LEVEL 4 DIPLOMA IN COMPUTING

(L4DC)

Qualification Unit Specification
2021
(For first assessment in Summer 2021)

Modification History

Version	Revision Description
V2.3	Updated NOS January 2020
V3.0	Added Specialisms
V3.1	Topic Updates
V3.2	"Global Examination" occurrences changed to "Time-constrained Assessment' – February 2021
V3.3	Updated grade descriptors, syllabus content and GLH

CONTENTS

1. About NCC Education

NCC Education is a UK awarding body, active in the UK and internationally. Originally part of the UK National Computing Centre, NCC Education started offering IT qualifications in 1976 and from 1997 developed its Higher Education portfolio to include Business qualifications, IT qualifications for school children and a range of Foundation qualifications.

With Centres in over forty countries, four international offices and academic managers worldwide, NCC Education strives to employ the latest technologies for learning, assessment and support. NCC Education is regulated and quality assured by Ofqual (the *Office of Qualifications and Examinations Regulation*, *see* www.ofqual.gov.uk) in England.

1.1   Why choose this qualification?

NCC Education's Level 4 Diploma in Computing is:

- **Regulated** by Ofqual and listed on the Qualifications and Credit Framework – Qualification Number 600/0406/X. The Regulated Qualifications Framework (RQF) is a credit-based qualifications framework, allowing candidates to take a unit-based approach to building qualifications.

  For more information see:

  https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels

- **Quality assured** and well established in the UK and worldwide

- **Recognised and valued** by employers and universities worldwide

- **A pathway qualification** for candidates who wish to complete the NCC Education degree journey. This qualification is equivalent to the first year of a Computing degree qualification in the UK university system and will allow access to the NCC Education Level 5 Diploma in Computing and the NCC Education Level 5 Diploma in Computing (with Business Management).

Objective

Candidates will be exposed to both the academic and vocational aspects of a wide range of computing-related subjects, enabling them to gain the necessary knowledge and skills vital for a career in the computing/business sectors or further studies.

2. Structure of the L4DC Qualification

Qualification Title, Credits, Units and Level
NCC Education Level 4 Diploma in Computing (RQF), 120 credits, all at RQF Level 4. Specialist pathways are included within brackets in the qualification title: • **NCC Education Level 4 Diploma in Computing** • **NCC Education Level 4 Diploma in Computing (with Business Management)** **Total Qualification Time: 1,200 hours.** **Guided Learning Hours:** • **NCC Education Level 4 Diploma in Computing: 540 hours** • **NCC Education Level 4 Diploma in Computing (with Business Management): 438 hours** Please see Section 5 below for Syllabuses, which include the Guided Learning Hours and Total Qualification Time for each Unit of the Level 4 Diploma in Computing. This qualification is regulated by Ofqual and listed on the Qualifications and Credit Framework – Qualification Number 600/0406/X. For further information see **http://register.ofqual.gov.uk/Qualification/Details/600_0406_X**

- **NCC Education Level 4 Diploma in Computing**

Candidates must pass 8 Units to be awarded the Level 4 Diploma in Computing certificate.

Category	Title	Unit Credit	Level
Core	Computer Networks	15	4
Core	Computer Systems	15	4
Core	Databases	15	4
Core	Designing and Developing a Website	15	4
Core	Skills for Computing	15	4
Specialist	Designing and Developing Object-Oriented Computer programs	15	4
Specialist	Office Solutions Development	15	4
Specialist	Software Development Techniques	15	4

- **NCC Education Level 4 Diploma in Computing (with Business Management)**

Candidates must pass all 8 Units to be awarded the Level 4 Diploma in Computing (with Business Management) certificate.

Category	Title	Unit Credit	Level
Core	Computer Networks	15	4
Core	Computer Systems	15	4
Core	Databases	15	4
Core	Designing and Developing a Website	15	4
Core	Skills for Computing	15	4
Specialist	eBusiness	15	4
Specialist	Essentials of Management	15	4
Specialist	Understanding Business Organisations	15	4

3. Assessment for the qualification

3.1 Assessment objectives

All assessment for the qualification is intended to allow candidates to demonstrate they have met the relevant Learning Outcomes. Moreover, NCC Education's assessment is appropriate to the assessment criteria as stated in this specification and is regularly reviewed to ensure it remains consistent with the specification.

3.2 Overview of Qualification Unit Assessment

Unit	Assessment Methods	
	Time-Constrained Assessment	Global Assignment
Computer Networks	-	100%
Computer Systems	-	100%
Databases	50%	50%
Designing and Developing a Website	-	100%
Designing and Developing Object-Oriented Computer programs	-	100%
eBusiness		100%
Essentials of Management		100%
Office Solutions Development	-	100%
Skills for Computing	50%	50%
Software Development Techniques	100%	-
Understanding Business Organisations		100%

A Time-Constrained Assessment is an assessment to be undertaken within specified time constraints. Students will use the knowledge they have gained over the course of their studies to complete the assessment. No sources, notes or textbooks are required. An assignment requires candidates to produce a written response to a set of one or more tasks, meeting a deadline imposed by the Centre. The overall Unit mark is computed from the weighted mean of its components. The pass mark for a Unit is 40%.

NCC Education Centres can provide candidates with a specimen assessment paper as well as a limited number of past Time-Constrained Assessment and assignment papers.

Past Time-Constrained Assessment and assignment papers may be made available only following results release for the corresponding assessment cycle. Results release dates and past Time-Constrained Assessment and assignment release dates can be found in the Activity Schedules area of *Candidate Registration Portal*, NCC Education's student registration system.

3.3 Accessibility of Assessment

We review our guidelines on assessment practices to ensure compliance with equality law and to confirm assessment for our Units is fit for purpose.

3.3.1   Reasonable adjustments and special consideration

NCC Education is committed to providing reasonable adjustments and special consideration so as to ensure disabled candidates, or those facing exceptional circumstances, are not disadvantaged in demonstrating their knowledge, skills and understanding.

Further information on NCC Education's arrangements for giving reasonable adjustments and special consideration can be found in the NCC Education *Reasonable Adjustments and Special Considerations Policy*.

3.3.2 Supervision and Authentication of Assessment

NCC Education Centres are required to organise all assessment activity for this specification according to NCC Education's Policies and Advice.

Candidates' identity and the authenticity of their work is verified and NCC Education moderates all assessment to ensure that the marking carried out is fair, and that the grading reflects the standard achieved by candidates as relevant to the specification Learning Outcomes and Assessment Criteria. Detailed guidance on this process and how candidate work must be submitted to NCC Education is given in NCC Education's *Instructions for Conducting Examinations* and *Assessments Instructions.* The Assessments Instructions also includes full reminder checklists for Centre administrators.

4 Administration

4.1 Assessment Cycles

Four assessment cycles are offered throughout the year, in Spring, Summer, Autumn and Winter.

Time-Constrained Assessment dates and assignment submission deadlines are published in the NCC Education *Activity Schedule*, which is provided to Centres by Centre Support. It is also available on *Candidate Registration Portal,* NCC Education's student registration system.

The *Activity Schedule* also gives the key dates for registering candidates for assessment cycles, the dates when Centres can expect the assessment documentation and, ultimately, the assessment results from NCC Education.

4.2 Language of Assessment

All assessment is conducted in English.

4.3 Candidates

NCC Education's qualifications are available to those Centre candidates who satisfy the entry requirements as stated in this specification.

4.4 Qualification and Unit Entry Requirements

Entry Requirements
• Holders of the Level 3 International Foundation Diploma for Higher Education Studies (L3IFDHES) qualifications.   • Holders of the NCC Education Level 3 Diploma in Computing (L3DC) (RQF)   • Holders of the Level 3 Diploma in Business (L3DB) (RQF) for candidates studying the Level 4 Diploma in Computing (with Business Management) specialism   • Holders of any local or international qualification deemed to be a similar level to either L3DC or L3IFDHES. These shall be agreed in advance with NCC Education.   • Holders of one 'A' level or equivalent or an appropriate School Leaver's certificate.   • Mature students, able to demonstrate over two years' relevant work experience and have an 'O' Level/GCSE English and Maths or equivalent.   For candidates whose first language is not English: • IELTS 5.5 or equivalent.   • GCE 'O' Level English C6

4.5 Candidate Entry

Candidates are registered for assessment via NCC Education's *Candidate Registration Portal* system and according to the deadlines for registration provided in the *Activity Schedule.*

Candidates are registered for the assessment of each Unit they wish to take in a particular assessment cycle (e.g. Units A and B in Summer, Units C and D in Autumn, Units E and F in Winter and Units G and H in Spring). This includes candidates who need to resit a particular Unit.

Further details can be found in NCC Education's *Operations Manual.*

4.6   Eligibility Period

The maximum period of time that NCC Education allows for the completion of your programme is three years. Please contact your Accredited Partner Centre if you have any queries relating to this.

4.7   Resits

If a candidate fails an assessment, they will be provided with opportunities to resit during the eligibility period.

Candidates may only seek reassessment in a previously failed Unit.

5. Syllabus

5.1. Computer Networks

Title:	Computer Networks

RQF code:	M/502/8332	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand network and communication protocols	1.1 Explain the overarching principles of the OSI seven-layer model 1.2 Explain the function of each layer of the OSI model, and the protocols associated with it. 1.3 Explain the function and application of a range of communication and network protocols. 1.4 Evaluate the use of various protocols against real-world purposes 1.5 Explain the function and rationale of wireless networking standards 1.6 Explain a range of contemporary wireless standards and their relevant applications.
2. Understand the principles of common network topologies and architectures	2.1 Explain the concept of network topology and its design. 2.2 Discuss various common network topologies and their application(s). 2.3 Propose a simple network topology in response to detailed requirements
3. Understand the application of network security measures	3.1 Install and configure a firewall on an internet-connected system 3.2 Install and configure essential software security measures
4. Be able to select and configure the hardware components of a computer network to meet the requirements of a precise specification.	4.1 Categorise network cables and connectors and their implementations 4.2 Select the hardware component of a network 4.3 Assemble the necessary hardware components to create a network according to a design specification 4.4 Configure the hardware components for a wireless network 4.5 Test the connectivity of a network 4.6 Troubleshoot client-side connectivity issues using appropriate tools

5. Be able to design and install network and server operating systems to meet the requirements of a precise specification.	5.1 Identify the software requirements for a computer network
	5.2 Install and run appropriate network software according to a design specification.
	5.3 Install and run software components for a wireless network.
	5.4 Test the correct operation of network and server software
6. Be able to install and configure internet telephony and communication systems	6.1 Install and configure a Voice over IP (VoIP) system
	6.2 Install and configure a web-based video conferencing solution
	6.3 Install and configure a Virtual Private Network (VPN)

Syllabus Content	
Topic	**Course coverage**
Introduction to the Module and Networks	- Introduction to module - What is a network? Purpose, benefits, resource implications, communications (e.g. transmission mediums), working practice, commercial opportunity, information sharing, collaboration. - Real world networks - Impact of networks on daily lives, the basic requirements of a reliable network and network trends. - The OSI seven-layer model - overarching principles of the OSI seven-layer model *Learning Outcome: 1*
Network Protocols and Standards	- Communications and network protocols - Purpose of protocols; adherence, routed protocols IPv4 & IPv6, ICMP, FTP, HTTP, SMTP. - Protocols and the OSI model - Protocols in real world networks - The Internet *Learning Outcome: 1*
Wireless Networking Standards	- Wireless devices - Establishing network connections including wired/wireless client configuration. - Wireless networking standards – IEEE 802.11 Wireless Standards - Issues for wireless networks - Wireless networking protocols - Wireless Equivalent Protection (WEP) or WPA (Wi-Fi Protected Access) *Learning Outcome: 1*

Network Topology and Architecture	• Network topology concepts – Network representation: logical & physical • Common network topologies and their application: Ethernet, Token Ring, Star, Ring, Bus. • Topologies and protocols ***Learning Outcome: 2***
Network Media and Connectors	• Network media - coaxial cable, twisted pair, wireless and fibre optic cable. • Network connectors • Selecting media and connectors ***Learning Outcome: 4***
Network Hardware	• Network hardware - Servers; hub, routers; switches; firewall • Hardware selection – network card, cabling; permissions; system bus; local-system architecture e.g. memory, processor, I/O devices • Creating a network - supporting infrastructure needs and supporting connectivity requirements ***Learning Outcome: 4***
Wireless Network Hardware	• Wireless network hardware - wireless devices; access point (wireless/wired), content filter, Load balancer, Modem, Packet shaper, VPN concentrator. • Wireless hardware selection • Creating a wireless network ***Learning Outcome: 4***
Security Software	• Network security threats - unauthorised use of a system; unauthorised removal or copying of data or code from a system; damage to or destruction of physical systems, data or code • Security countermeasures – logs, traces, honeypots, data mining algorithms, vulnerability testing. • Security software – Firewalls, Routers, Switches, Gateways • Installing and configuring security software – Configure Network Security measures such as Firewalls, Routers, Switches, Gateways, SSL, IPSec, HTTPs, FTPs, passwords and backup devices. ***Learning Outcome: 3***
Firewalls	• Functions of a firewall - Packet level filtering, Circuit level filtering, Application level filtering, • Types of firewall – Hardware and Software • Installing and configuring a firewall ***Learning Outcome: 3***

Network and Server Software	• Network software requirements - Client software, server software, client operating system, server operating system. • Wireless network software requirements • Configuring network software ***Learning Outcome: 5***
Voice over IP and Video Conferencing	• Voice over IP (VoIP) • Video conferencing • Installing and configuring voice networks • Installing and configuring video networks ***Learning Outcome: 6***
Virtual Private Networks	• Virtual private networks (VPN) - Explaining Virtual Private Network (VPN) features and benefits and compare VPN types. • Advantages and disadvantages of VPN • Installing and configuring VPN ***Learning Outcome: 6***

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP4013 P1-3 – Contribute to IT architecture work;
ESKITP4083 P1-4 – Prepare, under supervision, for IT/technology infrastructure design and planning activities;
ESKITP4083 P5-8 – Assist with IT/technology infrastructure design and planning activities;
ESKITP4083 P9-11– Assist others with relevant information concerning IT/technology infrastructure design and planning assignments;
ESKITP5043 P1-5 - Perform systems integration activities as directed;
ESKITP5044 P4-8 - Perform systems integration activities;
ESKITP5053 P1-5- Assist with gathering and documenting information to support systems installation, implementation and handover;
ESKITP5054 P1-4- Perform systems installation, implementation and handover activities

Assessments
Global Assignment (100%)
See also Section 3 above

5.2. Computer Systems

Title:	Computer Systems

RQF code:	L/601/0446	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand the function of computer systems	1.1 Explain the role of computer systems in different environments 1.2 Explain the hardware, software and peripheral components of a computer system 1.3 Compare different types of computer systems
2. Be able to design computer systems	2.1 Produce a system design specification to meet a client's needs 2.2 Evaluate the suitability of a system design specification
3. Be able to build and configure computer systems	3.1 Build and configure a computer system to meet a design specification 3.2 Test and document a computer system
4. Be able to undertake routine maintenance on computer systems	4.1 Perform routine maintenance tasks on a computer system 4.2 Upgrade the hardware and software on a computer system

Syllabus Content	
Topic	**Course coverage**

Introduction to Computer Systems	• Overview of the module
	• Types of computer
	   • Personal, mini, mainframe, mobile,
	   • Network, supercomputer, multiprocessor
	• History of modern computers
	   • Show & tell of old and modern computer equipment
	   • Student research on generations of computer
	Learning Outcome: 1

Environments, Functions of components and Health & Safety	• Computing Environments
	   • Home, business, computer gaming, networking, real-time, communication
	• Von Neumann architecture
	   • Example processors
	   • Fetch execute cycle
	• Internet research – Different types of processor.
	   • RISC v CISC
	   • Single v multi core
	   • Multiprocessor
	   • Distributed
	• Health and safety practices; mains electricity, hot components, lifting and carrying, electrostatic precautions.
	Learning Outcome: 1

Computer Hardware	• Standard architecture
	   • CPU, main memory (RAM, ROM), Backing storage, I/O
	• Current implementation of standard architecture
	   • CPU, motherboard, Power supply, cooling, backing store (hard disk, optical disks), memory types, interfaces (PCI, AGP, PCI Express), NIC, graphics card, sound.
	• Inside a PC
	   • Identify components and their functions
	• Identify alternative components and packaging
	Learning Outcome: 1

Peripherals and System Building	• Printers, & plotters, cameras & scanners; keyboard, mouse, touch screen/pad; monitors, display adapters; multimedia devices; storage media; networking; portable drives; plug and play components; performance factors
	• Disassemble and assemble a computer system
	   • Install motherboard, processor, heat-sink and fan, memory, power supply unit
	   • Install hard disc drive, optical drive;
	   • Install specialised cards
	   • Install peripheral devices
	Learning Outcomes: 1 & 3

Software, Installation and Configuration	• Systems software
	   • Operating systems,
	   • Utility programmes,
	   • Library programmes,
	   • Translator programmes
	• Applications software
	   • Standard packages
	   • Customised packages
	   • Special purpose software
	   • Bespoke software
	• Install key software
	   • Windows Operating Systems
	   • Office package
	   • Free utility software
	   • Anti-virus and security software
	Learning Outcomes: 1 & 3

Alternative Operating Systems	• Alternative operating systems • UNIX/Linux, OS X, Android • Linux installation ***Learning Outcome: 1***
System Testing	• Test plan • Test documentation • Fault detection, diagnostics, troubleshooting • Technical support • Test hardware and software • Repair • Fault diagnosis exercises ***Learning Outcome: 3***
Software Maintenance	• Software problems • Automatic updates • Upgrades • Utility software • Security software • Scheduling maintenance • Windows update exercise • Package update exercise • Driver update ***Learning Outcome: 4***

Hardware Maintenance	• Preventative maintenance
	• Upgrade v replace
	• Hardware upgrade
	   • Priorities
	   • Internal components
	   • Peripherals
	• Hardware upgrade exercises e.g.
	   • Memory update
	   • Graphics upgrade
	   • Hard disk upgrade
	   • Add second NIC
	Learning Outcome: 4

File Management	• File systems operation and organisation
	   • FAT, NTFS, ext
	   • Directories/folders
	   • Security, sharing and access rights
	• Data Protection
	   • Backup
	   • File/folder organisation
	• Windows file management exercises
	Learning Outcome: 4

Needs Analysis	• Client and system requirements
	   • Investigation/analytical techniques
	   • Problems/limitations with current/new system
	   • Functionality, costs, timescales, resources
	• Case study
	   • Introduction
	   • Needs analysis exercise
	Learning Outcome: 2

Selection and Systems Specification	• Selection criteria
	• System integration
	• Accessibility
	• Alternative solutions
	   • Identification, selection & justification
	• Matching client requirements and system requirements with system components
	• Systems options
	   • Off the shelf, self build, customise
	   • Alternatives
	• System documentation
	• Case study – Selection & specification
	Learning Outcome: 2 & 3

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP4013 P1-3 – Contribute to IT architecture work;
ESKITP4013 P4-8– Gather, use and maintain information relating to IT architecture models;
ESKITP4083 P1-4 – Prepare, under supervision, for IT/technology infrastructure design and planning activities;
ESKITP4083 P5-8 – Assist with IT/technology infrastructure design and planning activities;
ESKITP4083 P9-11 – Assist others with relevant information concerning IT/technology infrastructure design and planning assignments;
ESKITP5043 P1-5 - Perform systems integration activities as directed;
ESKITP5044 P4-8- Perform systems integration activities.

Assessments
Global Assignment (100%)
See also Section 3 above

5.3. Databases

Title:	Databases

RQF code:	T/502/8333	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand the concepts associated with database systems	1.1 Summarise the common uses of database systems 1.2 Explain the meaning of the term database 1.3 Explain the meaning of the term database management system (DBMS) 1.4 Describe the components of the DBMS environment 1.5 Describe the typical functions of a DBMS 1.6 Summarise the advantages and disadvantages of a DBMS
2. Understand the concepts associated with the relational model	2.1 Summarise the concept of the relational model 2.2 Explain the terminology associated with the relational model 2.3 Explain the purpose of relational integrity
3. Understand how to design and develop a database system	3.1 Explain the use of ER modelling in database design 3.2 Describe the basic concepts of an ER model 3.3 Describe ways of identifying problems in an ER model 3.4 Explain ways of solving problems in an ER model 3.5 Summarise the purpose of SQL 3.6 Describe how to create database tables using SQL
4. Be able to develop a logical database design	4.1 Identify a set of tables from an ER model 4.2 Check that the tables are capable of supporting the required transactions
5. Be able to develop a database system using SQL	5.1 Create database tables based on a data dictionary 5.2 Insert data into the tables 5.3 Update data in the tables 5.4 Delete data in the tables

Syllabus Content	
Topic	**Course coverage**
Introduction to the Module and Database Fundamentals	• Introduction to the module • What are databases? – The role of database systems e.g. as back-end systems, in e-commerce, for data mining applications etc. • Examples of databases in use – Comparison of global companies and types of databases used. • Data and information ***Learning Outcome: 1***
Databases and Database Management Systems (DBMS)	• Components of a database system – Tables, data elements, data types, indexes, primary/foreign keys, entity relationship modelling, referential integrity, data normalisation to third normal form. • Types of applications • Database Management Systems – Types of database management systems (DBMS) and their operating system support, e.g. MySQL, Oracle. • Available commercial implementations • History of information management • Pre-database information systems • Advantages of database approach and DBMS • Disadvantages of DBMS • Relational model and alternatives ***Learning Outcome: 1***
Entity Relationship (ER) Modelling (1)	• The goal of ER modelling • Types of notation – Symbols and relationships within an ER Model • Basic concepts – Entities, attributes and relationships • Identifying entities ***Learning Outcome: 3***
Entity Relationship (ER) Modelling (2)	• Constructing ER models – Logical design for relational databases • Strong and weak entities • Identifying problems in ER models – Connection traps, Fan traps and Chasm traps • Problem solving in ER models ***Learning Outcome: 3***
The Relational Model (1)	• Aims of the relational model • Basic concept of the relational model – Relational data structures, including: relations, attributes, domain, tuple, cardinality. • Terminology ***Learning Outcome: 2***

The Relational Model (2)	• The purpose of relational integrity – Constraints: key, domain • Basic purpose and concepts of normalisation – Normalisation in developing efficient data structures ***Learning Outcome: 2***
SQL (1)	• The purpose and role of SQL – To extract, manipulate and modify data • Basic concepts of SQL – Inserts, updates, amendments, deletions, data backup and recovery. • Standards and flavours of SQL – Modelling languages: query language, data definition language (DDL), data, manipulative language (DML), relational languages. ***Learning Outcome: 3***
SQL (2)	• Key constructs in SQL – Data manipulation using appropriate query tools, including complex queries to query across multiple tables, and using functions and formulae. • Creating and Selecting statements • Fixing mistakes – Making use of testing outcomes to improve and/or refine the solution. ***Learning Outcome: 3***
Database Design	• Understanding requirements – Design for relational databases, tables, data elements, data types, keys and indexes, entity relationship modelling, data flow diagrams, flowcharts. • Identifying a set of tables from an ER model • The data dictionary • Use of CASE tools • Entities to tables ***Learning outcome: 4***
Supporting Transactions	• Identifying business rules – Consideration of interface links with other systems • Checking a database will support the required transactions – System reports, transaction and concurrency in DBMS. • Identifying possible performance issues • Indexing and de-normalisation ***Learning Outcome: 4***
Database Implementation	• The implementation environment – Use of an appropriate database management system and Structured Query Language (SQL) • Creating tables based on database dictionary – Creating, setting up and maintaining data tables • Enforcing integrity and business rules via constraints – Domain constraint, tuple uniqueness constraint, key constraint, entity Integrity constraint, referential Integrity constraint. • Creating indexes • Insert, Update and Delete – Populating the Database ***Learning Outcome: 5***

Summary	• Summary of module
	• Identifying links with other modules/subject areas
	• Clarification of module material and related issues as identified by students
	Learning Outcomes: ALL

Related National Occupational Standards (NOS)

Sector Subject Area: IT and Telecoms

Related NOS: ESKITP4023 P1-4 – Contribute to data analysis assignment;

ESKITP4023 P5-9 – Carry out specified data analysis activities;

ESKITP4053 P1-3– Collate specified information relating to data design activities;

ESKITP4053 P4-9– Contribute to producing and maintaining data designs;

ESKITP4053 P10-14 – Assist, under supervision, the management of data relating to data designs;

ESKITP4053 P1-4 – Assist with the development for data design activities.

Assessments

Time-Constrained Assessment (50%)

Global Assignment (50%)

See also Section 3 above

5.4. Designing and Developing a Website

Title:	Designing and Developing a Website

RQF code:	L/601/3315	Credits	15	Level	4

Guided Learning Hours	90 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Design a website to address loosely-defined requirements	1.1 Identify the key design features inherent within a requirements specification 1.2 Use planning tools and techniques to create a site map 1.3 Evaluate different design models and select the most appropriate to meet requirements.
2. Use web development tools to build HTML- and CSS-based websites to address well-defined specifications	2.1 Describe the use of HTML to develop websites 2.2 Describe how to use CSS to standardise the overall style of a website 2.3 Write the source code for a simple web page in clean HTML according to a specification. 2.4 Write the source code for a CSS according to a specification 2.5 Explain the contextual application of a variety of web development tools 2.6 Explain the advantages and disadvantages of various web development methodologies and technologies
3. Understand the technology and tools needed to use multimedia in the context of a website	3.1 Explain the advantages and disadvantages of various types of multimedia file formats 3.2 Explain the advantages and disadvantages of different types of multimedia elements in relation to different contexts 3.3 Embed functional multimedia components in an HTML site
4. Develop test strategies and apply these to a website	4.1 Develop and apply a test strategy consistent with the design 4.2 Determine expected test results 4.3 Record actual test results to enable comparison with expected results 4.4 Analyse actual test results against expected results to identify discrepancies 4.5 Investigate test discrepancies to identify and rectify their causes

	4.6 Explain the need for testing on different platforms and browsers
5. Understand the need for Web standards	5.1 Explain the role of the W3C
	5.2 Explain W3C standards and their application in site coding
	5.3 Discuss web accessibility and usability issues from the viewpoint of an IT professional
6. Understand the concepts associated with using the Internet and the World Wide Web for business	6.1 Explain the underlying physical and operational properties of the Internet and World Wide Web, including the difference between the two
	6.2 Discuss the Internet and the Web as a business tool, including (but not limited to) as a tool for communications, research, sales and marketing
	6.3 Discuss the advantages and disadvantages of various internet-based models, in different contexts
	6.4 Discuss the advantages and disadvantages of various eCommerce models, in different contexts

Syllabus Content	
Topic	**Course coverage**
Introduction to the Module	• The Internet, IoT, and the World Wide Web • How the WWW works • The W3C and the importance of web standards – Common web development technologies and frameworks. • The challenges of web design – Browsers, screen resolution, accessibility, usability ***Learning Outcomes: 5 & 6***
Introduction to HTML-5	• Basic principles of mark-up: elements, tags and attributes • Document structure: Document type declarations, the root element, the head and body sections • Structuring text – Heading, paragraphs and lists • Block level and inline elements • Validating documents ***Learning Outcome: 2***
Hyperlinks	• Using the anchor element • Relative and absolute URLs • In-page hyperlinks • The HTML nav element • Accessible hyperlinks ***Learning Outcomes: 2 & 6***

Introduction to Cascading Style Sheets (CSS)	- What is CSS, why do we need CSS? - Applying CSS - Inline, embedded and external style sheets - Overview of CSS selectors, properties and values - Efficient CSS - Validating CSS - Developer tools – Useful HTML and CSS tools for Web Developers ***Learning Outcome: 2***
Integrating Media	- Inserting images, Image file types, Image maps - Audio and video file types - The object tag - HTML 5 video and audio tags - Accessibility and media types ***Learning Outcomes: 2, 3 & 5***
HTML Tables	- Basic structure of HTML tables – Captions groups of rows/columns - Column and Row Spanning - Tables as a page layout device - CSS and tables - Accessibility and tables ***Learning Outcomes: 2 & 5***
HTML Forms	- Basic structure of HTML Forms – Collecting user inputs and processing data - HTML Form elements – Different types of Form Elements and their uses. - Accessibility and HTML forms - Controlling the layout of forms - HTML 5 form elements ***Learning Outcomes: 2 & 5***
Page Layout with CSS	- The class and ID selectors - selecting HTML elements with a specific class attribute/element - Floating and positioning – CSS properties for floating and positioning objects on webpages - Fixed width and fluid page design - HTML 5 section elements – nav, aside, article and section - Page layout and mobile devices ***Learning Outcomes: 2 & 5***

Introduction to Web Design	• Understanding why an organisation needs a website – eBusiness models and eCommerce models
	• The process of designing a website – Tools, techniques and software used to develop websites
	• Involving users in the design process – How intuitive interfaces and actions, user-friendly designs, appropriate graphics, effective navigation and good quality content can help establish user trust and deliver an improved User Experience (UX).
	• Defining content and functionality
	Learning Outcomes: 1 & 6
Navigation and Interface Design	• Site structure
	• Interface Design and Navigation – Using front-end technologies, presentation layers and client-side programming to build a User Interface (UI) and effect User Experience (UX).
	Learning Outcomes: 1 & 5
Evaluation and Testing	• Validating documents
	• Testing with a range of browsers – Establish a test plan and use it to assess the performance of a website
	• Testing with users
	• An iterative approach to development
	Learning Outcomes: 4 & 5
Summary	• Summary and recap of previous units
	• Hosting a website – Look at relationships between domain names, DNS services and communication protocols used to access a website.
	• HTML 5, CSS 3 and the mobile web
	Learning Outcomes: All

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP4063 P1-5 – Contribute to human interaction and interface (HCI) design activities;
ESKITP4063 P6-10– Assist, under supervision, with the progress of human interaction and interface (HCI) design assignments;
ESKITP4064 P1-5 – Prepare for human interaction and interface (HCI) design activities;
ESKITP4064 P6-8 – Implement, under supervision, human interaction and interface (HCI) design activities;
ESKITP4064 P9-12 – Manage the needs of different users of HCI design activities;
ESKITP4065 P1-4 – Plan human interaction and interface (HCI) design activities.

Assessments
Global Assignment (100%)
See also Section 3 above

5.5. Designing and Developing Object-Oriented Computer Programs

Title:	Designing and Developing Object-Oriented Computer Programs

RQF code:	T/601/3308	Credits	15	Level	4

Guided Learning Hours	90 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Design object-oriented programmes to address loosely-defined problems	1.1 Identify a set of classes and their interrelationships to address the problem 1.2 Make effective use of encapsulation, inheritance and polymorphism 1.3 Select and reuse pre-existing objects and templates specialising as required 1.4 Structure the design so that objects communicate efficiently 1.5 Specify the properties and behaviour of classes to allow efficient implementation, selecting appropriate data types, data and file structures and algorithms 1.6 Record the design using well-established notations
2. Implement object-oriented programmes from well-defined specifications	2.1 Produce a working programme which satisfies the design specification 2.2 Make effective use of basic programming language features and programming concepts to implement a programme that satisfies the design specification 2.3 Make effective use of the features of the programming environment 2.4 Make effective use of user interface components in the implementation of the programme 2.5 Make effective use of a range of debugging tools
3. Develop object-oriented programs that reflect established programming and software engineering practice	3.1 Apply standard naming, layout and comment conventions 3.2 Apply appropriate data validation and error handling techniques
4. Develop test strategies and apply these to object-oriented programmes	4.1 Develop and apply a test strategy consistent with the design identifying appropriate test data 4.2 Apply regression testing consistent with the test strategy 4.3 Use appropriate tools to estimate the performance of the programme

| 5. | Develop design documentation for use in program maintenance and end-user documentation | 5.1 | Record the final state of the programme in a form suitable for subsequent maintenance |
| | | 5.2 | Provide end-user documentation that meets the user's needs |

Syllabus Content		
Topic	Title	Content
1	An Introduction to the .NET framework	• Visual Studio IDE • The Design of .NET programs • Sequential Program Flow ***Learning Outcomes: 2 & 3***
2	Event Driven Programming	• Understand different types of event driven programmes • Event Handling – Understand how events in C# work and make use of event handling to design responsive programs • Prototypes – Explore formats, characteristics and appropriateness of prototyping ***Learning Outcomes: 2, 3, & 5***
3	Programming Structures (1)	• Selections within .NET • Branching Program Flow ***Learning Outcomes: 2 & 3***
4	Programming Structures (2)	• Repetition within .NET • Iterative Program Flow ***Learning Outcomes: 2 & 3***

5	Object Orientation (1)	• Outline the object-orientated paradigm characteristics:
		   • Encapsulation
		   • Classes
		   • Objects
		   • Abstraction
		Learning Outcomes: 1, 2 & 3

6	Consolidation (1)	• Produce worked example of material to date ***Learning Outcomes: 1, 2, 3 & 5***

7	Data Structures	• Examine data structures and algorithms
		   • Arrays
		   • ArrayLists
		   • Dictionary
		   • Generics
		Learning Outcomes: 1, 2 & 3

8	Object Orientation (2)	• Object-orientated class relationships:
		
		    • Inheritance
		
		• Further object-orientated paradigm characteristics:
		
		    • Polymorphism
		
		• Introduction to UML – UML class design and suitable UML tools to develop class diagrams
		
		• Coupling – Explaining the interdependency between methods and object classes
		
		• Cohesion – Binding of the elements within one method and within one object class
		
		Learning Outcomes: 1, 2, 3, 4 & 5

9	Consolidation (2)	• Produce worked example of material to date ***Learning Outcomes: 1, 2, 3 & 5***

10	Testing and Error Handling	• Test the system against user and system requirements
		
		• Testing strategies to be used: test plans, test models e.g. white box, black box; testing documentation.
		
		• Functional and system testing and testing the robustness of the system
		
		    • Regression testing
		
		    • Detection and correction of errors
		
		    • Exception handling
		
		Learning Outcomes: 4 & 5

11	File IO	• File IO – The use of file input and output streams. • Serialization – The process of converting an object into a stream of bytes to store the object. ***Learning Outcomes: 2, 3, & 4***
12	Databases with .NET	• Connection to databases • Data manipulation using appropriate query tools. • Representing Data – Documentation can include diagrams showing movement of data through the system, and flowcharts describing how the system works. Documentation could also extend to user guides and any initial design and implementation plans. ***Learning Outcomes: 2, 3, 4 & 5***

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP5013 P1-6 - Carry out system development activities under direction; ESKITP5014v2 P1-5 - Perform systems development activities; ESKITP5014v2 P6-10 - Contribute to the management of systems development;

ESKITP5022v2 - Perform software development activities;

ESKITP5024 P6-12- Carry out IT/Technology solution testing activities under direction;

ESKITP5034 P1-4 - Carry out IT/Technology solution testing.

Assessments
Global Assignment (100%)
See also Section 3 above

5.6. eBusiness

Title:	eBusiness				

RQF code:	F/502/8321	Credits	15	Level	4

Guided Learning Hours	36 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Analyse eCommerce business models	1.1 Identify eCommerce business models 1.2 Discuss the advantages and disadvantages of eCommerce 1.3 Compare and contrast different eCommerce revenue models
2. Analyse eCommerce business-to-consumer strategies	2.1 Explain various eMarketing strategies 2.2 Discuss Customer Relationship Management (CRM) 2.3 Identify the various forms of online advertising
3. Analyse eCommerce business-to-business strategies	3.1 Explain the business purchase process using eCommerce technologies 3.2 Assess the use of Electronic Data Interchange (EDI) in eCommerce businesses 3.3 Discuss the importance of supply chain management in eCommerce businesses
4. Evaluate various forms of online marketplace	4.1 Identify different types and relative effectiveness of online marketplaces 4.2 Compare and contrast different types of online auction 4.3 Discuss the advantages and disadvantages of forms of online payment
5. Examine the security threats posed to eCommerce users	5.1 Describe the security threats posed by the use of eCommerce technology for end-users and enterprises 5.2 Discuss the technology available to combat eCommerce security threats
6. Understand how to plan eCommerce strategies	6.1 Identify the objectives for an eCommerce strategy 6.2 Explain the key factors in successfully managing an eCommerce project

Syllabus Content	
Topic	**Course coverage**
Introduction to eCommerce	• Scope of eCommerce – Customer expectations, benefits, drawbacks • Business models, drivers and identification of opportunities ***Learning Outcome: 1***
eCommerce Revenue Models	• A range of eCommerce revenue models, both established and emerging conducting research and providing examples of different types • Changing revenue models to meet the needs of users • Revenue strategy issues • Mobile commerce ***Learning Outcome: 4***

eMarketing Strategies	• Develop effective web-based marketing strategies by:
	    • Targeting market segments and interest groups
	    • Developing electronic 'web-communities'
	    • Customer Relationship Management (CRM)
	    • Promotion strategies to target specific market segments
	    • Search engine optimisation
	    • e-marketing software.
	• Research a local eMarketing campaign and identify strengths and weaknesses
	Learning Outcome: 2

Advertising and Brand Management	• Main options for web-based advertising and importance of effective brand management • Banner adverts • Other forms of web advertising • Email marketing • Creating and maintaining brands • Research successful use of search engine positioning and provide examples ***Learning Outcome: 2***
eCommerce Business to Business Strategies	• Use of eCommerce to enhance purchasing and logistics activities, and the role of Electronic Data Interchange (EDI) • Research developments in EDI on the Internet • Value Added Networks (VANs) ***Learning Outcome: 3***

Supply Chain Management	• Main elements of supply chain management and the potential efficiencies such as:
	• Satisfying customer demand
	• Identify key supply chain benefits/issues
	• Managed in house or sub-contracted
	• Developing 'partnership' relationships with suppliers
	• Materials tracking technologies
	• Ultimate consumer orientation
	• Building and maintaining trust
	Learning Outcome: 3
Online Auctions	• Different types of online auctions and applicability in the B2B environment
	• General consumer auctions
	• Specialist consumer auctions
	• Business to business auctions
	• Auction related services
	• Identify a local B2B auction and evaluate strengths and weaknesses
	Learning Outcome: 4
Online Marketplaces, Communities and Portals	• Overview of different approaches to developing online communities and associated revenue models
	• B2B marketplace models
	• Online marketplaces serving mobile business
	• Revenue models for web portals and virtual communities
	• Research a local web portal and establish the services offered
	Learning Outcome: 4
Security Threats and Countermeasures for End Users	• Overview of main security threats to PC users and the approaches to countering these
	• Online security issues
	• Cookies
	• Active content
	• Viruses and worms
	• Anti-virus software
	• Digital certificates
	• Research the major security threats posed by worms and Trojan horses
	Learning Outcome: 5

Security Threats and Countermeasures for Enterprises	• Overview of the main security threats posed to eCommerce servers and the approaches to countering these
	• Identifying possible threats to an eCommerce server such as:
	   • Network threats and vulnerabilities,
	   • Protecting and preventing attacks
	   • Mitigating risk.
	   • Denial-of-service (DoS) threats
	   • Wireless network threats
	Learning Outcome: 5

Payment Systems for eCommerce	• Main options for providing payment systems for eCommerce systems such as:
	   • Online transaction processing,
	   • Commercial Off the Shelf Software (COTS),
	   • Other payment systems e.g. PayPal, WorldPay.
	• Threats to payment systems
	• Research payment systems used on three eCommerce systems
	Learning Outcome: 4

Planning for eCommerce	• Planning eCommerce implementation by demonstrating that the E-Commerce strategy devised will be implemented using suitable tools and applications. • Managing the eCommerce implementation • Measuring its effectiveness by evaluating the success of the design and implementation of the E-Commerce strategy. ***Learning Outcome: 6***

Related National Occupational Standards (NOS)
Sector Subject Area: Management and Leadership National Occupational Standards 2008 **Related NOS:** CFAMLE4 - Promote the use of technology within your organisation; CFABAA111 Respond to change in a business environment; ESKIITS1, ESKIITS2, ESKIITS3 IT security for users. CFABAA623 Deliver a presentation

Assessments
Global Assignment (100%)
See also Section 3 above

5.7. Essentials of Management

Title:	Essentials of Management

RQF code:	L/502/8323	Credits	15	Level	4

Guided Learning Hours	36 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Analyse the function of management	1.1 Discuss the roles and functions of managers within an organisation 1.2 Evaluate the key skills needed to be a successful manager
2. Examine the management decision-making process	2.1 Discuss the importance of the management decision-making process 2.2 Compare and contrast different decision-making styles
3. Assess the use of management and organisational strategies	3.1 Discuss the importance of strategic management within an organisation 3.2 Discuss the different types of corporate and business-level strategies that can be employed
4. Analyse how management can influence individual and group performance	4.1 Discuss how organisational behaviour can explain, predict and influence individual behaviour 4.2 Evaluate the ways in which job satisfaction can impact upon employee behaviour 4.3 Evaluate the major determinants of group performance and satisfaction 4.4 Evaluate the strengths and weaknesses of contemporary theories of motivation 4.5 Discuss and explain the key factors in designing motivating jobs
5. Examine theories of leadership and control	5.1 Discuss the challenges posed to leadership by contemporary business models 5.2 Assess the importance of control in effective organisational performance

Syllabus Content	
Topic	**Course coverage**
Introduction to Management	• The role of managers in organisations • The main functions of management • The characteristics of an organisation • The importance of management in today's business environment • Management functions and characteristics of an organisation ***Learning Outcome: 1***
Management Theories	• Key research and theories in management • Defining management, what management is, what managers should do and key roles. • The various management theories that have been developed throughout history and the key contributors to these theories • How these theories impact upon today's management practices ***Learning Outcome: 1***
Decision Making	• The manager as a decision maker • The importance of effective decision making • The 8-step decision making process • Decision making approaches for structured and unstructured problems • The various decision making styles that can be adopted • Guidelines for effective decision making ***Learning Outcome: 2***
Planning	• How and why do managers plan? • The main purposes of planning • The roles of goals and plans • Different types of plans • Management by objectives (MBO) • Characteristics of well designed goals • Planning in uncertain environments ***Learning Outcome: 3***
Strategic Management	• Key steps in the strategic management process • What strategic management seeks to achieve • Why it is important to organisations of all sizes • The individual steps in the strategic management process • The components of a mission statement • How to undertake SWOT and STEEPLE analyses ***Learning Outcome: 3***

Organisational Strategies	• Research into types of growth and business level strategies • The types of corporate and business level strategies • The role of competitive advantage • Porter's Five Forces Model • The three competitive strategies • First mover advantages and disadvantages ***Learning Outcome: 3***
Planning Tools and Techniques	• The key planning tools and techniques for allocating resources and undertaking effective project management • Techniques for assessing the environment, including competitor intelligence • The quantitative and qualitative approaches to forecasting • The various types of budgets that can be utilised • The use of effective time management, efficient use of resources and project management tools for scheduling • The features of the project management process ***Learning Outcome: 5***
Foundations of Behaviour	• Research into the individual behaviour of employees and how it can impact upon their work-related performance • The goals of organisational behaviour • Importance of job satisfaction on employee behaviour • Personality traits and the approaches to classifying these • How perceptions influence behaviour • Individual learning theories and the shaping of employee behaviour ***Learning Outcome: 4***
Groups and Teams	• Group performance and effective teams • The stages of group development • Group member resources and their impact upon performance • Internal group structures • Group decision-making • The implications of group conflict and approaches to conflict resolution • The characteristics of effective teams ***Learning Outcome: 4***

Theories of Motivation	• Early and contemporary theories of motivation • Developers of early theories of motivation – Maslow, McGregor and Herzberg • Three-needs, goal-setting, reinforcement, equity and expectancy theories • Designing motivating jobs • Integrating contemporary theories of motivation • Motivating different groups of workers ***Learning Outcome: 4***
Leadership Theories	• Research into effective leadership • Early trait and behavioural theories • Contingency theories developed by Fiedler and Hersey-Blanchard • The path-goal model • The emergence of transformational, transactional and charismatic leadership • Sources of leader power • The importance of trust in effective leadership ***Learning Outcome: 5***
The Control Process	• Designing control systems and using tools to control organisational performance • The importance of effective controls in ensuring organisational goals are met • The control process • Different approaches to controlling organisational performance • Feedforward, concurrent and feedback controls • Commonly used financial controls • The role of the balanced scorecard ***Learning Outcome: 5***

Related National Occupational Standards (NOS)
Sector Subject Area: Business and Administration NOS (2010) **Related NOS:** CFABAG121 Contribute to decision-making in a business environment; CFABAG1212 Supervise a team in a business environment.

Assessments
Global Assignment (100%)
See also Section 3 above

5.8. Office Solutions Development

Title:	Office Solutions Development

RQF code:	R/601/1971	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand how application software can support business processes	1.1 Discuss ways in which application software can support business processes 1.2 Justify the use of different application software to support a given user requirement or business process 1.3 Discuss the importance of addressing both user and business requirements
2. Be able to design and implement office solutions	2.1 Design a solution to address a business or user need 2.2 Use advanced tools and techniques to implement a solution 2.3 Test a solution against expected results
3. Be able to demonstrate that business processes have been enhanced/improved	3.1 Discuss ways in which end user engagement has taken place 3.2 Provide evidence that business processes have been enhanced/improved 3.3 Evaluate possible further improvements that could be made to enhance the system

Syllabus Content	
Topic	**Course coverage**
Application Software and Business Processes	• An Introduction to the module • Types of business processes and functions • Application software defined • Types and range of application software • How application software supports business processes • Research into examples of commercial software • Evaluation of the role of applications software in specific business contexts • Case studies • Glossary ***Learning Outcome: 1***

An Introduction to End User Software Development	• End-User defined • Examine the need to address both user and business requirements • Interface defined • Identify Interface Design principles and good practice • Microsoft Office interface development • Case studies • Glossary ***Learning Outcome: 1***
An Introduction to the Advanced Features and Functions of the Microsoft Office Suite	• An introduction to the Microsoft Office suite • An overview of advanced features and functions • How the above improve business performance • Consideration of both user and business requirements • Application of interface design principles • Glossary ***Learning Outcomes: 1 & 2***
Advanced Features and Functions of Microsoft Access, Excel and Word	• An overview of advanced features and functions in Access • An overview of advanced features and functions in Excel • An overview of advanced features and functions in Word • Glossary ***Learning Outcome: 2***

An Introduction to VBA and Macros	• Define what is meant by a macro
	• Define what is meant by VBA
	• Explain that there is a range of macros used for different purposes
	• Describe the methods that can be used to develop macros
	• Explain the issues of macros and security
	• Use the Visual Basic Editor to create macros
	    • Use the Record Macro feature
	    • Save macros
	    • Edit macros
	Learning Outcome: 2

Using Macros in Microsoft Word	• Develop macros • Edit macros • Use the Macro Recorder • Assign a macro to the keyboard • Assign a macro to a button • Format text or pictures using macros • Customise headers and footers using macros • Secure documents against malicious macros ***Learning Outcome: 2***

Using Macros in Microsoft Access	• Create a macro in Microsoft Access • Understand key macro terms • Explain the sequence of macro production • Create Autoexec macros • Input data using a macro • Validate data using a macro • Filter and find records using a macro • Print records using a macro • Assign a macro to a command button • Navigate between forms and records using a macro • Run a query using a macro • Secure documents against malicious macros ***Learning Outcome: 2***
Using Macros in Microsoft Excel - 1	• Create a macro in Microsoft Excel • Format titles, formulas and tables • Input dates and times • Input and select data using a macro • Provide data validation using a macro • Design message boxes and feedback • Design interactive user forms ***Learning Outcome: 2***
Using Macros in Microsoft Excel - 2	• Create a macro that uses absolute cell references • Create a macro that uses relative cell references • Create an icon to run a macro • Print data using a macro • Secure documents against malicious macros ***Learning Outcome: 2***
Testing Software Development	• The need for testing • Types of testing • The Test Plan • Determine expected test results • Record actual test results to enable comparison with expected results • Analyse actual test results against expected results to identify discrepancies • Investigate test discrepancies to identify and rectify their causes • Testing Checklist • Glossary ***Learning Outcome: 2***
Evaluating Software Development	• Types of evaluation • Functionality evaluated

	• Efficiency evaluated
	• Reliability evaluated
	• Usability evaluated
	• Identify successful user interaction
	• Identify enhancements
	• Identify potential improvements
	• Evaluation Checklist
	• Glossary
	Learning Outcome: 3
Combining End User Software Development, Testing and Evaluation	• Topic Scenario
	• Identify business processes
	• Identify application software
	• Identify good practice in software interface design
	• Use advanced features and functions in Microsoft Excel and Word
	• Use macros in Microsoft Excel and Word
	• Produce a test plan
	• Produce an evaluation checklist
	Learning Outcomes: 1, 2 & 3

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP4063 P1-5– Contribute to human interaction and interface (HCI) design activities;
ESKITP4063 P6-10– Assist, under supervision, with the progress of human interaction and interface (HCI) design assignments;
ESKITP4064 P1-5 – Prepare for human interaction and interface (HCI) design activities;
ESKITP4064 P6-8 – Implement, under supervision, human interaction and interface (HCI) design activities;
ESKITP4064 P9-12 – Manage the needs of different users of HCI design activities;
ESKITP4065 P1-4 – Plan human interaction and interface (HCI) design activities;
ESKITP5013 P1-6- Carry out system development activities under direction;
ESKITP5014v2 P1-5 - Perform systems development activities;
ESKITP5014v2 P6-10 - Contribute to the management of systems development;
ESKITP5022v2 - Perform software development activities;
ESKITP5024 P6-12- Carry out IT/Technology solution testing activities under direction;
ESKITP5034 P1-4 - Carry out IT/Technology solution testing.

Assessments
Global Assignment (100%)
See also Section 3 above

5.9. Skills for Computing

Title:	Skills for Computing

RQF code:	F/502/8335	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Be able to use various skills to support the study of Computing	1.1 Explain strategies and skills to support learning at RQF Level 4 and above 1.2 Appreciate the importance of contributing and listening to discussion-based learning activities 1.3 Write clearly in a style appropriate to learning at RQF Level 4 1.4 Explain the importance of using citations and bibliographies and avoiding plagiarism 1.5 Apply a commonly-used system of organising citations and bibliographies in one's own work
2. Be able to communicate in a technical environment	2.1 Explain and apply common industry standards for technical documentation 2.2 Employ various media to communicate clearly in English 2.3 Explain technical issues in a manner appropriate to a non-technical audience
3. Be able to deploy thinking skills and problem-solving paradigms in both a business and learning context.	3.1 Summarise a range of problem-solving and creative thinking techniques 3.2 Apply at least one problem-solving technique to a business and/or education-based problem 3.3 Apply a creative thinking technique to a problem based on one's own learning experience
4. Be able to handle and present data	4.1 Extract pertinent data from a given source 4.2 Design an appropriate document or spreadsheet to record given data 4.3 Record data accurately in a usable manner 4.4 Execute an elementary statistical analysis 4.5 Present data professionally in an appropriate format to a specified audience
5. Understand the need for lifelong learning	5.1 Explain the concepts of Continuing Professional Development (CPD) and lifelong learning 5.2 Explain the particular application of CPD and lifelong learning to the IT Profession

Syllabus Content	
Topic	**Course coverage**
Learning to Learn	• Learning Strategy (CREAM: Creative, Reflective, Effective, Active, Motivated). • Personal Learning Plans – Own responsibilities, Setting and monitoring performance objectives. • Learning Situations: What are Lectures, Seminars, Tutorials and Labs and how to work well in them. • Continuing Professional Development (CPD) and Lifelong learning: applying your learning skills in other contexts *Learning Outcomes: 1 & 5*
Reading, Listening and Note-taking	• Extracting information from written sources • Taking notes from a speaker – Approaches to note taking • Taking minutes in a meeting – Key listening tips *Learning Outcome: 1*
Writing	• Analysing the question – Key words that define the task and scope • Planning and structuring – Essay planning, research, introduction, main body and conclusion. Drafting • Referencing – Sources, citation, reference lists, bibliographies *Learning Outcomes: 1 & 2*
Presentation Skills	• Soft skills e.g. personal effectiveness, working with others and social skills • Presentation Skills: researching, preparing, presenting and delivering *Learning Outcomes: 2 & 4*
Problem Solving	• Problem Solving tools and techniques • Problem definition and analysis – Analyse a problem and propose solutions • Success criteria and selecting a solution – Define the success criteria for solving a problem and evaluating solutions against success criteria *Learning Outcome: 3*
Creative Thinking	• Creative Thinking Techniques: Lateral Thinking, brain storming, mind maps, etc. • Creative Thinking Models: Parallel Thinking (De Bono 'Six Hats'), TASC (Thinking Actively in a Social Context) *Learning Outcomes: 1 & 3*
Assignment Preparation	• Technical documentation; knowing your audience • Proof-reading • Exercises in writing and problem-solving based on topics 3-6, practising for assignment tasks *Learning Outcomes: 1, 2 & 3*

Data Acquisition	• Methods of obtaining data – Surveys, questionnaires, filtering data • Types of data – Data sources; primary and secondary data, quantitative data, qualitative data, discrete data, continuous data • Storing data – Data integrity, data representation, protecting data **_Learning Outcome: 4_**
Charts and Estimates	• Be able to use charts – Types of charts; pie, bar, scatter etc • Understand what distributions represent – Binning, normal distribution, random variations, uniform distribution • Be able to estimate values – Estimating the mean and median **_Learning Outcome: 4_**
Accuracy and Correlation; Presenting Results	• Use standard errors – statistical errors, random variations, user error and systematic errors • Represent and analyse paired data • Recognise and interpret correlation • Analyse and present results correctly – Organising information, charts and plots • Understand ways in which statistics are misused – Lack of references, absence of control sets and correlation misuse • Learn to recognise mistakes in the way others present results **_Learning Outcomes: 2 & 4_**
Regression Analysis	• Pearson correlation – Calculate and interpret Pearson's correlation coefficient • Basics of simple linear regression • Spearman correlation – Calculate and interpret Spearman's correlation coefficient • Understand a straight line fit to bivariate data **_Learning Outcome: 4_**
Data Handling Revision and Exam Preparation	• Revision planning exercise • Exercises based on sample exam questions **_Learning Outcomes: 1, 3, 4 & 5_**

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms
Related NOS: ESKITP4073 P9-12– Document, under supervision, specified information relating to system/solution/service designs; ESKITP5053 P1-5- Assist with gathering and documenting information to support systems installation, implementation and handover; ESKITP5054 P5-8- Document and present systems installation, implementation and handover activities; ESKITP6015 P9-10- Communicate with others on information management activities; ESKITP6023 P3-4 - Document IT/technology security management processes

Assessments
Global Assignment (50%)
Time-Constrained Assessment (50%)
See also Section 3 above

5.10. Software Development Techniques

Title:	Software Development Techniques

RQF code:	A/502/8334	Credits	15	Level	4

Guided Learning Hours	60 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Identify and explain the key stages of software development lifecycles	1.1 Identify and describe the stages in traditional software lifecycle approaches 1.2 Explain why alternative software development lifecycles have been developed 1.3 Identify and explain the key features of modern approaches to software development
2. Express, design and evaluate algorithms	2.1 Express algorithms in a non-executable code 2.2 Develop algorithmic solutions to well-specified problems using appropriate notation 2.3 Evaluate algorithmic solutions with appropriately selected test data
3. Identify and use programming language constructs	3.1 Select and use variables and constants taking into account associated data type requirements 3.2 Select and use appropriate programming structures (sequence, selection and iteration)
4. Identify and use common data structures	4.1 Explain and use arrays 4.2 Explain and use common structures such as lists, queues and stacks
5. Explain and use common algorithms	5.1 Explain and use common algorithms for searching, sorting, parsing 5.2 Explain the efficiency criteria used to evaluate such algorithms
6. Explain and use test strategies	6.1 Develop and apply test strategies for well-defined algorithms 6.2 Identify and explain a range of methods used to test software
7. Explain how software is modularised	7.1 Explain procedural and object oriented programme structure 7.2 Demonstrate the use of programme structures using non-executable code

Syllabus Content	
Topic	**Course coverage**

Introduction to the Module and the Software Development Process	• Introduction to the unit
	• Introduction to the software development process
	  • How computer programs are designed
	  • How they are written
	  • How they are tested
	• The history of software development
	  • Software Development Lifecycle
	  • Project Life Cycle
	  • Waterfall
	  • Prototyping
	  • Agile
	  • User Stories
	Learning Outcomes: 1 & 2

Desk-checking	• Pseudocode format - suitability of software behavioural design techniques • Desk-checking – Process to find bugs and errors in code • Commenting – Annotating source code ***Learning Outcomes: 2 & 6***
Data Representation	• Memory management in a computer system – Storage of data, scaling, size of data, memory requirements • Data types – Whole numbers, string, real numbers, Boolean, character • Variable declaration and manipulation ***Learning Outcomes: 3***
Iteration	• Discuss the computational term iteration – Understand that this is used to repeat blocks of an algorithm without having to repeat ourselves. • Bounded Loops – When it is known how many times code is going to repeat – For Loops • Unbounded Loops – When it is unknown how many times code is going to repeat – While Loops • Mathematical algorithms ***Learning Outcomes: 2 & 3***
Selection	• If – Definition of the IF THEN structure • Nesting – Powerful technique for creating complex algorithms, definition of loops within loops • Else • Switch • Input validation – Truth tables to outline all the possible outcomes of compound conditionals ***Learning Outcomes: 3 & 6***

Functions	• Understand that functions exist independently of your main pseudocode program. They only get executed when they are invoked by your main program. • Calling functions, desk checking function calls, benefits of functions • Parameters – allow us to pass information or instructions into functions • Return Types – Defining return types, Using return values ***Learning Outcomes: 3, 4 & 7***
Testing and Debugging	• Formal testing – Functionality, no unexpected behaviour, required responses, anticipated data and error checking • Test strategies – Black box testing and White box testing • Unit testing – Testing functions in isolation • Integration testing – Methods of testing the links between our main program and each of its functions ***Learning Outcomes: 6***
Arrays	• What are arrays: Understand that an array is a data structure consisting of a collection of elements (values or variables). • Application of arrays – declaration of arrays, manipulation of arrays, passing an array to a function, returning an array • Two dimensional arrays – Understand that these are grids of data, work on creating, setting and getting ***Learning Outcomes: 3 & 4***
Searching and Sorting	• Big O Notation – Measure of how an algorithm will scale. • Linear search algorithms – Simplest of the searches, to search through every element in an array in order for a search term • Binary search algorithms – To partition a search for increased efficiency. An array in ascending or descending order can be subjected to binary searches • Bubble Sort Algorithm – A sort which works by repeatedly swapping adjacent elements until an array is orders. • Quick Sort – More efficient form of sorting, splits arrays and sorts individually • Recursion - A loop that is created by having a function call itself with a smaller set of data. ***Learning Outcomes: 4 & 5***

Objects	• Object design – Understand that Objects are a specific instantiation of a class, declaring and manipulating objects, object persistence, passing and returning objects • Classes – Understand that classes are more powerful than arrays • Modularity – Functions, objects and classes • Methods – Understand that methods are functions within classes, calling methods, method overloading • Constructors – Understand their use and capabilities; used to initialise a newly created object of the same type • Accessor Functions – A function used to set or get a variable in a class. ***Learning Outcomes: 3, 4 & 5***
Array Data Structures	• Lists – Understand that an array grows as needed • Stacks – Understand that a stack is a last in, first out (LIFO) data structure • Queues – Understand that queue is a first in, first out (FIFO) data structure • Recursion – The recursion process on stacks, factorials ***Learning Outcomes: 4 & 5***
Summary and Conclusion	• Summary of module • Contextualisation of concepts • Clarifications • Further reading ***Learning Outcomes: All***

Related National Occupational Standards (NOS)
Sector Subject Area: IT and Telecoms **Related NOS:** ESKITP4073 P1-4 – Follow, under supervision, the organisation's procedures for informing systems design activities; ESKITP4073 P5-8– Carry out, under supervision, specified systems design activities; ESKITP4073 P9-12– Document, under supervision, specified information relating to system/solution/service designs; ESKITP5023 P1-4 - Assist with the management of software development activities; ESKITP5023 P5-11 - Carry out software development activities under direction; ESKITP5024 P13-16- Control software development activities; ESKITP5033 - Carry out IT/Technology solution testing activities under direction;

Assessments
Time-Constrained Assessment (100%)
See also Section 3 above

5.11. Understanding Business Organisations

Title:	Understanding Business Organisations

RQF code:	J/502/9275	Credits	15	Level	4

Guided Learning Hours	36 hours	Total Qualification Time	150 hours

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Evaluate various types of organisations	1.1 Compare and contrast the form, aims, objectives and operations of business organisations across a number of sectors
2. Evaluate various forms of organisational structure	2.1 Discuss the process of organisational development 2.2 Compare and contrast the mechanistic and organic forms of organisation structure 2.3 Analyse the competitive forces exerting influences on an organisation and its structure
3. Examine the process of organisational change	3.1 Compare and contrast types of organisational change 3.2 Discuss the steps in the change process for organisations 3.3 Assess the impact of resistance to change on organisational performance
4. Assess the use of communication in organisations	4.1 Analyse the barriers to effective communication 4.2 Examine the ways in which communication processes can help or hinder organisational performance
5. Examine how organisational performance is monitored	5.1 Discuss the control processes put in place in organisations 5.2 Compare and contrast the use of budgetary and non-budgetary methods of control
6. Evaluate the use of IT systems on the performance and structure of an organisation	6.1 Assess how the effective use of IT can impact upon organisational performance 6.2 Explain how the Internet and collaboration technologies have enabled new forms of organisation

Syllabus Content	
Topic	**Course coverage**
Different Types of Organisations	• Different categories of non-incorporated business organisations • The importance of limited liability • The different types of limited companies • The advantages and disadvantages of the various types of business organisation • Other categories of business organisation, including not-for-profit *Learning Outcome: 1*
Organisational Structures	• The role of the organisation chart in illustrating the organisation structure • The purpose of lines of authority and delegation • The benefits and drawbacks of a centralised hierarchy • The five alternative forms of organisation structure • The importance of co-ordinating work activities *Learning Outcome: 1*
Mechanistic and Organic Forms of Organisational Structure	• The main characteristics of mechanistic and organic forms of organisational structure • The role of contingencies in choosing the most appropriate form of structure • The main types of contingent factors shaping organisation structures • The opportunities for management to select the most appropriate structure *Learning Outcome: 2*
Human Resource Management	• The impact of Human Resource Management (HRM) on organisational performance • The main activities undertaken by a human resources department • The importance of HRM policies having both an effective external and internal fit • The role of job analysis • The approaches that can be adopted for employee recruitment and selection • Performance appraisal and performance-related pay *Learning Outcome: 3*

Organisations and the Competitive Environment	• The main forces that can affect organisational performance • How to undertake a PEST analysis • The use of Porter's five forces model to analyse competitive environments • How to organise environmental analysis • The importance of managing stakeholder expectations ***Learning Outcome: 2***
Change in Organisations	• The motivations for organisational change • The types of change that can be introduced – structural, technological, systems and cultural • The impact of organisational culture on potential change ***Learning Outcome: 3***
Implementing and Managing Organisational Change	• The lifecycle, emergent, participative and political theories of change • Changing the internal context within an organisation • The different forms of resistance to change • Strategies for successfully implementing change • The process for managing change successfully • Kurt Lewin's three-step model for change ***Learning Outcome: 3***
Effective Communication in Organisations	• The importance of effective communication • The essentials of the communication process • Key factors in communicating successfully • Using the concept of media richness to decide upon the most appropriate communication medium • Upward, downward and horizontal communication flows • Common barriers to effective communication ***Learning Outcome: 4***
Monitoring Organisational Performance – Financial & Budgetary Control	• The various types of accounting activities found within an organisation • The role of cash flow, profit and loss accounts and balance sheets in monitoring organisational performance • The difference between profit and cash • The use of financial information for effective internal control • The range of budgets typically used within an organisation ***Learning Outcome: 5***
Optimising Organisational Performance – Quality and Operational Measures	• The role of quality management within an organisation • The Plan, Do, Check, Act (PDCA) cycle • Quality systems and standards • Service level agreements (SLAs) • The philosophy of total quality management (TQM) • Just-in-time (JIT) production ***Learning Outcome: 5***

The IT Environment Within Business	• The use of technology within the organisation for enhancing business activities, decision making and operations
	• The difference between data and information
	• How a business uses technology
	• The use of technology for operational purposes
	• How technology has influenced product research and design
	• Key factors in implementing IT systems
	• The impact of the Internet upon organisations
	Learning Outcome: 6
New Organisational Structures and Opportunities Through IT	• The use of evolving networking, eCommerce and social media technologies within organisations, and their impact on organisational structures and ways of working
	• Developments in e-commerce, e-business and other Internet-related technologies
	• The different categories of e-business involvement
	• The role of intranets, extranets and collaborative technologies in today's organisations
	• Remote working and virtual teams
	• Key issues associated with managing virtual teams
	Learning Outcome: 6

Related National Occupational Standards (NOS)
Subject Sector Area: Business and Administration (2013)   **Related NOS:** CFABAA111 Respond to change in a business environment;   **Subject Sector Area:** NOS for Operational Delivery Processing roles   **Related NOS:** SFJPA1.5 Manage and evaluate an information system.

Assessments
Global Assignment (100%)
See also Section 3 above

6. Results and Certificates

The grade descriptors Pass, Merit and Distinction are awarded by Unit to successful candidates. A Pass is awarded for an overall Unit mark of between 40 and 59. A Merit is awarded for an overall Unit mark of between 60 and 69 and a Distinction is awarded for an overall Unit mark of 70 and above. Candidates who obtain an overall Unit mark of below 40 are classed as *failed* in the Unit and may resit.

A final qualification mark will be awarded upon successful completion of all units. This is calculated by finding the average mark of all units that make up the qualification. Please note that in exceptional circumstances, NCC Education may be required to change the algorithm to calculate a final qualification mark for a learner in order to secure the maintenance of standards over time. Any necessary changes to this algorithm would be shared with Centres and learners promptly by NCC Education.

Grade Descriptors incorporate characteristics intended to provide a general indication of assessment performance in relation to each Unit's Learning Outcomes in this specification. The final Unit grade awarded will depend on the extent to which a candidate has satisfied the Assessment Criteria. A qualification is awarded when the candidate has achieved at least a pass in all Units.

After each assessment cycle, results slips are issued (in electronic format) which detail the grades achieved, i.e. Fail, Pass, Merit or Distinction (see *Appendix 2*). Certificates which contain your qualification grade and pass mark are then dispatched to Centres.

7. Further Information

For more information about any of NCC Education's products please contact customer.service@nccedu.com or alternatively please visit www.nccedu.com to find out more about our suite of high-quality British qualifications.

Appendix 1 Qualification Documentation

The following NCC Education documentation has been referred to in this specification:

- Reasonable Adjustments and Special Considerations Policy

- Instructions for Conducting Examinations

- Assessment Instructions

- Activity Schedule

- Centre Handbook

All documentation, together with access to NCC Education's online resources, is available to Centres and (where applicable) candidates who have registered for assessment.

Appendix 2 Grade Descriptors

The grade descriptors Pass, Merit and Distinction are awarded to successful candidates. The following are characteristics intended to provide a general indication of assessment performance in relation to each Learning Outcome in this specification. The final grade awarded will depend on the extent to which a candidate has satisfied the Assessment Criteria overall and it should be noted that weaknesses in some aspects of an assessment can be balanced by strong performance in other areas.

Grade descriptors for Computer Networks

Learning Outcome	Pass	Merit	Distinction
Understand network and communication protocols	Has an adequate understanding of some subject terminology and demonstrates a reasonable appreciation of current debates and updates in relation to this area of study.	Has very good understanding of a wide variety of subject terminology and demonstrates a wide appreciation of current debates and updates in relation to this area of study.	Has an extensive understanding of a comprehensive range of subject terminology and demonstrates an insightful appreciation of current debates and updates in relation to this area of study.
Understand the principles of common network topologies and architectures	Has an adequate understanding of some subject terminology and demonstrates a reasonable appreciation of current debates and updates in relation to this area of study.	Has very good understanding of a wide variety of subject terminology and demonstrates a wide appreciation of current debates and updates in relation to this area of study.	Has an extensive understanding of a comprehensive range of subject terminology and demonstrates an insightful appreciation of current debates and updates in relation to this area of study.
Understand the application of network security measures	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Be able to select and configure the hardware components of a computer network to meet the requirements of a precise specification	Produces a sufficiently-defined focus for enquiry, identifying relevant investigative strategies and plans. Reasonable data is collected from several sources and overall results meet the requirements and are communicated in an inappropriate format.	Produces a clearly-defined focus for enquiry, identifying relevant investigative strategies and plans. Accurate and relevant data is collected from a range of sources and overall results are precise and communicated in an appropriate format.	Produces a well-defined focus for enquiry, identifying insightful investigative strategies and plans. Meticulous data is collected from numerous sources and overall results are extensive and communicated in a highly appropriate format.
Be able to design and install network and server operating systems to meet the requirements of a precise specification	Demonstrates a satisfactory ability to use design principles to effectively create and adequately evaluate an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create and accurately evaluate an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create and critically evaluate an artefact to solve an identified issue.

Be able to install and configure internet telephony and communication systems	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.

Grade descriptors for Computer Systems

Learning Outcome	Pass	Merit	Distinction
Understand the function of computer systems	Has satisfactory awareness of principles and concepts underlying theoretical frameworks and approaches and demonstrates sufficient ability to identify associated strengths and weaknesses.	Has very good awareness of principles and concepts underlying theoretical frameworks and approaches and is able in detail to identify associated strengths and weaknesses.	Has an excellent awareness of principles and concepts underlying theoretical frameworks and approaches and is comprehensively able to identify associated strengths and weaknesses.
Be able to design computer systems	Demonstrates a satisfactory ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create an artefact to solve an identified issue.
Be able to build and configure computer systems	Demonstrates a satisfactory ability to develop an artefact to solve an identified issue.	Demonstrates a very good ability to develop an artefact to solve an identified issue.	Demonstrates an excellent ability to develop an artefact to solve an identified issue.
Be able to undertake routine maintenance on computer systems	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.

Grade descriptors for Databases

Learning Outcome	Pass	Merit	Distinction
Understand the concepts associated with database systems	Has satisfactory awareness of principles and concepts underlying theoretical frameworks and approaches and demonstrates sufficient ability to identify associated strengths and weaknesses.	Has very good awareness of principles and concepts underlying theoretical frameworks and approaches and is able in detail to identify associated strengths and weaknesses.	Has an excellent awareness of principles and concepts underlying theoretical frameworks and approaches and is comprehensively able to identify associated strengths and weaknesses.
Understand the concepts associated with the relational model	Has satisfactory awareness of principles and concepts underlying theoretical frameworks and approaches and demonstrates sufficient ability to identify associated strengths and weaknesses.	Has very good awareness of principles and concepts underlying theoretical frameworks and approaches and is able in detail to identify associated strengths and weaknesses.	Has an excellent awareness of principles and concepts underlying theoretical frameworks and approaches and is comprehensively able to identify associated strengths and weaknesses.
Understand how to design and develop a database system	Demonstrates a satisfactory ability to use design principles to effectively develop an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively develop an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively develop an artefact to solve an identified issue.
Be able to develop a logical database design	Demonstrates a satisfactory ability to use design principles to effectively develop an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively develop an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively develop an artefact to solve an identified issue.
Be able to develop a database system using SQL	Demonstrates a satisfactory ability to develop an artefact to solve an identified issue.	Demonstrates a very good ability to develop an artefact to solve an identified issue.	Demonstrates an excellent ability to develop an artefact to solve an identified issue.

Grade descriptors for Designing and Developing a Website

Learning Outcome	Pass	Merit	Distinction
Design a website to address loosely defined requirements	Demonstrates a satisfactory ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create an artefact to solve an identified issue.
Use web development tools to build (X)HTML- and CSS-based websites to address well-defined specifications	Demonstrates a satisfactory ability to develop an artefact to solve an identified issue.	Demonstrates a very good ability to develop an artefact to solve an identified issue.	Demonstrates an excellent ability to develop an artefact to solve an identified issue.
Understand the technology and tools needed to use multimedia in the	Can adequately identify, adapt and make use of a sufficient range of techniques and	Can appropriately identify, adapt and make use of a range of techniques and	Can consistently identify, adapt and make use of a comprehensive range of techniques and

context of a website	information sources within an array of contexts.	information sources within an array of contexts with depth that goes beyond the minimum to pass.	information sources within an array of contexts with depth.
Develop test strategies and apply these to a website	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
Understand the need for Web standards	Has satisfactory awareness of principles and concepts underlying theoretical frameworks and approaches and demonstrates sufficient ability to identify associated strengths and weaknesses.	Has very good awareness of principles and concepts underlying theoretical frameworks and approaches and is able in detail to identify associated strengths and weaknesses.	Has an excellent awareness of principles and concepts underlying theoretical frameworks and approaches and is comprehensively able to identify associated strengths and weaknesses.
Understand the concepts associated with using the Internet and the World Wide Web for business	Has an adequate understanding of some subject terminology and demonstrates a reasonable appreciation of current debates and updates in relation to this area of study.	Has very good understanding of a wide variety of subject terminology and demonstrates a wide appreciation of current debates and updates in relation to this area of study.	Has an extensive understanding of a comprehensive range of subject terminology and demonstrates an insightful appreciation of current debates and updates in relation to this area of study.

Grade descriptors for Designing and Developing Object Oriented Computer Programs

Learning Outcome	Pass	Merit	Distinction
Design object-oriented programmes to address loosely defined problems	Demonstrates a satisfactory ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create an artefact to solve an identified issue.
Implement object-oriented programmes from well-defined specifications	Demonstrates a satisfactory ability to implement an artefact to solve an identified issue.	Demonstrates a very good ability to implement an artefact to solve an identified issue.	Demonstrates an excellent ability to implement an artefact to solve an identified issue.
Develop object-oriented programmes that reflect established programming and software engineering practice	Demonstrates a satisfactory ability to develop an artefact to solve an identified issue.	Demonstrates a very good ability to develop an artefact to solve an identified issue.	Demonstrates an excellent ability to develop an artefact to solve an identified issue.
Develop test strategies and apply these to	Demonstrates a satisfactory ability to	Demonstrates a very good ability to review the	Demonstrates an excellent ability to

	review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
object-oriented programmes			
Develop design documentation for use in program maintenance and end-user documentation	Demonstrates a satisfactory ability to develop an artefact to solve an identified issue.	Demonstrates a very good ability to develop an artefact to solve an identified issue.	Demonstrates an excellent ability to develop an artefact to solve an identified issue.

Grade descriptors for eBusiness

Learning Outcome	Pass	Merit	Distinction
Analyse eCommerce business models	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address problems that are well defined but non-routine.
Analyse eCommerce business-to-consumer strategies	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
Analyse eCommerce business-to-business strategies	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
Evaluate various forms of online marketplace	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address

		defined but non-routine.	to address problems that are well defined but non-routine.	problems that are well defined but non-routine.
Examine the security threats posed to eCommerce users	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Understand how to plan eCommerce strategies	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.

Grade descriptors for Essentials of Management

Learning Outcome	Pass	Merit	Distinction
Analyse the function of management	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Examine the management decision-making process	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address problems that are well defined but non-routine.
Assess the use of management and organisational strategies	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Analyse how management can influence individual and group performance	Has satisfactory awareness of principles and concepts underlying theoretical frameworks and approaches and	Has very good awareness of principles and concepts underlying theoretical frameworks and approaches and is	Has an excellent awareness of principles and concepts underlying theoretical frameworks and approaches and is

Examine theories of leadership and control	demonstrates sufficient ability to identify associated strengths and weaknesses.	able in detail to identify associated strengths and weaknesses.	comprehensively able to identify associated strengths and weaknesses.
Examine theories of leadership and control	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.

Grade descriptors for Office Solutions Development

Learning Outcome	Pass	Merit	Distinction
Understand how application software can support business processes	Has an adequate understanding of some subject knowledge and demonstrates a reasonable appreciation of current debates and updates in relation to this area of study.	Has very good understanding of a wide variety of subject knowledge and demonstrates a wide appreciation of current debates and updates in relation to this area of study.	Has an extensive understanding and a comprehensive range of subject knowledge and demonstrates an insightful appreciation of current debates and updates in relation to this area of study.
Be able to design and implement office solutions	Demonstrates a satisfactory ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create an artefact to solve an identified issue.
Be able to demonstrate that business processes have been enhanced / improved	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of the design, implementation and evaluation of substantial problems.	Demonstrates a very good ability to judge the effectiveness and appropriateness of the design, implementation and evaluation of substantial problems that goes beyond the minimum required to pass.	Demonstrates an excellent ability to comprehensively judge the effectiveness and appropriateness of the design, implementation and evaluation of substantial problems, providing a critical insight.

Grade descriptors for Skills for Computing

Learning Outcome	Pass	Merit	Distinction
Be able to use various skills to support the study of Computing	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information and data due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information and data that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information and data due to a meticulous use of pre-defined techniques and/or criteria.
Be able to communicate in a technical environment	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Be able to deploy thinking skills and problem-solving paradigms in both a business and learning context.	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Be able to handle and present data	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Understand the need for lifelong learning	Has an adequate understanding of some subject knowledge and demonstrates a reasonable appreciation of current debates and updates in relation to this area of study.	Has very good understanding of a wide variety of subject knowledge and demonstrates a wide appreciation of current debates and updates in relation to this area of study.	Has an extensive understanding and a comprehensive range of subject knowledge and demonstrates an insightful appreciation of current debates and updates in relation to this area of study.

Grade descriptors for Software Development Techniques

Learning Outcome	Pass	Merit	Distinction
Identify and explain the key stages of software development lifecycles	Provides a satisfactory interpretation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation of numerous authoritative sources to critically address problems that are well defined but non-routine.
Express, design and evaluate algorithms	Demonstrates a satisfactory ability to use design principles to effectively create and adequately evaluate an artefact to solve an identified issue.	Demonstrates a very good ability to use design principles to effectively create and accurately evaluate an artefact to solve an identified issue.	Demonstrates an excellent ability to use design principles to effectively create and critically evaluate an artefact to solve an identified issue.
Identify and use programming language constructs	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information and data due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information and data that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information and data due to a meticulous use of pre-defined techniques and/or criteria.
Identify and use common data structures	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information and data due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information and data that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information and data due to a meticulous use of pre-defined techniques and/or criteria.
Explain and use common algorithms	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.

Learning Outcome	Pass	Merit	Distinction
Explain and use test strategies	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
Explain how software is modularised	Provides a satisfactory interpretation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation of numerous authoritative sources to critically address problems that are well defined but non-routine.

Grade descriptors for Understanding Business Organisations

Learning Outcome	Pass	Merit	Distinction
Evaluate various types of organisations	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address problems that are well defined but non-routine.
Evaluate various forms of organisational structure	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address problems that are well defined but non-routine.
Examine the process of organisational change	Demonstrates a satisfactory ability to review the effectiveness and appropriateness of information, data and results due to adequate use of pre-defined techniques and/or criteria.	Demonstrates a very good ability to review the effectiveness and appropriateness of information, data and results that goes beyond the minimum required to pass due to an accurate use of pre-defined techniques and/or criteria.	Demonstrates an excellent ability to comprehensively review the effectiveness and appropriateness of information, data and results due to a meticulous use of pre-defined techniques and/or criteria.
Assess the use of communication in organisations	Has satisfactory awareness of principles and concepts underlying	Has very good awareness of principles and concepts underlying	Has an excellent awareness of principles and concepts underlying

	theoretical frameworks and approaches and demonstrates sufficient ability to identify associated strengths and weaknesses.	theoretical frameworks and approaches and is able in detail to identify associated strengths and weaknesses.	theoretical frameworks and approaches and is comprehensively able to identify associated strengths and weaknesses.
Examine how organisational performance is monitored	Can adequately identify, adapt and make use of a sufficient range of techniques and information sources within an array of contexts.	Can appropriately identify, adapt and make use of a range of techniques and information sources within an array of contexts with depth that goes beyond the minimum to pass.	Can consistently identify, adapt and make use of a comprehensive range of techniques and information sources within an array of contexts with depth.
Evaluate the use of IT systems on the performance and structure of an organisation	Provides a satisfactory interpretation and consequently an adequate evaluation of several authoritative sources to meet the requirements of problems that are well defined but non-routine.	Provides a very good interpretation and consequently an accurate and relevant evaluation of a variety of authoritative sources that goes beyond the minimum requirements to address problems that are well defined but non-routine.	Provides an excellent to outstanding interpretation and consequently a sophisticated evaluation of numerous authoritative sources to critically address problems that are well defined but non-routine.