



## **National Unit specification: general information**

**Unit title:** Computer Networking: Project Design and Implementation (SCQF level 5)

**Unit code:** FX1G 11

**Superclass:** CB

**Publication date:** March 2012

**Source:** Scottish Qualifications Authority

**Version:** 02

### **Summary**

This Unit enables candidates to develop skills in designing and implementing a network solution to meet client requirements. Candidates will develop skills in problem solving and communication.

This is a mandatory Unit in the NC Computing: Technical Support (SCQF level 6). It is also available as a freestanding Unit.

This Unit is suitable for a wide range of candidates but is particularly appropriate for those who are interested in a career in technical support.

### **Outcomes**

- 1 Design a network solution.
- 2 Implement and test the network solution.
- 3 Evaluate the effectiveness of the network solution.

### **Recommended entry**

While entry is at the discretion of the centre it would be beneficial if candidates have basic IT skills or have attained the following Unit, or equivalent:

D01D 10 Information Technology Intermediate 1 Computing Studies

## **National Unit specification: general information (cont)**

**Unit title:** Computer Networking: Project Design and Implementation  
(SCQF level 5)

### **Credit points and level**

1 National Unit credit at SCQF level 5: (6 SCQF credit points at SCQF level 5\*)

*\*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

### **Core Skills**

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

## **National Unit specification: statement of standards**

**Unit title:** Computer Networking: Project Design and Implementation  
(SCQF level 5)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

### **Outcome 1**

Design a network solution.

#### **Performance Criteria**

- (a) Design the layout for a network in accordance with a client specification.
- (b) Create a testing plan with test data.

### **Outcome 2**

Implement and test the network solution.

#### **Performance Criteria**

- (a) Prototype and connect a network.
- (b) Test a prototype network using the testing plan.

### **Outcome 3**

Evaluate the effectiveness of the network solution.

#### **Performance Criteria**

- (a) Evaluate the solution in relation to the original client requirements.
- (b) Present the results of the evaluation.

## National Unit specification: statement of standards (cont)

**Unit title:** Computer Networking: Project Design and Implementation (SCQF level 5)

### Evidence Requirements for this Unit

Evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria. A project brief and client specification requirements should be given to candidates covering all Outcomes. The requirements must allow for the building and connecting of two small networks. At this level it is not required for candidates to analyse a brief and derive their own requirements.

**Outcome 1** — written and/or oral recorded and product evidence that demonstrates that the candidate can:

- ◆ produce a network diagram showing correct physical network topology, to include all nodes and connections, according to client specification
- ◆ create a testing plan with test data including:
  - cable testing (correct wiring, cable connections)
  - network testing (TCP IP utilities)
  - uplink lights

**Outcome 2** — written and/or oral recorded and performance evidence that demonstrates that the candidate can:

- ◆ prototype and connect two small separate networks:
  - select appropriate connection methods (cable and/or wireless, cable connectors)
  - select a suitable network interface card
  - select a suitable hub/switch
- ◆ establish connections between network devices. Each small network must utilise a minimum of two network devices
- ◆ document practical work for building networks
- ◆ document software configurations (TCP IP, resource sharing)
- ◆ test the prototype network using the testing plan, logging and resolving any errors

The evidence for Outcomes 1 and 2 must be obtained under controlled, supervised open-book conditions. Candidates will have access to notes and reference books.

**Outcome 3** — written and/or oral recorded evidence that demonstrates that the candidate can:

- ◆ evaluate the suitability of the design in meeting the client requirements
- ◆ evaluate the process of implementing the design
- ◆ evaluate the effectiveness and scope of testing in picking up errors
- ◆ present the evaluation to a small group of peers

The evidence for Outcome 3 must be obtained under controlled, supervised open-book conditions. Candidates will have access to notes and reference books.

## National Unit specification: support notes

### Unit title: Computer Networking: Project Design and Implementation (SCQF level 5)

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

### Guidance on the content and context for this Unit

This Unit has been partially aligned to the e-Skills National Occupational Standards unit.

- ◆ IT/technology infrastructure design and planning (competence 4.8.J.2)
- ◆ Carry out, under supervision, customer requirements for IT/technology infrastructure design and planning (points (d) and (e)).

Where applicable the use of virtualisation and simulation is recommended.

#### Outcome 1

Candidates should be introduced to a client requirements document and be walked through the process of deriving a client requirements document from a project scenario. Discussion should take place on functional and non-functional requirements in network.

It may also be useful at this stage to familiarise candidates with a project plan.

#### Outcome 2

Candidates should be familiar with health and safety risks associated with working with electrical equipment and in the general environment. ESD should be described and the potentially harmful effect this has on devices should be covered along with means of protecting components from this.

Candidates should be familiar with common LAN topologies and technologies such as bus, star, ring and mesh. Candidates should be familiar with network technologies such as Ethernet, token ring and wireless. Wired and wireless networking components operation should be described for example, switches, hubs, wireless access points, NICS, wireless NICS and cabling such as length, standard and type of cable and common cable tests.

Candidates should be familiar with the main functions of network operating system such as administration, share and user level security. In addition candidates should be able to explain the function of common network protocols such as TCP/IP and NetBEUI.

#### Outcome 3

Discussion should take place on the various methods appropriate for presenting information, eg presentation software, overhead transparencies.

Where the evaluation is presented in written format, it is recommended that this is approximately 500 words. Where evaluation is presented in oral/recorded format, it is recommended that this should last no more than approximately 5 minutes.

## **National Unit specification: support notes (cont)**

**Unit title:** Computer Networking: Project Design and Implementation  
(SCQF level 5)

### **Guidance on learning and teaching approaches for this Unit**

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours. A guide time for each Outcome is:

Outcome 1: 6 hours

Outcome 2: 28 hours

Outcome 3: 6 hours

### **Guidance on approaches to assessment for this Unit**

A holistic approach to assessment is encouraged for this Unit. A project brief and client requirements could be given to candidates covering all Outcomes. The requirements must allow for the building and connecting of two small networks. In this Unit, candidates are not required to analyse a brief and derive their own client requirements, these should be given by the tutor.

Where re-assessment is required, a different instrument of assessment should be used.

#### **Outcome 1**

In evidencing the design of the network candidates will create a network diagram. To aid candidates in creating a test plan a pro-forma might be provided. Test plan should detail actual tests, results and error resolution incorporate the test data as outlined in the performance criteria.

#### **Outcome 2**

Activity log books or a pro-forma can be used to document candidate's practical work during the build of the network. An assessor signed checklist should also be completed to verify that the tasks have been completed correctly by the candidate and retained by the centre.

Network should be tested to meet the minimum test requirements as stated in Outcome 2 and any errors resolved and documented.

#### **Outcome 3**

Candidates should present their evaluation to a small group of their peers. Candidates are required to use an appropriate method of presentation to do this. Candidates might use a presentation software program.

## National Unit specification: support notes (cont)

**Unit title:** Computer Networking: Project Design and Implementation (SCQF level 5)

### Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

### Opportunities for developing Core Skills

In this Unit candidates will develop skills in designing and implementing a network solution to meet client requirements.

Candidates will:

- ◆ consider possible resources and technologies and choose the one most suited to meeting the requirements of a client brief
- ◆ design the network layout
- ◆ create a testing plan
- ◆ build a prototype and connect and test it using the testing plan
- ◆ evaluate the effectiveness of network solution in terms of design and testing methods
- ◆ present results of evaluation

As candidates are doing this Unit they will be developing aspects of the Core Skills of *Problem Solving* and *Communication*.

### Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements)

## History of changes to Unit

Version	Description of change	Date
02	Clarification that the networks referred to in Outcome 2 do not need to be connected to each other.	22/03/2012

© Scottish Qualifications Authority 2012

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.