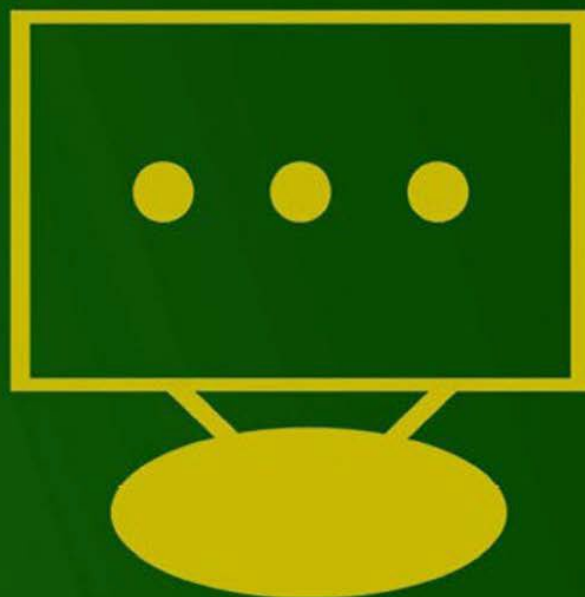




# **DIPLOMA IN COMPUTING**

Qualification Unit  
Specification



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## PROGRAMME SPECIFICATION

Name and level of final award	Bachelor of Science with Honours – Computing  Any other related IT course where all entry requirements are met.
Name and level of intermediate awards	NCC Level 3 Diploma in Computing (L3DC)  NCC Level 4 Diploma in Computing (L4DC)
Awarding body/institution	NCC Education
Teaching institution	Sol Institute
Status of awarding body/institution	Recognised by Ofqual
Location of delivery	Online delivery
Language of delivery and assessment	English
Sol Institute course title, mode of attendance and standard length	Diploma in Computing, Full time online learning, 12 months
Intakes	September/January/April

The Sol Institute Diploma in Computing is a combination of the NCC Level 3 Diploma in Computing and the NCC Level 4 Diploma in Computing. Upon the conclusion of the 12-month course students will become eligible to go straight into the 2nd year in partner UK universities to continue for a BSc in any of the specified awards in the table above.

## PROGRAMME STRUCTURE

### SEMESTER ONE: NCC LEVEL 3 DIPLOMA IN COMPUTING

<b>Module Title</b>	<b>UK credit</b>	<b>Level</b>
Introduction to Computer Science	10	3
Foundation Mathematics	10	3
Introduction to Programming	10	3
Study and Communication Skills	20	3
Culture Studies	10	3

### SEMESTER TWO: NCC LEVEL 4 DIPLOMA IN COMPUTING

<b>Module Title</b>	<b>UK Credit</b>	<b>Level</b>
Computer Networks	15	4
Computer Systems	15	4
Databases	15	4
Designing and Developing a Website	15	4
Skills for Computing	15	4
Designing and Developing Object-Oriented Computer programs	15	4
Office Solutions Development	15	4
Software Development Techniques	15	4

## OVERVIEW OF QUALIFICATION ASSESSMENTS – L3DC & L4DC

### L3DC

Unit	Assessment Methods		
	Local Examination	Global Examination	Global Assignment
Study and Communication Skills	-	-	100%
Foundation Mathematics	-	100%	-
Culture Studies	-	-	100%
Introduction to Computer Science	-	100%	-
Introduction to Programming	-	-	100%

### L4DC

Unit	Assessment Methods	
	Global Examination	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%
Office Solutions Development	-	100%
Skills for Computing	50%	50%
Software Development Techniques	100%	-

## **ASSESSMENT CYCLES – DIPLOMA IN COMPUTING**

An examination is a time-constrained assessment that will take place on a specified date. An assignment requires candidates to produce a written response to a set of one or more tasks, meeting a deadline imposed by Sol Institute. The overall Unit mark is computed from the weighted mean of its components. The pass mark for a Unit is 50%.

Two assessments cycles are offered in Summer and Winter. Examination dates and assignment submission deadlines will be advised to the students at the start of the semester.

### **LANGUAGE OF ASSESSMENT**

English language

### **ENTRY REQUIREMENTS**

For entry into the Diploma in Computing programme, students must have demonstrably previously studied in English at secondary school level or have a valid score of 5.5 or above in the International English Language Testing System (IELTS) Examination (or equivalent).

### **RESIT**

If a candidate fails an assessment, they will be provided with opportunities to re-sit. Candidates may only seek reassessment in a previously failed Unit.

## SYLLABUS – L3DC

### Study and Communication Skills

<b>Guided Learning Hours</b>	75 hours	<b>Total Qualification Time</b>	200 hours
<b>RQF Code</b>	A/504/1424	<b>Credits</b>	20

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> The Learner can:
1. Be able to take effective notes from a variety of sources	1.1 Identify key information from a range of different texts 1.2 Record key points when listening to information being given 1.3 Critically review their own notes 1.4 Use their own notes to accurately summarise information given 1.5 Use their own notes to present a summary to others. 1.6 Demonstrate using a range of sources to gather information.
2. Understand how to work out the meaning of unfamiliar content	2.1 Identify unfamiliar content 2.2 Identify a number of different strategies for working out the meaning of unfamiliar content 2.3 Demonstrate the ability to find the meaning of unfamiliar content 2.4 Demonstrate the application of own understanding to unfamiliar content.
3. Understand common steps in producing academic work	3.1 Describe the common steps in producing academic work 3.2 Define plagiarism 3.3 Explain correct referencing in an academic essay.
4. Be able to produce a piece of academic work suitable for this level following a drafting process	4.1 Create a timetabled plan to meet the requirements of an academic assignment. 4.2 Check own work for errors. 4.3 Evaluate own work against criteria/requirements given 4.4 Develop sections of an assignment

	<p>towards a final draft.</p> <p>4.5 Demonstrate the correct use of academic referencing.</p> <p>4.6 Present a completed piece of academic work to others.</p>
5. Understand different learning styles	<p>5.1 Explain the idea of multiple intelligences</p> <p>5.2 Describe a range of learning styles</p> <p>5.3 Identify own preferred learning style.</p> <p>5.4 Identify own study strengths and weaknesses.</p>

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course Coverage</b>
Learning to Learn	<ul style="list-style-type: none"> <li>• Learner styles and multiple intelligences</li> <li>• Self study methodology</li> <li>• Time management</li> <li>• Goal setting</li> <li>• Self analysis and critical reflection</li> <li>• Keeping a learner diary</li> </ul>
Reading Textbooks and Note Taking	<ul style="list-style-type: none"> <li>• Reading a textbook &amp; note taking skills</li> <li>• Using notes to write summaries</li> <li>• Public Speaking skills &amp; Peer assessment</li> <li>• Learner diaries and study skills self-assessment</li> </ul>
Note Taking in Lectures	<ul style="list-style-type: none"> <li>• Note taking in lectures</li> <li>• Recognising key points</li> <li>• Guessing meaning</li> <li>• Editing and reviewing notes</li> <li>• Planning a speech</li> <li>• Public speaking practice and assessment</li> </ul>
Library Research and Writing an Essay	<ul style="list-style-type: none"> <li>• Accessing the library and reading strategies</li> <li>• Note taking from books</li> <li>• Essay planning and organising notes</li> <li>• Public speaking practice and assessment</li> </ul>



Journal-based Research for Essay Writing	<ul style="list-style-type: none"> <li>• Journals and articles</li> <li>• Critical reading and analyzing data</li> <li>• Describing data in an essay</li> <li>• Academic Style</li> <li>• Editing and proof reading</li> <li>• Public speaking practice and assessment</li> </ul>
Internet Research for Essay Writing	<ul style="list-style-type: none"> <li>• Using the internet for research</li> <li>• Bibliographies and referencing</li> <li>• Plagiarism and paraphrasing</li> <li>• Editing and checking work against criteria</li> <li>• Including sufficient detail</li> <li>• Public speaking practice and assessment</li> </ul>
Writing a Research Report	<ul style="list-style-type: none"> <li>• Approaching a task and making an assignment strategy</li> <li>• Understanding requirements and using criteria</li> <li>• Integrating evidence into a report</li> <li>• Editing and proof reading</li> <li>• Public speaking practice and assessment</li> </ul>
Examinations and Assessment	<ul style="list-style-type: none"> <li>• Writing summaries and reviewing notes</li> <li>• Preparing for exams</li> <li>• Time Management</li> <li>• Stress and anxiety management</li> </ul>

### Related National Occupational Standards (NOS)

**Sector Subject Area:** IT Users 6.2

**Related NOS:** ESKIICF2 FS12:2 Access, search for, select and use Internet-based information and evaluate its fitness for purpose

ESKIINT3 P8-10 Use browser tools to search effectively and efficiently for information from the Internet

**Sector Subject Area:** Business and Administration (2013)

**Related NOS:** CFABAA617 Develop a presentation CFABAA623

Deliver a presentation

CFASAD111 Plan and manage own workload

### Assessment Type

Global Assignment (100%)

The assignment is broken into three sections as follows:

- Learner Portfolio
- Note-taking and summary writing assignment
- Research project

<b>Guided Learning Hours</b>	50 hours	<b>Total Qualification Time</b>	100 hours
<b>RQF code</b>	F/615/0154	<b>Credits</b>	10

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> The Learner can:
1. Be able to perform a range of algebraic calculations	1.1 Simplify a range of algebraic expressions involving powers 1.2 Simplify algebraic expressions by multiplying and dividing expressions 1.3 Factorise algebraic expressions using a range of techniques 1.4 Simplify and solve Algebraic Fractions
2. Be able to solve a range of basic Calculations equations	2.1 Transpose formulae 2.2 Solve linear and quadratic equations 2.3 Solve simultaneous equations 2.4 Perform statistical calculations relating to central tendency
3. Be able to present data in graphical form	3.1 Present data using tables, pie charts and bar charts 3.2 Construct frequency distributions 3.3 Present data as histograms, ogives and time series graphs 3.4 Present linear and quadratic equations in graphical form 3.5 Provide graphical solutions to simultaneous equations
4. Understand the fundamentals of Differential Calculus	4.1 Explain the rate of change of one variable in respect of another 4.2 Calculate the gradient of a curve using differentiation 4.3 Plot maximum and minimum turning points using graphs 4.4 Identify the maximum and minimum turning points using differentiation
5. Understand the fundamentals of Integral Calculus	5.1 Recognise integration as the inverse of differentiation 5.2 Recognise the constant of integration 5.3 Evaluate the constant of integration 5.4 Evaluate the definite integral

	5.5 Calculate of the area under a curve
6. Understand Measures of Dispersion	6.1 Calculate the range, quartiles and quantiles 6.2 Calculate the mean deviation 6.3 Calculate the variance 6.4 Calculate the standard deviation
7. Understand the fundamentals of Probability	7.1 Calculate probability using the addition and multiplication rules 7.2 Calculate the probability of compound events 7.3 Use tree diagrams to determine probability 7.4 Calculate probabilities of permutations and combinations

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to Algebra	<ul style="list-style-type: none"> <li>• Simplification of a range of algebraic expressions including those involving powers</li> <li>• Simplifying a range of algebraic expressions by multiplying and dividing expressions</li> <li>• Factorising algebraic expressions by using a range of techniques</li> <li>• Simplify and solve a range of Algebraic Fractions</li> </ul>
Using Algebraic Equations	<ul style="list-style-type: none"> <li>• Transposing formulae</li> <li>• Solving simple linear equations</li> <li>• Solving simple quadratic equations</li> <li>• Solving simultaneous equations</li> </ul>
Solving algebraic equations Using Graphs	<ul style="list-style-type: none"> <li>• Presenting a range of linear equations in graphical form</li> <li>• Presenting a range of quadratic equations in graphical form</li> <li>• Solving simultaneous equations using graphical forms</li> </ul>

Introduction to Differential Calculus	<ul style="list-style-type: none"> <li>• Using the principles of calculus to explain the rate of change of one variable in respect of another</li> <li>• Calculation of the gradient of a curve using differentiation</li> <li>• Plotting maximum and minimum turning points using graphical means</li> <li>• Identification of the maximum and minimum turning points using differentiation</li> </ul>
Introduction to Integral Calculus	<ul style="list-style-type: none"> <li>• Recognising the process of integration as the inverse of differentiation</li> <li>• Recognition of the role played by the constant of integration</li> <li>• Evaluation of the constant of integration</li> <li>• Evaluation of the definite integral</li> <li>• Calculation of the area under a curve</li> </ul>
Presentation of Data	<ul style="list-style-type: none"> <li>• Present data using tables, pie charts and bar charts</li> <li>• Construct Frequency distributions</li> <li>• Present data as histograms, ogives and time series graphs</li> </ul>
Beginning Statistics	<ul style="list-style-type: none"> <li>• Calculation of the arithmetic mean for a range of data samples</li> <li>• Calculation of the arithmetic mean for a range of frequency distributions</li> <li>• Calculation of the arithmetic mean for grouped data</li> <li>• Calculation of the modal value of data sets</li> <li>• Calculation of the median value of data sets</li> </ul>
Understanding Dispersion	<ul style="list-style-type: none"> <li>• Calculation of the range, quartiles and quantiles</li> <li>• Calculation the mean deviation</li> <li>• Calculation of the variance</li> <li>• Calculation of the standard deviation</li> </ul>

<b>Assessments</b>
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Global Examination (100%)
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## Culture Studies

<b>Guided Learning Hours</b>	55 hours	<b>Total Qualification Time</b>	100 hours
<b>RQF code</b>	F/615/0155	<b>Credits</b>	10

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> The Learner can:
1. Understand the concept of culture, cultural values and how different cultures can be defined	1.1 Explain the terms 'culture' and 'subculture' 1.2 Identify a range of cultural practices and values and their unique aspects 1.3 Explain what is meant by a 'stereotype'
2. Understand how the political and education system of a foreign country differs from their own	2.1 Explain the general organisational structure of the education and political systems of a particular city or country 2.2 Demonstrate understanding of the application and enrolment process for studying abroad
3. Understand how the business culture of a foreign country differs from their own	3.1 Identify variances in work culture and management structures 3.2 Describe the benefits of cultural diversity for an organisation 3.3 Assess how cultural factors impact on communication and effective working practices
4. Understand the relationship between digital technologies, communication and culture	4.1 Understand how life online has impacted how people communicate 4.2 Explain the impact of social media, online retail and online news on culture 4.3 Understand aspects of digital culture. 4.4 Explain the ways in which digital technologies have impacted on the individual and society.

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
What is Culture?	<ul style="list-style-type: none"> <li>• Definition of culture</li> <li>• Aspects of culture</li> <li>• Personal Cultural Identity</li> <li>• Cultural Practice and unique aspects</li> </ul>
Subcultures	<ul style="list-style-type: none"> <li>• Definition of subculture</li> <li>• Aspects of subcultures</li> <li>• Comparisons between different cultural aspects</li> <li>• Stereotypes</li> </ul>
Government	<ul style="list-style-type: none"> <li>• Basic types of political system</li> <li>• Police and Crime</li> </ul>
Values	<ul style="list-style-type: none"> <li>• Personal, familial and societal values</li> <li>• Common etiquette in different countries</li> <li>• Common pastimes and the values associated with these</li> </ul>
Education Systems	<ul style="list-style-type: none"> <li>• Different stages of education systems at home and abroad</li> <li>• Identifying universities in different places</li> </ul>
Application to Higher Education	<ul style="list-style-type: none"> <li>• Courses, subjects and methods of assessment at chosen universities</li> <li>• The university application process</li> <li>• Personal statements</li> </ul>
Work	<ul style="list-style-type: none"> <li>• Understanding different attitudes to work</li> <li>• Work culture; organisational and management structures</li> <li>• Cultural differences in international business</li> <li>• Benefits of cultural diversity to an organisation</li> </ul>

Digital Culture	<ul style="list-style-type: none"><li>• Understanding social media, online retail and online news and its impact on culture</li><li>• Digital culture and disparity in access</li><li>• Positives/ negatives of life online on the individual</li><li>• Positives/ negatives of life online on society</li></ul>
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<b>Assessments</b>
Global Assignment (100%)

## Introduction to Computer Science

<b>Guided Learning Hours</b>	56 hours	<b>Total Qualification Time</b>	100 hours
<b>RQF code</b>	F/504/0727	<b>Credits</b>	10

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> The Learner can:
1. Understand fundamental concepts relating to hardware and software	1.1 Describe the functions of a computer system 1.2 Describe a range of computer systems or justify the use of a type of computer system for a particular purpose 1.3 Define the term 'hardware' 1.4 Describe the purpose or characteristics of computer hardware 1.5 Define the term 'software' 1.6 Identify categories of software 1.7 Describe types of application software or justify the use of application software for a particular purpose 1.8 Describe types of system software or justify the use of system software for a particular purpose. 1.9 Describe types of utility software or justify the use of utility software for a particular purpose.
2. Understand the characteristics of hardware components	2.1 Describe internal components of computer hardware 2.2 Describe the components of a central processing unit (CPU) 2.3 Describe the functions of a CPU 2.4 Explain the function of the fetch-decode-execute cycle 2.5 Describe how hardware components communicate with each other 2.6 Identify units of measurements of computer storage. 2.7 Describe a range of computer storage media or justify the use of a type of storage media for a particular



	<p>purpose.</p> <p>2.8 Describe a range of input devices or justify the use of a type of input device for a particular purpose.</p> <p>2.9 Describe a range of output devices or justify the use of an output device for a particular purpose.</p>
<p>3. Understand how data is represented in a computer system</p>	<p>3.1 Describe how data is represented by binary</p> <p>3.2 Describe how data is represented by ASCII</p> <p>3.3 Describe how data is represented by Unicode</p> <p>3.4 Explain how encryption can be used to represent data</p> <p>3.5 Explain how compression can facilitate the storage and transmission of data</p> <p>3.6 Explain the purpose of number systems</p> <p>3.7 Explain the binary number system</p> <p>3.8 Demonstrate addition or subtraction of binary numbers</p> <p>3.9 Demonstrate an understanding of two's complement</p> <p>3.10 Explain the hexadecimal number system</p> <p>3.11 Demonstrate conversion between decimal, binary or hexadecimal numbers</p> <p>3.12 Describe how images are represented in a computer system</p> <p>3.13 Describe how sound is represented in a computer system</p> <p>3.14 Explain how compression can facilitate storage and transmission of images or sound</p> <p>3.15 Define the term 'digital logic'</p> <p>3.16 Explain the purpose and operation of logic gates.</p>
<p>4. Understand the fundamental concepts of computer networks</p>	<p>4.1 Explain the purpose of a computer network</p> <p>4.2 Describe types of computer network or explain the criteria for selecting a particular type of network</p>

	<p>4.3 Describe the hardware used in a computer network</p> <p>4.4 Describe the software used in a computer network</p> <p>4.5 Describe the transmission media used in a computer network</p> <p>4.6 Describe types of network transmission protocols</p> <p>4.7 Describe types of computer network topology or justify the use of a topology for a particular purpose.</p> <p>4.8 Describe Internet and World Wide Web technologies.</p> <p>4.9 Discuss computer network issues</p>
5. Understanding cultural, legal, ethical issues relating to computing.	<p>5.1 Explain what a cultural issue is and describe a range of cultural issues.</p> <p>5.2 Explain how cultural issues can be addressed.</p> <p>5.3 Identify laws and guidelines that relate to computing.</p> <p>5.4 Describe situations where laws and guidelines have been used to deal with people using computers to commit crimes or cause offence.</p>

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course Coverage</b>
Introduction to Computer Systems and Hardware	<ul style="list-style-type: none"> <li>• Definition of computer system</li> <li>• Functions of a computer system</li> <li>• Data and information</li> <li>• An overview of a typical computer system</li> <li>• Types of computer systems</li> <li>• Big data</li> <li>• The Internet of Things</li> <li>• Definition of hardware</li> <li>• The role of computer hardware</li> <li>• Types of computer hardware</li> <li>• Accessibility</li> </ul>

<p>Introduction to Application Software and System Software</p>	<ul style="list-style-type: none"> <li>• Definition of software</li> <li>• Categories of software</li> <li>• Software compatibility</li> <li>• Types and uses of application software</li> <li>• How to obtain software</li> <li>• Software licenses</li> <li>• Criteria to consider when selecting application software</li> <li>• System software <ul style="list-style-type: none"> <li>- operating system software</li> <li>- utility software</li> <li>- driver software</li> </ul> </li> <li>• Criteria to consider when selecting system software</li> </ul>
<p>Internal Components of Computer Hardware</p>	<ul style="list-style-type: none"> <li>• Internal components: Motherboard, chips, central processing unit (CPU), clock, memory, chipset, expansion slots and cards, power supply, fan, buses, connectors</li> <li>• How components communicate with each other</li> <li>• How components communicate with external devices</li> </ul>
<p>Computer Processors</p>	<ul style="list-style-type: none"> <li>• The role of a computer processor</li> <li>• Types of processor</li> <li>• Components of a CPU</li> <li>• The functions of a CPU</li> <li>• How components of a CPU communicate with each other</li> <li>• The fetch-execute-decode cycle</li> </ul>
<p>Storage Devices and Input and Output Devices</p>	<ul style="list-style-type: none"> <li>• Computer storage</li> <li>• Units of measurement of computer storage</li> <li>• Computer storage media</li> <li>• Storage locations</li> <li>• Criteria to consider when selecting computer storage</li> <li>• Input devices</li> <li>• Criteria to consider when selecting input devices</li> <li>• Output devices:</li> <li>• Criteria to consider when selecting output devices</li> </ul>
<p>Data Representation</p>	<ul style="list-style-type: none"> <li>• Binary representation of data</li> <li>• ASCII representation of data</li> <li>• Unicode representation of data</li> <li>• Hexadecimal representation of data</li> <li>• Definitions of encryption and decryption</li> <li>• Examples of encryption</li> <li>• Definition of compression</li> <li>• Compression of data</li> </ul>

<p>Number Representation</p>	<ul style="list-style-type: none"> <li>• Number systems</li> <li>• Decimal number system</li> <li>• Binary number system</li> <li>• Why consider number systems?</li> <li>• Addition of binary numbers</li> <li>• Subtraction of binary numbers</li> <li>• Two's complement</li> <li>• Hexadecimal number system</li> <li>• Converting decimal, binary and hexadecimal numbers</li> </ul>
<p>Image and Sound Representation</p>	<ul style="list-style-type: none"> <li>• Image representation</li> <li>• Image file formats</li> <li>• Compression of images</li> <li>• Sound representation</li> <li>• Sound file formats</li> <li>• Compression of sound</li> </ul>
<p>Digital Logic</p>	<ul style="list-style-type: none"> <li>• Digital logic</li> <li>• Truth Tables</li> <li>• Logic gates <ul style="list-style-type: none"> <li>-AND</li> <li>-OR</li> <li>-NOT</li> <li>-NAND</li> <li>-NOR</li> </ul> </li> </ul>
<p>Computer Networks</p>	<ul style="list-style-type: none"> <li>• Definition of a computer network</li> <li>• Types of network</li> <li>• Criteria for selecting a network</li> <li>• Network hardware</li> <li>• Network transmission media</li> <li>• Network transmission protocols</li> <li>• Network software</li> </ul>

Network Topologies and the Internet	<ul style="list-style-type: none"> <li>• Define a network topology</li> <li>• Types of topology</li> <li>• Criteria for selecting a topology</li> <li>• Definition of the Internet</li> <li>• Definition of the World Wide Web (WWW)</li> <li>• World Wide Web technologies</li> <li>• Computer network issues</li> </ul>
Cultural, Ethical and Legal Issues Relating to Computing	<ul style="list-style-type: none"> <li>• Definition of cultural issues</li> <li>• Examples of cultural issues</li> <li>• Addressing cultural issues</li> <li>• Definition of ethical issues</li> <li>• Examples of ethical issues</li> <li>• Addressing ethical issues</li> <li>• UK laws and guidelines <ul style="list-style-type: none"> <li>- Data Protection Act (1998)</li> <li>- Computer Misuse Act (1990)</li> <li>- Copyright, Designs and Patents Act (1988)</li> </ul> </li> <li>• Global laws and computers</li> <li>• Examples of situations where the law has been applied</li> </ul>

### Related National Occupational Standards (NOS)

**Sector Subject Area:** IT Users

**Related NOS:** ESKITU080, ESKIDMS1 P1-5, Enter, edit and organise structured information in a database

ESKIDB1 P6-7 Use database software tools to extract information and produce reports

ESKIDB2 P8-11 Use database software tools to run queries and produce reports ESKIDB3 P1-4

Plan, create and modify relational database tables to meet requirements ESKIDMS2 P1-5

Enter, edit and maintain data records in a data management system ESKIDMS1 P6-7 Retrieve and display data records to meet requirements

ESKIDMS1 P1-5 Enter, edit and maintain data records in a data management system

**Sector Subject Area:** IT and Telecoms

**Related NOS:** ESKITP4062 PS-7 Document specified information relating to human interaction and interface (HCI) design

### Assessments

Global Examination (100%)

## Introduction to Programming

<b>Guided Learning Hours</b>	50 hours	<b>Total Qualification Time</b>	100 hours
<b>RQF code</b>	A/504/0967	<b>Credit</b>	10

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> The Learner can:
1. Create project documentation.	1.1 Understand why the design, implementation and testing of a program should be supported by appropriate documentation. 1.2 Create and complete a Project Control Object Definition Sheet
2. Implement a program that uses data capture and validation.	2.1 Write a working program which accepts and stores user input. 2.2 Write a working program which validates user input and only accepts expected values.
3. Implement a program that uses sequential programming with different data types.	3.1 Write a working program that uses sequential programming. 3.2 Write a working program which makes use of at least two different data types.
4. Implement a program that uses iteration and selection constructs.	4.1 Write a working program that uses a for loop construct. 4.2 Write a working program that uses an if - else construct. 4.3 Identify and document appropriate testing of loops and selection statements.
5. Implement a program that uses file i/o	5.1 Write code that demonstrates how to output data to an external file. 5.2 Write code that demonstrates how to read in and store data from an external file. 5.3 Identify and document appropriate testing of file input/ output
6. Implement a program that uses arrays	6.1 Write code that demonstrates how to declare an array 6.2 Write code that demonstrates how to manipulate an array 6.3 Write code that demonstrates how to

	sort an array 6.4 Identify and document appropriate testing of arrays
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<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course Coverage</b>
Introduction to the IDE, VB properties and creating a GUI	<ul style="list-style-type: none"> <li>• Introduction to Visual Studio Community 2015 IDE</li> <li>• Introduction to GUI objects and properties.</li> <li>• Introduction to creating a GUI</li> </ul>
Introduction to data types and sequential programming	<ul style="list-style-type: none"> <li>• Introduction to programming</li> <li>• Introduction to objects</li> <li>• Introduction to variables</li> <li>• Assignment statements</li> <li>• Introduction to data types</li> <li>• Arithmetic operations</li> </ul>
Introduction to the programming construct of iteration and fixed loops	<ul style="list-style-type: none"> <li>• Introduction to iteration</li> <li>• Flow of execution</li> <li>• For loop structure</li> <li>• Variables and loops</li> <li>• Nested loops</li> </ul>
Introduction to the programming construct of selection	<ul style="list-style-type: none"> <li>• If statement structure</li> <li>• Comparison operators</li> <li>• If-Else structure</li> <li>• If-Else-If structure</li> <li>• Compound conditionals</li> <li>• Switch statements</li> </ul>
Introduction to conditional loops and data validation	<ul style="list-style-type: none"> <li>• Importance of data validation</li> <li>• Checking for specific values</li> <li>• Checking for a range of values</li> <li>• String comparisons</li> <li>• While loop structure</li> <li>• Logical comparisons</li> <li>• Multiple conditions</li> <li>• Do - While loops</li> </ul>
Project Definition and Design	<ul style="list-style-type: none"> <li>• Specification, design, implementation, test cycle</li> <li>• Project Brief to Specification</li> <li>• Object Definition Sheets</li> <li>• Debugging and testing</li> </ul>
Case Study: Creating a GUI program that uses sequence, selection and iteration	<ul style="list-style-type: none"> <li>• Consolidation of learning from topics 1 - 6</li> <li>• Student mid-course assignment</li> </ul>
Introduction to Arrays	<ul style="list-style-type: none"> <li>• Benefits of arrays</li> <li>• Declaring arrays</li> <li>• Initialising and filling arrays</li> <li>• Accessing and changing values in arrays</li> <li>• Manipulating arrays using for loops</li> <li>• Sorting arrays</li> </ul>
Introduction to Methods	<ul style="list-style-type: none"> <li>• Different method types in VB (Subs and</li> </ul>

	Functions) and scope <ul style="list-style-type: none"> <li>• Parameter passing</li> <li>• Return statements</li> <li>• Method overloading</li> </ul>
Introduction to File I/O	<ul style="list-style-type: none"> <li>• Files and data storage</li> <li>• Writing to files</li> <li>• Reading from files</li> <li>• Exception handling for file I/O</li> </ul>
Case Study: Creating a GUI program that uses arrays, procedures and file I/O	<ul style="list-style-type: none"> <li>• Consolidation of learning from topics 1 - 10</li> <li>• Student end of course exam</li> </ul>

<p><b>Related National Occupational Standards (NOS)</b></p> <p><b>Sector Subject Area:</b> IT and Telecoms</p> <p><b>Related NOS:</b> ESKITP5013 P1-6 - Carry out system development activities under direction;</p> <p>ESKITP5014v2 P1-5 - Perform systems development activities;</p> <p>ESKITP5014v2 P6-10 - Contribute to the management of systems development;</p> <p>ESKITP5022 P1-7- Perform specified software development activities; ESKITP5024 P6-12 - Perform software development activities;</p> <p>ESKITP5033 P1-5 - Carry out IT/Technology solution testing activities under direction;</p> <p>ESKITP5034 P1-4 - Carry out IT/Technology solution testing</p>
<p><b>Assessment</b></p> <p>Global Assignment (100%)</p>



## SYLLABUS – L4DC

### Computer Networks

<b>Guided Learning Hours</b>	60 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	M/502/8332	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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	3.3 Install and configure a firewall on an internet- connected system. 3.4 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.

	<p>4.4 Configure the hardware components for a wireless network.</p> <p>4.5 Test the connectivity of a network.</p> <p>4.6 Troubleshoot client-side connectivity issues using appropriate tools.</p>
<p>5. Be able to design and install network and server operating systems to meet the requirements of a precise specification.</p>	<p>5.1 Identify the software requirements for a computer network.</p> <p>5.2 Install and run appropriate network software according to a design specification.</p> <p>5.3 Install and run software components for a wireless network.</p> <p>5.4 Test the correct operation of network and server software.</p>
<p>6. Be able to install and configure internet telephony and communication systems</p>	<p>6.1 Install and configure a Voice over IP (VoIP) system.</p> <p>6.2 Install and configure a web-based video conferencing solution.</p> <p>6.3 Install and configure a Virtual Private Network (VPN)</p>

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to the Module and Networks	<ul style="list-style-type: none"> <li>• Introduction to module</li> <li>• What is a network?</li> <li>• Real world networks</li> <li>• The OSI seven-layer model</li> </ul>
Network Protocols and Standards	<ul style="list-style-type: none"> <li>• Communications and network protocols</li> <li>• Protocols and the OSI model</li> <li>• Protocols in real world networks</li> <li>• The Internet</li> </ul>
Wireless Networking Standards	<ul style="list-style-type: none"> <li>• Wireless devices</li> <li>• Wireless networking standards</li> <li>• Issues for wireless networks</li> <li>• Wireless networking protocols</li> </ul>
Network Topology and Architecture	<ul style="list-style-type: none"> <li>• Network topology concepts</li> <li>• Common network topologies and their application</li> <li>• Topologies and protocols</li> </ul>

Network Media and Connectors	<ul style="list-style-type: none"> <li>• Network media</li> <li>• Network connectors</li> <li>• Selecting media and connectors</li> </ul>
Network Hardware	<ul style="list-style-type: none"> <li>• Network hardware</li> <li>• Hardware selection</li> <li>• Creating a network</li> </ul>
Wireless Network Hardware	<ul style="list-style-type: none"> <li>• Wireless network hardware</li> <li>• Wireless hardware selection</li> <li>• Creating a wireless network</li> </ul>
Security Software	<ul style="list-style-type: none"> <li>• Network security threats</li> <li>• Security countermeasures</li> <li>• Security software</li> <li>• Installing and configuring security software</li> </ul>
Firewalls	<ul style="list-style-type: none"> <li>• Functions of a firewall</li> <li>• Types of firewall</li> <li>• Installing and configuring a firewall</li> </ul>
Network and Server Software	<ul style="list-style-type: none"> <li>• Network software requirements</li> <li>• Wireless network software requirements</li> <li>• Configuring network software</li> </ul>
Voice over IP and Video Conferencing	<ul style="list-style-type: none"> <li>• Voice over IP (VoIP)</li> <li>• Video conferencing</li> <li>• Installing and configuring voice networks</li> <li>• Installing and configuring video networks</li> </ul>
Virtual Private Networks	<ul style="list-style-type: none"> <li>• Virtual private networks (VPN)</li> <li>• Advantages and disadvantages of VPN</li> <li>• Installing and configuring VPN</li> </ul>

<b>Related National Occupational Standards (NOS)</b>
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<p><b>Sector Subject Area:</b> IT and Telecoms</p>
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<p><b>Related NOS:</b> ESKITP4013 P1-3 - Contribute to IT architecture work;</p>
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<p>ESKITP4083 P1-4 - Prepare, under supervision, for IT/technology infrastructure design and planning activities;</p>
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<p>ESKITP4083 P5-8 - Assist with IT/technology infrastructure design and planning activities;</p>
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<p>ESKITP4083 P9-11-Assist others with relevant information concerning IT/technology infrastructure design and planning assignments;</p>
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<p>ESKITP5043 P1-5 - Perform systems integration activities as directed;</p>
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<p>ESKITP5044 P4-8 - Perform systems integration activities;</p>
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<p>ESKITP5053 P1-5- Assist with gathering and documenting information to support systems installation, implementation and handover;</p>
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<p>ESKITP5054 P1-4- Perform systems installation, implementation and handover activities</p>
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<b>Assessments</b>
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<p>Global Assignment (100%)</p>
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## Computer Systems

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<b>Guided Learning Hours</b>	60 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	L/601/0446	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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 need. 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.

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to Computer Systems	<ul style="list-style-type: none"> <li>• Overview of the module</li> <li>• Types of computer               <ul style="list-style-type: none"> <li>- Personal, mini, mainframe, mobile,</li> <li>- Network, supercomputer, multiprocessor</li> </ul> </li> <li>• History of modern computers               <ul style="list-style-type: none"> <li>- Show &amp; tell of old and modern computer equipment</li> <li>- Student research on generations of computer</li> </ul> </li> </ul>

<p>Environments, Functions of components and Health &amp; Safety</p>	<ul style="list-style-type: none"> <li>• Computing Environments <ul style="list-style-type: none"> <li>- Home, business, computer gaming, networking, real-time, communication</li> </ul> </li> <li>• Von Neumann architecture <ul style="list-style-type: none"> <li>- Example processors</li> <li>- Fetch execute cycle</li> </ul> </li> <li>• Internet research - Different types of processor. <ul style="list-style-type: none"> <li>- RISC v CISC</li> <li>- Single v multi core</li> <li>- Multiprocessor</li> <li>- Distributed</li> </ul> </li> <li>• Health and safety practices; mains electricity, hot components, lifting and carrying, electrostatic precautions.</li> </ul>
<p>Computer Hardware</p>	<ul style="list-style-type: none"> <li>• Standard architecture <ul style="list-style-type: none"> <li>- CPU, main memory (RAM, ROM), Backing storage, I/O</li> </ul> </li> <li>• Current implementation of standard architecture <ul style="list-style-type: none"> <li>- CPU, motherboard, Power supply, cooling, backing store (hard disk, optical disks), memory types, interfaces (PCI, AGP, PCI Express), NIC, graphics card, sound.</li> </ul> </li> <li>• Inside a PC <ul style="list-style-type: none"> <li>- Identify components and their functions</li> </ul> </li> <li>• Identify alternative components and packaging</li> </ul>
<p>Peripherals and System Building</p>	<ul style="list-style-type: none"> <li>• Printers, &amp; plotters, cameras &amp; scanners; keyboard, mouse, touch screen/pad; monitors, display adapters; multimedia devices; storage media; networking; portable drives; plug and play components; performance factors</li> <li>• Disassemble and assemble a computer system <ul style="list-style-type: none"> <li>- Install motherboard, processor, heat-sink and fan, memory, power supply unit</li> <li>- Install hard disc drive, optical drive;</li> <li>- Install specialised cards</li> <li>- Install peripheral devices</li> </ul> </li> </ul>
<p>Software, Installation and Configuration</p>	<ul style="list-style-type: none"> <li>• Systems software <ul style="list-style-type: none"> <li>- Operating systems,</li> <li>- Utility programmes,</li> <li>- Library programmes,</li> <li>- Translator programmes</li> </ul> </li> <li>• Applications software <ul style="list-style-type: none"> <li>- Standard packages</li> <li>- Customised packages</li> <li>- Special purpose software</li> <li>- Bespoke software</li> </ul> </li> <li>• Install key software <ul style="list-style-type: none"> <li>- Windows Operating Systems</li> <li>- Office package</li> <li>- Free utility software</li> <li>- Anti-virus and security software</li> </ul> </li> </ul>

Alternative Operating Systems	<ul style="list-style-type: none"> <li>• Alternative operating systems <ul style="list-style-type: none"> <li>- UNIX/Linux, OS X, Android</li> </ul> </li> <li>• Linux installation</li> </ul>
System Testing	<ul style="list-style-type: none"> <li>• Test plan</li> <li>• Test documentation</li> <li>• Fault detection, diagnostics, troubleshooting</li> <li>• Technical support</li> <li>• Test hardware and software</li> <li>• Repair</li> <li>• Fault diagnosis exercises</li> </ul>
Software Maintenance	<ul style="list-style-type: none"> <li>• Software problems</li> <li>• Automatic updates</li> <li>• Upgrades</li> <li>• Utility software</li> <li>• Security software</li> <li>• Scheduling maintenance</li> <li>• Windows update exercise</li> <li>• Package update exercise</li> <li>• Driver update</li> </ul>
Hardware Maintenance	<ul style="list-style-type: none"> <li>• Preventative maintenance</li> <li>• Upgrade v replace</li> <li>• Hardware upgrade <ul style="list-style-type: none"> <li>- Priorities</li> <li>- Internal components</li> <li>- Peripherals</li> </ul> </li> <li>• Hardware upgrade exercises e.g. <ul style="list-style-type: none"> <li>- Memory update</li> <li>- Graphics upgrade</li> <li>- Hard disk upgrade</li> <li>- Add second NIC</li> </ul> </li> </ul>
File Management	<ul style="list-style-type: none"> <li>• File systems operation and organisation <ul style="list-style-type: none"> <li>- FAT, NTFS, ext</li> <li>- Directories/folders</li> <li>- Security, sharing and access rights</li> </ul> </li> <li>• Data Protection <ul style="list-style-type: none"> <li>- Backup</li> <li>- File/folder organisation</li> </ul> </li> <li>• Windows file management exercises</li> </ul>

Needs Analysis	<ul style="list-style-type: none"> <li>• Client and system requirements <ul style="list-style-type: none"> <li>- Investigation/analytical techniques</li> <li>- Problems/limitations with current/new system</li> <li>- Functionality, costs, timescales, resources</li> </ul> </li> <li>• Case study <ul style="list-style-type: none"> <li>- Introduction</li> <li>- Needs analysis exercise</li> </ul> </li> </ul>
Selection and Systems Specification	<ul style="list-style-type: none"> <li>• Selection criteria</li> <li>• System integration</li> <li>• Accessibility</li> <li>• Alternative solutions <ul style="list-style-type: none"> <li>- Identification, selection &amp; justification</li> </ul> </li> <li>• Matching client requirements and system requirements with system components</li> <li>• Systems options <ul style="list-style-type: none"> <li>- Off the shelf, self build, customise</li> <li>- Alternatives</li> </ul> </li> <li>• System documentation</li> <li>• Case study - Selection &amp; specification</li> </ul>

#### 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 PS-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%)



## Databases

<b>Guided Learning Hours</b>	63 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	T/502/8333	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to the Module and Database Fundamentals	<ul style="list-style-type: none"> <li>• Introduction to the module</li> <li>• What are databases?</li> <li>• Examples of databases in use</li> <li>• Data and information</li> </ul>
Databases and Database Management Systems (DBMS)	<ul style="list-style-type: none"> <li>• Components of a database system</li> <li>• Types of applications</li> <li>• Database Management Systems</li> <li>• Available commercial implementations</li> <li>• History of information management</li> <li>• Pre-database information systems</li> <li>• Advantages of database approach and DBMS</li> <li>• Disadvantages of DBMS</li> <li>• Relational model and alternatives</li> </ul>
Entity Relationship (ER) Modelling (1)	<ul style="list-style-type: none"> <li>• The goal of ER modelling</li> <li>• Types of notation</li> <li>• Basic concepts (entities, attributes and relationships)</li> <li>• Identifying entities</li> </ul>
Entity Relationship (ER) Modelling (2)	<ul style="list-style-type: none"> <li>• Constructing ER models</li> <li>• Strong and weak entities</li> <li>• Identifying problems in ER models</li> <li>• Problem solving in ER models</li> </ul>
The Relational Model (1)	<ul style="list-style-type: none"> <li>• Aims of the relational model</li> <li>• Basic concept of the relational model</li> <li>• Terminology</li> </ul>
The Relational Model (2)	<ul style="list-style-type: none"> <li>• The purpose of relational integrity</li> <li>• Basic purpose and concepts of normalisation</li> </ul>
SQL (1)	<ul style="list-style-type: none"> <li>• The purpose and role of SQL</li> <li>• Basic concepts of SQL</li> <li>• Standards and flavours of SQL</li> </ul>

SQL (2)	<ul style="list-style-type: none"> <li>• Key constructs in SQL</li> <li>• Creating statements</li> <li>• Selecting statements</li> <li>• Fixing mistakes</li> </ul>
Database Design	<ul style="list-style-type: none"> <li>• Understanding requirements</li> <li>• Identifying a set of tables from an ER model</li> <li>• The data dictionary</li> <li>• Use of CASE tools</li> <li>• Entities to tables</li> </ul>
Supporting Transactions	<ul style="list-style-type: none"> <li>• Identifying business rules</li> <li>• Checking a database will support the required transactions</li> <li>• Identifying possible performance issues</li> <li>• Indexing and de-normalisation</li> </ul>
Database Implementation	<ul style="list-style-type: none"> <li>• The implementation environment</li> <li>• Creating tables based on database dictionary</li> <li>• Enforcing integrity via constraints</li> <li>• Enforcing business rules via constraints</li> <li>• Creating indexes</li> <li>• Insert, Update and Delete</li> </ul>
Summary	<ul style="list-style-type: none"> <li>• Summary of module</li> <li>• Identifying links with other modules/subject areas</li> <li>• Clarification of module material and related issues as identified by students</li> </ul>

### **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**

Global Examination (50%)

Global Assignment (50%)

## Designing and Developing a Website

<b>Guided Learning Hours</b>	90 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	L/601/3315	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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 standardize 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 simple web page in clean HTML 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	<p>6.1 Explain the underlying physical and operational properties of the Internet and World Wide Web including the difference between the two.</p> <p>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.</p> <p>6.3 Discuss the advantages and disadvantages of various internet-based models in different contexts.</p> <p>6.4 Discuss the advantages and disadvantages of various eCommerce models, in different contexts.</p>

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to the Module	<ul style="list-style-type: none"> <li>• The Internet, IoT, and the World Wide Web</li> <li>• How the WWW works</li> <li>• The W3C and the importance of web standards</li> <li>• The challenges of web design <ul style="list-style-type: none"> <li>○ Browsers</li> <li>○ Screen resolution</li> <li>○ Accessibility</li> </ul> </li> <li>○ Usability</li> </ul>
Introduction to HTML-5	<ul style="list-style-type: none"> <li>• Basic principles of mark-up: elements, tags and attributes</li> <li>• Document structure: <ul style="list-style-type: none"> <li>○ Document Type Declarations</li> <li>○ The root element</li> <li>○ The head and body sections</li> </ul> </li> <li>• Structuring text: heading, paragraphs and lists</li> <li>• Block level and inline elements</li> <li>• Validating documents</li> </ul>
Hyperlinks	<ul style="list-style-type: none"> <li>• Using the anchor element</li> <li>• Relative and absolute URLs</li> <li>• In-page hyperlinks</li> <li>• The HTML nav element</li> <li>• Accessible hyperlinks</li> </ul>
Introduction to Cascading Style Sheets (CSS)	<ul style="list-style-type: none"> <li>• What is CSS, why do we need CSS?</li> <li>• Applying CSS: inline, embedded and external style sheets</li> <li>• Overview of CSS selectors, properties and values</li> <li>• Efficient CSS</li> <li>• Validating CSS</li> <li>• Developer tools</li> </ul>

Integrating Media	<ul style="list-style-type: none"> <li>• Image file types</li> <li>• Inserting images</li> <li>• Image maps</li> <li>• Audio and video file types</li> <li>• The object tag</li> <li>• HTML 5 video and audio tags</li> <li>• Accessibility and media types</li> </ul>
HTML Tables	<ul style="list-style-type: none"> <li>• Basic structure of HTML tables</li> <li>• Column and Row Spanning</li> <li>• Tables as a page layout device</li> <li>• CSS and tables</li> <li>• Accessibility and tables</li> </ul>
HTML Forms	<ul style="list-style-type: none"> <li>• Basic structure of HTML Forms</li> <li>• HTML Form elements</li> <li>• Accessibility and HTML forms</li> <li>• Controlling the layout of forms</li> <li>• HTML 5 form elements</li> </ul>
Page Layout with CSS	<ul style="list-style-type: none"> <li>• The class and id selectors</li> <li>• Floating and positioning</li> <li>• Fixed width and fluid page design</li> <li>• HTML 5 section elements</li> <li>• Page layout and mobile devices</li> </ul>
Introduction to Web Design	<ul style="list-style-type: none"> <li>• Understanding why an organisation needs a website: <ul style="list-style-type: none"> <li>- eBusiness models</li> <li>- eCommerce models</li> </ul> </li> <li>• The process of designing a website</li> <li>• Involving users in the design process</li> <li>• Defining content and functionality</li> </ul>
Navigation and Interface Design	<ul style="list-style-type: none"> <li>• Site structure</li> <li>• Designing navigation</li> <li>• Interface Design</li> </ul>

Evaluation and Testing	<ul style="list-style-type: none"> <li>• Validating documents</li> <li>• Testing with a range of browsers</li> <li>• Testing with users</li> <li>• An iterative approach to development</li> </ul>
Summary	<ul style="list-style-type: none"> <li>• Summary and recap of previous units</li> <li>• Hosting a website</li> <li>• HTML 5, CSS 3 and the mobile web</li> </ul>

### 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%)

## Designing and Developing Object Oriented Computer Programs

<b>Guided Learning Hours</b>	90 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	T/601/3308	<b>Credit</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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
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<b>Syllabus Content</b>		
Topic	Title	Content
1	An Introduction to the .NET framework	<ul style="list-style-type: none"> <li>• Visual Studio IDE</li> <li>• The Design of .NET programs</li> <li>• Sequential Program Flow</li> </ul>
2	Event Driven Programming	<ul style="list-style-type: none"> <li>• Event Handling</li> <li>• Mouse Events</li> <li>• Paper Prototypes</li> <li>• Wizard of Oz</li> </ul>
3	Programming Structures (1)	<ul style="list-style-type: none"> <li>• Selections within .NET</li> <li>• Branching Program Flow</li> </ul>
4	Programming Structures (2)	<ul style="list-style-type: none"> <li>• Repetition within .NET</li> <li>• Iterative Program Flow</li> </ul>
5	Object Orientation (1)	<ul style="list-style-type: none"> <li>• Classes</li> <li>• Objects</li> <li>• Encapsulation</li> <li>• Abstraction</li> </ul>
6	Consolidation (1)	<ul style="list-style-type: none"> <li>• Worked example of material to date</li> </ul>
7	Data Structures	<ul style="list-style-type: none"> <li>• Arrays</li> <li>• Arraylists</li> <li>• Dictionary</li> <li>• Generics</li> </ul>
8	Object Orientation (2)	<ul style="list-style-type: none"> <li>• Inheritance</li> <li>• Polymorphism</li> <li>• Introduction to UML</li> <li>• Coupling and Cohesion</li> </ul>

9	Consolidation (2)	<ul style="list-style-type: none"> <li>• Worked example of material to date</li> </ul>
10	Testing and Error Handling	<ul style="list-style-type: none"> <li>• Testing strategies</li> <li>• Regression testing</li> <li>• Detection and correction of errors</li> <li>• Exception handling</li> </ul>
11	File 10	<ul style="list-style-type: none"> <li>• File 10</li> <li>• Serialization</li> </ul>
12	Databases with .NET	<ul style="list-style-type: none"> <li>• Connection to databases</li> <li>• Querying data</li> <li>• Representing Data</li> </ul>

#### **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%)

## Office Solutions Development

<b>Guided Learning Hours</b>	60 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	R/601/1971	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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. Develop object-oriented programs 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.

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Application Software and Business Processes	<ul style="list-style-type: none"> <li>• An Introduction to the module</li> <li>• Types of business processes and functions</li> <li>• Application software defined</li> <li>• Types and range of application software</li> <li>• How application software supports business processes</li> <li>• Research into examples of commercial software</li> <li>• Evaluation of the role of applications software in specific business contexts</li> </ul> <ul style="list-style-type: none"> <li>• Case studies</li> <li>• Glossary</li> </ul>

<p>An Introduction to End User Software Development</p>	<ul style="list-style-type: none"> <li>• End-User defined</li> <li>• Examine the need to address both user and business requirements</li> <li>• Interface defined</li> <li>• Identify Interface Design principles and good practice</li> <li>• Microsoft Office interface development</li> <li>• Case studies</li> <li>• Glossary</li> </ul>
<p>An Introduction to the Advanced Features and Functions of the Microsoft Office Suite</p>	<ul style="list-style-type: none"> <li>• An introduction to the Microsoft Office suite</li> <li>• An overview of advanced features and functions</li> <li>• How the above improve business performance</li> <li>• Consideration of both user and business requirements</li> <li>• Application of interface design principles</li> <li>• Glossary</li> </ul>
<p>Advanced Features and Functions of Microsoft Access, Excel and Word</p>	<ul style="list-style-type: none"> <li>• An overview of advanced features and functions in Access</li> <li>• An overview of advanced features and functions in Excel</li> <li>• An overview of advanced features and functions in Word</li> <li>• Glossary</li> </ul>
<p>An Introduction to VBA and Macros</p>	<ul style="list-style-type: none"> <li>• Define what is meant by a macro</li> <li>• Define what is meant by VBA</li> <li>• Explain that there is a range of macros used for different purposes</li> <li>• Describe the methods that can be used to develop macros</li> <li>• Explain the issues of macros and security</li> <li>• Use the Visual Basic Editor to create macros</li> <li>• Use the Record Macro feature</li> <li>• Save macros</li> <li>• Edit macros</li> </ul>
<p>Using Macros in Microsoft Word</p>	<ul style="list-style-type: none"> <li>• Develop macros</li> <li>• Edit macros</li> <li>• Use the Macro Recorder</li> <li>• Assign a macro to the keyboard</li> <li>• Assign a macro to a button</li> <li>• Format text or pictures using macros</li> <li>• Customise headers and footers using macros</li> <li>• Secure documents against malicious macros</li> </ul>
<p>Using Macros in Microsoft Access</p>	<ul style="list-style-type: none"> <li>• Create a macro in Microsoft Access</li> <li>• Understand key macro terms</li> </ul>

	<ul style="list-style-type: none"> <li>• Explain the sequence of macro production</li> <li>• Create Autoexec macros</li> <li>• Input data using a macro</li> <li>• Validate data using a macro</li> <li>• Filter and find records using a macro</li> <li>• Print records using a macro</li> <li>• Assign a macro to a command button</li> <li>• Navigate between forms and records using a macro</li> <li>• Run a query using a macro</li> <li>• Secure documents against malicious macros</li> </ul>
Using Macros in Microsoft Excel - 1	<ul style="list-style-type: none"> <li>• Create a macro in Microsoft Excel</li> <li>• Format titles, formulas and tables</li> <li>• Input dates and times</li> <li>• Input and select data using a macro</li> <li>• Provide data validation using a macro</li> <li>• Design message boxes and feedback</li> <li>• Design interactive user forms</li> </ul>
Using Macros in Microsoft Excel - 2	<ul style="list-style-type: none"> <li>• Create a macro that uses absolute cell references</li> <li>• Create a macro that uses relative cell references</li> <li>• Create an icon to run a macro</li> <li>• Print data using a macro</li> <li>• Secure documents against malicious macros</li> </ul>
Testing Software Development	<ul style="list-style-type: none"> <li>• The need for testing</li> <li>• Types of testing</li> <li>• The Test Plan</li> <li>• Determine expected test results</li> <li>• Record actual test results to enable comparison with expected results</li> <li>• Analyse actual test results against expected results to identify discrepancies</li> <li>• Investigate test discrepancies to identify and rectify their causes</li> <li>• Testing Checklist</li> <li>• Glossary</li> </ul>
Evaluating Software Development	<ul style="list-style-type: none"> <li>• Types of evaluation</li> <li>• Functionality evaluated</li> <li>• Efficiency evaluated</li> </ul>

Microsoft Access	<ul style="list-style-type: none"> <li>• Understand key macro terms</li> <li>• Explain the sequence of macro production</li> <li>• Create Autoexec macros</li> <li>• Input data using a macro</li> <li>• Validate data using a macro</li> <li>• Filter and find records using a macro</li> <li>• Print records using a macro</li> <li>• Assign a macro to a command button</li> <li>• Navigate between forms and records using a macro</li> <li>• Run a query using a macro</li> <li>• Secure documents against malicious macros</li> </ul>
Using Macros in Microsoft Excel - 1	<ul style="list-style-type: none"> <li>• Create a macro in Microsoft Excel</li> <li>• Format titles, formulas and tables</li> <li>• Input dates and times</li> <li>• Input and select data using a macro</li> <li>• Provide data validation using a macro</li> <li>• Design message boxes and feedback</li> <li>• Design interactive user forms</li> </ul>
Using Macros in Microsoft Excel - 2	<ul style="list-style-type: none"> <li>• Create a macro that uses absolute cell references</li> <li>• Create a macro that uses relative cell references</li> <li>• Create an icon to run a macro</li> <li>• Print data using a macro</li> <li>• Secure documents against malicious macros</li> </ul>
Testing Software Development	<ul style="list-style-type: none"> <li>• The need for testing</li> <li>• Types of testing</li> <li>• The Test Plan</li> <li>• Determine expected test results</li> <li>• Record actual test results to enable comparison with expected results</li> <li>• Analyse actual test results against expected results to identify discrepancies</li> <li>• Investigate test discrepancies to identify and rectify their causes</li> <li>• Testing Checklist</li> <li>• Glossary</li> </ul>
Evaluating Software Development	<ul style="list-style-type: none"> <li>• Types of evaluation</li> <li>• Functionality evaluated</li> <li>• Efficiency evaluated</li> </ul>

	<ul style="list-style-type: none"> <li>• Reliability evaluated</li> <li>• Usability evaluated</li> <li>• Identify successful user interaction</li> <li>• Identify enhancements</li> <li>• Identify potential improvements</li> <li>• Evaluation Checklist</li> <li>• Glossary</li> </ul>
Combining End User Software Development, Testing and Evaluation	<ul style="list-style-type: none"> <li>• Topic Scenario</li> <li>• Identify business processes</li> <li>• Identify application software</li> <li>• Identify good practice in software interface design</li> <li>• Use advanced features and functions in Microsoft Excel and Word</li> <li>• Use macros in Microsoft Excel and Word</li> <li>• Produce a test plan</li> <li>• Produce an evaluation checklist</li> </ul>

<p><b>Related National Occupational Standards (NOS)</b></p> <p><b>Sector Subject Area:</b> IT and Telecoms</p> <p><b>Related NOS:</b> ESKITP4063 P1-5- Contribute to human interaction and interface (HCI) design activities;</p> <p>ESKITP4063 P6-10- Assist, under supervision, with the progress of human interaction and interface (HCI) design assignments;</p> <p>ESKITP4064 P1-5 - Prepare for human interaction and interface (HCI) design activities;</p> <p>ESKITP4064 P6-8 - Implement, under supervision, human interaction and interface (HCI) design activities;</p> <p>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;</p> <p>ESKITP5014v2 P6-10 - Contribute to the management of systems development; ESKITP5022v2 - Perform software development activities;</p> <p>ESKITP5024 P6-12- Carry out IT/Technology solution testing activities under direction;</p> <p>ESKITP5034 P1-4 - Carry out IT/Technology solution testing.</p>
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<b>Assessments</b>
Global Assignment 100%

## Skills for Computing

<b>Guided Learning Hours</b>	62 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	F/502/8335	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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 organizing 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 Continuing Professional Development (CPD) and lifelong learning 5.2 Explain the particular application of CPD and lifelong learning to the IT Profession.



<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Learning to Learn	<ul style="list-style-type: none"> <li>• Learning Strategy (CREAM: Creative, Reflective, Effective, Active, Motivated).</li> <li>• Personal Learning Plans</li> <li>• Learning Situations: Lectures, Seminars, Tutorials and Labs</li> <li>• Continuing Professional Development (CPD) and Lifelong learning: applying your learning skills in other contexts</li> </ul>
Reading, Listening and Note-taking	<ul style="list-style-type: none"> <li>• Extracting information from written sources</li> <li>• Taking notes from a speaker</li> <li>• Taking minutes in a meeting</li> </ul>
Writing	<ul style="list-style-type: none"> <li>• Analysing the question</li> <li>• Planning and structuring</li> <li>• Introductions and conclusions</li> <li>• Referencing</li> </ul>
Presentation Skills	<ul style="list-style-type: none"> <li>• Presentation Skills: researching, preparing, presenting and delivering</li> </ul>
Problem Solving	<ul style="list-style-type: none"> <li>• Problem Solving tools and techniques</li> <li>• Problem definition and analysis</li> <li>• Success criteria and selecting a solution</li> </ul>
Creative Thinking	<ul style="list-style-type: none"> <li>• Creative Thinking Techniques: Lateral Thinking etc.</li> <li>• Creative Thinking Models: Parallel Thinking (De Bono 'Six Hats'), TASC (Thinking Actively in a Social Context)</li> </ul>
Assignment Preparation	<ul style="list-style-type: none"> <li>• Technical documentation; knowing your audience</li> <li>• Proof-reading</li> <li>• Exercises in writing and problem-solving based on topics 3-6, practising for assignment tasks</li> </ul>
Data Acquisition	<ul style="list-style-type: none"> <li>• Methods of obtaining data</li> <li>• Types of data</li> <li>• Storing data</li> </ul>

Charts and Estimates	<ul style="list-style-type: none"> <li>• Random variations</li> <li>• The importance of normal distributions.</li> <li>• Estimating the mean and median</li> </ul>
Accuracy and Correlation; Presenting Results	<ul style="list-style-type: none"> <li>• Handling uncertainty</li> <li>• Data comparisons</li> <li>• Organising information</li> <li>• Charts and plots</li> <li>• Showing dependence</li> </ul>
Regression Analysis	<ul style="list-style-type: none"> <li>• Pearson correlation</li> <li>• Sample linear regression</li> <li>• Spearman correlation</li> </ul>
Data Handling Revision and Exam Preparation	<ul style="list-style-type: none"> <li>• Revision planning exercise</li> <li>• Exercises based on sample exam questions</li> </ul>

### 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%)

Global Examination (50%)

## Software Development Techniques

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<b>Guided Learning Hours</b>	63 hours	<b>Total Qualification Time</b>	150 hours
<b>RQF code</b>	A/502/8334	<b>Credits</b>	15

<b>Learning Outcomes;</b> The Learner will:	<b>Assessment Criteria;</b> 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

<b>Syllabus Content</b>	
<b>Topic</b>	<b>Course coverage</b>
Introduction to the Module and the Software Development Process	<ul style="list-style-type: none"> <li>• Introduction to the unit</li> <li>• Introduction to the software development process               <ul style="list-style-type: none"> <li>- How computer programs are designed</li> <li>- How they are written</li> <li>- How they are tested</li> </ul> </li> <li>• The history of software development               <ul style="list-style-type: none"> <li>- Software Development Lifecycle</li> <li>- Project Life Cycle</li> <li>- Waterfall</li> <li>- Prototyping</li> <li>- Agile</li> <li>- User Stories</li> </ul> </li> </ul>
Desk-checking	<ul style="list-style-type: none"> <li>• Pseudocode format</li> <li>• Desk-checking</li> <li>• Commenting</li> </ul>
Variables and Data Representation	<ul style="list-style-type: none"> <li>• Memory management in a computer system</li> <li>• Data types</li> <li>• Variable declaration and manipulation</li> <li>• Arithmetic operators</li> </ul>
Iteration	<ul style="list-style-type: none"> <li>• For loops</li> <li>• While loops</li> <li>• Do-While loops</li> <li>• Mathematical algorithms</li> </ul>
Selection	<ul style="list-style-type: none"> <li>• If</li> <li>• Else</li> <li>• Switch</li> <li>• Input validation</li> </ul>
Functions	<ul style="list-style-type: none"> <li>• Parameters</li> <li>• Return Types</li> <li>• Scope</li> </ul>

Testing and Debugging	<ul style="list-style-type: none"> <li>• Black box testing</li> <li>• White box testing</li> <li>• Unit testing</li> <li>• Integration testing</li> </ul>
Arrays	<ul style="list-style-type: none"> <li>• Declaration of arrays</li> <li>• Manipulation of arrays</li> <li>• Application of arrays</li> <li>• Two dimensional arrays</li> </ul>
Searching and Sorting	<ul style="list-style-type: none"> <li>• Linear search algorithms</li> <li>• Big O Notation</li> <li>• Binary search algorithms</li> <li>• Bubble Sort Algorithms</li> <li>• Quick Sort</li> </ul>
Objects	<ul style="list-style-type: none"> <li>• Object design</li> <li>• Modularity</li> <li>• Methods</li> <li>• Constructors</li> <li>• Accessor Functions</li> </ul>
Array Data Structures	<ul style="list-style-type: none"> <li>• Lists</li> <li>• Stacks</li> <li>• Queues</li> <li>• Recursion</li> </ul>
Summary and conclusion	<ul style="list-style-type: none"> <li>• Summary of module</li> <li>• Contextualisation of concepts</li> <li>• Clarifications</li> <li>• Further reading</li> </ul>

### **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**

Global Examination (100%)

## 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 (see *Section 5.6* above).

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, LIPSAS awarding body 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 the learners promptly by LIPSAS. An example is given below:

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<b>Unit</b>	<b>Unit Points</b>	<b>Candidate Mark</b>	<b>Unit Points * Candidate Mark</b>
Introduction to Computer Science	10	86	860
Introduction to Programming	10	72	720
Culture Studies	10	81	810
Foundation Mathematics	10	88	880
Study and Communication Skills	20	93	1860
	<b>60</b>	<b>420</b>	<b>5130</b>

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$$5130/\text{potential } 6000 = 86$$

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. Certificates which contain your qualification grade and pass mark are then dispatched accordingly.