National Unit Specification: general information

UNIT   Engineering: Applying Information Technology (SCQF level 6)

CODE   F5D4 12

SUMMARY

This Unit is a mandatory Unit in the National Qualifications Group Awards (NQGA) in Engineering, but it can also be undertaken as a free-standing Unit.

This Unit is designed to extend knowledge and expertise on features of an operating system and available software application packages including software packages relevant to an engineering environment. The candidate will gain practical experience in the use of the features in these types of software, and in the development of internet search techniques. The Unit will also provide candidates with information regarding the selection of appropriate software for specific tasks.

OUTCOMES

1   Use an operating system to manage applications and files.
2   Use computer application software functions.
3   Use internet facilities to locate and evaluate information.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, it would be beneficial if candidates had attained the following, or equivalent:

F5D6 11   *Engineering: Using Information Technology*

National Unit Specification: general information (cont)

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CREDIT VALUE

1 credit at SCQF level 6 (6 SCQF points at SCQF level 6*).

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

Complete Core Skills   Information and Communication Technology at SCQF Level 6

Core Skill component   none

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit Specification.

National Unit Specification: statement of standards

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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

Use an operating system to manage applications and files.

Performance Criteria

(a) A file/directory system is implemented correctly.
(b) A relevant file naming policy is implemented correctly.
(c) A security/backup policy is implemented correctly.

OUTCOME 2

Use computer application software functions.

Performance Criteria

(a) Use functions of a word processing application package.
(b) Use functions of a spreadsheet application package.
(c) Use an engineering software package.

OUTCOME 3

Use internet facilities to locate and evaluate information.

Performance Criteria

(a) The selection of a search strategy is effective in locating the desired information.
(b) Browser controls and hyperlinks are effectively used to navigate a website.
(c) The quality of the design of the website is evaluated using defined criteria.
(d) The quality of the information is evaluated using defined criteria.

EVIDENCE REQUIREMENTS FOR THIS UNIT

This section details the evidence required to demonstrate that candidates have achieved all Outcomes and Performance Criteria. This evidence should be produced under supervised, controlled conditions.

Performance evidence, supplemented by an assessor observation checklist, is required, which demonstrates that the candidate has achieved all mandatory requirements for all Outcomes. This evidence will be gathered under supervised, open-book conditions.

National Unit Specification: statement of standards (cont)

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The Assessment Support Pack (ASP) for this Unit will provide sample assessment materials including assessor checklists, practical tasks and an instrument of assessment for the knowledge. Centres wishing to develop their own assessments should refer to the Assessment Support Pack to ensure a comparable standard.

National Unit Specification: support notes

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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 is mandatory within the NQGAs in engineering at SCQF level 6. It may also be taken as a free-standing Unit.

The overall aim of this Unit is to ensure the candidate works in an efficient manner using the computing resources available effectively and economically. Centres may deliver this Unit using stand-alone PCs or by use of a network, with candidates having user accounts. Whichever method the centre employs, sufficient guidance must be given to the candidate to allow them to successfully overtake the Outcomes of this Unit.

It is expected that candidates will be aware of the correct procedure to start and shut down a computer, how to log onto a (network) system and the importance of logging off when they have finished using the system. Candidates should also be aware of the correct procedure for starting and terminating an application package.

The Unit is intended to extend candidate expertise in the following software areas:

♦ Word processing
♦ Spreadsheets
♦ Engineering software (to be chosen by the presenting centre)
♦ Internet search software

On completion of the Unit candidates should also be able to make an informed choice as to which software to use for a particular task. The Unit is designed to be task-based and it is anticipated that most of the time will be spent by candidates on practical work, although some discussion work is required, for example, when discussing which types software are suitable for specific purposes, especially in the engineering environment.

Outcome 1

Centres will be delivering this Unit either by using stand-alone PCs, or by accessing a network. Candidates will require sufficient induction in whichever method the centre is intending to employ for the Unit.

Candidates will require instruction in the correct procedure to start and shut down a computer or how to log onto a (network) system, using the correct username and password methodology employed. They will also understand the importance of logging off when they have finished using their particular system.

Candidates will require instruction in the preferred centre directory and file storage strategy, and will be expected to implement and comply with this.

National Unit Specification: support notes (cont)

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Candidates will either conform to a provided centre file naming policy of will be given appropriate guidance to allow them to develop, implement and maintain such a policy themselves.

The importance of file and data security will also need to be highlighted to candidates. It is expected that the centre will provide candidates with an appropriate security and backup procedure.

Outcome 2

This Outcome involves the candidate developing and extending knowledge and expertise in the use of four software application packages. These are split into two categories:

♦   Standard — word processing and spreadsheet
♦   Specific — engineering based software

Standard

Word processing: the candidate should be introduced to use customising and automating tools and techniques to produce complex documents (producing newsletters, journals, complex reports, company fliers, form letters, form envelopes and form address labels), using documents from an engineering environment wherever possible and practical.

Spreadsheets: the candidate should be introduced to producing spreadsheets for analysing and interpreting complex data, such as budgets and annual accounts or in a stock control application. Candidates should be able to use appropriate tools to predict trends and understand how to produce information that communicates effectively by structuring the content to take account of different contexts and audience needs. Candidates should be able to use tools to automate routine tasks.

Specific

Engineering software: the candidate should be introduced to at least one (and, where possible, more than one) type of engineering software. S/he should be able to demonstrate an understanding of its function and purpose in an engineering context and use it effectively.

Outcome 3

This Outcome relates to locating information on the internet. The type of information that candidates are expected to find should relate to their vocational interests but may be complex and unfamiliar. In particular, given that centres are likely to possess a restricted choice of engineering software packages, one of the searches carried should be to locate and investigate sources and types of such engineering software packages

The Performance Criteria define the standards which should be applied to candidate activity.

National Unit Specification: support notes (cont)

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Performance Criteria (a) requires candidates to select a **search strategy**. A search strategy typically includes:

♦   selecting the type of search service(s) to be employed
♦   selecting specific search facilities
♦   selecting the key attributes of the target information
♦   translation of these attributes into appropriate keywords and queries
♦   the selection of filters to reduce the number of located resources/pages

At this level, candidates are expected to locate information rapidly, through their skilled use of search facilities. Candidates should be familiar with advanced search techniques including the use of Boolean operators and compound search criteria. Candidates are also expected to be skilled at selecting keywords to use within their searches. Search services, which include search engines, meta search engines and directories, should be introduced.

Candidates are required to locate a range of information types (text, number and graphic) and are expected to be proficient at searching for each of these media types.

Performance Criteria (b) relates to **browser navigation controls**. Candidates are expected to be familiar with these controls (such as the back and forward buttons) and be able to use them effectively to move between pages in a website. Similarly, candidates are required to recognise and use embedded hyperlinks. It is not acceptable for candidates to double-click on a hyperlink (since this infers that they are not recognised as hyperlinks). The combined use of browser controls and hyperlinks should enable candidates to effectively navigate a specific website.

Performance Criteria (c) relates to the **design** of a website. Once a website has been located, candidates are required to evaluate the quality of its design using defined criteria. These criteria will relate to:

♦   Usability
♦   Navigation/structure
♦   Presentation

Candidates are expected to know and apply standards for the design of websites.

Performance Criteria (d) relates to the **quality of** the **information provided** by a website. The quality of information relates to the following attributes:

♦   Relevance
♦   Accuracy
♦   Clarity
♦   Brevity
♦   Depth/detail
♦   Timeliness

National Unit Specification: support notes (cont)

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Specifically it needs to be emphasised that information is:

♦ relevant if it relates to the subject under investigation
♦ accurate if it is factually correct — or at least known not to be factually incorrect
♦ clear if it is well written in accordance with the rules for clear and simple writing
♦ brief if it is succinct and to-the-point
♦ detailed if sufficient information is provided to give the reader a clear understanding of the subject matter
♦ timely if it is up-to-date

Note that some of these attributes conflict — there is a tension between brevity and depth and it is difficult to maintain a website's timeliness and accuracy.

Candidates are required to know about these attributes and apply them to specific websites.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

This Unit has been designed to provide practical experience in the use of non-routine functions of word processing, spreadsheet and engineering application software. It also extends the skills required to find and evaluate information from the internet, obtained through structured searches. It is anticipated that the vast majority of the time spent on this Unit will be through hands on practical exercises.

The Unit is designed to be task-based and it is anticipated that most of the time will be spent on practical work, although some discussion work is required, particularly with Outcome 3, on the use of the internet.

Outcome 2 can require the candidate to make an informed decision as to what software packages to use for specific engineering tasks, assuming the presenting centre can provide more than one appropriate engineering based software package. It is expected that the features of each application, and what each package can, and cannot do, will be covered during the practical exercises.

A teaching plan for the Unit might follow a sequential pattern, commencing with Outcome 1 and progressing numerically to Outcome 3. However this order is not compulsory and presenting centres may choose to deliver and assess Outcomes in a different order to suit local needs. It is possible that work on all Outcomes might run in parallel.

While teaching will necessarily focus on a specific product, candidates should be made aware that alternative products are available and should be encouraged to explore these alternatives, possibly in the overall context of Outcome 3.

The actual distribution of time between Outcomes is at the discretion of the centre. However one possible distribution of time is:

Outcome 1   5 hours
Outcome 2   30 hours
Outcome 3   5 hours

National Unit Specification: support notes (cont)

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The allocated timings allow for assessment and re-assessment where required.

OPPORTUNITIES FOR DEVELOPING CORE SKILLS

This Unit involves candidates:

♦ using a range of *IT* and carrying out searches to extract and present relevant information which may which may provide an opportunity to gather evidence towards aspects of the *IT* Core Skill
♦ making selective use of *IT* and evaluating their choice, which may provide an opportunity to gather evidence towards aspects of the *Problem Solving* Core Skill
♦ reporting a number of aspects of the assessment, which may provide an opportunity to gather evidence towards aspects of the *Communication* Core Skill

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

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 communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. 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)*.

Candidates are encouraged to use the internet in any research, etc, however, the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of candidate's evidence.

Candidates will be expected to demonstrate and provide hard copy evidence that they have organised their computer work area in an appropriate hierarchical manner. The file naming policy that is required, may be developed by the candidate under supervision, or may be implemented as an organisational standard, and its compliance in use monitored. Candidates will be expected to implement and document centre agreed security and backup procedures.

The assessment for this Outcome will consist of **three** practical assignments, **one** for word processing, **one** for spreadsheets and **one** for an engineering application, which will be constructed in such a way that the candidate is required to use:

National Unit Specification: support notes (cont)

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- ♦ **Six** word processing functions chosen from:
  - — Creating and using templates
  - — Comments and tracking changes
  - — Envelopes and labels
  - — Index generation — manual and automatic
  - — Graphics — using a graphic as a watermark, adding a caption to a graphic
  - — Creating and using table of contents
  - — Hyperlinks and bookmarks
  - — Macros
  - — Sections — formatting text differently in each section, changing the header and footer in each separate section
  - — Incorporating other file types, eg spreadsheet

- ♦ **Four** spreadsheet functions chosen from:
  - — Analysis: filtering; charting, trend analysis
  - — Creating templates
  - — Data validation
  - — Functions: general; statistical; logical; financial; lookup; database
  - — Macros
  - — Protection
  - — Integrating spreadsheet data with other applications
  - — Importing data from external sources such as other spreadsheets

- ♦ At least **four** functions from a centre specified engineering software package chosen from:
  - — Importing files
  - — File conversion
  - — Data manipulation
  - — Output generation
  - — Exporting files
  - — Integration with other packages such as a word processor, presentation package etc

Performance evidence in written, electronic or hard copy form, supplemented by an assessor checklist, is required which demonstrates that the candidate has achieved all the requirements for Outcome 2 listed above to the standard specified in the Outcome and Performance Criteria. This evidence may be gathered under supervised, open-book conditions, over an extended period of time.

National Unit Specification: support notes (cont)

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Outcome 3

Candidates will be expected to undertake a practical assignment for assessment purposes. The assignment will involve candidates being given four subjects/topics to research on the internet.

Candidates are required to demonstrate that they can:

♦   locate three Web pages that contain information that relates to different contexts and covers at least three of the defined types of information (text, number, and/or graphic). Each search must involve a minimum of two search criteria. The information located and method used for location must be different on each assessment occasion. Searching will include accessing websites using a URL, use of an appropriate search engine and appropriate keywords and queries; carrying out searches efficiently using meta search engines, directories, wild cards, AND or NOT (Boolean notation), natural search methods.
♦   navigate websites using browser controls, recognise and use embedded hyperlinks, use a browser's history facilities to re-visit websites from various dates using bookmarks or favourites and software settings.
♦   review sources and information to help choose what is most relevant, and to decide when sources and information have been found.
♦   save (download) pages found during the searches to an appropriate folder(s).
♦   provide written and/or oral recorded evidence of the search strategy.
♦   adhere to the rules of 'netiquette'.
♦   take security measures and make use of anti-virus and firewall protection.
♦   use acceptable policies for communicating.

It may be appropriate for some of the evidence for this Unit to be produced using e-assessment provided the national standard is applied and the conditions of assessment are consistent for all candidates. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical tasks/assignments).

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

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. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (**www.sqa.org.uk**).