



# MCAST

## **MQF Level 4**

### **Advanced Diploma in IT (Computer Systems and Networks)**

**IT4-A1-21**  
**IT4-A1-21G**

**Course Specification**

## **Course Description**

This course is the first step towards entering the field of computer networks. It will provide the learners with core computer networking skills. At this level, students will be exposed to the design, implementation and administration of small to medium sized networks. The first year of this course will be common for all advanced diploma students. During the second year, students will be focusing on networking subjects such as LAN switching, routing, server management and virtualisation.

## **Programme Learning Outcomes**

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

- 1. Identify the ideal infrastructure components for a given requirement.*
- 2. Diagnose and solve problems in an existing computer network.*
- 3. Deploy and manage virtual infrastructure services.*
- 4. Monitor and document network infrastructures.*

## **Entry Requirements**

MCAST Diploma in IT

or

MCAST Diploma in iGaming

or

4 SEC/O-Level passes/SSC&P (Level 3) passes

Compulsory: Mathematics and one subject from Computer Studies, Physics, Information Technology

Preferred: English Language

**Current Approved Programme Structure**

<b>Unit Code</b>	<b>Unit Title</b>	<b>ECVET/ECTS</b>	<b>Year</b>
ITDBS-406-1501	Database Concepts and Design	6	1
ITSYS-406-2003	Computer Systems	6	1
ITSFT-406-1501	Fundamentals of Scripting	6	1
ITSFT-406-2000	Logic Programming	6	1
ITNET-406-2002	Networking Concepts	6	1
ITWEB-406-1501	Website Design	6	1
ITSYS-406-1503	Embedded Systems	6	1
ITMMD-406-1501	Introduction to Multimedia Design	6	1
CDKSK-406-2001	English	6	1
CDKSK-406-2007	Mathematics	6	1
ITNET-406-1502	LAN fundamentals	6	2
ITNET-406-2003	Infrastructure Design	6	2
ITSTY-406-1501	Computer Security	6	2
ITDBS-406-1502	Relational Databases	6	2
ITNET-406-2004	Network Administration	6	2
ITNET-406-1505	Routing and WAN	6	2
ITNET-406-1506	Virtualisation	6	2
ITPRJ-406-2011	Project	6	2
CDKSK-402-2104	Community Social Responsibility	2	2
CDKSK-404-1915	Employability and Entrepreneurial Skills	4	2
ITCMP-406-1612	Vocational Competencies in Computer Systems and Networks*	6	2
<b>Total ECVET/ECTS</b>		<b>120</b>	<b>/</b>

\*Students that are not on apprenticeship are offered CDKSK-406-2000-Critical Thinking in exceptional circumstances.

# ITDBS-406-1501 Database Concepts & Design

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

Today, in a challenging and fast paced environment, businesses and organizations need to be able to make quick responses in order to remain competitive and meet information demands. Databases are central in supporting core business processes and information systems and therefore need to be as efficient and accurate as possible.

This unit is relevant to learners wishing to develop a sound understanding of the features and functions of databases, and skills in designing and building an efficient database to meet specified requirements and provide accurate information. The unit will introduce the background database concepts and key design methods integral to creating a working database with validity and integrity. No previous competence with a database is assumed.

Learners should develop the underpinning knowledge and understanding through the database design and build process to enable efficiency and accuracy in terms of both structure and data. Learners will design and construct relationships through the process of normalisation, identifying entities and attributes, applying appropriate data types and other properties for implementation within a database application. Database structures will be enhanced by the learner using a variety of software and SQL features that allow for the creation and alteration of tables.

On completion of the unit learners will be familiar with essential database theory and design methods. Learners will be able to implement these within database application software and use a range of SQL techniques to manage the database structure.

## Learning Outcomes

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

1. *Explain the features of a database and a database management system (DBMS).*
2. *Explain and use database design methods to create a relational database structure.*
3. *Implement a relational database design with the use of structured query language.*

# ITSYS-406-2003 Computer Systems

**Unit Level (MQF): 4**

**Credits: 6**

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## Unit Description

The purpose of this unit is twofold: to understand the main components of a computer system including the principal aspects and functions of both the hardware and the software components. Secondly it addresses the general skills to recommend the appropriate systems for business purposes which includes the setup, testing and the maintenance of a system.

The unit will start off describing different hardware components and their application of use. It will then go into the different flares of operating systems and illustrate the use of some. Software utilities will be mentioned and a few examples will be given.

Computer Security is an integral part in computer systems and some recommendations will be pointed out.

Learners will be assessed on all of the above and they will also understand the true meaning of computer systems. This involves having the student appreciate the skill set required to be knowledgeable in computer systems and relate to several technical terminologies.

The specific objective of this unit is that the learner undertakes a logical / correct sequence of what computer systems are and be able to recommend different setups to a business environment.

## Learning Outcomes

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

1. *Explain the main components of a computer system.*
2. *Evaluate the scope of operating systems and the different uses.*
3. *Demonstrate different types of software utilities.*
4. *Apply knowledge to recommend, setup and configure systems.*

# ITSFT-406-1501 Fundamentals of Scripting

**Unit Level (MQF): 4**

**Credits : 6**

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## Unit Description

This unit has been designed to teach learners the fundamentals of scripting in the context of procedural paradigm irrespective of framework or delivery platform. The development of procedural code is still at the core of many embedded systems even when it comes to event driven systems and object oriented platforms.

This unit enables learners to become familiar with the underpinning concepts of scripting languages and assumes no prior knowledge of scripting. An introduction is given to the concepts of programming, particularly as contrasted with scripting. A scripting language is introduced and the basic sequence such as variables, conversions, expressions, statements and functions will be covered.

Following these basics, conditionals and iterations will be introduced to cover the basic structure of a procedural programming. For data storage, strings and files will be covered with particular focus on file manipulation - a common task in automation scripts.

Learners will use a structured approach to the design and development of scripting applications, ensuring the solution is well documented and thoroughly tested against the original user requirement.

This unit will set the stepping stone for the Embedded System unit which will guide learners through the basis of common system architectures, Operating Systems (OS) management, I/O interfaces and control.

## Learning Outcomes

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

- 1. Understand the features of a scripting language in context of procedural programming paradigm.*
- 2. Use the tools and techniques of a scripting language to build console applications.*
- 3. Design and develop console applications using a scripting language for a specific use.*
- 4. Demonstrate the use of console applications using a scripting language for a specific use.*

# ITSFT-406-2000 Logic Programming

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This unit has been designed to teach learners the basic programming techniques to build an application. It is a skills-based unit and is designed to allow the learners to understand and apply the necessary skills to create interactive applications.

This unit presents the theory and practice of programming languages in different scenarios. This is a practical unit and the focus is to introduce and revise basic programming techniques. This unit is delivered using Digital Game Based Learning techniques. This will motivate the students to learn more in a fun and interactive environment.

The first part of the course will introduce basic concepts used in programming languages such as variables, loops, functions, events, arrays and objects. After learning the basics, the students will learn how to create interactive applications using these methods.

Flowcharts are also introduced as a diagrammatic representation of algorithms in order to help learners think logically when building applications. During this unit, learners will be introduced to different flowchart symbols and techniques to build a working application.

Learners will also be introduced to debugging and testing techniques to minimise logical errors in their applications. They will be assisted to understand how to use debugging techniques such as watch on variables, breakpoints, step-in and step-out, etc.

Once learners complete this unit, they will be ready to proceed and learn to build more advanced applications.

## Learning Outcomes

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

- 1. Plan and develop logic for an application.*
- 2. Use and explain the features and techniques of a programming language.*
- 3. Construct and apply algorithms to solve simple programming problems.*
- 4. Show the ability to prepare an application for release.*

# ITNET-406-2002 Networking Concepts

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This is a theoretical-based unit during which learners will be exposed to basic concepts on data networking as a foundation to other network-related units.

Learners will appreciate the reasons behind the growth of networks, with a quick look at the origin of PC networks and the Internet, and some of the benefits of networks. The role of network standards is also discussed with an overview of the major standards bodies. The Open

Systems Interconnection Reference model (the OSI model) is then discussed in detail. Learners will be exposed to the concept of protocol layering in order to better understand the functions of the OSI stack. The differences between connection-oriented and connectionless services are explained as part of the discussion of the different levels of network quality-of-service required for different Internet applications (ex. SMTP in Email, VoIP, HTTP etc.)

This unit will also cover TCP/IP fundamentals and the two basic protocols from which it takes its name, Transmission Control Protocol (TCP) and Internet Protocol (IP). Learners will understand the TCP, IP, UDP datagrams and TCP/IP addressing. Address assignment is also covered considering that this is a critical part of network design and deployment. Learners will understand how IP addresses are structured, how name resolution and human-recognizable hostnames are resolved to numeric addresses using DNS. The evolution of IPv4 to IPv6 to cater for more flexibility in IP addressing schemes will also be covered.

The unit will also cover practical aspects of networking concepts. Learners will be able to configure TCP/IP properties and make use of TCP/IP utilities for network troubleshooting. Learners will also make use of applications such as wire-shark in order to inspect data packets.

Throughout the unit, learners will be provided with hands-on experience on selected aspects, and discussions will be facilitated, prompting the learners to brainstorm ideas based on the learning outcomes. On completion of the unit, learners would be able to apply theory into practical applications and have a solid foundation for subsequent units related to data networking.

## **Learning Outcomes**

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

1. *Explain the Use of Networks, Network Types and Architectures.*
2. *Explain the Role of Network Protocols and Models.*
3. *Familiarise with the Transmission Control Protocol / Internet Protocol (TCP/IP).*
4. *Configure and trouble-shoot TCP/IP.*

# ITWEB-406-1501 Website Design

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

Effective website design is central to successful website production. Designers need to present an appropriate image to consumers and maximize opportunities to capture and retain interest. Sites need to be accessible to all and attention also needs to be given to usability issues such as navigation to enable users to access all aspects of a site with ease. Web users will quickly navigate away from poorly designed sites.

This unit follows the development of a website from initial requirements through design, build, test and review.

Learners will develop skills in using design techniques, together with hypertext markup language (HTML) and cascading style sheets (CSS) and build an interactive website using JavaScript. Learners will prepare the site for publication on the internet. This will require learners to be confident in carrying out more advanced techniques and to have the underpinning knowledge and understanding to test functionality, ensuring the site is fully operational in different browser environments and is compliant with copyright and accessibility guidelines

The unit is relevant to learners wishing to learn and develop skills which can be used to provide website solutions in a variety of contexts.

## Learning Outcomes

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

1. *Prepare a website with the latest mark-up language.*
2. *Design a website using the latest styling technology.*
3. *Create interactivity in the website using JavaScript and a JavaScript Framework.*
4. *Upload, test and review created website.*

# ITSYS-406-1503 Embedded Systems

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This unit is a continuation of the unit Fundamentals of Scripting. This unit has been designed to teach learners the knowledge, skills and competence gained from the 'Fundamentals of Scripting' unit and put it into practice by implementing the constructs in an embedded system. This is a skills based unit and will allow learners to demonstrate they have the necessary skills to be able to understand and work with an embedded system.

The unit will guide learners through the basics of common system architectures, Operating Systems (OS) management, I/O interfaces and control. Learners will use the scripting language concepts learned in the 'Fundamentals of Scripting' unit and as a consequence should be able to operate effectively at more than a basic level of competence before commencing this unit.

An introduction is given to the embedded system covering its major hardware components, installation of the Operating System (OS) and basic configurations.

Following these basics, an introduction to scripting commands such as but not limited to: accessing files, processes and permissions will be covered with a particular focus on administration of the Operating System (OS) with command line.

Scripting language specific features are also revisited from the unit 'Fundamentals of Scripting', including the basic constructs, functions and modules. A number of practical tasks can be associated with this module, including programming digital input/ output, blinking LED, face detection and scheduling commands with cron.

During this unit, learners will be able to create small projects such as a cron lamp timer, simple soundboard and photo booth.

## Learning Outcomes

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

1. *Illustrate and develop the fundamental components of an embedded system.*
2. *Produce and describe a simple embedded system proposal for a specific use.*
3. *Prepare and configure hardware and software to manage an embedded system.*
4. *Manipulate and develop a simple embedded system solution for a specific use.*

# ITMMD-406-1501 Introduction to Multimedia Design

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This unit is designed to introduce the learner to the concepts and principles applied to the design and development of simple yet interactive multimedia applications. The unit will appeal to those with an interest in animation, computing, sound or graphic design. Learners will develop a methodology of working which will take them through the stages of development from analysis and planning through to design and finally the implementation and initial testing of a multimedia product to an advanced prototype state. Learners are prepared for this by providing them with the knowledge needed to carry out this type of development. In addition, they will gain an understanding of current terminology and the wide and varied applications of multimedia.

This is a valuable unit for learners since multimedia is used everywhere from educational applications and product advertising, to games and entertainment. Sound, animation, video and graphical art are expected to be components in most applications, therefore it is important to know how and when to apply these components to enhance the user experience. The learner will be introduced to user-orientated design and prototyping and also to Graphical User Interface (GUI) features and design conventions followed to encourage intuitive interaction.

Following planning and design, the learner will go on to develop a small application; they will use storyboards and mood boards to assist the planning and will learn to integrate multimedia components into the final product. The final product will be developed to an advanced prototype standard.

On completion of the Unit learners will understand the processes involved in the design and development of a small interactive multimedia application. They will be able to develop component parts such as audio, animation and graphics. They will learn about interactivity and user-orientated design, and will apply their learning to develop a small and potentially interactive prototype application.

## Learning Outcomes

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

1. *Plan the multimedia components for a small interactive application.*
2. *Use appropriate tools and techniques to develop the design of the application.*
3. *Design the application using a user-orientated approach.*
4. *Build an advanced prototype multimedia application in accordance with the design.*

# ITNET-406-1502 LAN Fundamentals

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This is a theoretical-based unit during which learners will be exposed to concepts on LAN networking equipment and protocols. Learners will acquire knowledge on how signalling and data access takes place in a multi-node network environment. Different LAN protocols will be covered in detail, in particular the various flavours of the Ethernet standard (including Fast Ethernet and Gigabit Ethernet) and its evolution throughout the years to meet the increasing demands of network throughputs. Wireless LAN technologies will also be covered as part of this unit, including an overview of wireless LAN components and related protocols. Learners will distinguish between the various wireless modes, configuration options and will also be able to setup small wireless networks through guided hands-on lab sessions. Learners will appreciate the benefits and limitations of wireless networks and will cover technologies such as WiFi, Bluetooth and RFID.

The unit will also cover theoretical and practical aspects of hubs, bridges and switches and their specific function within a LAN environment. Learners will be able to understand how active equipment can be used to extend a LAN or interconnect LANs together. Learners will be able to recommend the selective use of wired and / or wireless technologies, based on requirements provided. They will be also able to justify the use of protocols and suitable networking equipment for a LAN implementation. Throughout the unit, the importance of standards will be covered, making reference to industry standard protocols established by standard bodies.

Learners will also understand the importance of managing a LAN through proper fault, performance and security management. Network management solutions will be discussed and performance analysis tools will be covered as part of this unit.

Throughout the unit, learners will be provided with hands-on experience on selected aspects, and discussions will be facilitated prompting the learners to brainstorm design ideas based on the learning outcomes. On completion of the unit, learners would be able to apply theory into practical applications and provide solutions to requests for simple wired and wireless LAN requests.

## Learning Outcomes

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

1. *Explain the differing methodologies used in LAN signalling and access.*
2. *Implement wireless LANs.*
3. *Use networking equipment to interconnect LANs.*
4. *Perform basic LAN management and trouble-shooting.*

# ITNET-406-2003 Infrastructure Design

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This unit will provide students with the knowledge and practical skills required in assessing and analysing the requirements of establishing an enterprise data communication infrastructure. The unit starts off with an overview of the evolution of computer networks and emerging trends in the technology of internetworking. Since its inception by DARPA research, the technology of interconnecting computer machines in geographically disparate locations has given inordinate leverage to the creation, manipulation, and dissemination of knowledge through what is known as the Internet. It is, therefore, necessary for IT professionals to acquire an in-depth understanding of the physical and logical design of digital communication and connectivity. This unit focuses on concepts and skills pertinent to the planning, design, installation and maintenance of Local Area Networks. During the course of this unit, students will learn about the different cabling techniques and systems using the various types of copper and fibre optic cables.

Focus will also be placed on the physical layer of the OSI model, installation of cable cabinets, network equipment shelving, and concepts related to the configuration of certifiable cable plants. Students will receive comprehensive coverage on cabling management, conduit and trunking, connections points, and current methodologies of copper and fibre optic cabling. Students' practical skills in the utilisation of location maps, when planning for cable installation, will be enhanced. Other planning considerations such as power and environmental needs will be covered theoretically. However, the majority of student exercises in this unit will be based on practical exercises in specialist computer networks laboratories.

## Learning Outcomes

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

- 1. Outline and discuss the major milestones of computer network evolution and the current methodologies of digital communication and interconnectivity.*
- 2. Explain the process involved in selecting appropriate types of cables, network connection points, and cabling methodology through the demonstration of strengths and limitations of these types for the implementation of an enterprise-level infrastructure.*
- 3. Discuss and identify the specific power, cabinet and shelving, cable trunking and other environmental requirements for the installation of a functioning Local Area Network.*

# ITSTY-406-1501 Computer Security

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

The aim of this unit is to ensure students gain knowledge about a range of potential attacks that computer systems are exposed to. The overall strategy for this unit is to explain different attack vectors, launch attacks in a lab environment and then understand and implement the security measures to protect computer systems from such attacks.

The learner will a broad learning curve in physical and application security, outlining key concepts on how to secure systems to further enhance the CIA (confidentiality, integrity and availability) of platforms.

Learners will be assessed on all of the above and they will also understand the true meaning of operating systems. This involves having the student appreciate the skillset required to be knowledgeable in operating systems and relate to several technical terminologies.

The specific objective of this unit, is that the learner undertakes a logical / correct sequence of what computer security is all about and be able to relate to different terminologies and suggest systems as per best practices.

## Learning Outcomes

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

1. *Explain the basic concepts of computer security.*
2. *Experiment with physical and Operating System security.*
3. *Implement cryptography and the different usages.*
4. *Deploy network security.*

# ITDBS-406-1502 Relational Databases

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

Today, every business and organization need to have some form of IT system in order to function efficiently and be able to cope with competition. Databases are therefore a necessity in order to persist the data generated on daily basis. Data retrieval from these data sources is a core component in every type of information system.

Relational Databases is a unit which is relevant to learners wishing to develop the skills required to carry out different database operations through the use of Structured Query Language (SQL). SQL is considered as the official language used by database and information system developers to manage and interrogate the information held in Relational Database Systems. The unit will introduce a number of different querying techniques to add, update, remove and retrieve data. The content of the unit is practical in nature and provides the knowledge and skills to create reliable, efficient and effective SQL commands. The learner should be able to generate reports which output all the information indicated by the user, in order to meet the business requirements.

This unit will not require the learner to have any previous knowledge of SQL. It is designed to be delivered as a continuation of Database Concepts & Design as part of the Extended Diploma in IT (Software Development) although it may also be delivered as a standalone unit.

On completion of this unit, learners will be familiar with the majority of the basic querying concepts. Learners will be able to make use of different querying techniques to handle data stored in a DBMS.

## Learning Outcomes

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

1. *Create basic queries to manage data held in a relational database management system (RDBMS).*
2. *Use different functions within SQL to meet user requirements.*
3. *Use different querying techniques to retrieve more complex user requirements.*

# ITNET-406-2004 Network Administration

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

This unit is a learning and practical based unit which will guide the students through various aspects and concepts of network design and administration, mainly focusing on today's small to medium sized enterprises. Students will be guided into understanding the principles and hands-on work required for designing, setting up, maintaining and managing day-to-day operations of a network. The unit will provide learners with a good understanding of the requirements of today's enterprise networks, and of how to endorse, tune, and troubleshoot networks within a given a set of requirements or scenarios.

The student will also gain the necessary insight on whether to base further studies on the subject, while clearly illustrating which areas of skill need further academic pursuit.

The roles and responsibilities of a network administrator will be clearly defined for basic tasks to be performed, while highlighting areas which would need further knowledge and learning.

## Learning Outcomes

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

- 1. Describe, the concepts of IT networking and the role of a Network Administrator within such scenarios.*
- 2. Define and identify the physical, conceptual and logical building blocks of LANs.*
- 3. Recognise the technical challenges and solutions brought about by the needs of mobility and geographically dispersed environments within today's dynamic corporations.*
- 4. Illustrate and explain the roles and best practices of network administration.*

# ITNET-406-1505 Routing & WAN

**Unit Level (MQF): 4**

**Credits : 6**

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## Unit Description

The growth and complexity 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. As more businesses have connected to the Internet they have found they are no longer confined to the Local Area Network and now find many more opportunities to communicate collaborate and interact in new ways.

In its simplest term the Internet can be thought of as a huge mesh of Local Area Networks all connected together, sharing resources and information. Connected to each of these Local Area Networks are countless different devices and technologies but none no more important that the Router. The Router is the primary device which makes the communication possible since its primary function is to connect different networks together and route traffic between those networks, by selecting the best path to a destination and forwarding traffic to the next router along the path, until it finally reaches its intended destination.

The aim of this unit is to provide learners with an understanding of the basic routing concepts and technologies required by Local area networks (LANs) and Wide area networks (WANs) to efficiently and effectively to communicate and collaborate on the Internet.

Learners will be introduced to network protocols such as TCP/IP and how these are regulated for use in LANs and WANs by the OSI reference model. They will learn how IP addressing is constructed and used in both the Local and wide area networks and gain an understanding of the differences between IPv4 and IPv6.

Learners will gain an understanding of the functions of a router and how they can be configured and used for both static and dynamic routing. By the end of the unit they will be able to identify and describe the different types of routing protocols in particular RIP, EIGRP, OSPF, RIPng and OSPFv3 and how they are governed by the IP addressing scheme being used namely IPv4 or IPv6.

Learners will be introduced to Inter-VLAN routing within a switched network and how layer 3 switches can be used to provide basic routing functionality. They will gain and understanding of the importance and benefits of using VLANs to segment a network and how they can be used in conjunction with trunk links and the VTP protocol to manage the routed traffic within the network.

Finally, learners will develop knowledge and skills in WAN technologies and services and will be able to explain in detail the different types of WAN infrastructure namely private and public and the protocols that can be implemented and used for each model.

## **Learning Outcomes**

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

1. *Explain basic Internetworking concepts.*
2. *Identify and explain Routing fundamentals and protocols.*
3. *Describe Inter-VLAN routing in switched networks.*
4. *Explain WAN Technologies and services in enterprise networks.*

## **ITNET-406-1506 Virtualisation**

**Unit level (MQF): 4**

**Credits: 6**

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### **Unit Description**

This is a learning based unit and will provide an entry knowledge level into virtualisation, particularly its use and function, application to different sections of the IT world. The learner will also be able to distinguish between different virtualisation technologies and where one would expect them to be deployed. The learner will be knowledgeable about the core components of virtualised environments, the mechanisms used, the functional structure, requirements and dependencies,

The unit is intended for students who would like to gain a grounding knowledge of one of the most important technical concepts in today's IT-driven world. With cloud computing being at the forefront of technology services-hosting and provisioning, a foundation knowledge of virtualisation concepts is a requirement for any student considering a career in any IT-related field. In cases where a career in IT infrastructure is considered, such knowledge would need to be compounded with further in-depth research and hands-on since it forms the skeleton on which today and tomorrow's systems run.

With virtualisation being the current (and undoubtedly, future) technology of choice at various levels, including storage, network, server, and application virtualisation, the concepts of virtualisation need to be ingrained into the minds and way of thinking of today's IT-focused professional, be at an infrastructure, application development, or data analysis level.

Students who complete this module will be able to differentiate between virtualisation types, appreciate and understand the benefits of virtualisation from a physical, environmental, management, and mobile environment, y understanding the core concepts and pillars of virtualisation, and their application to today's cloud-centric environments.

## Learning Outcomes

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

1. *Describe and explain virtualisation from a technical perspective, including the host, hypervisor, and guest layers and each of their roles in virtualised environments.*
2. *Distinguish between virtualisation types, and their application in cloud-computing, enterprise-environments, and application development in relation to today's IT-requirements.*
3. *Identify clearly and present the benefits of virtualisation for a given objective, over a non-virtualised counterpart, providing examples of virtualization in practical scenarios.*
4. *Demonstrate, with practical and functional examples, how a Virtual Machine is designed, created, and managed throughout its' lifecycle and how virtual resources are assigned to a VM during operation.*

# ITPRJ-406-2011 Project

**Unit level (MQF): 4**

**Credits: 6**

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## Unit Description

The purpose of this unit is to allow learners to demonstrate the practical and technical skills they have acquired whilst studying on the MCAST Extended Diploma in IT (Network Administration / Software Development).

The unit should help learners consolidate prior learning from other theoretical and practical units they have completed on the Diploma and should help learners considering a career in IT gain successful employment or progression to studies at a higher level.

There is a strong emphasis on academic competencies and learners will have the opportunity to develop these personal skills to a higher level.

Learners will be encouraged to choose a project in an area of their own specific interest derived from the course but which promotes research on topics that the learner is not familiar with. In doing so the learner will be provided with the opportunity to develop their research skills using investigative and analytic skills to locate resources and information and evaluate it for accuracy, currency and relevance to the project assignment.

To encourage and develop the learner's academic writing skills, they will be required to produce documentary evidence of undertaking the project assignment. Learners will be encouraged to produce evidence which is well structured, demonstrates the use of a wide range of sources to substantiate writing, incorporates citations in the text using appropriate reference systems and bibliographies.

## Learning Outcomes

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

- 1. Analyse and interpret a project brief gathering all information required to undertake the project.*
- 2. Develop and organise a solution that meets the given specification.*
- 3. Implement and revise the chosen solution through to project completion.*
- 4. Reflect and evaluate the success of the implemented solution against the project brief and the given specification.*

# ITCMP-406-1612 Vocational Competencies in Computer Systems and Networks\*

**Unit level (MQF): 4**

**Credits: 6**

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## **Unit Description**

A network engineer designs, installs, maintains and supports communication networks within an organisation or between organisations. Network engineers maintain high levels of operation of communication networks in order to provide maximum performance and availability for their users, such as staff, clients, customers and suppliers. Network engineers must understand network configuration, cloud, network administration and monitoring tools, and be able to give technical advice and guidance.

## **Learning Outcomes**

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

- 1. Identify main processes followed/practiced at the place of work.*
- 2. Use tools &/material &/equipment &/machinery to carry out safely assigned tasks.*
- 3. Communicate effectively in a workplace environment with all stakeholders.*
- 4. Review personal and professional experience achieved throughout your work placement.*
- 5. Follow good work practices at the place of work.*