



# MCAST

Malta College of Arts, Science & Technology

MQF Level 6

IT6-01-20

MCAST 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

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, Business related subject or Mathematics

## Current Approved Programme Structure

<b>Unit Title</b>	<b>ECTS</b>
Object Oriented Programming	6
Software Engineering	6
Security Fundamentals	6
Financial Accounting and Reporting	6
Server Side Scripting	6
Internet Marketing in Business	6
Managing Financial Resources and Decisions	6
Database Programming 1	6
Virtualisation	6
Networking Concepts	6
Fundamentals of Leadership and Management	12
Research Methods 1	6
Personal and Professional Development	6
Research Methods 2*	6
Enterprise Programming	6
Business Intelligence & Reporting	6
Applied Business and Financial Mathematics	6
Applied Computational Intelligence	6
Statistics for Computer Science	6
Strategic Management	6
Handling Business Data and Statistics	6
Consumer Behaviour	6
IT Project*	6
Content Management Systems	6
English	6
Mathematics	6
Entrepreneurship	6
Dissertation	12
<b>Total ECTS</b>	<b>180</b>

\*BCRSCH-506-1801- Research Methods 2 is only delivered to students who choose to opt for a Business Dissertation.

\*ITPRJ-506-1605-Project is only delivered to those students who wish to work on an IICT dissertation.

# Object Oriented Programming

**Unit level (MQF):** 5

**Credits:** 6

---

## Unit Description

This unit assumes students are already familiar with OOP principles and concepts, and is as such designed for learners who have completed the level 4 OOP module or who have equivalent experience.

This unit covers advanced object-oriented concepts, allowing the students to design object-oriented solutions from start to finish. Students will learn how to create applications using a markup-driven GUI framework and how to link created applications to a database using object-relational mapping (ORM). It is up to the lecturer to choose the specific technologies to be used in this unit. For example, one can teach markup-driven GUI with WPF/XAML, ANT, GTK or QT, as well as any other markup-driven GUI language. ORM can be delivered using LINQ, Hibernate, TopLink or any other object-relational language.

The unit starts with a revision of object-oriented concepts to ensure that all learners are on track with their knowledge. This revision includes access modifiers, properties, constructors, inheritance, overriding virtual methods, abstract classes, interfaces and polymorphism.

Following this, advanced object-oriented concepts will be covered including aggregation vs inheritance, dependency injection, open-closed principle, single responsibility principle, Liskov substitution principle, interface segregation principle and dependency inversion principle.

Learners will then develop applications using a markup-driven GUI framework. The markup language (such as XML/XAML or similar markup) will be introduced, as well as layout and display control. Learners will learn how to create and style controls as well as how to use WPF/ANT/GTK/QT (or other) user controls. The GUIs created will then be made functional with a focus on event handling and data binding.

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

## Learning Outcomes

On completion of this unit the student will be able to

1. *Design and build object-oriented solutions using both fundamental and advanced object-oriented concepts to be able to address business requirements.*
2. *Implement persistence in created applications to allow created applications to store and read data from multi-user database management systems.*
3. *Design applications that leverage object-oriented design principles to ensure best practices are adhered to.*



## 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 utilised 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

On completion of this unit the student will be able to

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.

# 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 becoming widely available.

This course will focus on network security concerns related to hardware, software, network and physical access. Industry standard best practises will also be explored.

Knowledge of threats and attacks is important in order to appreciate the potential consequences to an organization and implement defence mechanisms.

## Learning Outcomes

On completion of this unit the student will be able to

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.

# Financial Accounting and Reporting

**Unit level (MQF):** 5

**Credits:** 6

---

## Unit Description

This unit is intended to provide a thorough introduction to financial accounting and the reporting thereof. This will also include an insight into the basic international accounting standards, as well as the pertinent local legislations regulating the reporting of financial data.

At the initial stages learners are introduced to the basic accounting concepts, starting from the conceptual framework and the double entry. This makes the unit suitable to learners who are just starting to study accounting. The unit will then continue developing and students are introduced to several accounting standards, as well as briefly touch upon some obligations set out by the Maltese legislation, namely the Companies Act and the Value Added Tax Act.

Next, the preparation of Financial Statements for various types of businesses and group structures will be covered. This will enable learners to produce financial information in accepted formats for publication. Learners should at this point have the necessary knowledge and skills to prepare an array of financial statements for different structures, from both complete and incomplete records.

Towards the end of the unit a selection of different accounting ratios will be covered, amongst which ratios that are used by the management, investors, bankers and financial analysts.

By the end of the unit, the learners should have the underpinning knowledge and understanding to prepare, evaluate, interpret and compare financial data presented in financial statements.

## Learning Outcomes

**On completion of this unit the student will be able to**

1. *Recognise the importance of the entities' financial reporting for the different users.*
2. *Compute basic double entries for an array of transactions.*
3. *Produce financial statements for a range of entities, whom are different by nature.*
4. *Explain and compare financial data through the use of ratios.*

## 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 student 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.*

## Internet Marketing in Business

**Unit level (MQF):** 5

**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.

## Learning Outcomes

On completion of this unit the student will be able to

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 - Organisational.*



# Managing Financial Resources and Decisions

**Unit level (MQF):** 5

**Credits:** 6

---

## Unit Description

### WHAT IS 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.

## Learning Outcomes

**On completion of this unit the student will be able to**

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.*

# 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.

## Learning Outcomes

On completion of this unit the student will be able to

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.*



## Virtualisation

**Unit level (MQF):** 5

**Credits:** 6

---

### Unit Description

Nowadays virtualisation plays a key role in the IT industry. Companies are no longer dedicating physical servers for every system that is deployed. There are different models that an organisation may use to take the advantage of virtualisation within their day to day operations.

Through this course, learners will be exposed to the planning, installation and management of virtualised environments. The importance of monitoring, backups and redundancy will also be stressed.

A significant number of practical exercises will be carried out and learners will be able to put every aspect of the theory covered into practise. This unit is not tied to any particular virtualisation solution vendor and therefore can be adapted according to the need of the institution.

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

### Learning Outcomes

**On completion of this unit the student will be able to**

1. *Assess the use of various technologies used in the implementation of virtualised environments.*
2. *Implement a virtualisation solution for a given scenario.*
3. *Monitor and troubleshoot a virtualised environment.*
4. *Implement high availability in a virtualised environment.*

## Unit: ITNET-506-1602 Networking Concepts

**Unit level (MQF):** 5

**Credits:** 6

---

### Unit Description

Computer networks are vital in different areas of our lives. The 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

On completion of this unit the student will be able to

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.*

# Fundamentals of Leadership and Management

**Unit level (MQF):** 5

**Credits:** 12

---

## Unit Description

Effective management is fundamental to the success of any organisation. An understanding of the different types of organisational structure, and the ability to analyse an individual's own organisation and an individual's place within it are therefore critical to an individual's ability to manage effectively.

This module focuses on the principles of management, in terms of the management of people, systems and self. It also identifies the importance of management skills in the strategic context, personal skills for the delivery of quality customer service and the increasing importance of organisations operating in a socially responsible manner.

The syllabus topics have been chosen to develop the student's knowledge and understanding of organisational structures and theories, institutional management issues and their importance for effective management within the workplace. The module also allows students to appreciate the importance of effective organisational management when dealing with customers and other external stakeholders.

## Learning Outcomes

**On completion of this unit the student will be able to**

1. *Ensure an adequate level of management skills in order to boost personal performance over time.*
2. *Evaluate the features of selected management and leadership styles, the theories of group operations, motivation and theory to ensure a high level of effective management.*
3. *Outline the legal background of employing staff, together with the procedures and systems involved in their recruitment for long-term development.*
4. *Apply different structures of organisation and related theories according to the specific corporate culture.*
5. *Demonstrate a broad understanding of the strategic importance of management skills at individual, team and institutional levels for a better socially responsible organisation.*
6. *Evaluate the external environment and its key stakeholders.*

## Research Methods 1

**Unit level (MQF):** 5

**Credits:** 6

---

### Unit Description

Research is conducted in many ways in a wide variety of contexts and for different purposes. Research can have a considerable impact upon organisations and their employees.

The intricacy of organisational issues makes it difficult to understand them fully. Issues are complicated when they involve many interconnected causes and consequences. Researching an organisational issue or problem involves additional stakeholders who bring with them additional tensions and this unit is designed to highlight these tensions with an aim to develop learners' relationship skills with stakeholders.

Research is rarely straightforward and is undertaken by means of individual and self-contained stages; the research process is more integrated.

To avoid disorder Research Methods 1 is designed to prepare learners to successfully undertake supervised research projects by working within an orderly framework. The unit aims to develop learners' understanding of research by identifying and developing appropriate techniques for the purposes of individual research. Research skills will be of value to learners' future career.

The unit is designed to provide learners with an awareness of the research stages required to complete the research process by considering research methodologies and types of research data that can be used and their appropriateness for particular types of research.

### Learning Outcomes

On completion of this unit the student will be able to

1. *Describe the basic research process model.*
2. *Explain the importance of research.*
3. *Identify stakeholders in research and ethical considerations.*
4. *Produce a research proposal by applying data handling techniques and interpreting key data.*

## 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

On completion of this unit the student will be able to

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.*

## Research Methodologies II

**Unit level (MQF):** 5

**Credits:** 6

---

### Unit Description

This unit utilises and builds on the knowledge and understanding developed in Research Methods 1 and is designed for students who wish to develop their personal and professional research skills.

A key skill is an ability to analyse situations and use investigative techniques to underpin problem solving and decision making. Therefore, research training is fundamental to academic and professional development and this unit designed to help students develop the skills to undertake a supervised research project, relevant to their course and of their choice.

This unit is designed to be practical in nature and as such both the contents and processes are to be assessed to ensure that the learner can demonstrate both knowledge and application of that knowledge in the context of a research project. This unit is designed to encourage students to systematically gather and analyse relevant research literature to underpin a robust research question and to evaluate and research and methods suited to their chosen topic.

This unit is designed to encourage students to think critically and enhance the learners' critical thinking, analysis and interpretation of qualitative and quantitative data. This unit encourages the development of effective problem solving and decision making, communication and time management skills.

### Learning Outcomes

On completion of this unit the student will be able to

1. *Demonstrate fundamental research skills.*
2. *Plan & carry out a research project.*
3. *Present findings of the research including the application of data handling techniques.*
4. *Outline the implications of these findings for 'best practice'.*

# Enterprise Programming

**Unit level (MQF):** 5

**Credits:** 6

---

## Unit Description

This unit will provide students with a level 5 theoretical knowledge on how enterprise applications are designed and built and expose them to create well defined business logic that can meet the clients' requirements.

Students will learn about the various software architecture styles available and the role that software architecture plays in the development of larger scale software applications. These will be strongly coupled with software patterns and the capabilities that will be offered within the enterprise to adhere to common entities or policies set up by the client. Furthermore, students will gain the necessary knowledge on the provision of common interfaces that may be applied by other applications. They will also identify common frameworks to keep a common standard of design and development of software applications.

Through these units' students will have a deep insight business logic and acumen to understand and meet with the clients requirements and moving along in grasp a better understanding of the what is involved in the actual configuration management and the scalability needs for such large scale applications. This will also prepare the students to appreciate the specific security requirements needs to safeguard enterprise knowledge and share the common capabilities amongst the various applications that may developed.

This unit will also allow students to appreciate the complexity of cloud services, the notion of cloud services and how it is utilised in such large scale enterprise as well as have a taste at uploading applications. Students will be able practice uploading test applications to a specific cloud services community.

## Learning Outcomes

**On completion of this unit the student will be able to**

1. Identify the importance of software architecture and its role within enterprise applications.
2. *Describe and illustrate the different software patterns used to design large scale software.*
3. *Discuss the capabilities, configuration and management tactics involved in designing and delivering enterprise software.*

4. *Outline the use of cloud services and the method of uploading content.*

MCast

## Business Intelligence & 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 organisations. 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

**On completion of this unit the student will be able to**

1. *Discuss the ways in which data warehousing coupled with Business Intelligence technologies help to meet the data requirements of strategic decision makers within organisations.*
2. *Design the schema for a data warehouse to meet a given set of requirements and implement the said model as a relational data warehouse.*

3. 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.
4. 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.



## Project

**Unit level (MQF):** 5

**Credits:** 6

---

### Unit Description

The rise and evolution of network technology and the internet has made significant changes and improvements to the world around us. Individuals, businesses and countries have benefited greatly through global dissemination of information, growth of electronic commerce, and business innovation through collaboration.

Recent technology trends and the rapid and significant developments in mobility and cloud computing have all played a major role in promoting and enhancing growth in global economies. Whilst this growth and the benefits derived from it have been welcomed they have compounded to a growing shortage of highly skilled employees with the necessary skillsets to work within the industry.

The primary aim of the MCAST Higher Diploma in Network Design and Implementation is to provide participants with a comprehensive range of knowledge and practical skills in designing, building and maintaining computer network infrastructures.

The structure of the award and the inclusion of units particularly in the areas of Virtualisation, cloud computing, network security and intrusion prevention will ensure the award is well placed to address the growing demand for the aforementioned skillsets.

The purpose of this unit is to allow students to demonstrate the practical and technical skills they have acquired whilst studying on the diploma.

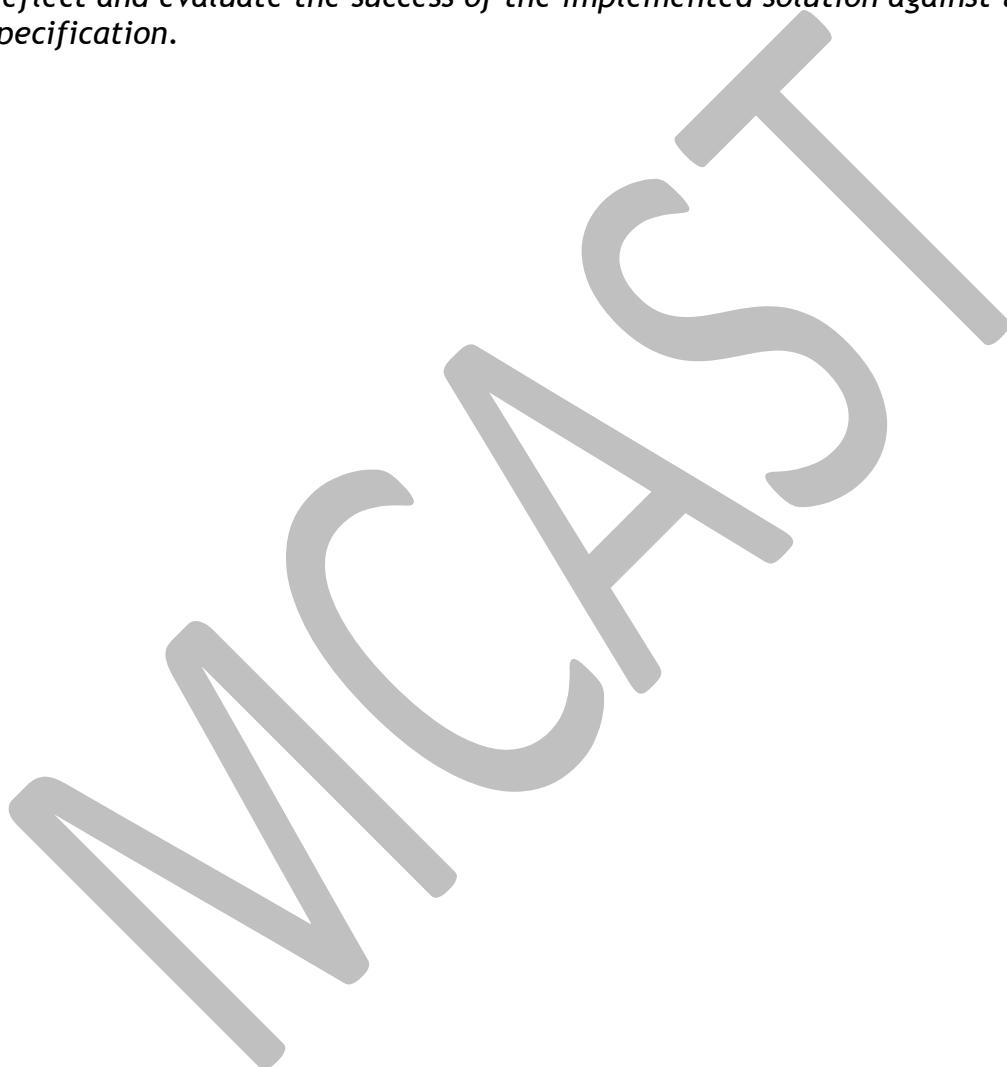
The unit should help students to consolidate their learning of network design, implementation and maintenance and should help students considering a career in IT with a particular emphasis on networks gain successful employment or progression to studies at a higher level.

Students should be encouraged to choose a project in an area of their own specific interest derived from the course. The chosen project should however allow the students to demonstrate their competence in the field of network design and should reflect the other units they have learnt on the course namely, installation and configuration of computer platforms, management of databases and Content Management Systems, Virtualisation/Cloud computing and Wider Area Networks, and network security.

## Learning Outcomes

On completion of this unit the student will be able to

1. Analyse a networking project assignment brief and develop a solution to meet a given specification.
2. Plan and organize a technical solution that meets the given specification.
3. Implement the chosen solution in phases through to project completion.
4. Reflect and evaluate the success of the implemented solution against the given specification.



# 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.

## Learning Outcomes

On completion of this unit the student will be able to

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.*



## 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 student 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.*

## 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 a 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 student 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.*

## Handling Business Data and Statistics

**Unit level (MQF):** 6

**Credits:** 6

---

### Unit Description

This unit emphasises the student's ability to make sense of data-sets and the statistical processes used to analyze them since this involves a dynamic rather than a static numerical exercise. Statistics is the science of collecting and interpreting data, and then using this data to draw inferences. This unit will discuss the collection, summarization and interpretation 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 data and statistical results should serve as a springboard for sound business decision-making; the former feeds the latter in real-time business terminology applying economic indicators to reflect the increasing dynamism of a business enterprise.

### Learning Outcomes

On completion of this unit the student will be able to

1. *Summarise, present and interpret data appropriately by using adequate descriptive techniques.*
2. *Describe, evaluate and justify the use of sampling methods and techniques.*
3. *Make inferences related to a business scenario by using confidence intervals and hypothesis testing.*
4. *Analyse and generalise the relationship between two variables.*

## 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.

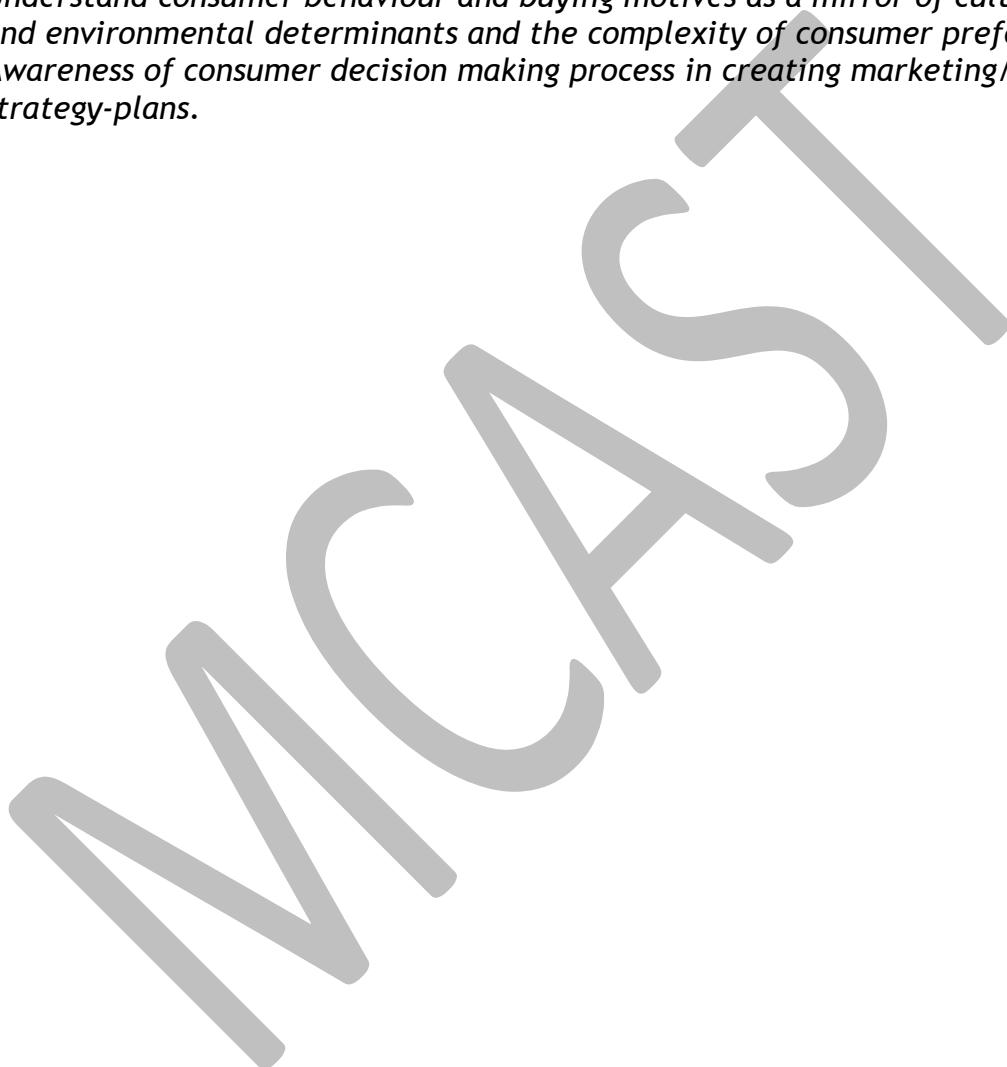
Consumers buy what they understand and what they see value in. Consumer behaviour also provides with insight on how to create an effective marketing strategy. If we do not understand our consumers, how can we possibly market to them and serve them? Companies often fail to gain an understanding of what 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.

## Learning Outcomes

On completion of this unit the student will be able to

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.*



## IT Project

**Unit level (MQF): 6**

**Credits: 6**

---

### Unit Description

In this unit, students will be studying the research methods which may be applied to the results and discussions section in their thesis. They will be guided in the development of conclusions and inferring patterns from their results, and will learn how best to interpret and explain data gathered as part of their research. This module is intended to help students working on their final year projects and the practical assessments will be based in part on their project work.

### Learning Outcomes

On completion of this unit the student will be able to

1. Define research scope.
2. Identify the correct approach for a given research problem.
3. Explain different research methodologies.
4. Present information and conclusions effectively.

## Content Management Systems

**Unit level (MQF):** 6

**Credits:** 6

---

### Unit Description

When learning how to program students typically write short programs all by themselves. This contrasts with the reality of most workplaces which require employees to work in teams on larger projects. A content management system supports a number of users working in an environment that promotes synergies for people to achieve their goals. Enterprise-level software is more complex and typically requires a future-proof architecture that keeps maintainability and extendibility manageable.

The unit starts by exploring the anatomy of a Content Management system; a system that has stood the test of time. Furthermore, it considers how its design maintains the delicate balance between simplifying extendibility and keeping conflicts and bugs in check.

Next, learners can explore how this architecture can be extended through the creation of themes, plugins, and REST API applications.

Themes allow the programmer to modify the look and feel of the software. While it focuses on design, other development considerations such as responsiveness, and support for different layouts come into play.

Plugins, on the other hand, allow the developer to extend the functionality of the application via self-contained modules that can easily be activated or deactivated by a website administrator.

Finally, REST API application development allows one to write and integrate external applications that can have their own independent architecture and that can be written using an entirely different programming language. Although the unit is software intensive, it also covers administration topics such as authentication and authorization, configuration, and module management.

## Learning Outcomes

On completion of this unit the student will be able to

1. Identify the features and functionality of an extendible content management system.
2. Activate and customise a versatile and responsive theme that supports multiple layouts.
3. Install and set up several plugins including ones that incorporate settings and short-codes.
4. Integrate an external application capable of communicating with the content management system through a REST API.

