Level 3 Diploma in Computing
(QCF) (L3DC)
Qualification Unit Specification
2014/15

Modification History

Version	Revision Description
V1.0	For release
V1.1	Version for academic year 2014/15

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 and Northern Ireland.

1.1   Why choose this qualification?

NCC Education's Level 3 Diploma in Computing is:

- **Regulated** by Ofqual and listed on the Qualifications and Credit Framework – Qualification Number 600/6407/9. The Qualifications and Credit Framework (QCF) is a credit-based qualifications framework, allowing candidates to take a unit-based approach to building qualifications.

  For more information see:

  http://ofqual.gov.uk/qualifications-and-assessments/qualification-frameworks/

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

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

- The NCC Education Level 3 Diploma in Computing (QCF) is an Applied General qualification which allows candidates to demonstrate key transferrable study skills, mathematical understanding and applied IT competency, as well as an understanding of the essential concepts of computer programming.

  In addition successful candidates will fulfil the main entry requirements for NCC Education's Level 4 Diploma in Computing or Level 4 Diploma in Business IT, as well as opening up opportunities to access a range of higher education courses or employment. Examples of higher education opportunities include, but are not limited to, progressing to university degrees in Software Engineering or Computer Science, Computer Networking Systems, Digital Media Technology, Computer Forensics and Security. Examples of employment opportunities include roles such as IT Helpdesk Professional, Data Entry Clerk, IT Support Technician and Computer Service and Repair Technician.

  The Level 3 Diploma in Computing syllabus and assessment is suitable for students aged 16-19 as well as adult learners.

  The above purpose is stated in the Qualification Specification, Section 1.1, Page 4. The Qualification Specification is published on the NCC Education website at: http://www.nccedu.com/our-qualifications/foundation/ncc-education-level-3-diploma-in-computing-(qcf)

Structure of the L3DC Qualification

Qualification Title, Credits, Units and Level
NCC Education Level 3 Diploma in Computing (QCF), 60 credits, all at QCF Level 3. Candidates must pass all 5 Units to be awarded the L3 Diploma in Computing certificate.

Study and Communication Skills (20 credits)	Mathematical Techniques (10 credits)	IT Skills (10 credits)
Introduction to Computing (10 Credits)	Introduction to Programming (10 Credits)	

Please see Section 5 below for Syllabuses

This qualification is regulated by Ofqual and listed on the Qualifications and Credit Framework – Qualification Number 600/6407/9. For further information see http://register.ofqual.gov.uk/Qualification/Details/600_6407_9

2. 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		
	Local Examination	Global Examination	Global Assignment
Study and Communication Skills	-	-	100%
Mathematical Techniques	-	100%	-
IT Skills	100%	-	-
Introduction to Computing	-	100%	-
Introduction to Programming	50%	-	50%

An examination is a time-constrained assessment that will take place on a specified date and usually in an NCC Education Centre. 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 examination and assignment papers.

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 *Examination Guidelines* and *Moderation Manual*. The Moderation Manual also includes full reminder checklists for Centre administrators.

4 Administration

4.1   Assessment Cycles

Four assessment cycles are offered throughout the year, in March, May, September and December.

Examination dates and assignment submission deadlines are published in the NCC Education *Activity Schedule*, which is provided to Centres by Customer Services. It is also available on *Connect,* 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
For entry onto the NCC Education L3DC qualification, 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). The Level 3 Diploma in Computing syllabus and assessment is suitable for students aged 16-19 as well as adult learners.

4.5   Candidate Entry

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

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

4.6   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. Study and Communication Skills

Title:	Study and Communication Skills				

QCF code:	A/504/1424	Credits	20	Level	3

Guided Learning Hours	75

Learning Outcomes; The Learner will:	Assessment Criteria; 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 towards a final draft 4.5 Demonstrate the correct use of academic referencing 4.6 Present a completed piece of academic work to others

5. Understand different learning styles	5.1 Explain the idea of multiple intelligences
	5.2 Describe a range of learning styles
	5.3 Identify own preferred learning style
	5.4 Identify own study strengthes and weaknesses

Syllabus Content	
Topic	**Course Coverage**
Learning to Learn	• Learner styles and multiple intelligences • Self study methodology • Time management • Goal setting • Self analysis and critical reflection • Keeping a learner diary ***Learning outcome: 5***
Reading Textbooks and Note Taking	• Reading a textbook & note taking skills • Using notes to write summaries • Public Speaking skills & Peer assessment • Learner diaries and study skills self-assessment ***Learning outcomes: 1,4***
Note Taking in Lectures	• Note taking in lectures • Recognising key points • Guessing meaning • Editing and reviewing notes • Planning a speech • Public speaking practice and assessment ***Learning outcomes: 1,2***
Library Research and Writing an Essay	• Accessing the library and reading strategies • Note taking from books • Essay planning and organising notes • Public speaking practice and assessment ***Learning outcomes: 1,4***
Journal-based Research for Essay Writing	• Journals and articles • Critical reading and analyzing data • Describing data in an essay • Academic Style • Editing and proof reading • Public speaking practice and assessment ***Learning outcome: 4***

Internet Research for Essay Writing	• Using the internet for research • Bibliographies and referencing • Plagiarism and paraphrasing • Editing and checking work against criteria • Including sufficient detail • Public speaking practice and assessment ***Learning outcomes: 1,4***
Writing a Research Report	• Approaching a task and making an assignment strategy • Understanding requirements and using criteria • Integrating evidence into a report • Editing and proof reading • Public speaking practice and assessment ***Learning outcome: 3,4***
Examinations and Assessment	• Writing summaries and reviewing notes • Preparing for exams • Time Management • Stress and anxiety management ***Learning outcome: 1***

Related National Occupational Standards (NOS)

Sector Subject Area: 6.2 ICT for Users:

Related NOS: ICF:B2 Access, search for, select and use Internet-based information and evaluate its fitness for purpose

INT:C3 Use browser tools to search effectively and efficiently for information from the Internet

Sector Subject Area: 15.3 Business Management

Related NOS: BAA617 Develop a presentation

BAA623 Deliver a presentation

SAS 5 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

See also Section 3 above

5.2. Mathematical Techniques

Title:	Mathematical Techniques				

QCF code:	F/504/0968	Credits	10	Level	3

Guided Learning Hours		60

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Be able to perform basic number calculations	1.1 Identify place value 1.2 Perform all four operations with large numbers and decimals up to two decimal points 1.3 Round numbers up and down, to the nearest whole number, and up to 3 decimal places 1.4 Estimate answers to a range of calculations
2. Be able to use ratio, percentages and fractions	2.1 Identify multiples, factors and primes 2.2 List a range of multiples, factors and primes 2.3 Use ratio notation 2.4 Divide quantities using a given ratio 2.5 Use proportional reasoning to solve a range of problems 2.6 Identify equivalent fractions, decimals and percentages 2.7 Perform calculations with fractions, decimals and percentages
3. Understand the fundamentals of algebra and algebraic calculations	3.1 Explain the difference between an expression, a formula and an equation 3.2 Explain linear graphs 3.3 List a range of algebraic expressions and formulae 3.4 Solve a range of linear equations 3.5 Simplify algebraic expressions 3.6 Factorise algebraic expressions 3.7 Substitute positive and negative values into algebraic expressions and formulae
4. Understand the fundamentals of probability and probability calculations	4.1 Describe the probability scale 4.2 Explain relative frequency 4.3 Use the probability scale to show a range of probabilities 4.4 Calculate probabilities for mutually exclusive events 4.5 Demonstrate use of tree diagrams in calculating conditional probabilities

5. Be able to perform basic calculations with shapes, spaces and measurements	5.1 List a range of metric units for length, mass and capacity
	5.2 Identify conversions between different units of measurement
	5.3 Estimate angles
	5.4 Calculate unknown angles
	5.5 Calculate perimeter, area and volume
	5.6 Demonstrate use of Pythagoras' Theorem in finding the length of unknown sides in a right-angled triangle
6. Be able to use a range of techniques to present mathematical data	6.1 Explain the difference between discrete and continuous data
	6.2 Demonstate appropriate use of a range of methods for visually representing discrete data
	6.3 Demonstate appropriate use of a range of methods for visually representing continuous data
	6.4 Identify correlation and the line of best fit in a scattergraph

Syllabus Content	
Topic	**Course Coverage**
Number 1	- Place Value - Multiplying and dividing by powers of 10. - Four rules of number – mental and written calculations including with decimals - Estimation and Rounding - Solving written problems *Learning Outcome: 1*
Number 2	- Negative numbers - Multiples, factors and primes - Index numbers - Ratio - Fractions, decimals and percentages *Learning Outcome: 2*
Algebra	- Sequences - Using formulae and substituting values into formulae - Simplifying algebraic expressions - Solving linear equations - Graphs of the form y = mx + c *Learning Outcome: 3*

Probability	• Using the probability line • Calculating probability • Probability of successive independent events • Theoretical and experimental probability • Conditional probability ***Learning Outcome: 4***
Shape, Space and Measures	• Angles • 2D and 3D shape names and properties • Perimeter, area and volume • Metric measures • Pythagoras' Theorem ***Learning Outcome: 5***

Data Handling	• Representing data
	   – Tally tables
	   – Frequency diagrams
	   – Stem and Leaf diagrams
	   – Pie charts
	   – Grouping data
	   – Scatter graphs
	• Statistics
	   – Calculating averages
	• Interpreting data
	   – Carrying out a survey
	Learning Outcome: 6

Related National Occupational Standards (NOS)
Sector Subject Area: 15.3 Business Management **Related NOS:** BAD: 321 Organise and report data BAD: 322 Analyse and report data **Sector Subject Area:** 6.2 ICT for Users **Related NOS:** ISF:B3: Present information in ways that are fit for purpose and audience

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

5.3. IT Skills

Title:	IT Skills

QCF code:	J/504/0728	Credits	10	Level	3

Guided Learning Hours		50

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand the main functions of a word processor	1.1 Explain the main functions within a word processing package 1.2 Describe how to insert, overtype, move and delete text 1.3 Describe how to open, save and close an existing document 1.4 Describe how tables and diagrams can be inserted within a text 1.5 Describe how pictures and symbols can be inserted within a text document
2. Be able to use the main functions of a word processor	2.1 Demonstrate the use of common functions for manipulating and evaluating text 2.2 Demonstrate the use of a range of functions to alter the presentation of word processed documents 2.3 Demonstrate the use of a range of functions to improve the presentation of word processed documents
3. Be able to extract information from the Internet without plagiarising	3.1 List a range of search engines which can be used to find specific information 3.2 Extract text from a website 3.3 Export website text into a word processed document 3.4 Demonstrate how website text should be presented in a word processed document in order to avoid plagairism
4. Understand how to open, create and modify a spreadsheet	4.1 Explain how to open a new spreadsheet 4.2 Describe how to open a new worksheet and enter data 4.3 Describe how to save and close a worksheet 4.4 Describe a range of ways in which data can be manipulated and evaluated 4.5 Describe how to modify and print graphs

5. Be able to format a spreadsheet	5.1 Demonstrate how cells, rows, columns and worksheets can be formatted
	5.2 List a range of formulae which can be applied to data in a worksheet
	5.3 Demonstrate the use of a range of formulae to manipulate worksheet data
	5.4 Identify the tools which navigate worksheets, different views and sections
	5.5 Demonstrate the use of a range of functions to improve the presentation of data in a worksheet
6. Be able to create graphs from a spreadsheet	6.1 Select from a range of graph types according to how information needs to be presented
	6.2 Enter data ranges, titles and labels to create graphs
	6.3 Demonstrate how to place a graph onto a spreadsheet
7. Understand the main functions of presentation software	7.1 Describe how to open, save and close a presentation slideshow
	7.2 Explain how to insert and duplicate slides
	7.3 Describe how to print slides, handouts and speaker notes
	7.4 Explain how to incorporate animation into a presentation
8. Be able to utilise presentation software	8.1 Demonstrate how to navigate a screen display and view a presentation
	8.2 Demonstrate the use of a range of tools for editing slide text
	8.3 Demonstrate the creation of a presentation with a range of types of text, graphics and animation

Syllabus Content	
Topic	**Course Coverage**
An Introduction to Word Processing	• A definition of word processing and its main functions • Microsoft Office Word • The Word screen • Navigating the screen, different views • Basic commands: new, open, save, close, print, page set-up, print properties, print preview • Enter text, set language, autocorrect, spelling check, grammar check, thesaurus, word count • Insert, overtype, move, delete, highlight text • Edit: cut, copy, paste, undo, redo/repeat • Modify text: find and replace, change case • Search for text, graphics, tables • Insert pictures, symbols, special characters, charts, screenshots • Use shortcut keys ***Learning Outcome: 1***
Editing and Formatting Word Processed Documents Part I	• Format a page: format and edit background, change page orientation and size, adjust margins, insert columns, edit columns, add headers and footers, add page numbers, insert a page break, insert a watermark, select the page background colour • Format text: bold, italics, underline, alignment, font style, font size, font colour, font effects • Format paragraphs: alignment, indentation, spacing • Select and edit themes and styles • Insert and edit bullet points and numbering • Format borders and shading • Use shortcut keys ***Learning Outcome: 2***
Finding and Using Information from the Internet	• Define plagiarism • Examples of search engines • Use search engines to find and select specific information • Select text from a website • Export text from a website • Present website text and cite its source • Select a picture from a website • Export a picture from a website • Present a picture taken from a website and cite its source ***Learning Outcome: 3***

Editing and Formatting Word Processed Documents Part II	• Insert a table • Format a table • Edit a table • Insert shapes • Draw shapes • Format shapes, apply special effects • Insert objects • Resize, move, copy, delete, add text, fill, align, rotate, edit, and rotate shapes and objects • Insert and format WordArt • Insert and format SmartArt • Produce a checklist for an effective word processed document *Learning Outcome: 2*
An Introduction to Spreadsheets	• A definition of spreadsheet software and its main functions • Key terminology: workbook, worksheet, cell, row, column • Microsoft Office Excel • The Excel screen • Navigating the screen, different views • Basic commands: new, open, save, close, print page set-up, print properties, print preview, select a print area • Types of data: labels, constants, formulae • Enter data: cell, row, column • Edit: cut, copy, paste, undo, redo, find, replace, select all, edit active cell, clear cell contents • Format labels • Format values • Insert a row, column • Widen columns • Introduction to formulae: constants and operators • Addition formula • Subtraction formula • Use shortcut keys *Learning Outcomes: 4, 5*

Spreadsheet Formulae and Functions	• Use relative cell references • Use absolute cell references • Use mixed cell references • Use commonly used formulae and functions: multiplication, division, average, minimum, maximum, round a number, count values • Use AutoSum • Use Autocalculate • Display formulae when printing • Display row and column headings when printing • Sort data • Filter data • Understand common error messages ***Learning Outcomes: 4, 5***
Formatting Spreadsheets	• Workbook management: insert a new worksheet, rename a worksheet, move/copy a worksheet, change a worksheet tab colour, delete a worksheet • Protect a worksheet • Format cells, rows and columns • Add borders • Insert: diagrams, pictures, symbols • Insert headers and footers • Format as a table • Hide selected rows • Apply cell styles • Hide columns and rows • Produce a checklist for an effective spreadsheet ***Learning Outcomes: 4, 5***
Creating Graphs from a Spreadsheet	• Present information using a graph • Select appropriate types of graph • Enter data ranges • Enter titles: main, axes and data • Enter a legend • Format a graph • Print a graph • Modify a graph • Resize a graph • Move a graph • Produce a checklist for an effective graph ***Learning Outcome: 6***

An Introduction to Presentation Software	• A definition of presentation software and its main functions
	• Microsoft Office PowerPoint
	• The PowerPoint screen
	• Navigate the PowerPoint screen and different views.
	• Define presentation software and its main functions.
	• Navigate the PowerPoint screen and different views, including normal, slide sorter, reading, slide show and the outline pane.
	• Select slide design, background and layout.
	• Enter text, set language and use the spelling check, grammar check and thesaurus.
	• Use basic commands such as: new, open, save, close, print, page set-up, print properties, print preview, handouts and speaker notes.
	• Format text – select font style, size and colour and alignment.
	• Edit, delete, copy, find and replace text.
	• Format paragraphs.
	• Insert slide numbers, date and time, headers and footers.
	• Insert new slides and duplicate slides.
	• Re-arrange and delete slides.
	• Insert pictures, Clip Art graphics, SmartArt, diagrams, graphs, tables, text boxes and hyperlinks.
	• Format graphics.
	• Draw shapes and objects and format, move, resize and delete objects.
	• Run and stop a slideshow.
	• Use shortcut keys
	Learning Outcome: 7
Producing a Multimedia Presentation	• Define transitions and add transitions and effects to slides
	• Define animations and add animations and effects to objects
	• Copy animation from one object to another
	• Insert audio clips from files and ClipArt
	• Record an audio clip
	• Insert videos from files, websites and ClipArt
	• Insert actions
	• Set up slideshow delivery
	• Produce a checklist for an effective slideshow
	Learning Outcome: 8

Related National Occupational Standards (NOS)
Sector Subject Area: 6.2 ICT for Users
Related NOS: IPU: A2 - Use IT systems and software efficiently to complete planned tasks
IPU: B1 - Plan, select and use appropriate IT systems and software for different purposes
IUF: B1 - Use IT systems to meet a variety of needs
IUF: B2 - Manage information storage and retrieval appropriately
ICF: B2 - Access, search for, select and use Internet-based information and assess its fitness for purpose
INT: C3 - Use browser tools to search effectively and efficiently for information from the Internet
ISF: A4 - Make effective use of IT tools and facilities to present information
ISF: B2 - Enter, develop and format different types of information to suit its meaning and purpose
ISF: B3 - Present information in ways that are fit for purpose and audience
PS : B1 - Input and combine text and other information within presentation slides
PS : C2 - Use presentation software tools to structure, edit and format presentations
PS : C3 - Prepare interactive slideshow for presentation
SS : C1 - Use a spreadsheet to enter, edit and organise numerical and other data
SS : C2 - Select and use appropriate formulae and data analysis tools and techniques to meet requirements
SS : C3 - Use tools and techniques to present, and format and publish spreadsheet information
WP :C1 - Enter and combine text and other information accurately within word processing documents
WP:C2   - Create and modify appropriate layouts, structures and styles for word processing documents
WP:C3   - Use word processing software tools and techniques to format and present documents effectively to meet requirements

Assessments
Local Examination (100%)
See also Section 3 above

5.4. Introduction to Computing

Title:	Introduction to Computing

QCF code:	F/504/0727	Credits	10	Level	3

Guided Learning Hours		70

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Be able to identify the main components of a computer system	1.1 Describe a range of different computer systems 1.2 Define 'data' and 'information' 1.3 Explain the relationship between data and information 1.4 Describe the historical and ongoing development of computers
2. Understand a microprocessor in terms of its main parts and how it runs a programme	2.1 Explain how different data is represented in the computer 2.2 Demonstrate knowledge of the basics of decimal, binary and hexadecimal number systems
3. Understand the role of databases in information management	3.1 Explain what a database is and its advantages over other methods of information storage 3.2 Explain the basic security requirements associated with data storage
4. Be able to design and create a simple working relational database	4.1 Demonstrate the ability to use a DBMS (Database Management System) 4.2 Demonstrate the ability to construct entity relation diagrams 4.3 Demonstrate the ability to create tables 4.4 Demonstrate the ability to create links between tables 4.5 Demonstrate the ability to query a database
5. Understand the basic concepts of human-computer interaction	5.1 Describe a range of different human-computer interfaces 5.2 Explain the common challenges faced in developing new human-computer interfaces 5.3 Explain natural language use in human-computer interfaces
6. Understand the fundamental features of a computer network	6.1 Explain what is meant by a computer 'network' 6.2 Describe a range of different network topologies 6.3 Explain the use of protocols with respect to data transmission across a network 6.4 Identify a range of issues related to the use of the Internet

7. Understand the use of graphics and multimedia in computing	7.1 List a range of principal applications of computer graphics
	7.2 Explain how graphics can help to communicate abstract data
	7.3 Describe a range of common issues relating to the size of graphic files
	7.4 Demonstrate an awareness of the use of graphics in virtual reality and gaming

Syllabus Content	
Topic	**Course Coverage**
Introduction to Computer Systems	• Definitions of basic terms • Hardware components of a computer system • Software components of a computer system • Examples of computer systems such as personal computers, mainframes and embedded systems • Data and information • How computers developed, key milestones • Current important developments such as the dominant organisations and the place of Open Source ***Learning Outcome: 1, 2***
Computer Architecture	• Digital logic • Data representation • Number systems • Basic computer arithmetic • Microprocessors • Primary and secondary Memory • Little Man Computer • The machine cycle • Input/output • Communication ***Learning Outcome: 2***

Information Management	• Databases • Data modelling • Relational databases • Data integrity and security • Query language • Data mining • Confidentiality of data • Threats to data ***Learning Outcome: 3, 4***
Human-Computer Interaction	• Principles of Human-Computer Interfaces • Examples of Human-Computer Interfaces • GUIs • The benefits of standardization • Voice recognition • Natural language interaction ***Learning Outcome: 5***
Networks	• Definition of a network • Types of network – LAN, WAN and SAN • Topologies • Bandwidth • Protocols • Data transmission • Error checking • The Internet • Security issues • Data compression • Search engines • Hypertext ***Learning Outcome: 6***
Graphics and Multimedia	• Types of graphics • Uses of graphics • Storage issues • Speed issues • Examples of graphics processing • Rendering of abstract data into visual displays • Animation • Virtual reality • Games ***Learning Outcome: 7***

Related National Occupational Standards (NOS)
Sector Subject Area: 6.2 ICT for Users
Related NOS: DB:C2 Enter, edit and organise structured information in a database
DB:A2 Use database software tools to extract information and produce reports
DB:B3 Use database software tools to run queries and produce reports
DB:C1 Plan, create and modify relational database tables to meet requirements
DMS:A1 Enter, edit and maintain data records in a data management system
DMS:A2 Retrieve and display data records to meet requirements
DMS:B1 Enter, edit and maintain data records in a data management system
Sector Subject Area: ICT for Practitioners
Related NOS: 4.6.J.2 Document specified information relating to human interaction and interface (HCI) design

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

5.5. Introduction to Programming

Title:	Introduction to Programming

QCF code:	A/504/0967	Credits	10	Level	3

Guided Learning Hours	50

Learning Outcomes; The Learner will:	Assessment Criteria; The Learner can:
1. Understand the Visual Basic (VB) Integrated Development Environment (IDE) and development framework.	1.1 Describe the fundamental facilities of the Visual Basic (VB) Integrated Development Environment (IDE) 1.2 Describe the concept of variables and scope 1.3 Explain the use of debugging facilities provided by the VB IDE 1.4 Explain the communication process between procedures and functions 1.5 Explain the difference between Modal and Non-Modal forms 1.6 Explain the concept of forms and modules
2. Understand the programming constructs of sequence and iteration.	2.1 Describe the 'For – Next' construct 2.2 Explain the purpose of the 'For – Next' construct 2.3 Describe the 'If – Then – Else – End If' construct 2.4 Explain the purpose of the 'If – Then – Else – End If' construct
3. Understand the concept of project documentation.	3.1 Explain why the design, implementation and testing of programmes should be supported by appropriate documentation 3.2 Describe the Project Control Object Definition Sheet
4. Understand data capture and validation.	4.1 Describe how data is captured in a VB programme 4.2 Describe the approach to serial handling used by VB 4.3 Explain what data validation is and why it is important.

5. Implement a programme that uses iteration and sequence constructs.	5.1 Write code for either a 'Form_Paint' or 'Form_Load' procedure that uses the 'For – Next' construct
	5.2 Write code for either a 'Form_Paint' or 'Form_Load' procedure that uses the 'If – Then – Else – End' If construct
	5.3 Write code for either a 'Form_Paint' or 'Form_Load' procedure that uses the For – Next construct and the If – Then – Else – End If construct
	5.4 Identify and document appropriate testing
6. Implement a programme that uses screen controls	6.1 Write code that demonstrates the use of a range of screen controls
	6.2 Write code that demonstrates the use of the TextBox control
	6.3 Write code that demonstrates the use of the ListBox control
	6.4 Write code that demonstrates the use of the InputBox control in conjunction with the Rnd and Randomize functions
	6.5 Demonstrate programming of arrays to select and search
	6.6 Demonstrate programming of a range of controls, the Sort Method and programme menus
	6.7 Identify and document appropriate testing
7. Implement a programme that uses serial files	7.1 Identify 'Data', 'Items', 'Records' and 'Files'
	7.2 Design and implement a data capture form
	7.3 Demonstrate programming of the Common Dialog control, StreamWriter and StreamReader objects
	7.4 Identify and document appropriate testing
8. Implement a programme that uses arrays	8.1 Write code that demonstrates how to declare an array
	8.2 Write code that demonstrates how to sort an array
	8.3 Identify and document appropriate testing

Syllabus Content	
Topic	**Course Coverage**
Introduction to the Programming Constructs of Sequencing and Iteration	- Introduction to programming - Introduction to objects - Introduction to variables - Assignment statements - From specification to code - The VB Integrated Development Environment (IDE) - VB forms, basic graphics facilities and statements ***Learning Outcome: 1***
Introduction to the Programming Construct of Selection.	- Further data types - Simple expressions - String manipulation - VB-specific constructs for the above ***Learning Outcome: 2***
Programming the Graphical User Interface	- Variable scope - VB screen controls ***Learning Outcome: 1,***
Project Definition and Design	- Multiple forms - Specification, design, implementation, test cycle - VB debugging and testing - Student mid-course assignment ***Learning Outcome:1, 3, 5***
Programming More Complex User Interfaces	- Arrays and their manipulation - More VB screen controls ***Learning Outcome: 6***
Programming Serial File Processing	- Files and records - Data validation - File handling in VB ***Learning Outcome: 4, 7***
Programming the Range and Type of Procedures.	- Procedures, functions and scope - Parameter passing - Collections **Learning Outcome: 5**

Related National Occupational Standards (NOS)
Sector Subject Area: 6.1 ICT for Users **Related NOS:** 5.1.A.1 - Carry out system development activities under direction; 5.1.P.1 - Perform systems development activities; 5.1.P.2 - Contribute to the management of systems development; 5.2.J.1 - Perform specified software development activities; 5.2.P.2 - Perform software development activities; 5.3.A.1 - Carry out IT/Technology solution testing activities under direction; 5.3.P.1 - Carry out IT/Technology solution testing

Assessment
Global Assignment (50%) Local Examination (50%)
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 (see *Section 5.6* above).

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 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

- Examination Guidelines

- Moderation Manual

- Activity Schedule

- Operations Manual

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.

Grade descriptors for Introduction to Programming

Learning Outcome	Pass	Merit	Distinction
Understand the Visual Basic (VB) Integrated Development Environment (IDE) and development framework	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the programming constructs of sequence and iteration	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the concept of project documentation	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand data capture and validation	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Implement a programme that uses iteration and sequence constructs	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Implement a programme that uses screen controls	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Implement a programme that uses serial files	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Implement a programme that uses arrays	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard

Grade descriptors for Introduction to Computing

Learning Outcome	Pass	Merit	Distinction
Be able to identify the main components of a computer system	Demonstrate adequate ability to differentiate and recognise components	Demonstrate sound and consistent ability to differentiate and recognise components	Demonstrate exceptional ability to differentiate and recognise components
Understand a microprocessor in terms of its main parts and how it runs a programme	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the role of databases in information management	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Be able to design and create a simple working relational database	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand the basic concepts of human-computer interaction	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the fundamental features of a computer network	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand the use of graphics and multimedia in computing	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding

Grade descriptors for IT Skills

Learning Outcome	Pass	Merit	Distinction
Understand the main functions of a word processor	Demonstrate adequate understanding of functions	Demonstrate robust understanding of functions	Demonstrate highly comprehensive understanding of functions
Be able to use the main functions of a word processor	Demonstrate adequate and appropriate use	Demonstrate appropriate and effective use	Demonstrate highly appropriate and effective use
Be able to extract information from the Internet without plagiarising	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand how to open, create and modify a spreadsheet	Demonstrate adequate understanding of functions	Demonstrate robust understanding of functions	Demonstrate highly comprehensive understanding of functions
Be able to format a spreadsheet	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Be able to create graphs from a spreadsheet	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand the main functions of presentation software	Demonstrate adequate understanding of functions	Demonstrate robust understanding of functions	Demonstrate highly comprehensive understanding of functions
Be able to utilise presentation software	Demonstrate adequate and appropriate use	Demonstrate appropriate and effective use	Demonstrate highly appropriate and effective use

Grade descriptors for Mathematical Techniques

Learning Outcome	Pass	Merit	Distinction
Be able to perform basic number calculations	Demonstrate ability to perform all techniques	Demonstrate ability to perform all techniques consistently well	Demonstrate ability to perform all techniques to the highest standard
Be able to use ratio, percentages and fractions	Demonstrate ability to perform all techniques	Demonstrate ability to perform all techniques consistently well	Demonstrate ability to perform all techniques to the highest standard
Understand the fundamentals of algebra and algebraic calculations	Demonstrate adequate understanding of techniques	Demonstrate robust understanding of techniques	Demonstrate highly comprehensive understanding of techniques
Understand the fundamentals of probability and probability calculations	Demonstrate adequate understanding of techniques	Demonstrate robust understanding of techniques	Demonstrate highly comprehensive understanding of techniques
Be able to perform basic calculations with shapes, spaces and measurements	Demonstrate ability to perform all techniques	Demonstrate ability to perform all techniques consistently well	Demonstrate ability to perform all techniques to the highest standard
Be able to use a range of techniques to present mathematical data	Demonstrate ability to perform all techniques	Demonstrate ability to perform all techniques consistently well	Demonstrate ability to perform all techniques to the highest standard

Grade descriptors for Study and Communication Skills

Learning Outcome	Pass	Merit	Distinction
Be able to take effective notes from a variety of sources	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand how to work out the meaning of unfamiliar content	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Understand common steps in producing academic work	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding
Be able to produce a piece of academic work suitable for this level, following a drafting process	Demonstrate ability to perform the task	Demonstrate ability to perform the task consistently well	Demonstrate ability to perform the task to the highest standard
Understand different learning styles	Demonstrate adequate level of understanding	Demonstrate robust level of understanding	Demonstrate highly comprehensive level of understanding