

MQF Level 6

IT6-01-21

Bachelor of Science (Honours) in Business Analytics

Course Specification

Course Description

This course is intended for those students who are keen in understanding how computer and software systems work, and how such systems can help them derive meaningful insights to either address business problems, or discover hidden trends and patterns to leverage business success. In this course the student will also learn how to solve business problems through software systems, and how to develop, implement, and test such software systems. The student will also be following units which help them market their business, understand consumer behaviour and be familiar with the laws governing business related processes.

Students following this course are expected to work on their own initiative, with the support of the college, on subjects which they might not be very familiar with, such as students who have never followed Business, or ICT subjects.

Programme Learning Outcomes

At the end of the programme the learner will be able to:

- 1. Develop and implement software systems;
- 2. Interpret complex data through the use of software systems to leverage business success;
- 3. Develop an understanding how businesses operate;
- 4. Develop leadership and management skills.

Entry Requirements

MCAST Advanced Diploma in IT or MCAST Advanced Diploma in Business Administration or MCAST Advanced Diploma in Marketing or MCAST Advanced Diploma in Financial Services or MCAST Advanced Diploma in Insurance Or 2 A-Level passes and 2 I-Level passes Compulsory A-Level: Computing or Mathematics or a Business related subject Preferred A or I-Level: Computing or Mathematics or a Business related subject

Unit Code	Unit Title	ECTS	Year
BCFIN-506-1517	Managing Financial Resources and Decisions	6	1
BCMTH-506-1810	Applied Business and Financial Mathematics	6	1
ITSFT-506-2006	Object Oriented Programming	6	1
ITSFT-506-1606	Software Engineering	6	1
ITSTY-506-1601	Security Fundamentals	6	1
BCACC-506-1801	Financial Accounting and Reporting	6	1
ITSFT-506-1612	Server Side Scripting	6	1
ITDBS-506-1603	Database Programming 1	6	1
CDKSK-503-1907	English I	3	1
CDKSK-503-1908	English II	3	1
CDKSK-506-1704	Mathematics	6	1
BCMGT-506-2001	Applied Leadership and Management	6	2
ITNET-506-2005	Virtualisation	6	2
ITNET-506-1602	Networking Concepts	6	2
ITSFT-506-2003	Client Side Scripting I	6	2
ITRSH-506-2101	Research Design 1	6	2
BCPRF-506-1501	Personal and Professional Development	6	2
ITDBS-506-2003	Database Programming II	6	2
ITSFT-506-2011	Enterprise Programming	6	2
ITBSI-506-1601	Business Intelligence and Reporting	6	2
CDKSK-604-1909	Entrepreneurship	4	2
CDKSK-602-2105	Community Social Responsibility	2	2
BCMRK-606-1514	Consumer Behaviour	6	3
BCMRK-506-1513	Internet Marketing in Business	6	3
ITSFT-606-1618	Applied Computational Intelligence	6	3
ITSTA-606-1601	Statistics for Computer Science	6	3
BCMGT-606-1507	Strategic Management	6	3
BCSTA-606-1801	Handling Business Data and Statistics	6	3
ITRSH-606-2102	Research Design 2	6	3
ITBCK-606-2101	Blockchain	6	3
ITDIS-612-1601	Dissertation	12	3
Total ECTS		180	/

Current Approved Programme Structure

BCFIN-506-1517 Managing Financial Resources and Decisions

Unit level (MQF): 5

Credits: 6

Unit Description

WHAT ARE FINANCIAL RESOURCES?

"The money available to a business for spending in the form of cash, liquid securities and credit lines. Before going into business, an entrepreneur needs to secure sufficient financial resources in order to be able to operate efficiently and sufficiently well to promote success."

This is a knowledge based unit which will allow learners to develop a detailed understanding of the various financial resources currently being used in the business environment. Learners will use the knowledge derived from the various financial instruments described in this unit to analyse and interpret financial data and extract meaningful information. The Unit will also define what criteria is required to make business decisions based on the financial information gathered and ultimately to help the learner evaluate the financial performance of a business entity.

The Unit is relevant to learners wishing to further develop their knowledge on financial resource management as a tool to help business decision makers. This Unit will provide the Learner with the ability to use various financial tools to assess a business's strengths and weaknesses as well as understand its current economic activity through the interpretation of the financial statements. The learner will also understand the International Accounting Standards (IAS) role and importance in the preparation of financial information.

Learners will also interpret the budgeting processes required by business and its importance in today's volatile economic environment. The unit also describes why cash flow planning and investments analysis can be critical for business entities.

- 1. Explain the sources of finance available to a business.
- 2. Recognise the implications of finance as a resource within a business.
- 3. Make financial decisions based on financial information .
- 4. Evaluate the financial performance of a business .

BCMTH-506-1810 Applied Business and Financial Mathematics

Unit level (MQF): 5

Credits: 6

Unit Description

Applied Business and Financial Mathematics aims to introduce students to more complex mathematical and statistical concepts which may be applied to business and financial setups. Students are introduced to linear programming and the idea of finding the optimal solution of an objective function. The area of linear algebra is used to formally present students with data which is of a multivariate nature; a common occurrence in business and financial data. To this end, the topics of vectors and matrices are covered in detail in this unit. As a result, the variance-covariance matrix and the correlation matrix are discussed as a generalisation of their univariate counterparts. Calculus is an integral part of any course in business and financial statistics. Therefore, this unit presents elementary differentiation and integration. Finally, statistical distributions, both discrete and continuous are discussed and applied to solve problems related to business, finance, and economics.

Learning Outcomes

On completion of this unit the learner will be able to:

- 1. Use linear programming to solve minimization and maximization problems.
- 2. Apply concepts from calculus to solve business and financial problems.
- 3. Produce production plans and/or forecasts using linear algebra.
- 4. Summarise multivariate data.

5. Describe and solve business and financial problems in terms of probabilistic models involving discrete and/or continuous random variables.

ITSFT-506-2006 Object Oriented Programming

Unit level (MQF): 5

Credits: 6

Unit Description

This unit aims to build up learners from basic concepts in OOP to more advanced objectoriented concepts. Basic OOP concepts include objects and classes, access modifiers, properties, constructors and use of methods (parameters and returning data). Following this, more advanced concepts will be introduced such as encapsulation, polymorphism and abstraction. Focus will be given in particular to possible relationships between different objects. Such relationships include inheritance, association, aggregation and composition. Such concepts will be applied to more advanced scenarios, ensuring that there is an in depth understanding of the different concepts.

Finally, the unit covers persistence. In this part of the unit, learners will integrate with and store data in a database using the object-relational language LINQ. Learners will appreciate the differences between a data-centric approach and an object-centric approach when designing the model layer of an application.

During the learning process for this unit, learners will be given the necessary tools to acquire skills for proper management of building an Object-Oriented solution. Such management will be including preparation and design, time management, presentation, handling queries and as error handling.

Learning Outcomes

- 1. Build object-oriented solutions using both fundamental and advanced objectoriented concepts to be able to address business requirements.
- 2. Implement different relationships between objects found in a scenario and show proper understanding of such existing relationships.
- 3. Implement persistence in created applications to allow created applications to store and read data from multi-user database management systems.
- 4. Show management skills in the process of building and deploying an Object-Oriented solution.

ITSFT-506-1606 Software Engineering

Unit level (MQF): 5

Credits: 6

Unit Description

This unit has been designed to introduce learners to the main concepts behind the science of software engineering. Throughout the course of their studies, students will acquire the skills to understand and support the complete life cycle of a software system - from inception, requirements elicitation and design, through the various stages until release and maintenance. Students will gain an understanding of different software development techniques and will learn how to critically select which technique is best suited to the development of different systems.

The unit places focus on some of the more recent software development processes, making particular emphasis on the Agile philosophy of software development. Students will understand the agile process and its constituent components, its applicability to modern software development and the various actors involved in the process together with their roles and responsibilities. Another core component of this module will be that of introducing students to the Unified Modelling Language, UML, as a tool to facilitate and speed up the software development process. The various constructs of this modelling language will be covered, together with explanations of how they can be utilized to specify and document the software and business processes.

This unit will also present students with a range of advanced software engineering concepts and approaches which will give them the skills required to be able to support new and evolving developments. Students will be introduced to a number of different software architectures and design approaches and they will be encouraged to analyse which setups are most adequate as solutions for diverse scenarios.

Learning Outcomes

- 1. Plan and tackle a small software design project as part of a team using an Agile approach.
- 2. Perform a requirements acquisition exercise in order to identify the main functional and non-functional requirements of a proposed software system.
- 3. Identify and construct the most applicable UML modelling diagrams to use in particular phases in a software system's development process to achieve a specified goal.

4. Design a solution to a problem by proposing the most suitable architecture and utilising known design patterns.

ITSTY-506-1601 Security Fundamentals

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is designed to introduce candidates to the issues involved in designing and constructing secure computer networks. An organisation must consider security to protect its network from damage and information theft.

Security is an essential part of an IT system. As security attacks become more sophisticated, the level of skill required to perform the simplest of attacks is decreasing. Several tools which enable users with basic security skills to launch attacks are become widely available.

This course will focus on network security concerns related to hardware, software, network and physical access. Industry standard best practices will also be explored. Knowledge of threats and attacks is important in order to appreciate the potential consequences to an organization and implement defense mechanisms.

Learning Outcomes

- 1. Demonstrate network security, compliance and operational security.
- 2. Identify and describe threats and vulnerabilities.
- 3. Implement basic application, data and host security.
- 4. Identify suitable methods of cryptography.

BCACC-506-1801 Financial Accounting and Reporting

Unit level (MQF): 5

Credits: 6

Unit Description

The main objective of this unit is to provide learners with a solid understanding of the fundamental accounting concepts and principles. Primarily, learners will learn about the importance of an accounting framework and a basic explanation of the double entry accounting system. This will enable the learners to distinguish between assets, liabilities and capital, as well as revenue and expenses. Learners will also learn about accounting for VAT in Malta, including the different VAT rates that are applicable, as well as the difference between Input and Output VAT.

The unit provides learners with a good practical knowledge of year-end accounting procedures, namely involving the preparation of the sales ledger and the purchases ledger control accounts and end-of-year adjustments. Such adjustments include adjustments for inventory, irrecoverable debts and allowances for doubtful debts, depreciation, accruals and prepayments. The unit also covers the preparation of a set of financial statements, focusing on the Statement of Profit or Loss, Statement of Financial Position and Statement of Cash Flows. The unit also includes the preparation of Accounting Ratios as a tool for management to monitor the performance of the business. The unit also incorporates an an appreciation of the important role of Costings in Accounting.

Learning Outcomes

- 1. Understand the basics of financial accounting and reporting.
- 2. Carry out year-end accounting procedures and correction of errors.
- 3. Prepare a set of financial statements in accordance with international financial reporting standards and the importance of Accounting Ratios.
- 4. Appreciate the important role of Costings in Accounting.

ITSFT-506-1612 Server Side Scripting

Unit level (MQF): 5

Credits: 6

Unit Description

Server side scripting is a powerful and customizable technology for creating dynamic web pages. It has several benefits over client side scripting. For example it allows controllable environment for executing server side scripts whereas user environment cannot be controlled when using client side scripting. Server side scripts are able to change the HTML output according to the web browsers. Server- side technologies are installed on the web servers to process the scripts and HTML stream is then returned to the client's web browser. This unit does not require the use of any particular server side scripting language and the user can choose depending upon their knowledge and skills.

This is a skills based unit and will allow learners to demonstrate that they have the necessary skills to be able to design, program and test server side scripts. The unit will guide learners through the process of constructing dynamic web pages using relevant server side technology.

Outcome 1 concentrates on the typical requirements for running server side scripts and understanding the difference between static and dynamic web pages. The learner will familiarise themselves with the requirements and installation process. The learner will also understand the process of configuring and setting up the web server to test web pages.

Outcome 2 focuses on dealing with the anatomy of a dynamic web page using server side scripting and how this technology works. Learners will understand different data types supported by their chosen programming language through the use of Server side controls/web controls while creating simple web pages.

Outcome 3 focuses on the use of control structures in the chosen programming language. Learners will understand the use of operators, branching and looping structures. They will also understand the practical aspects of the event driven programming. They will also understand the use of functions by passing parameters and returning values. They will learn how to identify problems when loading the web page and testing its functionality.

Outcome 4 emphasises on theoretical and practical aspects related to the use of databases in dynamic web pages. They will understand the use of data handling controls to fetch data for web pages. Learners will also be given the opportunity to demonstrate

their mastery of the unit by developing a program using their chosen programming language implementing all of the features they have studied in order to design a dynamic data handling web application.

Learning Outcomes

On completion of this unit the learner will be able to:

1. Construct a viable environment to create dynamic web pages with reference to client-server architecture.

2. Develop asynchronous dynamic web pages using server side scripting language.

3. Demonstrate the ability to implement OOP event driven programming and handling errors.

4. Demonstrate the ability to integrate server side scripting with databases to manage and manipulate data.

ITDBS-506-1603 Database Programming 1

Unit level (MQF): 5

Credits: 6

Unit Description

This unit provides the basis of advanced database theory and design principles that shall be used in future modules. Following this module, a student should be confident in concepts about relational theory and database design. The theory presented is independent of any specific database management system, however the database design conforms to agreed-upon notation easily adopted to other relational database management systems.

The unit starts with the data manipulation via data manipulation language. In this part of the unit, the learner will learn how to build databases in a relational database management system by creating tables and choosing indices. Attention is given to the enforcement of data integrity rules and their associated delete and update repercussions via foreign keys.

Following this, data query via data query language is discussed. Basic select statements are covered including selecting from multiple tables and using conditions (such as WHERE). This is then extended to include predicates and combining predicates as well as filtering character, date and time data. Finally, data is ordered and paged using appropriate techniques.

Advanced concepts then follow, including performing different types of joins based on the database content as well as using set operations. As part of this topic, different types of joins will also be discussed. At this point, data insertion, updates and deletion will be discussed using the appropriate SQL keywords.

Grouping (via GROUP BY) and windowing are also discussed in this topic, allowing for both single and multiple grouping as well as pivoting. For windowing, aggregation, ranking and offsets will be discussed.

The unit concludes with a discussion and practical use of views, as well as how inline functions can be incorporated into SQL to extract calculated fields.

- 1. Create the structure of a relational database.
- 2. Retrieve data from a database.
- 3. Manipulate the data in a database.
- 4. Prepare advanced reports from data within a database.

BCMGT-506-2001 Applied Leadership and Management

Unit level (MQF): 5

Credits: 6

Unit Description

Effective leadership and management are fundamental to the success of any organisation. This unit has therefore been designed to develop the learners' knowledge and understanding of organizational management and leadership issues.

Primarily, students will understand the difference between the function of a manager and the role of a leader. The characteristics, behaviors and traits which support effective management and leadership are considered. In addition, the importance of ensuring an effective human resource management function within the organisation is also tackled. Employees are the lifeblood of any organisation and being able to attract, recruit and retain talented people is at the core of the human resource function.

The unit also examines the role which leaders and managers play in the operations of an organisation by considering organizational structures, mission, objectives and strategies, power, authority and culture, change management and the increasing importance of organizations operating in a socially responsible manner. Lastly, the unit also allows learners to appreciate the importance of understanding an organization's external environment and stakeholders.

Learning Outcomes

- 1. Distinguish between the role of a leader and of a manager within an organisation
- 2. Analyse the effectiveness of an organization's human resource management function
- 3. Examine the role leaders and managers play in the operations of an organisation
- 4. Evaluate an organization's external environment and key stakeholders

ITNET-506-2005 Virtualisation

Unit level (MQF): 5

Credits: 6

Unit Description

In a world where organisations strive to make better use of their resources, virtualization technologies have found their place within all corporate environments. Through virtualization technologies, one can eliminate the one to one mapping between an OS instance and a physical machine.

Throughout this unit, learners are introduced to the building blocks of virtualization technologies. The importance of high-availability is also stressed.

The specification of this unit is vendor neutral. Practical exercises can be carried out using products from any of the leading virtualization platform providers.

The assessment process focuses significantly on being able to apply the content covered in class to a practical business scenario with specific requirements and constraints.

Learning Outcomes

- 1. Understand core virtualization concepts.
- 2. Deploy highly available virtual machines.
- 3. Design, implement and troubleshoot virtual networks.
- 4. Design, implement and troubleshoot shared storage.

ITNET-506-1602 Networking Concepts

Unit level (MQF): 5

Credits: 6

Unit Description

Computer networks are vital in different areas of our lives. This aim of this unit is to reinforce the basic concepts that enable data communication over computer networks. Students will be introduced to the theoretical foundations of data transmission along with an in-depth coverage and application of the OSI & TCP/IP models.

Practical exercises will be presented to provide a practical perspective to the theory presented. A number of core networking protocols will be discussed and analysed using a protocol analyser. Students will also be introduced to copper and fibre structured cabling design, installation, testing and certification. Emerging technologies such as IPv6 are also an essential part of this unit.

The unit shall assist the learner in preparing himself/herself for professional/vendor certifications.

Learning Outcomes

- 1. Show understanding of the basic concepts behind data transmission technology.
- 2. Understand and apply networking models and protocols.
- 3. Show understanding of the operation of various network components.
- 4. Design, configure, test and troubleshoot a network.

ITSFT-506-2003 Client Side Scripting I

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is designed to introduce learners the fundamental and intermediate concepts of client-side scripting. In particular emphasis will be placed on manipulating the DOM, creating a responsive web application and using a JavaScript framework/library that allows the developer to build highly dynamic interactive web applications. It is intended for learners who already have some understanding of HTML, CSS and JavaScript.

The unit starts with a brief introduction of why developers felt the need to create frameworks and a revision of client-side scripting, whereby the learner is shown how HTML, CSS and JavaScript can be used together to build the presentation layer of a web application. This includes basic tasks covered in pure JavaScript and being able to react to user input and update the screen dynamically without the need to refresh the page. Learners are introduced to the Single-Page-Application (SPA) approach where the Server sends an HTML page and thereafter the JavaScript framework/library takes over and controls the UI. Following this, learners will be introduced to the Document Object Model (Model) which encompasses not only the structure of a document but also the behavior of a document and the objects of which it is composed. Then learner will be introduced to CSS and JavaScript frameworks/libraries, which simplify the development of a responsive single-page application. Learners will learn how to bind to DOM elements via a JavaScript framework/library and hence how to manipulate DOM objects. They will also learn how to listen for changes in the DOM and react accordingly with JavaScript functions. Learners will also be introduced to asynchronous JavaScript whereby pages load faster since the browser isn't waiting for the server to respond in the middle of a page render since requests and transfers happen in the background. Using these libraries and JavaScript, the learners are then shown how to create and consume data in a JavaScript Object Notation (JSON) format.

Learning Outcomes

- 1. Apply basic requirements to build the presentation layer of a web application using HTML, CSS and JavaScript.
- 2. Develop a web application with state management in place, providing users with authentication.

- 3. Implement using a JavaScript Framework/Library a Web Application that fetches and consumes data.
- 4. Deploy a web application with proper navigation which can handle and validate user input data through forms.

ITRSH-506-2101 Research Design I

Unit level (MQF): 5

Credits: 6

Unit Description

The purpose of this unit is to give the learner the necessary skills to start researching in an area of personal interest yet also of relevance to the area of studies and to the benefit of the local/regional community. This module differentiates itself from the rest in the manner that the criteria focus on how research is to be performed, whilst it is the learner who will determine the subject area and tools to be utilized to build the prototype necessary.

Therefore, this unit requires the learner to identity a theme such as the study of beach deterioration in local beaches, then through guidance, determine the sources of data (Satellite imagery) and tools needed to conduct such research. Every other learner will focus on areas that are either of personal interest, subject areas communicated by other researchers (potential future mentors), topics of funded projects, or recommendations by various parties such as key external partners. This unit will give a structure to how research is conducted in a scientific manner, following industry standards and common practice.

The fundamental objective of this unit is to introduce the learner to hypothesis testing. Therefore, after a theme is selected, a hypothesis needs to be formulated together with research questions. A research pipeline highlighting the methods to be used in order to address the research questions follows. A preliminary literature review will be undertaken by the researcher in order to familiarize themselves with the current state of the art and to justify key decisions made in their individual research.

The learner is expected to work on a proof-of-concept, prototype or working solution in order to gather the necessary data from research experiments so to be able to argue and answer the set research questions. Upon analysis and reflection, the learner should be in a position to understand what a scientific research process is, what is expected of him/her from a dissertation and how to undertake such a research endeavor at a larger scale as expected in the final dissertation.

- 1. Formulate a research hypothesis and research methodology.
- 2. Evaluate, after research, the current state of the art.
- 3. Evaluate project outcomes critically.
- 4. Report project outcomes and recommendations within a structured framework.

BCPRF-506-1501 Personal and Professional Development

Unit level (MQF): 5

Credits: 6

Unit Description

This unit will give learners the opportunity to take responsibility of their own academic, personal and employment progression and development.

PDP will ensure Learners become an effective and confident individual who can identify what skills and qualities are required within education, life or employment. They will use methods to reflect on their own personal skills and abilities which employers seek in the workplace and which are increasingly recognised as underpinning success in their personal and academic life.

The unit will utilise the contexts of progression to employment and or from college to university. Learners will identify their individual skills, abilities and development needs and review these in relation to their own personal, academic and employability aims. Learners will devise a personal action plan setting achievable goals, then undertake and review the plan at regular stages. They will generate and showcase evidence of each stage of the plan in their portfolio of evidence.

Learning Outcomes

- 1. Explain how independent learning can enrich personal development
- 2. Design and maintain PDP portfolio and action plan
- 3. Implement and review action plan
- 4. Demonstrate acquired and transferable skills

ITDBS-506-2003 Database Programming II

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is a continuation of Database Programming I and furthers the student's knowledge in advance database programming concepts. The unit is based on four main concepts commonly needed in large scale database systems: advanced database objects such as triggers, stored procedures, views and sequences; query optimization; error handling and concurrency support; integration of advanced techniques such as JSON support and integration with external applications. This unit empowers the student with the necessary information to design a scalable database and integrate it with external applications, which is a very common and realistic industry need.

It is important to note that this unit is a continuation of Database Programming I and so the latter is a pre-requisite. This unit delves into advanced techniques commonly faced by backend software developers and systems architects.

Business Intelligence topics have not been included in this unit since these are considered as more advanced topics which merit a unit of their own. It is also strongly recommended that such a unit would follow this unit, since this unit offers a solid basis for the advanced BI topics.

Learning Outcomes

- 1. Improve a database design using advanced techniques needed for support of big systems.
- 2. Optimise database and query performance.
- 3. Design a resilient database system via error handling and concurrency support.
- 4. Integrate support for external data and applications with an existing database.

ITSFT-506-2011 Enterprise Programming

Unit level (MQF): 5

Credits: 6

Unit Description

Enterprise applications are software solutions that provide business logic and tools to satisfy the needs of an organisation to improve productivity and efficiency. These type of applications are commonly the central hub for a large variety of data received from a number of sources.

This unit will provide Learners the theoretical and practical knowledge to design and develop enterprise applications. This will provide Learners the knowledge to create well defined business logic that can meet the clients' requirements.

Learners will learn various enterprise software architecture types including different enterprise software design patterns. Learners will also learn the role which software architecture plays in the development of larger scale enterprise systems. Moreover, Learners will gain an understanding of the common enterprise software features offered by most enterprises to adhere to common entities or policies set up by clients. Furthermore, Learners will gain the necessary knowledge to identify common frameworks that follow common standards of design and development practices for developing enterprise software applications.

Through this unit, Learners will gain an insight in designing and developing business logic that will enable them to understand how to meet clients' requirements. This will help them grasp a better understanding of what is involved in the actual configuration management and scalability needs for such large scale applications. Moreover, this unit will enable the Learners to understand basic security requirements to safeguard and share enterprise knowledge amongst various applications.

This unit will also allow Learners to understand cloud services and how cloud services are utilized in large scale enterprises as well as gain experience at uploading applications. Ultimately, Learners will be able to upload applications to cloud services.

- 1. Improve a database design using advanced techniques needed for support of big systems.
- 2. Optimize database and query performance.
- 3. Design a resilient database system via error handling and concurrency support.
- 4. Integrate support for external data and applications with an existing database.

ITBSI-506-1601 Business Intelligence and Reporting

Unit level (MQF): 5

Credits: 6

Unit Description

This unit is designed to provide students with the skills necessary to understand and participate in data warehousing projects and to support the analytical reporting tasks that would successively be carried out on these data stores. Technological advances made in recent years have led to an explosion in the amount of data being collected and stored within organizations. Most businesses now recognize the fact that they can harness the power of big data to increase their competitiveness and/or improve their processes, and this is not limited only to commercial scenarios. The ability to analyse voluminous data sets has been an important step forward for the most disparate of fields spanning government institutions, medicine and health, astronomy and biology and many more. During the course of this unit, students will be introduced to Business Intelligence as a collection of tools and techniques that allow for the extraction of knowledge from large sources of data.

Due to its central role in any BI solution, focus will be placed on the data source itself with the first part of the unit dedicated to the data warehouse. The architecture and logical and physical design of the data warehouse will be covered both theoretically as well as through practical exercises. Students will learn to identify data sources and analyse and transform data sets in an ETL procedure to populate the data warehouse.

OLAP analysis will be covered as a second main topic of this unit. The concept of multidimensional data structures and the various operations that can be carried out on them to analyse data from different viewpoints and at varying level of detail will be highlighted in order to give students an understanding of the benefits brought about by BI technology.

Learning Outcomes

- 1. On completion of this unit the student will be able to
- 2. Discuss the ways in which data warehousing coupled with Business Intelligence technologies help to meet the data requirements of strategic decision makers within organizations.

- 3. Design the schema for a data warehouse to meet a given set of requirements and implement the said model as a relational data warehouse.
- 4. Outline and discuss the main steps involved in an ETL process and support the theoretical knowledge with the design and implementation of such a process to populate a Data Warehouse.
- 5. Explain multi-dimensional data structures and discuss and demonstrate the capabilities of OLAP tools through the practical application of dedicated OLAP analysis software on a data warehouse store.

BCMRK-606-1514 Consumer Behaviour

Unit level (MQF): 6

Credits: 6

Unit Description

The aim of this unit is to provide students with a thorough understanding of consumer behaviour and relates these same concepts to marketing theory and practice. Consumer behaviour and buying motives represents the study of individuals and the activities that take place to satisfy their realized needs. That satisfaction comes from the processes used in selecting, securing, and using products or services when the benefits received from those processes meet or exceed consumers' expectations. In other words, when an individual realizes that he has a need, the psychological process starts the consumer decision process. Through this process, the individual sets out to find ways to fulfil the need he has identified. That process includes the individual's thoughts, feelings, and behaviour. When the process is complete, the consumer is faced with the task of analysing and digesting all the information, which determines the actions he will take to fulfil the need.

Consumer behaviour provides a wealth of information about the individuals that purchase any products and services. If we understand a consumer, we could address directly to him/her and his/her needs. This special communication not only increases the consumer's ability to understand the value of the product, but it also increases sales.

Consumers buy what they understand and what they see value in. Consumer behaviour also provides with insight on how to create an effective marketing strategy. If we do not understand our consumers, how can we possible market to them and serve them? Companies often fail to gain an understanding of what their consumers want and need before they actually create their marketing strategies. They lack knowledge of what influences their consumers. Therefore that evaluation and understanding of consumer behaviour should always come before the development of a marketing strategy or plan. Today consumers are faced with an array of product selection, and competition is fierce among companies. This is why your understanding of consumer behaviour is vital to the success of your business. Understanding potential consumers better than the competition is a precondition of both winning and survival on the market place.

- 1. Understand the role of consumers in the marketplace with an integrated overview of the market segments and consumer perception.
- 2. Recognize and assess consumers learning and attitude aspects. Furthermore, to choose applicable and relevant attitude change strategy.
- 3. Understand consumer behaviour and buying motives as a mirror of cultural, social and environmental determinants and the complexity of consumer preferences
- 4. Awareness of consumer decision making process in creating marketing/sales strategy-plans.

BCMRK-506-1513 Internet Marketing in Business

Unit level (MQF): 6

Credits: 6

Unit Description

This unit provides a framework for students to develop their knowledge of the role of internet marketing within an organisation and in the context of modern marketing. The unit will develop candidate's knowledge and understanding of internet marketing and the benefits of internet marketing to customers. The unit will also focus on the opportunities for business in engaging in and using Internet Marketing.

Outcome 1 focuses on the role of the Internet within modern marketing. The outcome will consider the marketing concept, the marketing planning process and the range of internet marketing tools available to a business to support the achievement of business objectives.

Outcome 2 will focus on the importance of using modern information and communications to develop new products and new market opportunities. Outcome 2 also considers the role of business information in the decision making process and how to gather and manage marketing information.

Outcome 3 will consider the opportunities that Internet marketing offers customers and businesses, specifically in improving; access to products and services, the availability of products/services and the efficiency of operating a business. Outcome 3 gives candidates an understanding of the changing behaviour of customers. Candidates will consider the segmentation, targeting and positioning process and how internet marketing is changing the way customers buy products and services. Outcome 3 will also consider how internet marketing communications and offline marketing communications should be integrated to improve marketing and sales channels that can increase sales and turnover. Finally, outcome 3 will discuss how internet marketing can be used to improve business performance and productivity.

Overall, candidates will understand the important role internet marketing plays in running a successful business, how they can take advantage of these technologies to win and retain customers and how to use these tools to improve business performance.

- 1. Explain the role of internet marketing within a modern marketing context
- 2. Analyse marketing information using ICT systems to support internet marketing strategy development
- 3. Design Internet marketing strategies to improve business performance -Customers
- 4. Design Internet marketing strategies to improve business performance Organizational.

ITSFT-606-1618 Applied Computational Intelligence

Unit level (MQF): 6

Credits: 6

Unit Description

This unit builds on the previous data related modules, namely Database Programming I, Database Programming II, and Business Intelligence & Reporting. The purpose of this unit is to focus on the data analysis aspect of artificial intelligence.

The aim of this unit is to provide the learner with the data analytical skills needed to identify patterns from data reports and to solve real world problems commonly encountered by professionals. This unit will highlight the different kind of solutions and approaches that can be taken in specific scenarios.

The first aspect of this module will be to expose the learner to NP-complete kind of problems and explain when to use exact solution algorithms and when to use heuristic algorithms. Then the student should be able to do exploratory analysis on a dataset to determine an appropriate approach to address the problem at hand.

After an exploratory analysis, the student should be able to clean the data and normalise it in preparation for use within an algorithm. Such algorithm will vary from exact algorithms to heuristic algorithms. Such algorithms will be used to proof or disproof a hypothesis.

Finally, a proper analysis of the gathered data will be done in an academic report following a specific conference template. This report will follow a similar structure as that used for the dissertation which will serve as further practice and preparation for their final year project.

For this unit, a statistical analysis software such as Microsoft Excel and R-Programming will be used. Development of a small prototype can be done using any other programming language. Documentation of the final report will be done using a conference template such as IEEE, ideally with a LaTeX editor.

- 1. Understand different solution algorithm types and when to use each.
- 2. Analyse a dataset and identify an appropriate approach to solve the problem.
- 3. Implement several solution algorithms for a given data set and problem.
- 4. Document findings in a technical report.

ITSTA-606-1601 Statistics for Computer Science

Unit level (MQF): 6

Credits: 6

Unit Description

This unit covers a variety of statistical concepts and applications to algorithms and computer science.

The unit covers several topics including: probability, randomised algorithms, statistical inference, clustering, high dimensional data analysis, data mining, and artificial intelligence and Monte Carlo algorithms.

The core aim of this unit is to give the learners additional tools related to statistics and its application in computer science. These can be applied to solve particular problems at the work place or as part of research, such as the research being undertaken in the student's thesis.

At the end of the unit, the student is expected to have applied these tools and be able to identify the correct tool and apply it independently.

For this unit, the lecturer can choose any programming language however a programming language for which the students are familiar is recommended. The lecturer may also use pseudo-code and mathematical notation to describe concepts and algorithms within the unit. Mathematical notation is essential for presenting statistical concepts and probability.

Learning Outcomes

On completion of this unit the learner will be able to:

1. Understand how statistics and randomised algorithms are used to make inferences based on the data and are applied to algorithms.

2. Apply and evaluate statistics and randomised algorithms in contexts related to computer science.

3. Use statistical inference to extract information from data.

4. Implement randomised algorithms.

BCMGT-606-1507 Strategic Management

Unit level (MQF): 6

Credits: 6

Unit Description

The aim of this module is to develop learners' abilities to think strategically. The unit will support the learner in analysing the business environment of an organisation. The tools that will be learnt throughout the module will help the learner to analyse the impact of the business environment on an organisation.

The unit will enable learners to gain an understanding of the different types of strategies that are available for management in order to pursue so that corporate objectives will be reached. The learner will be able not only to distinguish between the various strategies but also to make the most appropriate strategic choice that will bring an organisation in line to its business environment.

The learner will learn procedures that enable the smooth implementation of s chosen strategy within an organisation. Emphasis will be put on the role of culture and leadership. Reference will be made on the corporate social responsibility of an organisation and the importance of business ethics to ensure an effective strategic performance of a business.

The learner will be provided with opportunities to analyse organisations and their business environment. They will be provided with hands on experience in producing and analysing a strategic plan.

Learning Outcomes

On completion of this unit the learner will be able to:

1. Understand the basic principles of strategic management and its importance in a business environment

- 2. Understand the business environment and its effects on strategy formulation
- 3. Analyse the different types of strategies and their implementation
- 4. Understand the role of corporate culture and leadership in strategy execution

BCSTA-606-1801 Handling Business Data and Statistics

Unit level (MQF): 6

Credits: 6

Unit Description

Statistics is the science of collecting and interpreting data, and then using this data to draw inferences. This module will discuss the collection of data using appropriate sampling techniques, as well as the techniques that can be used to make predictions and derive estimates about a large body of data. The ability to construct confidence intervals and to assess the level of reliability of inferences, which perhaps is the most important aspect of handling business data and statistics, will be analysed in detail. The content should integrate with the other modules. The ability to handle business/financial data and statistical results should serve as a springboard for sound decision-making in business and/or financial services areas.

Learning Outcomes

- 1. Describe, evaluate and justify the use of sampling methods and techniques.
- 2. Make inferences related to a business scenario by using confidence intervals and hypothesis testing.
- 3. Analyse and generalise the relationship between two variables.
- 4. Use principal component analysis to reduce the dimension of a given set of data.

ITRSH-606-2102 Research Design 2

Unit level (MQF): 6

Credits: 6

Unit Description

The main focus of Research Design II unit is to help learners gain a more in-depth understanding of research design in ICT, thereby, enabling them to evaluate the different ways in which research may be conducted and to choose the approaches that most suit their goals based on already published research and academic theories.

Amongst the most important topics to be covered are the analysis of a hypothesis to better define the scope of a research and to clarify the aim and objectives of a research in view of an applied problem in a specific domain. Knowledge of different research approaches and testing strategies is also paramount; this will lead to the selection and justification of the most appropriate approaches/strategies for the chosen research based on sound academic theories and past research published through conference proceedings and journal articles. Such knowledge will provide the learners with the necessary know-how to present data gathered from results in a manner that is clear and effective for inferring patterns and developing sound and unbiased conclusions with regards to their hypothesis. Critical reflection upon decisions taken throughout the research journey, especially with regards to the chosen research approach, methodology and testing strategies is also an important aspect of this unit for evaluating one's own research in the light of future improvements.

The delivery of the unit should also capitalize on the opportunity to foster a collaborative research environment between learners where they can discuss their with peers, provide research ideas each other, and constructive as criticism/suggestions on how a research idea/approach can be improved. Sharing of knowledge, ideas, opinions and academic resources for carrying out such research is to be encouraged and viewed as an integral part of healthy academic discussion and knowledge sharing.

Proper presentation of the learner's own work carried out during research is also an important part of the unit; tools that support the management of references and the formatting of scientific documents to adhere to well known, pre-defined formats suitable for submission of papers for conference proceedings or articles in scientific journals will be explored.

- 1. Propose the most suitable methodology for a chosen research.
- 2. Analyse testing strategies used for validating a hypothesis.
- 3. Analyse collected data to arrive to findings and conclusions for a chosen research.
- 4. Produce scientific documents using appropriate writing styles, document formats and tools.

ITBCK-606-2101 Blockchain

Unit level (MQF): 6

Credits: 6

Unit Description

This unit has been designed to teach learners the core concepts and advanced programming techniques with regards to public blockchains. Learners will have the opportunity to understand how a public blockchain works and how this technology can be applied for different use cases. It is a skills-based unit and is designed to allow the learners to understand and apply the necessary skills to create a decentralised application.

Initially learners will learn the fundamentals of a public blockchain. They will experiment with different wallet types and learn how to create wallets via code. Following this setup, the unit exposes the learner to the core principles behind a public blockchain. This includes node hosting, mining, transaction fees, having events, difficulty adjustment, memory pools, forking and different types of consensus algorithms.

Following this, learners will be exposed to smart contracts. Learners will learn how to create Turing-complete programs (contracts) by making use of programming concepts such as conditionals, functions, mapping, arrays, and events. Later, they will learn how to deploy contracts on a public blockchain. Then they will be required to design and develop a decentralised application that makes use of smart contracts.

Learners will learn the design patters recommended for smart contract programming. This includes behavioural patterns, security patterns, upgradeability patterns and economic patterns. Learners are also required to experiment with smart contract templates such as fungible and non-fungible tokens. Learners will be also required to make use of a peer-to-peer hypermedia protocol. This will help them understand how to build a robust decentralised application.

Finally, the learners are required to understand that once a smart contract is deployed, it cannot be modified or removed. Therefore, they are required to learn how to conduct unit testing and deploy an error free decentralised application.

Once leaners complete this unit, they will have a clear understanding how blockchain technology works and how to build decentralised applications.

- 1. Outline the core components and use cases for public blockchains.
- 2. Build a functional decentralised application.
- 3. Develop secure and robust smart contracts.
- 4. Examine a decentralised application for release.