and learn the web languages: HTML, CSS and Javascript to create interactive web pages.
Assessment: Coursework only.

CM2005　Object oriented programming

You will learn what objects and classes are and how to write your classes. You will see how objects can interact with each other, including defining and implementing interfaces to control the interaction. You will learn how to use inheritance to inherit and extend functionality from parent classes. You will learn how to write code according to style guidelines and how to write formal code documentation.
Assessment: Coursework only.

CM2010　Software design and development

This module aims to advance your software development skills so that you can write more robust and complicated programs. You will learn how to use a range of programming techniques to check the data before processing it. You will learn about test-driven development, where you write tests for your code, and write the code itself, in parallel. You will also learn how to use software versioning tools to manage a software project as it develops.
Assessment: ONE three-hour unseen written examinations and coursework.

CM2015　Programming with data

This module will show you how to work with data: getting data from a variety of sources, visualising data in compelling, informative ways, processing data to make it useful and shareable, and reasoning with data to test hypotheses and make parameterised predictions. The module will also introduce you to a new language and programming environment that is well-adapted to languages for these applications.
Assessment: ONE three-hour unseen written examinations and coursework.

CM2025　Cyber security

This module provides a structured exploration into the domain of digital security. Drawing upon engineering, computational and mathematical foundations, the curriculum enables you to identify and categorise cyber threats, address network security challenges and implement cryptographic methods for data protection. The module also introduces blockchain technology, highlighting its relevance in enhancing transactional security. A notable aspect of the module is its emphasis on the broader societal and ethical dimensions of cybersecurity, prompting you to assess practices in light of environmental and equality, diversity and inclusion (EDI) considerations.
Assessment: ONE three-hour unseen written examinations and coursework.

CM2030　Graphics programming

This module aims to show you how to work with images in a variety of ways. You will learn how to synthesise graphics and how to process visual signals. You will learn about the mathematical ideas that underpin digital representations of graphics; how digital media files represent graphics, and how to handle and manipulate them; and the basics of working with simulated physics and 3D graphics.
Assessment: Coursework only.

CM2035　Algorithms and data structures II

This module aims to provide you with detailed knowledge of several common algorithms and data structures. You will improve your understanding of searching and sorting and learn new algorithms to solve new problems; learn about a range of data structures such as trees, heaps, sets, maps, stacks, queues and graphs, to evaluate and describe the performance of algorithms using big-O notation.
Assessment: ONE three-hour unseen written examinations and coursework.

CM2040　Databases, networks and the web

In this module, you will learn theory and practical skills focused on the modern web, internet and client-server applications related to data modelling and database implementation in SQL. You will learn about the Relational Model, Query processing, and socket architectures to enable communication.
Assessment: ONE three-hour unseen written examinations and coursework.

CM2045   Professional practice for computer scientists

This module bridges theoretical knowledge and practical skills essential in computing-related professions. It helps students to develop critical judgment through a legal, ethical, and sustainability lens, fostering a holistic understanding of computing's societal impacts. The emphasis on effective communication, teamwork, and project management prepares students for real-world problem-solving, analysis, and system development, working within diverse teams. Through continuous professional development planning, students are equipped for a lifelong learning trajectory in computer science.

Assessment: ONE three-hour unseen written examinations and coursework.

CM3005   Data Science

By taking this module, you will be working with different types of data, processing text data and gaining a data science skillset. With these skillsets, you will be able to generate plots and interactive visualisations of data and how to apply statistical methods to the interpretation of results. You will also learn about a range of application domains for data science.

Assessment: ONE three-hour unseen written examinations and coursework.

CM3010   Databases and advanced data techniques

You will learn how to use SQL and NoSQL databases to store tabular data and documents; audio and video data, and the challenges of working with this kind of data.

Assessment: ONE three-hour unseen written examinations and coursework.

CM3015   Machine learning and neural networks

You will learn how to solve common machine learning problems such as regression, classification, clustering, matrix completion and pattern recognition. You will learn about neural networks and how they can be trained and optimised, including an exploration of deep neural networks. You will learn about machine learning and neural network software libraries that allow you to develop machine learning systems rapidly, and how to verify and evaluate the results.

Assessment: Coursework only.

CM3020   Artificial intelligence

This module is focused on Artificial Intelligence techniques. You will become familiar with the foundations of agent-based approaches to software design, decision making and problem solving including under uncertainty thru the topics covered in this module.

Assessment: ONE three-hour unseen written examinations and coursework.

CM3025   Virtual Reality

Discover the medium of Virtual Reality (VR) and VR development. This module combines the theory and psychology of VR with practical development skills. Design and develop compelling VR environments for use in creative practice, science and industry. This module aims to give you the skills needed to develop VR. These skills include understanding the basic theory of presence in VR, which underlies the basic design principles. You will also learn practical development skills, using an appropriate 3D engine to create interactive virtual environments.

Assessment: Coursework only.

CM3030   Games development

This module will introduce you to i) industry standard tools ii) the process of game development. You will undertake a short series of game development projects, each lasting a set number of weeks and with a specific brief. For each project, you will propose a game that fits the brief, and then you will implement it. You are expected to deliver the proposed game and document it thoroughly. Through this process, you will develop an awareness of intended audience and the use of media for documentation.

Assessment: Coursework only.

CM3035   Advanced web development

Through this module, you will learn how to build dynamic, data-driven websites using databases, front-end frameworks and server-side programming to do full stack web development work. You will develop a web developer skill set that enables you to understand how to build and deploy complete, data-driven websites. You will explore methods for developing server-side web applications, by building web-accessible wrappers around databases.

Assessment: Coursework only.

CM3040   Physical computing and the internet of things

This module will introduce you to the core techniques used in physical computing. The module complements other parts of the programme, especially regarding programming, networking and the analysis of sensor data. This module provides an introduction to the development and programming of hardware devices that can sense and act in the environment.
Assessment: Coursework only.

CM3045   3D graphics and animation

This module will cover advanced methods used in current state-of-the-art graphics and animation systems and their use in creative practice. There are several distinct study areas: 3D modelling and animation, the graphics pipeline, simulation of physics and shader programming. You will study a range of examples, and through these learn how you can program computer graphics in contemporary graphical software for different applications.
Assessment: ONE three-hour unseen written examinations and coursework.

CM3050   Mobile development

This module aims to give you the fundamental understanding and skills needed to develop mobile applications. You will learn about data-driven mobile applications, and how you can integrate a mobile application to a data source. You will learn about the mobile development ecosystem and how you can develop, run and test your applications on mobile devices using built-in APIs.
Assessment: Coursework only.

CM3055   Interaction design

When taking this module, you will examine the notion of 'interaction with technology' focusing on the concepts behind modern user experience design and production. This involves specification, design, prototyping and evaluation. Thru the process, you will learn how to evaluate interactive systems against criteria such as efficiency and usability.
Assessment: ONE three-hour unseen written examinations and coursework.

CM3060   Natural language processing

This module will provide you with a grounding in both rule-based and statistical approaches to NLP combining theoretical study with hands-on work. The module focuses on text processing, and by taking this module, you will learn about how you can work with text-based natural language in your computer programs. You will learn about grammars and how they can be used to analyse text. You will learn how statistical analysis can be used to extract information from and classify text. You will work in an appropriate programming environment for NLP, using libraries to implement NLP workflows.
Assessment: ONE three-hour unseen written examinations and coursework.

CM3065   Intelligent signal processing

This module aims to provide you with a broad experience of digital signal processing techniques and applications on how audio and video signals can be captured and processed by a computer program. You will learn about time domain and frequency domain representations and processing. You will learn how you can extract information from audio signals. You will implement movement and face detection systems that work with live camera input.
Assessment: Coursework only.

CM3070   Final project

In this module, you will undertake a substantial independent project that will allow you to demonstrate a wide range of skills such as project planning, management, research, software implementation, and written presentation.
Assessment: ONE three-hour unseen written examinations and coursework.