

CTI Bachelor of Science in Information Technology



Module Descriptions 2015

Bachelor of Science in Information Technology

(3 years full-time)

Year 1

Business Communication

Module description

Communication is often described as the glue that binds an organisation or a company together. This aim of this module is to introduce students to effective communication skills as they are applied in the workplace, involving an overview of the most common forms of written and oral communication situations they are likely to encounter in the business world. Although there is an element of theory in the module, the main focus of the module is on the practical abilities and communication skills that students will be able to utilise in the business environment.

Apart from creating a product or providing a service, a successful business venture also requires business communication skills. Therefore, business English and business communication are practised extensively in the business and professional environment. In the module of the students' studies, they are familiarised with the importance of communication. Apart from being important for their personal development, communication is an essential component in marketing, human resource management and project management. In these modules communication is explained within the context of the particular field, e.g. the planning and implementation of a communication plan during the execution of a project, or the communication that occurs between an employer and employees in human resource management (in the form of application and appointment documentation, job selection interviews and memoranda).

Academic English has provided the students with the essential language, reading and writing skills that they need to perform academic and information-related tasks and assessments (i.e. assignments, tests and examinations). In this module, the students are given the opportunity to apply their knowledge of academic English to the business and professional environment by focusing on business communication.

Computer Skills Development

Module description

The main purpose of the module is to supply students with an outline of computer skills development in the form of basic concepts and procedures. The module aims to provide practical use of computer applications to create, manage and format data by developing word processing, spreadsheet, presentation and database skills in a Windows OS environment.

Within the field of IT, there is often the need to carry out tasks using the internet, word processors, spreadsheets or databases. This module provides students with the necessary skills to effectively carry out these everyday tasks.

This module introduces students to Microsoft's Office applications to enable them to carry out these tasks. As students' progress, they will use the skills they have learnt to successfully access the internet and be able to create and edit documents using Microsoft Word. They will be introduced to spreadsheets through Microsoft Excel and be able to create and edit spreadsheets that contain both graphs and formulae. By using Microsoft Access, students will gain an overview of relational database terms and concepts and be able to create tables, run queries and display results using Access reports. This module is designed as an introductory module to provide the basis upon which more advanced tasks can be accomplished once more experience and practice has been gained.

Computer Systems

Module description

The aim of this module is to enable students to understand computer systems and apply their theoretical knowledge to practical applications when building, configuring and maintaining computer systems.

Most information technology (IT) professionals will, at some stage, have to set up, use, customise and maintain computer systems. In order to do so effectively, they will need to understand how computer systems work. Students will develop an understanding of the theoretical aspects of computer systems and how information is processed. This module will explore the hardware, software and peripheral components that make up such a system.

There are many different manufacturers of computer systems and each will produce a wide range of models with different specifications. Deciding which particular model is appropriate for a given situation depends on a variety of factors. Custom-built computer systems are also an advantage when meeting specialised requirements while maintaining performance and keeping costs low. These aspects will be explored in this module so that students can make informed choices when designing a computer system for a given purpose.

Students will also be able to apply their theoretical knowledge to practical application by building, configuring and testing a functional computer system, which will need to meet a given specification. Computer users, further, need the skills required to set up and perform routine maintenance on computer systems. Although this module does not extensively cover fault finding and repair, it does include the basic maintenance skills that would normally be expected of most computer users.

Human Computer Interaction

Module description

This module aims to explore recent Human Computer Interaction (HCI) developments and techniques, approaches and principles that inform the development of an effective human computer interface.

As technology moves forward, new methods of communicating with computer systems are becoming possible. Developers need to make reasoned choices as to the nature and appropriateness of the interface they are developing or using, in order to ensure that the user interaction is as natural, efficient and effective as possible. This requires a good understanding of the essentials of HCI and of the latest developments. A long-term goal of HCI is to design systems that minimise barriers between the human's cognitive model of what they want to do and the computer's understanding of the user's intent.

Students will be encouraged to explore the detail of how users interact with software, how the interface works to help fulfil the user needs and how it makes allowances for different users. Students will develop a critical appreciation of the advantages and disadvantages of various interfaces currently available and develop an HCI using an appropriate programming language or software tool.

Introduction to Information Systems

Module description

The aim of this module is to provide students with an understanding of how organisations use information systems to help them manage their specific needs. Information is the most valuable resource that an organisation possesses. The effective gathering, protection, analysis, processing and dissemination of information is vital to the success of any organisation. As globalisation and the 24-hour economy develop and increase, organisations must ensure that their information systems are reliable, efficient and able to cope with rapid change.

Organisations whose information systems previously dealt purely with data processing have now introduced those supporting strategic management and decision support. Managers at all levels need appropriate and timely information to plan successfully in the short, medium and long term, and that information can have many sources and destinations. As organisations diversify and de-centralise, information also needs to be available to many non-managerial staff in a variety of locations. The logical conclusion is that an organisation is now completely dependent on the effectiveness of its information systems in order to survive and thrive in the 21st century business environment.

Students will begin this module by analysing the information needs of an organisation at different levels and within different functional areas. It is important that computing professionals are able to understand how an organisation works and how it uses information, in order to be able to design, implement, maintain and manage systems to support its operation.

On completion of this module, students will understand the importance of effective information systems to an organisation. They will be aware of the variety of options available for information processing and know that these will inevitably change over time. They will also use an information system to produce management information.

Introduction to Programming

Module description

The aim of the module is to prepare students to the world of programming, giving them the foundation of programming basics. Thus the ability to use various platforms to create real life programs with the use of languages such as C#, C++, and Java.

The student will understand the basic knowledge of general principles and the concepts of programming. Students will develop programs and although the content could be delivered from a range of languages, compilers or platforms, the module should aim to deliver skills and knowledge that will easily transfer to other areas of the qualification life cycle.

Students will adopt good practice while designing programs using industry techniques. The student will also use variables, constants and literals. The student will understand the concepts of data storage within a computer program and identify or select appropriate iterative and selection structures when writing simple programs. In addition to the above, the student will learn the facilities and rules of the language e.g. operators, and I/O commands and make use of comments and code layout.

The student will use or create both predefined and user-defined functions and procedures, and map structured design onto a program using functions or procedures, passing data by value and reference, create software applications e.g. a word processor or graphics, analysis, design and implementation of documentation, professional standards. Students will test the data and schedules e.g. black box, white box, dry testing, and data collection.

Mathematics for Computer Science

Module description

This module provides students with an understanding of the underlying mathematical concepts that support the diverse fields supported by software engineers. This module is an introduction to some of the mathematical concepts and techniques that will be required by software engineers. To develop the mathematical skills necessary for software engineering, students must acquire a range of mathematical skills, which are often applied in the creation of coded solutions to everyday problems.

The module will, furthermore, allow students to appreciate and prepare for the more advanced concepts of mathematics required in relation to software engineering. Students undertaking this module will explore areas of mathematics that are used to support programming.

Topics to be covered by this module include conditional statements, graphics and gaming (geometry and vectors), relationships in databases, the naming methods (or procedures), matrices in the handling of arrays, large datasets and mapping, statistics, propositional calculus and set theory.

Networking Technologies

Module description

The aim of this module is to provide a background to the basic components of networked systems from which all networking operations derive. It also includes the evaluation of networks and network applications.

To enable students to understand computer networking concepts, how they function and operate, and the protocols, standards and the models associated with networking technology. Understanding of the underlying principles of networking is of vital importance to all IT professionals in an environment that is increasingly complex and under continuous development.

Students taking this module will explore a range of hardware and technologies, culminating in the design and deployment of a networked system. Working with many technologies, this module informs the design, selection, implementation and support of a variety of network systems, including local area networks and larger scale wider area networked systems. Supporting a range of modules in the qualification, this module underpins the principles of networks for all and enables students to work towards their studies in other modules, if applicable.

Object Oriented Programming

Module description

To provide students with an understanding of the principles of Object Oriented Programming as an underpinning technological concept in the field of programming, data management and systems development.

Object Oriented Programming is an industry-proven method for developing reliable modular programs and is popular in software engineering and systems development. Consistent use of object oriented techniques can lead to shorter development life cycles, increased productivity, adaptable code, reuse of different technologies, the interaction of different systems using common platforms and therefore lower the cost of producing and maintaining systems. The development of systems with objects simplifies the task of creating and maintaining complex applications. Object Oriented Programming is a way of modelling software that maps programming code to the real world.

In terms of impact, object oriented technology can be found in many systems, from commercial operating systems to mobile phones and in many multimedia applications. The majority of programming languages are object oriented in focus, with the exceptions preferring to offer specialist programming resources. It is dominant in Visual Studio, C++, Java, the Microsoft .Net environment, Action Script and many other systems.

Students taking this module will have the opportunity to develop their understanding of the object oriented paradigm and develop code suited to a range of platforms using the object oriented methodology.

Procedural Programming

Module description

To provide students with an understanding of the principles of procedural programming and to enable them to design and implement procedural programming solutions. Irrespective of framework or delivery platform, the development of procedural code is still at the core of many commercial application development projects. Event-driven systems and object oriented platforms all use procedural code for the critical command content of their objects, events and listeners.

This module allows students to become familiar with the underpinning principles of procedural programming. Many languages have the capacity to develop procedural code and it is not important which language is chosen for this module.

Ideally, for students who are new to programming, this module would be considered the starting point before progressing onto one (or all) of the many programming modules. Whilst the student is not expected to develop any complex code in this module, the foundations will enable the development of their programming skills.

Software Development Project 1

Module description

In this module you will learn about systems development projects; the basic principles of project management; the available methodologies that serve as frameworks for systems development; and how to design usable interface design prototypes.

The aim of this module is for students to expand their knowledge on information systems development projects and to conduct research and create documentation to reflect their understanding of theory related to the systems development process and basic Information Technology (IT) project management principles. This is an individual project and each student will deliver a project consisting of three deliverables.

In today's competitive world, organisations realise the benefits of investing in software development projects and the importance of using information systems in various departments to increase an organisation's overall competitive advantage in an industry. Every system developed becomes a project and has to be managed accordingly by an assigned project manager.

The same case study (see Section 1.4 in the student guide) will be provided to all students and some sections of the deliverables should be completed based on the content in the case study. Students will complete the deliverables to show that they understand the theory and are able to apply it to the case study. Students will be expected to conduct research and additional reading in order to complete the deliverables. This will require additional time, outside normal lecturing hours, for the purpose of obtaining journal articles and information from credible sources.

Year 2

Networking Infrastructure

Module description

Students taking this module will explore the principles supporting any network infrastructure system, design a solution for a given networked environment as well as implement and test the solution. This module follows on from Network Technologies and focuses on some of the more advanced elements and features of network infrastructures, including network packet construction and analysis.

Network infrastructure is best understood through the exploration of more complex concepts such as, addressing schemes, routing, and remote access processes. In addition, this module also studies the security aspects, elements and application of network security and encryption strategies and technologies which are essential in any modern business network infrastructure. Students are exposed to network management and monitoring processes such as configuration and virtual networks, along with the application of each of these in various scenarios.

A third of this module focuses on the construction and analysis of network packets constructed by a small selection of protocols operating in different layers of the OSI model, to demonstrate in great detail, the specific role and function of the selected protocols. This part aims to establish a deep understanding of network communication, routing and transmission processes.

Data Analysis and Design

Module description

The scope of this module covers advanced database system design, management and administration using MySQL. The emphasis is to equip students with expertise to administer and manage a database using MySQL/SQL. The module focuses on the effective maintenance, manipulation and management of databases for a variety of purposes. The module introduces aspects that can be implemented to improve database design. It encompasses relational requirements analysis that can be implemented to make relational databases systems more robust and offer more capabilities for decision-making. The scope also encompasses data manipulation and tools that are useful for the management and administration of data. The focus is to empower the student with the expertise to be able to extract data requirements from multiple tables and transform it into meaningful reports. In this module, we address the change process through various control mechanisms and the various testing procedures that are used.

An understanding of database tools and technologies is key to many of today's industries. Database systems are predominant in the world of IT, and continue to demand more complex data structures and interface, as applications get increasingly sophisticated. Databases provide the infrastructure to many organisations, and they offer support to key business applications and information systems. The most common database model used commercially is the relational one.

The aim of this module is to provide a knowledge and understanding of database systems including design principles, practical implementation and development skills for both the system designer and software engineer. The importance of structured query languages should be stressed, in terms of how they can be used to manipulate data and how they are used for a variety of tasks including querying and report writing.

On completion of this module the student should be able to understand, design, query and implement a database(s). Students will also have a theoretical insight into the requirement for designing a database that meets a given user or system requirement and that is functional, user friendly and robust.

Data Structures and Algorithms

Module description

This module provides students with an understanding of how data structures are used in algorithms and enables them to design and implement data structures.

The module starts by introducing abstract data types and explores their use in data structures. Based on this knowledge and understanding, students should be able to develop solutions, using data structures for a range of commercial needs. Data structures may be implemented using a variety of programming paradigms and students may use one or more areas for their implementations.

Finally, students will research commercial applications that incorporate data structures and evaluate their use.

On completion of this module the learner should be able to design and implement a variety of data structures and be able to evaluate different algorithms that implement data structures.

Database Design Concepts

Module description

The scope of this module covers intermediate database design, management and administration using MySQL. The normalization principle is explored in great depth and forms the basis of designing relational databases in this module. The normalized data is to be transformed into an Entity Relationship diagram (ERD) and translated in physical tables. All concepts taught are translated into practice using MySQL. This module's scope builds up to other modules. The concepts taught enable the student to design a database that can be used to interact with other third party applications. The module scope basically introduces students to practical interaction with the application using the command line interface. This module focus more on a client-server topology.

Databases play an integral part in commercial domains, they provide users with a tool in which to store, model and retrieve data. Database development is fundamental in the area of computing and ICT within organisational contexts. Database Management Systems (DBMS) provide the systems, tools and interfaces by which the organisation can manage their information and use it to assist in the effective running of the organisation. Databases offer many links to other areas such as programming, systems analysis, HCI, as well as embracing issues of compatibility and end-user interfacing.

This module explores database architecture, DBMS and the use of databases in an organisational context. Database design techniques are investigated and successful students will be able to apply theoretical understanding to design, create and document a database system.

Internet Server Management

Module description

The aim of this module is to enable students to implement and manage secure internet technologies for networking systems.

As more organisations adopt internet-aware software there is an increasing need to understand the implications of internet technologies. In addition many organisations are now creating their own internet and intranet sites and therefore the successful management of sites and servers is becoming fundamental to network managers. The aim of this module is to provide an introduction to internet server management within the context of a network operating system.

Internet technologies play an important role in all modern businesses operations. They are used extensively to strengthen the competitive edge of organisations and businesses and their position in the current marketplace climate. They allow businesses not just to market their products and services, but also to undertake business transactions with their partners and customers.

Internet servers are the backbone on which these internet technologies are implemented; these servers are at the heart of modern business operations. In this module students will discuss and analyse modern internet technologies used to establish internet services such as web, FTP, mail, proxy, certificate servers, directory servers, and many others. Students will install, maintain and secure web servers using tools and techniques available.

Introduction to Business Management

Module description

This module introduces students to the fundamentals of business and key management practices in organisations, including in enterprises. The concept of business management refers to those activities that a manager in a business needs to perform, in order to operate the enterprise successfully. These activities range from compiling the business plan to managing resources and people (human resources). The module provides students with essential information and skills to understand and engage in management activities and business operations.



Programming in Java

Module description

The aim of this module is to provide students with an understanding of the principles of programming in Java, exploring the object oriented nature of the language and the multi-platform versatility offered.

Object Oriented Programming is an industry-proven method for developing reliable modular programs and is popular in software engineering and systems development. Consistent use of object oriented techniques can lead to shorter development lifecycles, increased productivity, adaptable code, reuse of different technologies, the interaction of different systems using common platforms and therefore lower the cost of producing and maintaining systems.

Java is synonymous with the object orient paradigm offering all the features of the technology in a format that can be used on many differing systems. The development of systems with Java objects simplifies the task of creating and maintaining complex applications. Many environments use Java as its 'underpinning' framework, with Java applications found on mobile phones, dedicated systems, web-based multimedia, security and control systems as well as traditional applications and bespoke operating systems.

Students taking this module will have the opportunity to develop their understanding of the Java programming language and develop code suited to a range of platforms. The module is not specific to one instance of the Java programming language and may be used to deploy, among others, mobile applications, bespoke applications or web-based solutions.

Project Management

Module description

This module provides an understanding and experience of project management principles, methodologies, tools and techniques that may be used in industry and the public sector. Through this module students will develop an understanding of what constitutes a project and the role of a project manager. They will examine the criteria for the success or failure of a project, evaluate project management systems and review the elements involved in project termination and appraisal.

Students will also understand the need for structured organisation within the project team, effective control and coordination and good leadership qualities in the project manager. They will be able to analyse and plan the activities needed to carry out a project. This includes how to set up a project, how to control and execute a project, how to cost a project and how to carry out project reviews using a specialist project management software package. Together with factors associated with effecting project change, students will also appreciate how the application of project management principles may contribute to achieve organisational objectives.

Software Development Project 2

Module description

The aim of this module is for students to apply their knowledge of systems development to develop an information system of medium complexity for a virtual customer, and to create the necessary documentation related to the systems development process. This is a group project and each group should consist of four to five students working together to deliver the project consisting of six deliverables. The lecturer will play the role of the virtual customer.

The students will experience the process of the system life cycle and will develop the information system by following a prescriptive systems development methodology (the Waterfall methodology). Students will be expected to formulate a scenario for their chosen topic and they will analyse, design and develop the information system to meet the customer's requirements. The lecturer will offer guidance and approve the chosen topic to ensure that it is at the right complexity level.

Since students have, by this time, studied modules in Project Management, Introduction to Information Systems, and Databases and Programming, this second-level project can now include these aspects. Year 1 has created a theoretical foundation for students to complete the Year 2 project.

Systems Analysis and Design

Module description

This module aims to provide students with the knowledge and skills to undertake a systems analysis investigation via a recognised methodology.

The systems development life cycle (SDLC) provides a comprehensive framework for initially capturing data and information through a feasibility study and the use of recognised fact-finding techniques. Students will be encouraged to identify and consider a full set of stakeholder interests to ensure that the wider implications of any systems development project are considered.

Students will, further, examine different systems development methodologies, also referred to as 'systems life cycle models'; appreciate their particular strengths and weaknesses; and determine to which situations they are most appropriate. A theoretical understanding will be translated into practical skills through actual systems investigations; students will become confident in the use of particular tools and techniques relevant to the methodology chosen. For practical purposes, it is likely that one particular methodology and its related tools and techniques will be chosen for a practical work. However, it is important that students understand that other research tools and techniques exist.

Year 3

Advanced Database Systems

Module description

The primary aim of this module is to provide the students with a deeper understanding of relational databases, and a basic understanding of distributed databases, including the ability to link a database to a software application or web application.

The scope of this module covers practical application of a database system with third party applications. The outcome is to demonstrate expertise in integrating a database system with a web-based or an independent application. The module ultimately exhibits the student's gained expertise in the information technology sphere by applying knowledge into a practical reality. The scope promotes the creativity of students and launches them into an innovation mode that prepares them for their career ahead. Today's world embraces technically innovate students that can offer innovative solutions to the challenges facing industries, modernize current processes to improve efficiencies and transform the ordinary into the extraordinary. This module tends to require students to exhibit skill and integrate a database system with an application or web site.

As an IT professional, one has to be able to create a distributed system which consists of linking a collection of autonomous computers to a computer network and equipping such with distributed system software. In order to do this effectively, one needs to understand how distributed systems work.

Distributed computing systems allow corporations with various computer systems access to a networking system that allows resource sharing, openness, concurrency, scalability, fault tolerance and transparency. Additionally, a distributed system enables the use of any hardware, software or data anywhere in the system.

This module will also enable students to relate their theoretical knowledge to practical application by building a network chat application which involves communication between a server and a client over a transport protocol. Students will, furthermore, be able to understand how to remotely evoke a method from such a programme running on the server.

Information Systems Strategic Design

Module description

A selection of topics related to the strategy of information systems (IS) design are dealt with in this module to explore the scope, role and purpose of IS design as well as the management of such in modern organisations. It explores the relationships between organisation-, business- and information systems strategies and the impact that these strategies have on each other. Students will acquire a deep understanding of the impact of technology on business processes and business success, and will interrogate the role of technology to support and enable business for competitive advantage. Experts from industry will be invited to present the topics, and students will be required to report on, and discuss the content of these lectures afterwards.

Internet Programming and e-Commerce

Module description

This module presents the strategic themes and issues associated with the field of e-commerce and highlights how four infrastructures – technology, capital, public, policy and media – provide the context in which the strategy operates.

The goal of this module is twofold. First, the student is exposed to the underlying technology that supports the World Wide Web, which includes HTML, CSS, JavaScript and PHP. Secondly the student is prepared as current and future executives, managers and strategists to create value in the networked economy – in other words, to gain understanding and insight on how new technology and media forms have created unprecedented challenges and opportunities for business.

Technologies including the Internet and the World Wide Web and more specifically, their use in electronic-commerce are reshaping the way that business leaders think about management, strategy and business design. There is a shortage of executives who can understand and manage strategy in the networked economy.

Java and Distributed Systems

Module description

This module aims to enable students to understand computer networks and distributed computer systems while applying theoretical knowledge to practical scenarios. Skills obtained during this module could be equally applied to other computer science fields such as game theory or artificial intelligence relating to the design and development of a scalable system.

The module will provide students with a solid programming background pertaining to the techniques of modelling network and distributed systems.

Object Oriented Systems Analysis and Design

Module description

In this module we will focus in great depth on only one systems development methodology. The systems development world is slowly changing from a process-oriented way of modelling to that of object oriented modelling, and students should be equipped to develop systems in an object oriented way.

This module focuses on an object oriented method which uses the Object Management Group's Unified Modelling Language (UML) for modelling. As the strategic value of software increases for many companies, the industry looks for techniques to automate the production of software and to improve quality and reduce cost and time-to-market. These techniques include component technology, visual programming, patterns and frameworks. Businesses also seek techniques to manage the complexity of systems as they increase in scope and scale. In particular, they recognise the need to solve recurring architectural problems, such as physical distribution, concurrency, replication, security, load balancing and fault tolerance. Additionally the development for the World Wide Web, while making some things simpler, has exacerbated these architectural problems. The Unified Modelling Language (UML) was designed to respond to these needs.

Object Oriented Systems Analysis and Design consists of several systems development activities, including the following: systems analysis, modelling, design, implementation, testing, and maintenance. Software development methodologies are applied and these lead to the development of an application. The software processes describe how the work is carried out in order to achieve the original goal, based on the system requirements. The software development process is an ongoing process which does not stop at system implementation.

Object oriented systems development approach is based on functions and procedures. The Unified Modelling Language (UML) is a set of notations and conventions used to describe and model an application. Finally, Object Oriented Systems Analysis and Design allows for the production of systems which are easier to evolve, more flexible, more robust, and more reusable than a top-down structure approach.

Operating Systems

Module description

An operating system defines an abstraction of hardware behaviour with which programmers can control the hardware. It also manages resource sharing among the computer's users. A thorough understanding of the extent of the use of an operating system is essential for the detailed study of the internal implementation of algorithms and data structures. The topics that are covered therefore address both the use of an operating system as well as its design and implementation. According to the IEEE, studying internal design has relevance in such diverse areas as dependable programming, algorithm design, algorithm implementation, modern device development, building secure and safe systems, managing networks and many others.

Social Practices and Security

Module description

Technical issues are central to any computing curriculum, however, they do not, by themselves, constitute a complete educational programme. Students must, therefore, develop an understanding of the social and professional contexts in which computing are executed. This module will aim to prepare students to take managerial and technical decisions with regard to information security. Students will also examine strategies to manage and mitigate security risk.

In this module students will investigate different approaches to implementing information security. The implementation of information security in an organisation takes a number of factors into consideration, including laws, regulations and the codes of conduct of professional organisations. Students will further understand that security is about business needs and, thereafter, Information Technology (IT). Students will also explore how a risk analysis is conducted; and how risks are identified, assessed and controlled. They will note the different ways that hackers follow to gain access to and examine a system in order to design/modify such so that hackers cannot gain access. Finally, students will gain an understanding of cryptography techniques in the field of digital forensics.

Software Development Project 3

Module description

The aim of this module is for students to apply their knowledge of systems development to develop an information system of medium to large complexity for a virtual customer, and to create the necessary documentation related to the systems development process. This is a group project, and each group should consist of five to six students working together to deliver the project consisting of six deliverables. The lecturer will play the role of the virtual customer and will assign students to groups. Students will not be allowed to choose which group they belong to. The lecturer will ensure that each group contains a mix of skills required to complete the group project.

The students will experience the process of the system life cycle and will develop the information system by following an agile systems development methodology (iterative incremental development). Students will be expected to formulate a scenario for their chosen topic and they will analyse, design and develop the information system to meet the customer's requirements. The lecturer will offer guidance and approve the chosen topic to ensure that it is at the right complexity level.

By the end of this group systems development project, the students should be able to demonstrate their ability to identify all the components of a computer-based solution to a complex information processing problem, consider various alternative design strategies and security issues, and participate in managing the development of an information system using the latest software and hardware tools. This project will clearly be at a more advanced level than the second-level project, and could typically involve the development of a web-based distributed application.