National Unit Specification: general information

UNIT Database Systems (Intermediate 2)

NUMBER DM4A 11

COURSE Information Systems (Intermediate 2)

SUMMARY
This Unit is designed to develop knowledge and understanding of the principles of database systems and provides an opportunity to apply this knowledge to solve problems through the use of contemporary hardware and software. It is designed for candidates undertaking the Intermediate 2 Information Systems Course, but is also suitable for anyone wishing to develop a basic understanding of Database Systems.

OUTCOMES
1. Demonstrate knowledge and understanding of the principles, features and techniques of database systems.
2. Demonstrate practical skills using contemporary hardware and software in the context of database systems.

RECOMMENDED ENTRY
While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- Intermediate 1 Computer Applications Unit
- Intermediate 1 Computing Studies Course
- Standard Grade Computing Studies at General level

Administrative Information

Superclass: CD

Publication date: August 2005

Source: Scottish Qualifications Authority

Version: 01

National Unit Specification: general information (cont)

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CREDIT VALUE
1 credit at Intermediate 2 (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
This Unit gives automatic certification of the following:

Core Skill components for the Unit	Critical Thinking	Int 2
	Planning and Organising	Int 2

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 the Scottish Qualifications Authority.

OUTCOME 1

Demonstrate knowledge and understanding of the principles, features and techniques of database systems.

Performance Criteria

a) Basic database terminology is used appropriately.
b) Simple descriptions and explanations are related to practical and familiar contexts.
c) Simple conclusions, predictions and generalisations are made from knowledge and understanding.

Evidence Requirements

Written or oral evidence that the candidate can describe, explain and apply the principles, features and techniques of database systems accurately and concisely.

Evidence should be obtained using questions in a closed book test, under supervision, lasting no more than 45 minutes. The test must sample a content (see Information Systems (Intermediate 2) Course Content) in each of the following areas:

- database fundamentals
- entities and data relationships
- data modelling concepts
- normalisation
- implementation

(The content statements are also reproduced for convenience as a table in the support notes for this Unit)

The standard to be applied is illustrated in the National Assessment Bank items available for this Unit. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

National Unit Specification: statement of standards (cont)

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OUTCOME 2

Demonstrate practical skills using contemporary hardware and software in the context of database systems.

Performance Criteria

a) A range of appropriate hardware is used effectively.
b) Common features of software are selected and used effectively.
c) Practical tasks are planned and organised with detailed guidance.
d) Practical tasks are undertaken in an appropriate range of simple contexts.

Evidence Requirements

Observation checklist showing that the candidate has carried out practical activities in each of the following contexts:

- design of data table from source document
- design of user interface/screen design
- creation of database (including interface) from design
- implementation of queries
- creation of simple forms and reports

Hard copy evidence should be provided of the database implementation.

These practical skills may all be demonstrated in a single extended task, or in a number of smaller tasks.

The practical skills should be demonstrated in the context and at a level defined by the content statements (see Information Systems (Intermediate 2) Course Content).

The candidate will be allowed access to books, notes and online help while completing the tasks.

(The content statements are also reproduced for convenience as a table in the support notes for this Unit).

The standard to be applied is illustrated in the National Assessment Bank items available for this Unit. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

National Unit Specification: support notes

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This part of the Unit Specification is offered as guidance.

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

The content for this Unit is detailed below (and also in the National Course Specifications: Course details).

Content Statements: Database fundamentals
Description of the benefits of an electronic database system in comparison with manual data storage, including: ♦ searching and sorting ♦ data retrieval ♦ data storage and updating ♦ data analysis and reporting

Content Statements: Entities and data relationships
Description and exemplification of simple data entities, in terms of the following attributes: ♦ name ♦ multi-valued or single valued ♦ data type (text, integer, real, object, date, time)

Content Statements: Data Modelling
Design and creation of data tables, including consideration of: ♦ table names ♦ fields (name and type) ♦ keys (primary and foreign) ♦ validation (presence, restricted choice) Description and exemplification of the following field types: text, number, object, link, date, time, Boolean. Identification of the limitations of flat file databases, and the advantages of linked tables (relational databases).

Content Statements: Normalisation
Explanation of normalisation. Identification of entities with a single one-to-many relationship between them in a single source document. Identification and removal of multi-valued fields in records.

National Unit Specification: support notes (cont)

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Content Statements: Implementation
Implementation of database system based on data table. Description and implementation of simple queries including. ♦ sorting (two fields, ascending/descending) ♦ searching (two fields) Description and implementation of data input forms and simple reports.
Implementation of consistent, user-friendly user interface and screen design.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Candidates will require individual access to appropriate computer hardware and software throughout this Unit.

The two Outcomes should be delivered in an integrated way. Appropriate practical activities should be taught and used to illustrate and exemplify the knowledge and understanding required for Outcome 1.

Candidates who have completed the *Computer Applications* Unit at Intermediate 1 level will have some limited experience of database systems but may well need to revise this before progressing to Intermediate 2 content.

The intention of this Unit is to provide candidates with the requisite skills and knowledge to allow them to produce a database system consisting of two tables or files. The candidates will be presented with data in a familiar context which will clearly breakdown into two constituent parts. There will be a single one-to-many relationship between the constituent parts of the database.

Examples of an appropriate context would be recording artists and albums, provided each recording artist and each album is given a predefined unique identifier in the data presented to the candidates. Other appropriate contexts include car manufacturers and car models, ski resorts and pistes/trails, mobile phone manufacturers and mobile phone models and countries and political leaders. Candidates must be provided predefined unique identifiers in the data. Candidates are not expected to introduce surrogate keys or work with compound keys. Candidates are expected to produce a design for the database system based on the data structures produced. This will include details of tables, fields, data type and validation.

Implementation will require candidates to demonstrate practical skill and an awareness of the various views of the data stored in the database system and the construction of these views. The database system produced should include all the features of the implementation content grid. Candidates should be able to construct an appropriate user interface for the database system based on a design which has been created prior to the implementation. Such a design would usually be completed on a screen layout chart or other similar document.

In addition to the production of a working database system, candidates must be able to demonstrate knowledge and understanding of: the need for the database model, data modelling, data structures and aspects of implementation.

National Unit Specification: support notes (cont)

UNIT Database Systems (Intermediate 2)

The amount of time spent on each area of content will vary depending on the teaching methodology used and the ability and prior experience of the candidates. However, the following times are suggested as a rough guide:

Database Fundamentals	4 hours
Entities and data relationships	4 hours
Data Modelling concepts	6 hours
Normalisation	6 hours
Implementation	16 hours

1½ hours should be set aside to:

a) administer the Outcome 1 test
b) gather evidence for Outcome 2

A further 2½ hours is allowed for remediation and re-assessment if required

If the Unit is delivered as part of a Course, the Course documentation will provide further information on teaching and learning in a Course context, including the identification of a number of 'themes' to facilitate holistic learning across the Course.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

National Assessment Bank tests have been created specifically to assess Outcome 1 of the Unit. This assessment consists of a closed book test, and must be conducted under examination conditions. In order to gain success in this Outcome, the candidate must achieve at least the cut-off score for the test. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

Outcome 2 requires the candidate to demonstrate practical skills while using contemporary hardware and software. These practical skills will normally be demonstrated in the context of a number of relatively short tasks. However, they may be demonstrated in the context of a single extended task. Skills will normally be demonstrated by the candidate during the teaching and learning activities of the Unit, rather than as separate formal assessment activities. The candidate will be allowed access to books, notes and online help while completing the tasks.

To gain success in this Outcome, the candidate must demonstrate practical skills at an appropriate level in four of the following contexts, as defined in the content statements (see Information Systems (Intermediate 2) Course Content):

- design of data table from source document
- design of user interface/screen design
- creation of database (including interface) from design
- implementation of queries
- creation of simple forms and reports

Hard copy evidence should be provided of the database implementation.

National Unit Specification: support notes (cont)

UNIT Database Systems (Intermediate 2)

An observation checklist for Outcome 2 is provided in the National Assessment Bank materials.

All evidence must be retained by the centre. The assessment of this Unit is subject to moderation by SQA.

SPECIAL NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, September, 2003).