e-Quals Unit Syllabus

Level 3 Develop software using Visual Basic

7266/7267-304

www.cityandguilds.com/e-quals07
August 2008
Version 2.0

About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes City & Guilds, ILM (the Institute of Leadership & Management) which provides management qualifications, learning materials and membership services, NPTC which offers land-based qualifications and membership services, and HAB (the Hospitality Awarding Body). City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement *Access to assessment and qualifications* is available on the City & Guilds website.

Copyright

The content of this document is, unless otherwise indicated, © The City and Guilds of London Institute 2007 and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and learners studying for City & Guilds qualifications may photocopy this document free of charge and/or include a locked PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching learners working towards a City & Guilds qualification, or for internal administration purposes
- learners may copy the material only for their own use when working towards a City & Guilds qualification
- the *Standard Copying Conditions* on the City & Guilds website.

Please note: National Occupational Standards are not © The City and Guilds of London Institute. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications

City & Guilds publications are available on the City & Guilds website or from our Publications Sales department at the address below or by telephoning +44 (0)20 7294 2850 or faxing +44 (0)20 7294 3387.

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)20 7294 2787
F +44 (0)20 7294 2413
www.cityandguilds.com
centresupport@cityandguilds.com

Contents

Unit 304	**Develop software using Visual Basic**	
Outcome 1	Interpret program specifications to develop software	3
Outcome 2	Use components to create a Graphical User Interface (GUI)	4
Outcome 3	Use built-in database management features	6
Outcome 4	Develop code for implementation	7
Outcome 5	Test software	9
Outcome 6	Produce documentation	10
Unit record sheet		11

Unit 304 Develop software using Visual Basic

Rationale

The aim of this unit is to enable candidates to understand the principles required to develop software using the Visual Basic programming language. Candidates will develop the skills required to design, create and test software to solve a given problem.

Learning outcomes

There are **six** outcomes to this unit. The candidate will be able to:

Interpret program specifications to develop software
Use components to create a Graphical User Interface (GUI)
Use built-in database management features
Develop code for implementation
Test software
Produce documentation

Guided learning hours

It is recommended that 90 hours should be allocated for this unit. This may be on a full time or part time basis.

Connections with other qualifications

This unit contributes towards the knowledge and understanding required for the following qualifications:

Outcome	This award contributes to the knowledge and understanding of the following Areas of Occupational Competence in the City & Guilds NVQ for IT Professionals (4324)
1,2,3,4,5 6	311 Software development – component creation 3

Key Skills

This unit contributes towards the Key Skills in the following areas:

Communication	C1.3, C3.2
Application of Number	N1.1
Information technology	None
Working with others	None
Improving own learning	LP3.1, LP3.2, LP3.3
Problem solving	PS3.1, PS3.2, PS3.3

Assessment and grading

Assessment will be by means of a **set assignment** covering practical activities, and a **multiple choice test** covering underpinning knowledge.

Unit 304 Develop software using Visual Basic

Outcome 1 Interpret program specifications to develop software

Practical skills

The candidate will be able to:

1 design a solution to meet a given specification

2 identify and document input screens and output layouts

3 select the most appropriate controls and events to fulfil the specification

4 identify constants, variables, procedures, functions and modules required

5 use meaningful names for forms, controls, procedures, functions and modules using consistent naming conventions

6 identify the links between events, procedures, functions and modules

7 use a suitable method to document the code required for each procedure, function or module eg pseudocode, flowchart or structured English

8 provide a solution which is structured, easily maintained and fulfils the specification.

Underpinning knowledge

The candidate will be able to:

1 identify the need for program design

2 explain the need for effective validation of input data in software

3 explain the need for consistency in naming.

Unit 304 Develop software using Visual Basic

Outcome 2 Use components to create a Graphical User Interface (GUI)

Practical skills

The candidate will be able to:

1 select and use controls

2 change the settings for the properties of controls

3 set the **CancelError** property of the **CommonDialog**

4 select and use bound controls

5 set the **DataSource**, **DataField** and **DataFormat** properties of bound controls to enable access to database records.

Underpinning knowledge

The candidate will be able to:

1 explain the purpose and action of controls:

- a **Data**
- b **CommonDialog**
- c **ComboBox**
- d **Image**
- e **ListBox**
- f **PictureBox**
- g **CheckBox**
- h **TextBox**

2 explain the purpose of the properties of controls

- a **ActiveForm**
- b **ActiveControl**
- c **AddItem**
- d **AutoSize**
- e **AutoRedraw**
- f **Cancel**
- g **Value**
- h **DatabaseName**
- i **Default**
- j **DragIcon**
- k **DragMode**
- l **DrawWidth**

m **Index**

n **ListCount**

o **MousePointer**

p **Picture**

q **RecordSet**

r **RecordSource**

s **Selected**

t **TabStop**

u **Tag**

v **TextWidth**

w **Width**

3 describe the purpose of a Bound control:

a **ComboBox**

b **PictureBox**

c **CheckBox**

d **TextBox**

4 describe how the **List** and **ListIndex** properties can be used to set and return list items.

Unit 304 Develop software using Visual Basic

Outcome 3 Use built-in database management features

Practical skills

The candidate will be able to:

1 create a form to be used to display fields or records from a database table

2 connect to a database table and populate the controls on a form

3 write code to navigate, edit, update, add, delete and display records from a database table

4 add controls to a form to allow movement to the first, last, next or previous record

5 write code to perform a search on data in records

6 add controls to a form to allow a record to be edited, updated, added and deleted

7 validate data input to a control on a form.

8 use an embedded **SQL** query statement to implement a search.

Underpinning knowledge

The candidate will be able to:

1 describe the features of a record structured database

2 identify appropriate data types for the fields in a given record

3 describe the purpose of an index

4 state that a primary key field is used to uniquely identify a record

5 state the syntax and structure of basic **SQL** queries

6 state the reasons for timely archiving of records from a database:

   a size of database

   b speed of access.

Unit 304 Develop software using Visual Basic

Outcome 4 Develop code for implementation

Practical skills

The candidate will be able to:

1. declare and use local and global constants and use built-in predefined constants
2. use **Dim**, **Static** and **Global** for variable declarations
3. declare and use arrays of **integer** and **string** variables
4. declare and use the **Type** definition to create a user defined variable with two or more elements
5. use the **Tag** property of a control
6. use the **Randomize** statement and the **Rnd** function to generate random integer numbers
7. create and use control arrays
8. set the **TabIndex** property of controls to preset the order in which they receive focus
9. write code for event procedures for controls
10. use methods for controls
    - a **Clear**
    - b **Cls**
    - c **Print**
    - d **PrintForm**
    - e **SetFocus**
11. use functions for concatenating and manipulating strings
12. write code for procedures and functions in forms and separate code modules
13. use **KeyPress** and **KeyDown** events to monitor and acquire keyboard input
14. use the **KeyAscii** argument and the **Chr$** function to echo user keyboard input
15. use the **IsNumeric**, **Val** and **StrComp** functions in the validation of numeric input data
16. use the properties of the **Screen** object to position forms on the screen
17. use the Visual Basic co-ordinate system as it applies to: the screen; a form and its location on the screen; a container, and its location on a form
18. use drawing methods:
    - a **Line**
    - b **Circle**
    - c **Pset**
19. use the **Drag** method and the **DragDrop** event to initiate actions
20. use the **SelLength**, **SelStart** and **SelText** properties to manipulate text in a TextBox
21. write simple error-handling routines
22. use the **Show** and **Hide** methods and the **Load** and **Unload** statements

23 use the **ActiveForm** and **ActiveControl** properties in applications having more than one form

24 create simple multi-form applications that use procedures in a code module

25 create simple applications in which event procedures on one form reference properties on another form.

Underpinning knowledge

The candidate will be able to:

1 describe and state the scope of **Dim** and **Static** variables declared in procedures

2 describe and state the scope of **Dim** and **Global** variables declared in modules

3 describe the user-defined data type and how **Type** definitions should be placed in code

4 explain how the **AddItem** method is used to populate a **ComboBox** or **ListBox** control

5 describe the functions for concatenating and manipulating strings

6 explain the purposes and functions of control arrays and the **Index** property

7 explain the meaning of the term 'focus', its effects on a control and the means by which a control can receive the focus

8 explain how the **Print** method is used to send data to a printer

9 describe

- a simple sources of run-time errors
- b responses by Visual Basic when an error occurs
- c simple uses of the **OnError** statement
- d use of **GoTo** and **Resume** to manage errors
- e use of **Err** and **Error$** in error-handling

10 explain the purpose of event procedures for controls:

- a **Activate**
- b **Change**
- c **DragOver**
- d **DragDrop**
- e **Error**
- f **GotFocus**
- g **Load**
- h **LostFocus**
- i **Resize**
- j **Unload**.

Unit 304 Develop software using Visual Basic

Outcome 5 Test software

Practical skills

The candidate will be able to:

1 determine the expected results from a given set of test data

2 test the software according to a prepared test plan

3 compare the expected to the actual results and correct any errors

4 keep a log of the results for each test, clearly identifying:

   a discrepancies between the expected and actual results

   b amendments made to correct errors

5 resolve logical and run-time errors found during testing using appropriate methods

6 use the **Error** statement to test an error handling routine

7 verify that the program conforms to the design specification

8 create an **EXE** file and test its operation.

Underpinning knowledge

The candidate will be able to:

1 explain the reasons for testing a program prior to implementation

2 describe the meaning of a dry run

3 describe the meaning of a compilation error

4 describe the meaning of a run-time error

5 describe the purpose of test data

6 explain the need to test software in the target environment

7 state the difference between interfacing and integration

8 explain the need for overall control when developing software projects

9 identify the benefits of teamwork to avoid duplication of effort, when working on a large project

10 describe the need for control and documentation of any changes to programs.

Unit 304 Develop software using Visual Basic

Outcome 6 Produce documentation

Practical skills

The candidate will be able to:

1 provide end user instructions that are clear and unambiguous

2 produce technical documentation to describe the purpose of the program and its operation

3 print listing of code

4 print forms (screen images).

Underpinning knowledge

The candidate will be able to:

1 identify the need for end user instructions

2 describe the need for technical documentation to aid future maintenance and reusability.

Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

Outcome	✓	Date
1 **Interpret program specifications to develop software**	☐	
2 **Use components to create a Graphical User Interface** (GUI)	☐	
3 **Use built-in database management features**	☐	
4 **Develop code for implementation**	☐	
5 **Test software**	☐	
6 **Produce documentation**	☐	

Candidate Signature ..... **Date** .....

City & Guilds Registration Number ....

Centre Name ..... **Centre Number** .....

Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2468
F +44 (0)20 7294 2400
www.cityandguilds.com
www.cityandguilds.com/e-quals07

City & Guilds is a registered charity established to promote education and training