Higher National Unit Specification

General information for centres

Unit title: Data and Telecommunications Infrastructure

Unit code: DW4T 35

Unit purpose: This Unit seeks to provide candidates with knowledge and understanding in network technologies and computer hardware and software systems for data and voice communications.

On completion of the Unit candidates should be able to:

1   Understand alternative local and wide area data network technologies.
2   Explain alternative public and private voice networks and wireless technologies.
3   Identify the benefits of structured wiring systems.
4   Explain the role of computer hardware and software systems.

Credit points and level: 1 HN Credit at SCQF level 8: (8 SCQF credit points at SCQF level 8*).

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.

Recommended prior knowledge and skills: The Unit includes all the basic principles necessary to allow candidates possessing other qualifications or experience to succeed in this Unit.

Core Skills: There are opportunities to develop the Core Skills of IT and Problem Solving in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: It is possible to assess candidates either on an individual Outcome basis, combinations of Outcomes or by a single holistic assessment combining all Outcomes. The single holistic assessment event should not exceed two hours. The assessment paper/s should comprise an appropriate balance of short answer, restricted response and structured questions. It should be noted that candidates must achieve all the minimum evidence specified for each outcome in order to pass this unit.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

General information for centres (cont)

Candidates should be expected to make their own assumptions in support of their response to these Outcomes.

An exemplar instrument of assessment and marking guidelines have been produced to provide an example of the type of evidence required to demonstrate achievement of the aims of this Unit and to indicate the national standard of achievement at SCQF level 8.

Higher National Unit specification: statement of standards

Unit title: Data and Telecommunications Infrastructure

Unit code: DW4T 35

The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Throughout the Unit emphasis will be placed where appropriate on the application of Health and Safety and Sustainability. Safe working practices should be looked at in accordance with current safety codes of practice and regulations. Sustainability should include reference to criteria affecting sustainability, impact of not implementing sustainability on the environment and the legislation promoting sustainability.

Outcome 1

Understand alternative local and wide area data network technologies.

Knowledge and/or skills

♦   Theoretical principles of local and wide area networks in data communications
♦   Dual role of local area networks in communicating building and organisation centred data
♦   Hardware and software protocols and the function of network devices
♦   Main factors in selecting an appropriate local and wide area network system

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **two out of four** knowledge and/or skills items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

In order to ensure the candidate will not be able to foresee what items they will be questioned on, a different sample of **two out of four** knowledge and/or skills items is required each time the Outcome is assessed.

Where sampling takes place, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for the items sampled by showing that the candidate is able to:

♦   describe, discuss and evaluate alternative local and wide area data network technologies in supporting building and organisation centred communications

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

Higher National Unit specification: statement of standards (cont)

Unit title: Data and Telecommunications Infrastructure

The assessment for this Outcome might be combined with one or more of the other outcomes to form one or more assessment papers. The assessment event should be carried out under closed book, supervised and controlled conditions.

Outcome 2

Explain alternative public and private voice networks and wireless technologies.

Knowledge and/or skills

♦   Theoretical principles of public and private voice networks
♦   Main features of a private automated branch exchange (PABX)
♦   Role of wireless technologies in supporting mobile working
♦   Advantages and disadvantages of wired and wireless technologies in business telephony

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **two out of four** knowledge and/or skills items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

In order to ensure the candidate will not be able to foresee what items they will be questioned on, a different sample of **two out of four** knowledge and/or skills items is required each time the Outcome is assessed.

Where sampling takes place, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for the items sampled by showing that the candidate is able to:

♦   describe and explain alternative public and private voice networks and wireless technologies in supporting flexible working environments

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with one or more of the other outcomes to form one or more assessment papers. The assessment event should be carried out under closed book, supervised and controlled conditions.

Outcome 3

Identify the benefits of structured wiring systems.

Higher National Unit specification: statement of standards (cont)

Unit title: Data and Telecommunications Infrastructure

Knowledge and/or skills

♦ Practical advantages in the convergence of data and voice communications
♦ Cabling standards and importance of cable management in designing cabling infrastructure
♦ Structured wiring and interface connections to local area networks
♦ Benefits of structured wiring in facilitating change management

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **two out of four** knowledge and/or skills items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

In order to ensure the candidate will not be able to foresee what items they will be questioned on, a different sample of **two out of four** knowledge and/or skills items is required each time the Outcome is assessed.

Where sampling takes place, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for the items sampled by showing that the candidate is able to:

♦ define, explain and evaluate the benefits of structured wiring systems in facilitating change management

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with one or more of the other outcomes to form one or more assessment papers. The assessment event should be carried out under closed book, supervised and controlled conditions.

Outcome 4

Explain the role of computer hardware and software systems.

Knowledge and/or skills

♦ Role of personal computers, peripherals and hardware systems
♦ Function of computer software systems in data processing and communications
♦ Role of the portable computer in support of mobile working
♦ Role of modern computer systems in supporting different workstyles and workplaces

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **two out of four** knowledge and/or skills items is required each time the Outcome is assessed. Candidates must provide a satisfactory response to both items.

Higher National Unit specification: statement of standards (cont)

Unit title: Data and Telecommunications Infrastructure

In order to ensure the candidate will not be able to foresee what items they will be questioned on, a different sample of **two out of four** knowledge and/or skills items is required each time the Outcome is assessed.

Where sampling takes place, a candidate's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for the items sampled by showing that the candidate is able to:

♦ discuss and explain the role of hardware and software computer systems in supporting building and business communications

Assessment guidelines

Questions used to elicit candidate evidence should take the form of an appropriate balance of short answer, restricted response and structured questions.

The assessment for this Outcome might be combined with one or more of the other outcomes to form one or more assessment papers. The assessment event should be carried out under closed book, supervised and controlled conditions.

Administrative Information

Unit code: DW4T 35

Unit title: Date and Telecommunications Infrastructure

Superclass category: XM

Date of publication: June 2006

Version: 01

Source: SQA

Higher National Unit specification: support notes

Unit title: Data and Telecommunications Infrastructure

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 written in order to allow candidates to develop knowledge, understanding and skills in the following areas:

1   Understand alternative local and wide area data network technologies.
2   Explain alternative public and private voice networks and wireless technologies.
3   Identify the benefits of structured wiring systems.
4   Explain the role of computer hardware and software systems.

The context of knowledge delivered in this unit will focus on the data and telecommunications infrastructure relating to "buildings in use" therefore developing on prior knowledge, providing new knowledge and forming links with subjects areas in HND Facilities Management.

The context for delivery will therefore encourage candidates to adopt a holistic approach in connecting existing and new knowledge across the relevant subject areas within the Group Award.

The context of delivery will also present knowledge in the form of mini case studies which will encourage candidates in their application of concepts and analysis in problem solving.

This Unit has been developed as part of a group of facilities management units. There are three other units in the group entitled Facilities Management: Property Services, Facilities Management: Operational and Support Services and Facilities Resource Planning and Contract Management. This Unit at SCQF level 8 is a mandatory Unit within the HND Facilities Management award.

The three Units mentioned in the previous paragraph have been developed as an integrated suite of units to meet all the facilities management requirements of the new HNC and HND Built Environment awards. However this does not preclude the use of one or more of these units in other awards where award designers consider this to be appropriate. As well as providing a substantial course in facilities management principles these units also provide important underpinning knowledge, understanding and skills for other parts of the HNC and HND Built Environment awards.

In designing this Unit the unit writers have identified the range of topics they would expect to be covered by lecturers. The writers have also given recommendations as to how much time should be spent on each outcome. This has been done to help lecturers to decide what depth of treatment should be given to the topics attached to each of the outcomes. Whilst it is not mandatory for the centre to use the list of topics it is strongly recommended that it does so. This is to ensure continuity of teaching and learning across the Facilities Management units and because the assessment exemplar pack for this unit is based on the knowledge and/or skills and list topics in each of the outcomes.

This Unit is core to the delivery of this Group Award.

Higher National Unit specification: support notes (cont)

Unit title: Data and Telecommunications Infrastructure

The list of topics is given below. Lecturers are advised to study this list of topics in conjunction with the assessment exemplar pack so that they can get a clear indication of the standard of achievement expected of candidates in this Unit.

The context of the unit will focus on:

1 **Understand alternative local and wide area data network technologies. (8 hours)**

   ♦ local area networks, topology, hardware and software protocols, network operating systems and virtual and digital wide area networks

2 **Explain alternative public and private voice networks and wireless technologies. (10 hours)**

   ♦ direct dialling in business telephony and wireless handsets and mobile telephones

3 **Identify the benefits of structured wiring systems. (10 hours)**

   ♦ horizontal structured and workstation wiring, outlet distribution from patch panels and cable interface connections

4 **Explain the role of computer hardware and software. (10 hours)**

   ♦ hardware and peripherals and typical application of software systems in common use

The content of this Unit will include provision and application of knowledge on data and voice networks, cabling, hardware and software systems used for business and building centred communications.

Guidance on the delivery and assessment of this Unit

Where this Unit is incorporated into other group awards it is recommended that it be delivered in the context of the specific occupational area(s) that the award is designed to cover.

Details on approaches to assessment are given under Evidence Requirements and Assessment guidelines under each Outcome. It is recommended that these sections be read carefully before proceeding with assessment of candidates.

The format of delivery of this unit may include:

♦ a series of lectures based on written handouts providing information in the form of first principles and processes including examples case studies and best practice
♦ open and networking sessions encouraging interactive discussion
♦ computing sessions encouraging searching given websites for information
♦ summary and feedback session

Higher National Unit specification: support notes (cont)

Unit title: Data and Telecommunications Infrastructure

Lectures will be designed to encourage two-way discussion relevant to the given subject areas.

Open and networking sessions will encourage candidates to share knowledge and experiences within given subject areas.

Computing sessions will encourage candidates to use information technology to source knowledge relevant to given subject areas.

Summary and feedback will highlight areas of strength and weakness in both knowledge and skills relative to the subject areas within this unit.

The main aims of this format of delivery of the Unit should ensure:

♦   clarity of purpose
♦   opportunity to share knowledge and skills
♦   opportunity of developing existing and new skills in Oral and Written Communication, Numeracy, Information Technology, Problem Solving and Working with Others

Opportunities for developing Core Skills

The following grid provides a general guide to opportunities for the development of Core Skills in this Unit. Opportunities for the development of Core Skills at the output level are more fully identified in the Core Skills Signposting Guide.

Core Skill	Outcome 1	Outcome 2	Outcome 3	Outcome 4
1 Communication				
Reading				
Writing				
Oral				
2 Numeracy				
Using Number				
Using Graphical Information				
3 IT				
Using Information Technology		✓		✓
4 Problem Solving				
Critical Thinking				
Planning and Organising				
Reviewing and Evaluating	✓		✓	
5 Working with Others				

Higher National Unit specification: support notes (cont)

Unit title: Data and Telecommunications Infrastructure

Open learning

Given the availability of suitable learning material this Unit could be delivered by distance learning, which may incorporate some degree of on-line support. However, with regard to assessment, planning would be required by the centre concerned to ensure the sufficiency and authenticity of candidate evidence. Arrangement would be required to be put in place to ensure that the assessment, which is required to be at a single event, was conducted under controlled, supervised conditions.

For information on normal open learning arrangements, please refer to the SQA guide *Assessment and Quality Assurance of Open and Distance Learning* (SQA 2000).

Candidates with additional support needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs,* which is available on the SQA website **www.sqa.org.uk.**

General information for candidates

Unit title: Data and Telecommunications Infrastructure

This Unit has been designed to allow you to develop knowledge, understanding and skills in a range of data and telecommunication infrastructure technologies and computer systems. It will enable you to understand the practical use of these technologies in commercial buildings. The content of the unit is intended to provide sufficient depth of knowledge and understanding of facilities management for those following courses in the Built Environment programme.

You will be given an introduction to the unit including a list of recommended reading texts and journals some of which would be available in the college library.

You will be encouraged to form links with other subject areas within the Unit and with other Units within the group.

During formative sessions you should be able to demonstrate ability in synthesizing knowledge across other subject areas within this, and other units relevant to the group award.

Data networks will be discussed by function; characteristics and the technologies they adopt to provide flexibility and economies in their application.

Voice networks will be discussed in relation to the workplace and flexible workstyles and the various features of the private automated branch exchange (PABX).

Structured wiring systems will be discussed in terms of how it facilitates, with least disruption, people movement within the workplace.

Hardware and software systems will be discussed in regard to shared peripherals, databases and common software applications including word processing, spreadsheets, graphical presentations and reprographics.

Assessing risks will discuss insurance in connection with workplace and fire risk assessments and their connection with primary and subordinate health and safety legislation.

Whilst the above subjects will be discussed within the context of facilities management there will be natural links with knowledge gained in other units within the group award.

The central theme of the Unit will be facilities management practice within the context of "buildings in use", connections will be made to core business, thus demonstrating the contribution of facilities to overall business performance.

On completion of this Unit you should be able to:

1   Understand alternative local and wide area data network technologies.
2   Explain alternative public and private voice networks and wireless technologies.
3   Identify the benefits of structured wiring systems.
4   Explain the role of computer hardware and software systems.