INFORMATION SYSTEMS
Advanced Higher

Second edition — published March 2006

National Course Specification

Information Systems (ADVANCED HIGHER)

COURSE CODE   C216 13

COURSE STRUCTURE

This Course has two mandatory Units and the choice of one of two optional Units
Mandatory Units:

Unit Code	Unit Title	Credit and Duration
DV4X 13	*Database Analysis and Design (AH)*	*1 credit (40 hours)*
DV4Y 13	*Database Implementation and Testing (AH)*	*1 credit (40 hours)*

Optional Units — one selected from:

Unit Code	Unit Title	Credit and Duration
DV50 13	*On-line Database Systems (AH)*	*1 credit (40 hours)*
DV51 13	*Information Systems Interfaces (AH)*	*1 credit (40 hours)*

All Courses include 40 hours over and above the 120 hours for the Units. This may be used for induction, extending the range of learning and teaching approaches, support, consolidation, integration of learning and preparation for external assessment.

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:

♦ Higher Information Systems
♦ Higher Relational Database Systems Unit

PROGRESSION

This Course or its Units may provide progression in the following way:

♦ to Higher Education programmes in Information Systems and related subjects

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Administrative Information

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National Course Specification (cont)

CREDIT VALUE

The Advanced Higher Course in Information Systems is allocated 32 SCQF credit points at SCQF level 7*.

SCQF 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

Achievement of this Course gives automatic certification of the following:

Complete Core Skill   Problem Solving at SCQF level 6
                                Information Technology SCQF level 6

Core Skills component   None

National Course Specification: Course details

COURSE   Information Systems (Advanced Higher)

RATIONALE

Information and its associated technologies are having an ever increasing role in many aspects of modern life affecting work, home and leisure activities. This is recognised in the inclusion of information technology as a core skill within many contemporary qualifications and a centre piece to numerous activities. Technological developments in hardware and software permit a wide range of data types to be stored and processed in digital form to provide useful information. Such information is used extensively by individuals and organisations when making decisions and is becoming increasingly integrated into everyday practice and thinking across many disciplines.

Developments in communication technologies and the Internet have ensured that information is widely accessible. Such developments are themselves generating demand for further access to information. This inclusiveness has led to the development of an e-culture relying on information systems. In parallel with these developments has come the recognition of the need to adopt a systematic approach to using information and working with information systems. For example, disciplined approaches to the provision of information to meet user requirements have long been recognised and are well established in database design. Methodical approaches should be underpinned by technical considerations in collecting, storing, processing and communicating data in a meaningful form.

Information is a vital resource to the requirements of individuals and organisations and, as such, is worthy of detailed study and lifelong learning. The Information Systems courses offer a progressive study from Intermediate 2, through Higher, to Advanced Higher, building on the generic skills offered within the SQA framework (Intermediate 1 and Standard Grade Computing Studies), and other awarding bodies. The courses examine what is meant by information, how that information is produced, what purpose it serves, and, what value the information has. The courses develop candidates' database and information skills and allow them to focus on specific aspects of Information Systems.

The development of the candidate's knowledge and understanding of contemporary database systems and information skills is of primary importance, so these are the basis of the two mandatory units in all Information Systems courses. The courses also focus on the value and characteristics of information in a variety of contexts, including personal, professional and educational applications. Information Systems is more than using computing tools: it develops candidate fluency and literacy in areas of critical skills, understanding of concepts, problem solving abilities, and the use of vast amounts of information with analytical skill.

The purpose of the Course is to build on the knowledge and understanding and practical skills developed by the candidate in the Higher Information Systems Course, and provide a useful bridge towards further study of Information Systems and related courses in Higher Education. This bridge is achieved by a Course, which consolidates and extends learning, provides opportunity for independent and investigative work, while allowing teamwork, and requires candidates to undertake and report on a significant database-related project.

The importance of both knowledge and understanding, and related practical skills are reflected in the two Outcomes of each Unit. The ability to combine knowledge and understanding and practical skills to solve practical problems is a key theme of the Course.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

AIMS

The aims of the Course are to extend:

♦   knowledge and understanding of Information Systems
♦   skill in the process of systems analysis and design
♦   critical skills, practical problem solving abilities and analytical skills in the use of a range of Information Systems
♦   an awareness of modern trends in Information Systems
♦   an appreciation and awareness of the social, economic, ethical, and legal implications of Information Systems
♦   an appreciation of the value of information as a resource
♦   the use of Information Systems and associated technologies

Related to these aims, and underlying the study of Information Systems are a number of **unifying themes** which are developed and exemplified throughout the Units of the Course. These themes are:

♦   information in decision making
♦   an ethos of practical problem solving
♦   technological developments in information systems
♦   social, economic, ethical and legal implications associated with information systems

The knowledge and skills gained within this Course should enable the candidate to play a full and active role within the e-culture of the information society.

Higher and Advanced Higher

The Advanced Higher Information Systems Course should extend and deepen the knowledge and understanding and practical skills developed by the candidate in the Higher Information Systems Course. Many topics from Higher are re-visited, to provide a foundation for independent and investigative work on a significant database-related project.

As the Advanced Higher Course and component Units are set at SCQF level 7, it is expected that a candidate will require to devote significant amounts of time beyond the 160 hours designated for the Course, in order to carry out independent study and research relating to the Course.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

COURSE CONTENT

The Course is made up of two mandatory Units, *Database Analysis and Design, Database Implementation and Testing,* and a choice of one from two optional Units.

The *Database Analysis and Design* Unit and the *Database Implementation and Testing* Unit develop the candidate's knowledge and skills in developing relational database solutions to complex problems. They build on the learning laid down in the *Relational Database Systems* Unit at Higher level, or other equivalent experience. The candidate will draw on the knowledge and understanding and practical skills developed through previous study, extend these through investigation, and then analyse, design and implement a solution to a significant database related problem. This solution must then be tested and evaluated, and a project report produced.

Information Systems is a wide and rapidly developing field of study, so a choice of two optional Units is offered, each one allowing candidates to extend their learning in a contemporary aspect of applied Information Systems — *On-line Database Systems* and *Information Systems Interfaces.*

To ensure consistency of terminology, the meanings of the technical terms used throughout this documentation (including the Unit Specifications) were taken from the British Computer Society's publication *A Glossary of Computing Terms*, 10th edition, published by Addison-Wesley, 2002. This glossary of terms will be used as a reference for all Unit and Course assessments, and its use is encouraged in all teaching and learning activities.

The Unit Specifications have been fully developed and provide detailed support notes to assist tutors in their understanding of Outcomes and Performance Criteria. The detailed content for each Unit is also provided in the form of a table in the content/context section of each Unit Specification.

Content statements

The following pages of content statements describe in detail the knowledge and understanding which a candidate should be able to demonstrate in the Course assessments, which will sample across these content statements. In order to achieve a Course award, candidates must also demonstrate an appropriate level of problem solving skills (application, analysis, synthesis and evaluation) based on these content statements.

This table defines the terms 'knowledge and understanding' and 'problem solving' as used in these arrangements in terms of the terminology used in Bloom's Taxonomy of Learning:

COURSE   Information Systems (Advanced Higher)

Arrangements	Bloom's Classification	Typical skills/words
Knowledge and Understanding	Knowledge	recall of information (list, state, define, label, describe, name, identify)
	Comprehension	interpreting information in own words, grasping meaning (interpret, explain, discuss, predict, summarise, classify
Problem Solving	Application	application to new situations (apply, demonstrate, show, relate, explain)
	Analysis	identification of patterns, recognising relationships (analyse, arrange, order, explain, connect, infer, compare, categorise)
	Synthesis	generalise, create new ideas, bring together from different sources, draw conclusions, predict (integrate, modify, design, compose, plan, arrange)
	Evaluation	make judgements, assess ideas, compare ideas, evaluate data (judge, evaluate, recommend, justify)

Advanced Higher Information Systems: Database Analysis and Design (mandatory Unit)

The candidate must demonstrate knowledge and understanding, practical skills and problem solving based on the following content statements:

Overview of the Systems Analysis and Design cycle
♦ Description of the stages of the systems analysis and design life cycle as applied to the development of complex information systems: analysis (including investigation), design, implementation (including documentation and evaluation), testing, maintenance.
♦ Explanation of the iterative nature of the cycle.

The techniques involved in systems analysis
♦ Explanation of a feasibility study: economic, legal, technical, time.
♦ Description and exemplification of project planning: importance of plan, elements in plan (including time, resources, and costs), application and monitoring of plan.
♦ Identification and explanation of investigative techniques: observation, document sampling, questionnaires, interviewing.
♦ Description of results from investigation, including: background information, departmental objectives, description of components in existing system, organisation procedures.
♦ Description and exemplification of systems specification based on results of investigation and modelling: functional requirements, restrictions on development.

Modelling Techniques
♦ Description and exemplification of normalisation.
♦ Creation of un-normalised form (UNF) from complex source document(s).
♦ First normal form: identifying repeating groups, dealing with repeating groups, problems with first normal form (1NF).
♦ Second normal form: functional dependency, problems with second normal form (2NF).
♦ Third normal form: transitive dependency.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

♦ Description and exemplification of entity-relationship modelling.
♦ Translation of third normal form (3NF) into E/R diagrams: entities (weak entity, strong entity), relationships (mandatory, optional, strong/weak).
♦ Description and exemplification use of a Data Dictionary.
♦ Description and exemplification of entity/event modelling.
♦ Entity/Event Matrix: add, modify, delete, read.
♦ Entity Life Histories: sequence, iteration, selection.
♦ Description and exemplification of dataflow modelling using level 0 and level 1 data flow diagrams: system boundary, environment, data flow, physical flow, data store, external entity, process.

Database Design
♦ Description of system refinement using modelling techniques.
♦ Description of logical and physical design.
♦ Description of processes using structured English and one graphical design notation.
♦ Description and exemplification of screen layout and user interfaces using graphical techniques or rapid application development (RAD) tools.

Advanced Higher Information Systems: Database Implementation and Testing (mandatory Unit)

The candidate must demonstrate knowledge and understanding, practical skills and problem solving based on the following content statements:

Overview of database system implementation
♦ Description of stages of implementation: creation of test plan, database development, testing, documentation, system conversion techniques, post implementation review (evaluation), maintenance.
♦ Explanation of the iterative nature of the process.

Testing
♦ Description of types of testing: component testing, integrative testing, systems testing, acceptance testing.
♦ Description and exemplification of creation of test plan: elements to be tested, sequence of testing, types of testing, creation of test data values (normal, extreme and exceptional).
♦ Exemplification of systematic testing including: summary of results, rectifying errors and bugs.

Database Development
♦ Exemplification of: tables, relationships, queries, forms, reports, user interface, scripting.
♦ Description and use of different conversion techniques: piloting, parallel, phased, direct.

Documentation, Evaluation and Maintenance
♦ Description and exemplification of documentation: User Guide, system design documentation (including models and design of system).
♦ Description of contents and purpose of evaluation: comparison to specification, ease of use, maintainability.
♦ Description of types of maintenance: corrective, adaptive, perfective.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Advanced Higher Information Systems: On-line Database Systems (optional Unit)

The candidate must demonstrate knowledge and understanding, practical skills and problem solving based on the following content statements:

Internet Developments
♦   Description of applications of on-line database systems including: Content Management Systems, Customer Relationship Management, E-commerce Platforms.
♦   Comparison of Open Source and Commercial On-line Database Software and related issues: cost effectiveness, security, flexibility and adaptability, ongoing support and development by a community of users.
♦   Description of applications and features of Electronic Data Interchange (EDI): transaction standardisation, translation software, communications, legal restrictions.

Database Connectivity
♦   Description and exemplification of the requirements for connection to database server username/password, server address, database name.
♦   Description of use of a server-based database management tool/application:
—   to connect a database client to a database server
—   to create/modify/delete table structures

Structured Query Language
♦   Exemplification and application of the uses of SQL to create simple and complex queries:
—   Data Manipulation Language (DML) — Insert, Update, Delete
—   Data Query Language (DQL)
—   Keywords or clauses of the select statement — Select, From, Where, Order By
—   Logical Operators — Is Null, Between, In, Like, Exists, Unique, All and Any
—   Negating Conditions with the Not Operator — Not Equal, Not Between, Not In, Not Like, Is Not Null, Not Exists, Not Unique
—   Aggregate Functions — Count, Sum, Max, Min, Avg
—   Sorting and Grouping Data — Group By, Order By
—   Equi-joins/inner joins

Application Development
♦   Description and exemplification of server-side scripting language for server connection, database selection, execution of SQL queries and extraction of results.
♦   Description and exemplification of forms processing to insert and amend data.
♦   Description of structure of HTML forms including:
—   the <form> element and its action and method attributes
—   the <input> element and its type, name and value attributes
—   the <button> element and its type, name and value attributes

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National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Advanced Higher Information Systems: Information Systems Interfaces (optional Unit)

The candidate must demonstrate knowledge and understanding, practical skills and problem solving based on the following content statements:

Interface modes
♦ Description of the factors which have contributed to the development of human computer interfaces, including technological (hardware, software), economic, social.
♦ Description of a range of interfaces, including desktop operating systems, web sites, mobile phones, palmtops or personal digital assistants (PDAs), public information kiosks, cash machines, in terms of mode, methods of input/output, typical users, physical constraints
♦ Identification, description and exemplification of interface modes:
— graphical (graphical user interface, direct manipulation)
— textual (command line, question and answer, form filling, natural language)
— sensory, including auditory (speech, sound), touch
— multimodal interfaces
♦ Description of the operation of a user interface in terms of syntax and semantics.

Intelligent interfaces
Description of the trend towards increasing use of intelligent techniques in information systems interfaces
♦ Description of the characteristics and benefits of intelligent interfaces.
♦ Description and exemplification of applications of intelligent interfaces, including:
— predictive and adaptive user interfaces (mobile phone predictive text, grammar and spelling checkers, adaptive menus in applications and operating systems, agent-based interfaces)
— natural language interaction: machine translation, natural language querying, command and control systems, speech driven software

Interface modelling and design
♦ Identification and description of the stages of the LUCID (Logical User Centred Interaction Design) methodology: envision, discovery, design foundation, design detail, build, release and their relationship to the stages of the stages of the systems analysis and design life cycle.
♦ Description of the characteristics and needs of different classes of user: novice, knowledgeable intermittent, expert/frequent users.
♦ Description and exemplification of the characteristics and relative merits of storyboards, state transition diagrams and prototypes as methods of interface design.
— storyboards: representation of layout, textual and graphical elements, audio, video and animated content; representation of sequence of screens; use as a cheap, quick, easily amended means of providing a mocked-up interface at an early stage
— state transition diagrams: representation of layout, navigational elements, links to other content and transition between screens
— prototyping: low fidelity (paper prototyping), high fidelity (rapid application development/RAD), horizontal, vertical

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Usability testing and evaluation
♦   Description of the characteristics and uses of qualitative techniques for usability testing: thinking aloud protocol, co-discovery method, question-asking protocol, eye tracking.
♦   Description of the characteristics and uses of quantitative measurement techniques for usability testing: time to learn, speed of task performance, user error rates, user retention of commands over time, subjective user satisfaction.
♦   Description and exemplification of the characteristics and uses of a range of quality inspection methods, including: heuristic evaluation, walkthroughs, feature set, consistency inspection, adherence to standards (including standard operating system design guidelines, web accessibility guidelines).
♦   Description of the characteristics and uses of a range of inquiry methods, including surveys, questionnaires, user performance data logging, self reporting logs.

ASSESSMENT

To achieve the Course award the candidate must pass the Units as well as the Course assessment. The candidate's grade is based on the Course assessment.

UNIT ASSESSMENT

Each Unit is assessed using two instruments of assessment. Outcome 1 (knowledge and understanding) is assessed using a short test which samples across the content statements for the Unit. Outcome 2 (practical skills) is assessed using a skills checklist; candidates are expected to demonstrate the required skills during the normal teaching and learning activities of the Unit. Further details are provided in the Unit descriptors and National Assessment Bank items provided.

COURSE ASSESSMENT

The Course assessment for Information Systems at Advanced Higher level will consist of two components:

	Time Allocation	Mark Allocation
Coursework Project	Completed during Course	80
Question Paper	2 Hours 30 Minutes	120

The Coursework Project provides candidates with the opportunity to demonstrate and integrate the practical skills, knowledge and understanding from the Units, and apply these in a more complex practical context.

The purpose of the question paper is to assess the candidate's competence to integrate and retain knowledge and understanding and demonstrate higher order cognitive abilities across the contents of all the Units, and in varied contexts, and to demonstrate the ability to communicate course-related concepts clearly.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

RELATIONSHIP BETWEEN UNIT AND COURSE ASSESSMENT AND ADDED VALUE

Unit assessment is designed to assess a candidate's basic knowledge and understanding and practical skills on a pass/fail basis. It is not designed to assess higher order skills, or to have any predictive value.

Course assessment should provide opportunities to demonstrate the following higher order skills:

♦   retention of knowledge, understanding and skills over a longer period of time
♦   integration of knowledge, understanding and skills acquired in the Units
♦   application of knowledge, understanding and skills in more complex contexts
♦   application of knowledge, understanding and skills in less familiar contexts

Unlike Unit assessment, Course assessment is graded, and is designed to differentiate between candidates.

DETAILS OF THE INSTRUMENTS FOR COURSE ASSESSMENT (1): **Coursework project**

The candidate should select a project:

♦   at an appropriate level for the Advanced Higher Course
♦   which builds on learning from the mandatory Units
♦   which is achievable within 40 hours

Advice on appropriate projects is included in the Coursework Project pack.

The project will be undertaken under 'open book' conditions. Collaborative projects are acceptable, but the assessor must ensure that each candidate's individual contribution to the project meets the criteria for a suitable project, and can be clearly identified and assessed.

The Coursework Project is based on the mandatory Units. During the development of the Project, the candidate will produce a record of work, which may be used as evidence of the practical skills required for Outcome 2 of the mandatory Units. This could consist of a 'log book', notes, references to sources, annotated hard copy of implementation at various stages, hard copy of screen shots, and notes on testing. It is expected that the production of this evidence will be achieved during the 80 hours of the *Database Analysis and Design* and *Database Implementation and Testing* Units.

In addition to this Unit assessment evidence, for **Course assessment**, the candidate should provide:

♦   the problem specification
♦   evidence of project planning
♦   system design documentation
♦   evidence of a completed solution (preferably files on a CD plus hard copy of data files, scripts, screen shots)
♦   user documentation
♦   an evaluation report

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

The Coursework Project will be marked internally, based on this evidence and observation of the candidate at work, using the marking scheme provided by SQA, but will be subject to moderation. The marking scheme will provide a mark out of 80, which will be submitted directly to SQA.

The marks available for each aspect will be:

♦   specification and plan   10
♦   system design documentation   15
♦   implemented product   15
♦   process skills   10
♦   user documentation   10
♦   evaluation report   20

It is expected that the production of the user documentation, and evaluation report, should be achieved using up to 10 hours of the 'additional' time provided during the Course.

DETAILS OF THE INSTRUMENTS FOR COURSE ASSESSMENT (2): **Question paper**

The question paper will comprise a single paper of 2 hours and 30 minutes duration. The total marks available will be 120. The examination will be set and marked by SQA. The paper will be composed of two sections:

Section 1 (60 marks)

This will consist of questions requiring extended responses requiring structuring and reasoning. These questions will test both knowledge and understanding and problem solving. Approximately 1/3 of the marks will be for knowledge and understanding and 2/3 for problem solving. The questions will be set in a range of familiar and less familiar contexts. The questions will sample across the content statements associated with the mandatory Units, and will require integration of knowledge across the two Units. Candidates will be expected to tackle all questions.

Section 2 (60 marks)

This will have two sub-sections, one for each of the optional Units. Candidates will be expected to tackle all the questions within any one sub-section. The questions will require extended responses. Approximately 1/3 of the marks will be for knowledge and understanding and 2/3 for problem solving as in section 1, and the questions, which will sample across the content statements for the optional Unit, will also require some integration of knowledge from the mandatory Units.

NOTES ON ASSESSMENT

Further details about assessment for this Course can be found in NAB materials, the Course Assessment Specification and the Specimen Question Paper.

Note: refer to the table preceding the content statements earlier in these arrangements for guidance on the meaning of the terms 'knowledge and understanding 'and 'problem solving" in this context.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

GRADE DESCRIPTIONS AT A AND C

The candidate's grade will be based on the total score obtained from the Course assessment. This total mark is obtained by adding the Question Paper mark (out of 120) to the Coursework Project mark (out of 80). The descriptions below indicate the nature of achievement for the award at grade C and A in the Course.

GRADE C	GRADE A
♦ **retention of knowledge, understanding and skills over a longer period of time**	
Candidates are able to describe and explain **some** of the facts and concepts to the standard defined by the Performance Criteria.	Candidates are able to describe and explain **most** of the facts and concepts to the standard defined by the Performance Criteria.
Candidates are able to demonstrate **some** practical skills to the standards defined by the Performance Criteria.	Candidates are able to demonstrate practical skills, which **exceed** the standards defined by the Performance Criteria.
• **integration of knowledge, understanding and skills acquired in Units**	
Candidates are able to demonstrate their knowledge and understanding in the context of specific Units.	Candidates are able to demonstrate the **integration** of knowledge and understanding from more than one Unit.
Candidates are able to demonstrate their practical skills in the context of specific Units.	Candidates are able to demonstrate the **integration** of practical skills from more than one Unit.
• **application of knowledge, understanding and skills in more complex contexts**	
Candidates are able to apply knowledge and understanding to solve problems in straightforward contexts relating to a single Unit.	Candidates are able to apply knowledge and understanding to solve problems in **more complex contexts relating to more than one Unit.**
Candidates are able to apply practical skills to solve problems in straightforward contexts relating to a single Unit.	Candidates are able to apply practical skills to solve problems in **more complex contexts relating to more than one Unit.**
♦ **application of knowledge, understanding and skills in less familiar contexts**	
Candidates are able to apply knowledge, understanding and skills to solve problems in familiar contexts.	Candidates are able to apply and **transfer** knowledge, understanding and skills to solve problems in **less familiar contexts**.
Candidates are able to carry out defined tasks to the standards defined in the Performance Criteria.	Candidates are able to **resolve non-routine problems** that arise during practical activity, **by independent research.**

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

ESTIMATES AND APPEALS

Estimates

In preparing estimates, evidence of performance should be considered from across the breadth of coverage of the Course and must take account of performance in the whole Course. Evidence used to compile estimates and support appeals must be valid and reliable, must take account of performance in both of the Course components, the Coursework Project and the Question Paper and must relate to the Course Grade Descriptions. The assessment instruments which are used to generate evidence for Estimates must, therefore, allow candidates opportunities to demonstrate attainment against the Course Grade Descriptions.

Further advice on the preparation of estimates is given in the Course Assessment Specification and in the SQA guidance on submitting estimates and appeals.

Appeals

Evidence assembled in support of an Assessment Appeal should cover the content of the Course. Ideally, this will comprise evidence generated by a properly constructed, integrated prelim which reflects the Course assessment in range, balance and depth.

Although a prelim is not mandatory it is desirable. This is because it provides evidence of how well a candidate can perform in conditions which replicate the Course Assessment. The prelim can test retention of knowledge and understanding across all areas of the Course content; can provide opportunities for integration; can allow candidates to demonstrate problem solving and the application of their knowledge in less familiar and more complex contexts. It can also result in evidence which is produced within the same time constraint as that specified by the Course Assessment.   Any prelim should replicate the style, level of demand and mark allocation of the Specimen SQA examination.

When developing prelim papers, centres should bear in mind that past papers, including SQA past papers, will not be accepted in their entirety. If past papers are being used, questions must be selected carefully from a minimum of three past papers, preferably adapted (to ensure the breadth and depth of coverage required to satisfy the Course Grade Descriptions) and combined to form a valid assessment instrument for a prelim.   Centres must also be certain that the question paper used for a prelim is not in the public domain and has not been previously seen by candidates. It is the responsibility of centres to ensure the validity, reliability and security of assessment instruments used for Estimates and Appeals.

Centres that submit an integrated test or prelim that only covers the mandatory Units should also submit an additional test covering the chosen optional Unit. Furthermore, this test must integrate some knowledge and understanding from the mandatory Units. As the Coursework Project is expected to represent a candidate's best practical work, there is no need to submit additional evidence of problem solving in practical contexts.

Unit Assessments are designed to allow candidates to demonstrate the knowledge and understanding and practical skills required to pass the Units. They cannot provide evidence of how a candidate can perform against the Course Grade Descriptions. Unit Assessments **do not** provide opportunities for the candidate to demonstrate problem solving skills, integration across Units, retention of knowledge, and application of knowledge in more complex and less familiar contexts, and therefore **do not** provide sufficient evidence for appeals.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

QUALITY ASSURANCE

All National Courses are subject to external marking and/or moderation. External markers, visiting examiners and moderators are trained by SQA to apply national standards. SQA is currently seeking to assist centres by preparing exemplification of standards materials in a number of subject areas. This will be rolled out to all subjects in due course.

The Units of all Courses are subject to internal moderation and may also be chosen for external moderation. This is to ensure that national standards are being applied across all subjects.

Courses may be assessed by a variety of methods. Where marking is undertaken by a trained marker in their own time, markers meetings are held to ensure that a consistent standard is applied. The work of all markers is subject to scrutiny by the Principal Assessor and a PA report is published for all subjects.

APPROACHES TO LEARNING AND TEACHING

The main aims of the Course are **to extend**:

♦   knowledge and understanding of Information Systems
♦   skill in the process of systems analysis and design
♦   critical skills, practical problem solving abilities and analytical skills in the use of a range of Information Systems
♦   an awareness of modern trends in Information Systems
♦   an appreciation and awareness of the social, economic, ethical, and legal implications of Information Systems
♦   an appreciation of the value of information as a resource
♦   the use of Information Systems and associated technologies

There is no prescriptive 'best way' to approach the teaching and learning of this Course. However a holistic approach is recommended which relates each of these aims to the facts and concepts being studied. Within each Unit, there is a combination of knowledge and understanding with practical problem solving skills. Teachers and lecturers are encouraged to provide learning experiences which blend together the acquisition of knowledge and understanding, the development of practical skills and opportunities to apply these to solve problems. Candidates will benefit from a combination of independent study, individual research, investigative work, co-operative teamwork, teacher-led tutorials and direct teaching. Teachers and lecturers are encouraged to make use of the wide range of teaching and learning materials (both paper-based and electronic) which have been developed to support this Course.

Throughout the Course, reference should be made to professional, social, ethical and legal implications where appropriate, and to 'real world' applications. Candidates should be encouraged to develop the use of appropriate terminology to communicate their understanding.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Related to the Course aims, a number of unifying themes have been identified which should be used to bring a coherence to the Course. Most of these themes can be illustrated and exemplified in each of the Units of the Course. These themes include:

♦   information in decision making
♦   an ethos of practical problem solving
♦   technological developments in information systems
♦   social, economic, ethical and legal implications associated with information systems

Candidates will require individual access to appropriate computer hardware and software throughout the Course. More detailed guidance is given within the support notes for each Unit.

The Units of the Course may be studied sequentially or in parallel (or a combination of these). The candidate's project is likely to be based on learning from both the Database Analysis and Design and Database Implementation and Testing Units, and so these would normally precede the project. However, as the project is an extended piece of work, it is advisable to encourage the candidate to begin this as early as possible. Note that some learning from the chosen optional Unit may also contribute towards some Coursework project ideas, so flexibility in timing and order of study may be required.

APPROACHES TO LEARNING AND TEACHING

A typical Course plan might therefore take the form:

August–October	Database Analysis and Design initial work on coursework project
October–December	Database Implementation and Testing further work on coursework project
January	preparation for prelim examination(s)
February–March	optional Unit
March	writing up project report
April	flexible time

Preliminary examinations, if used, should be timed to allow maximum coverage of the three Course Units. This can be achieved by holding the prelim as late as possible (end of March), or by having an early prelim covering two Units, with a supplementary prelim later covering the third Unit, and integration with the mandatory Units.

The teaching and learning and internal assessment of the three Units of the Course is designed to be completed within 120 hours. This includes practical activities in preparation for the practical coursework task. As centres are advised to allow 160 hours for the delivery of a National Course, this leaves up to 40 hours of flexible time.

As the Advanced Higher Course and component Units are set at SCQF level 7, it is expected that a candidate will require to devote significant amounts of time beyond the 160 hours designated for the Course, in order to carry out independent study and research relating to the Course.

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Use of the additional 40 hours

Appropriate activities for this time include:

♦ an introduction to the Course
♦ revision of required prior learning
♦ consolidation and integration of learning
♦ remediation and re-assessment
♦ formative assessment (class tests)
♦ preliminary examination(s)
♦ preparation for Course assessment
♦ completion of the project report
♦ extending the range of study

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 Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs.*

INFORMATION SYSTEMS IN A BROADER CONTEXT

A number of national initiatives and programmes have been designed to promote themes that are important to contemporary society. Consideration should be given to any sections of the Course or Units which could contribute to these current national initiatives, including education for enterprise, citizenship, financial and health education, and personal and social development. This might be achieved through suitable choice of contexts for problem solving activities within the Course. The Course should also contribute to the development of communication and problem solving skills.

Some suggestions are given below of opportunities within the Advanced Higher Information Systems Course for teachers and lecturers to help candidates make links to some of these cross-curricular themes:

National Course Specification: Course details (cont)

COURSE   Information Systems (Advanced Higher)

Cross-curricular theme	Course content
Enterprise in Education	Understanding the nature of the systems analysis and design life cycle, and its application to commercial organisations. Relating the knowledge of on-line database systems to their use in commercial enterprises. Understanding the growing application of e-commerce.
Education for Citizenship	Developing an awareness of security and privacy issues arising from the increasing use of information systems.
Financial Education	Understanding the relevance of project planning and its financial implications.
Health Education	Understanding the relevance of human computer interface design to a wide range of users, including those with disabilities.

National Unit Specification: general information

UNIT   Database Analysis and Design (Advanced Higher)

NUMBER   DV4X 13

COURSE   Information Systems (Advanced Higher)

SUMMARY

This Unit is designed to develop knowledge and understanding of systems analysis and design, including the systems analysis and design cycle, systems analysis techniques, modelling techniques and database design, and to develop practical skills in applying analysis and design techniques to database related problems.

On completion of the Unit, the candidate should be able to apply this knowledge and understanding, and these skills to solve practical problems.

It is designed for candidates undertaking the Advanced Higher Information Systems Course, but it is also suitable for anyone wishing to extend and deepen their experience of systems analysis and design beyond Higher level.

OUTCOMES

1   Demonstrate knowledge and understanding of the principles of systems analysis and design.
2   Demonstrate practical skills in the application of systems analysis and design techniques to complex database related problems.

National Unit Specification: general information (cont)

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:

♦   Higher Relational Database Systems Unit
♦   Higher Information Systems

CREDIT VALUE

1 credit at Advanced Higher (8 SCQF credit points at SCQF level 7*).

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

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

National Unit Specification: statement of standards

UNIT   Database Analysis and Design (Advanced Higher)

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 of systems analysis and design

Performance criteria

(a)   A range of advanced systems analysis and design terminology is used appropriately.
(b)   Technically accurate descriptions and explanations are related to a range of familiar and unfamiliar contexts.
(c)   Conclusions, predictions and generalisations are made from knowledge and understanding.

Evidence Requirements

Written or oral evidence that the candidate can describe and explain the principles of systems analysis and design 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 across the range of the Unit content (see Information Systems (Advanced Higher) Course content) in each of the following areas:

♦   overview of the systems analysis and design cycle
♦   techniques involved in systems analysis
♦   modelling techniques
♦   database design

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

The standard to be applied and the breadth of coverage 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.

OUTCOME 2

Demonstrate practical skills in the application of systems analysis and design techniques to complex database related problems.

Performance criteria

(a)   Appropriate hardware is used effectively and efficiently.
(b)   A wide range of appropriate features of software is used effectively and efficiently.
(c)   Practical tasks are planned and organised independently.
(d)   Practical tasks are undertaken in an appropriate range of familiar and unfamiliar contexts.

National Unit Specification: statement of standards (cont)

UNIT Database Analysis and Design (Advanced Higher)

Evidence Requirements

An observation checklist is completed showing that the candidate has carried out practical activities, demonstrating all of the following practical skills, as defined in the content statements for this Unit (see Information Systems (Advanced Higher) Course content):

♦ creation of system specification
♦ normalisation (to 3NF)
♦ entity-relationship modelling
♦ creation of Data Dictionary
♦ entity-event modelling
♦ dataflow modelling
♦ database design using structured English
♦ database design using a graphical design notation
♦ user interface design

Hard copy evidence should be provided of **one** modelling technique and **one** design activity.

These practical skills may all be demonstrated in a single extended task, or in a number of smaller tasks, or during the process of completing the Coursework Project.

The candidate will be allowed access to books, notes and on-line help while completing the task(s).

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

The standard to be applied and the breadth of coverage are 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

UNIT   Database Analysis and Design (Advanced Higher)

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 in the left-hand column describe the content covered in the Relational Database Systems Unit at Higher level, and are included here to clarify the context for the new learning for this Unit. They indicate the prior learning required by the candidate before undertaking the new and assessable learning for this Unit. Content in the right-hand column is the new and assessable content of this Unit.

Content Statements: Overview of the Systems Analysis and Design cycle	
Higher	**Advanced Higher**
	Description of the stages of the systems analysis and design life cycle as applied to the development of complex information systems ♦ analysis (including investigation) ♦ design ♦ implementation (including documentation and evaluation) ♦ testing ♦ maintenance Explanation of iterative nature of the cycle.

Content Statements: The techniques involved in systems analysis	
Higher	**Advanced Higher**
	Explanation of a feasibility study ♦ economic ♦ legal ♦ technical ♦ time
	Description and exemplification of project planning: ♦ importance of plan ♦ elements in plan including time, resources, and costs Application and monitoring of plan.

National Unit Specification: support notes (cont)

UNIT   Database Analysis and Design (Advanced Higher)

Content Statements: The techniques involved in systems analysis	
	Identification and explanation of investigative techniques ♦ observation ♦ document sampling ♦ questionnaires ♦ interviewing
	Description of results from investigation, including: ♦ background information ♦ departmental objectives ♦ description of components in existing system ♦ organisation procedures
	Description and exemplification of systems specification based on results of investigation and modelling ♦ functional requirements ♦ restrictions on development

Content Statements: Modelling techniques	
Higher	**Advanced Higher**
Definitions of normal forms: UNF, first normal form (1NF), second normal form (2NF), third normal form (3NF) *Creation of UNF from source documents.* *Normalisation to 1NF, by identifying and eliminating repeating groups.* *Description of problems of 1NF.* *Normalisation to 2NF by identifying partial key dependency* *Description of problems of 2NF.* *Normalisation to 3NF by identifying non-key dependency.*	Description and exemplification of normalisation. Creation of un-normalised form (UNF) from complex source document(s). First normal form ♦ identifying repeating groups ♦ dealing with repeating groups ♦ problems with first normal form (1NF) Second normal form ♦ functional dependency ♦ problems with second normal form (2NF) Third normal form ♦ transitive dependency

National Unit Specification: support notes (cont)

UNIT   Database Analysis and Design (Advanced Higher)

Content Statements: Modelling techniques	
Implementation of database system based on a data model, including entity/relationship diagram and data dictionary. *Description of need for, and exemplification of data dictionaries including name, type, size, validation, index/key.*	Description and exemplification of entity-relationship modelling. Translation of third normal form (3NF) into E/R diagrams ♦ entities (weak entity, strong entity) ♦ relationships (mandatory, optional, strong/weak)
	Description and exemplification of a Data Dictionary.
	Description and exemplification of entity / event modelling Entity/Event Matrix ♦ add ♦ modify ♦ delete ♦ read Entity Life Histories ♦ sequence ♦ iteration ♦ selection
	Description and exemplification of dataflow modelling using level 0 and level 1 data flow diagrams ♦ system boundary ♦ environment ♦ data flow ♦ physical flow ♦ data store ♦ external entity ♦ process

Content Statements: Database Design	
Higher	**Advanced Higher**
	Description of system refinement using modelling techniques. Description of logical and physical design. Description of processes using structured English and one graphical design notation. Description and exemplification of screen layout and user interfaces using graphical techniques or rapid application development (RAD) tools.

National Unit Specification: support notes (cont)

UNIT Database Analysis and Design (Advanced Higher)

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 rather than sequentially. For Outcome 2, the practical activities should be taught and used to illustrate and exemplify the knowledge and understanding required for Outcome 1. These practical activities can be used to generate evidence for Outcome 2.

The main purpose of the Unit is to develop knowledge and understanding of systems analysis and design and to develop practical skills in applying analysis and design techniques to database related problems. For those candidates undertaking the Information Systems Course, this Unit will provide a suitable basis for undertaking the analysis and design stages of the Coursework Project.

The amount of time spent on each content area 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:

Overview of the systems analysis and design cycle	2 hours
Techniques used in systems analysis	4 hours
Modelling techniques	10 hours
Database design	10 hours
Application of systems analysis and design techniques	10 hours

Where this Unit is taught as part of the AH Information Systems Course, the time allocated for application of systems analysis and design techniques can be used for analysis and design activities which will contribute towards the Coursework Project.

1½ hours should be set aside to:

♦ administer the Outcome 1 test
♦ gather evidence for Outcome 2

A further 2 ½ 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 supervision. In order to complete 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.

National Unit Specification: support notes (cont)

UNIT   Database Analysis and Design (Advanced Higher)

Outcome 2 requires the candidate to demonstrate practical skills in database analysis and design. These skills will normally be demonstrated by the candidate during the analysis and design of a problem to be used as the basis of the coursework project. The candidate will be allowed access to books, notes and on-line help while completing the task(s).

The assessment of Outcome 2 is based on a record of work produced by the candidate, which may include hand-written notes and diagrams, or screen shots demonstrating user interface design. A formal report is not required for Unit assessment.

To complete this Outcome, the candidate must demonstrate practical skills in the following contexts and at an appropriate level as defined by the content statements (see Information Systems (Advanced Higher) Course content):

♦   creation of system specification
♦   normalisation (to 3NF)
♦   entity-relationship modelling
♦   creation of Data Dictionary
♦   entity-event modelling
♦   dataflow modelling
♦   database design using structured English
♦   database design using a graphical design notation
♦   user interface design

A pro-forma observation checklist for Outcome 2 is provided in the National Assessment Bank materials.

Hard copy evidence should be provided of one modelling technique and one design activity; this need not be formal documentation - it could include hand-written notes and diagrams, or screen shots demonstrating user interface design.

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

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 document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).

National Unit Specification: general information

UNIT   Database Implementation and Testing (Advanced Higher)

NUMBER   DV4Y 13

COURSE   Information Systems (Advanced Higher)

SUMMARY

This Unit is designed to develop knowledge and understanding and practical skills in the implementation, testing, evaluation, documentation and maintenance of database systems.

On completion of the Unit, the candidate should be able to apply this knowledge and understanding, and these skills to solve practical problems.

It is designed for candidates undertaking the Advanced Higher Information Systems Course, but it is also suitable for anyone wishing to extend and deepen their experience of relational database systems beyond Higher level.

OUTCOMES

1   Demonstrate knowledge and understanding of the principles of database implementation, testing, documentation, evaluation and maintenance.
2   Demonstrate practical skills in the application of the principles of database implementation, testing, documentation, evaluation to a complex database related problem.

National Unit Specification: general information (cont)

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:

♦ Higher Relational Database Systems Unit
♦ Higher Information Systems

CREDIT VALUE

1 credit at Advanced Higher (8 SCQF credit points at SCQF level 7*)

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

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

National Unit Specification: statement of standards

UNIT   Database Implementation and Testing (Advanced Higher)

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 of database implementation, testing, documentation, evaluation and maintenance.

Performance criteria

(a)   A range of advanced database terminology is used appropriately.
(b)   Technically accurate descriptions and explanations are related to a range of familiar and unfamiliar contexts.
(c)   Conclusions, predictions and generalisations are made from knowledge and understanding.

Evidence Requirements

Written or oral evidence that the candidate can describe and explain the principles of database implementation, testing, documentation, evaluation and maintenance 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 across the range of the Unit content (see Information Systems (Advanced Higher) Course content) in each of the following areas:

♦   overview of database systems implementation
♦   testing
♦   database development
♦   documentation, evaluation and maintenance

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

The standard to be applied and the breadth of coverage 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.

OUTCOME 2

Demonstrate practical skills in the application of the principles of database implementation, testing, documentation, evaluation to a complex database related problem.

National Unit Specification: statement of standards (cont)

UNIT Database Implementation and Testing (Advanced Higher)

Performance criteria

(a)   Appropriate hardware is used effectively and efficiently.
(b)   A wide range of appropriate features of software is used effectively and efficiently.
(c)   Practical tasks are planned and organised independently.
(d)   Practical tasks are undertaken in an appropriate range of familiar and unfamiliar contexts.

Evidence Requirements

An observation checklist showing that the candidate has carried out practical activities, demonstrating all of the following practical skills, as defined in the content statements for this Unit (see Information Systems (Advanced Higher) Course content):

♦   creation of test data
♦   implementation of complex database
♦   systematic testing
♦   creation of documentation

Hard copy evidence should be provided of the implemented database.

These practical skills may all be demonstrated in a single extended development task, or in a number of smaller tasks, or during the process of completing the Coursework Project.

The candidate will be allowed access to books, notes and on-line help while completing the task(s).

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

The standard to be applied and the breadth of coverage 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

UNIT   Database Implementation and Testing (Advanced Higher)

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 in the left-hand column describe the content covered in the Relational Database Systems Unit at Higher level, and are included here to clarify the context for the new learning for this Unit. They indicate the prior learning required by the candidate before undertaking the new and assessable learning for this Unit. Content in the right-hand column is the new and assessable content of this Unit.

Content Statements: Overview of database system implementation	
Higher	**Advanced Higher**
	Description of stages of implementation ♦ creation of test plan ♦ database development ♦ testing ♦ documentation ♦ system conversion techniques ♦ post implementation review (evaluation) ♦ maintenance Explanation of the iterative nature of the process.

Content Statements: Testing	
Higher	**Advanced Higher**
	Description of types of testing ♦ component testing ♦ integrative testing ♦ systems testing ♦ acceptance testing
	Description and exemplification of creation of test plan ♦ elements to be tested ♦ sequence of testing ♦ types of testing ♦ creation of test data values (normal, extreme and exceptional)

National Unit Specification: support notes (cont)

UNIT   Database Implementation and Testing (Advanced Higher)

Content Statements: Testing	
	Exemplification of systematic testing including ♦ summary of results ♦ rectifying errors and bugs

Content Statements: Database Development	
Higher	**Advanced Higher**
Implementation of database system based on a data model, including entity/relationship diagram and data dictionary *Description and implementation of complex queries including: sorting (multiple fields, ascending/descending), searching (multiple fields, across linked / related tables)* *Use of related tables as sources for data entry (including lookups).*	Exemplification of: ♦ tables ♦ relationships ♦ queries ♦ forms ♦ reports ♦ user interface ♦ scripting
	Description and use of different conversion techniques: ♦ piloting ♦ parallel ♦ phased ♦ direct

Content Statements: Documentation, Evaluation and Maintenance	
Higher	**Advanced Higher**
	Description and exemplification of documentation ♦ user guide ♦ system design documentation, including models and design of system
	Description of contents and purpose of evaluation ♦ comparison to specification ♦ ease of use ♦ maintainability
	Description of types of maintenance ♦ corrective ♦ adaptive ♦ perfective

National Unit Specification: support notes (cont)

UNIT   Database Implementation and Testing (Advanced Higher)

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 rather than sequentially. For Outcome 2, the practical activities should be taught and used to illustrate and exemplify the knowledge and understanding required for Outcome 1. These practical activities can be used to generate evidence for Outcome 2.

The main purpose of the unit is to develop knowledge and understanding and practical skills in the implementation, testing, evaluation, documentation and maintenance of database systems. For those candidates undertaking the Information Systems Course, this unit will provide a suitable basis for undertaking the implementation, testing, documentation and evaluation stages of the Coursework Project.

The amount of time spent on each content area 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:

Overview of database system implementation	2 hours
Testing	4 hours
Database development	4 hours
Database implementation	22 hours
Documentation, evaluation and maintenance	4 hours

Where this Unit is taught as part of the AH Information Systems Course, the time allocated for database implementation can be used for activities which will contribute towards the Coursework Project.

1½ hours should be set aside to:

♦   administer the Outcome 1 test
♦   gather evidence for Outcome 2

A further 2 ½ 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.

National Unit Specification: support notes (cont)

UNIT   Database Implementation and Testing (Advanced Higher)

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 supervision. 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 in database implementation, testing, documentation, and evaluation. These skills will normally be demonstrated by the candidate during the implementation and testing of a database to be used as the basis of the coursework project report. The candidate will be allowed access to books, notes and on-line help while completing the task(s).

The assessment of Outcome 2 is based on a record of work produced by the candidate, which may include hand-written notes, diagrams and screen shots. A formal report is not required for Unit assessment.

To complete this Outcome, the candidate must demonstrate practical skills in the following contexts and at an appropriate level as defined by the content statements for this Unit (see Information Systems (Advanced Higher) Course content):

♦   creation of test data
♦   implementation of complex database
♦   systematic testing
♦   creation of documentation

A pro-forma observation checklist for Outcome 2 is provided in the National Assessment Bank materials.

Hard copy evidence should be provided of the implemented database.

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

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 document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).

National Unit Specification: general information

UNIT   On-line Database Systems (Advanced Higher)

NUMBER   DV50 13

COURSE   Information Systems (Advanced Higher)

SUMMARY

This Unit is designed to develop knowledge and understanding of the principles, development and uses of on-line database systems, in the context of server side databases, and provides an opportunity to apply this knowledge to solve problems through the use of contemporary hardware and software.

It is designed as an option for candidates undertaking the Advanced Higher Information Systems Course, but is also suitable for anyone wishing to extend and deepen their experience of on-line information systems beyond Higher level.

OUTCOMES

1   Demonstrate knowledge and understanding of the principles, features, development and techniques of on-line database systems.
2   Demonstrate practical skills by applying knowledge and understanding of the principles, features and techniques of on-line 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:

♦   Advanced Higher Database Analysis and Design Unit
♦   Advanced Higher Database Implementation and Testing Unit
♦   Higher Relational Database Systems Unit
♦   Higher Information Systems

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. The cost for each unit specification is £2.50. (A handling charge of £1.95 will apply to all orders for priced items.)

National Unit Specification: general information (cont)

CREDIT VALUE

1 credit at Advanced Higher (8 SCQF credit points at SCQF level 7*)

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

National Unit Specification: statement of standards

UNIT   On-line Database Systems (Advanced Higher)

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, development and techniques of On-line Database Systems.

Performance criteria

(a)   A wide range of advanced information systems terminology is used appropriately.
(b)   Technically accurate descriptions and explanations are related to familiar and unfamiliar contexts.
(c)   Conclusions, predictions and generalisations are made from knowledge and understanding.

Evidence Requirements

Written or oral evidence that the candidate can describe and explain the principles of systems analysis and design 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 across the range of the Unit content (see Information Systems (Advanced Higher) Course content) in each of the following areas:

♦   Internet Developments
♦   Database Connectivity
♦   Structured Query Language
♦   Application Development

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

The standard to be applied and the breadth of coverage 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.

OUTCOME 2

Demonstrate practical skills by applying knowledge and understanding of the principles, features and techniques of on-line database systems.

Performance criteria

(a)   Hardware and software is used independently, effectively and efficiently.
(b)   Practical tasks are planned and organised independently.
(c)   Practical tasks are undertaken in an appropriate range of familiar and unfamiliar contexts.

National Unit Specification: statement of standards (cont)

UNIT   On-line Database Systems (Advanced Higher)

Evidence Requirements

An observation checklist showing that the candidate has carried out practical activities, demonstrating all of the following practical skills, in the context of producing a data model, as defined in the content statements for this Unit (see Information Systems (Advanced Higher) Course content):

♦   use of a server-based database management tool
♦   creation of queries using SQL
♦   use of server-side scripting language

Hard copy evidence should be provided of:

♦   Server-side scripts
♦   HTML Output (completed pages and underlying code)

The candidate will be allowed access to books, notes and on-line help while completing the task(s).

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

The standard to be applied and the breadth of coverage 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

UNIT   On-line Database Systems (Advanced Higher)

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 in the left-hand column describe relevant content covered in an optional Unit at Higher level, and are included here to clarify the context for the new learning for this Unit. They indicate the prior learning required by the candidate before undertaking the new and assessable learning for this Unit. Content in the right-hand column is the new and assessable content of this Unit.

Content Statements: Internet Developments	
Higher	**Advanced Higher**
Internet (H) *Description of contemporary technical developments related to Internet usage and operation including:* ♦ *web based databases* ♦ *dynamic page design*	Description of applications of on-line database systems including ♦ Content Management Systems ♦ Customer Relationship Management ♦ E-commerce Platforms Comparison of Open Source and Commercial On-line Database Software and related issues: ♦ cost effectiveness ♦ security ♦ flexibility and adaptability ♦ ongoing support and development by a community of users Description of applications and features of Electronic Data Interchange (EDI): ♦ transaction standardisation ♦ translation software ♦ communications ♦ legal restrictions

National Unit Specification: support notes (cont)

UNIT On-line Database Systems (Advanced Higher)

Content Statements: Database Connectivity	
Higher	**Advanced Higher**
	Description and exemplification of the requirements for connection to database server ♦ username/password ♦ server address ♦ database name Description of use of a server-based database management tool/application ♦ to connect a database client to a server ♦ to create/modify/delete table structures

Content Statements: Structured Query Language	
Higher	**Advanced Higher**
	Exemplification and application of the uses of SQL to create simple and complex queries: ♦ Data Manipulation Language (DML) – Insert, Update, Delete ♦ Data Query Language (DQL) – Select — keywords or clauses of the select statement — Select, From, Where, Order By — logical operators — Is Null, Between, In, Like, Exists, Unique, All and Any — Negating Conditions with the Not Operator — Not Equal, Not Between, Not In, Not Like, Is Not Null, Not Exists, Not Unique — Aggregate Functions — Count, Sum, Max, Min, Avg — Sorting and Grouping Data — Group By, Order By — Equi-joins/inner joins

National Unit Specification: support notes (cont)

UNIT On-line Database Systems (Advanced Higher)

Content Statements: Application Development	
Higher	**Advanced Higher**
Internet (H) *Description of the use of web authoring packages in web page design (including page layout design and uploading of pages).* *Comparison of the use of web authoring packages and direct HTML coding.* *Description and exemplification of:* ♦ *cascading style sheets* ♦ *client side scripting (including form validation and alerts)*	Description and exemplification of server-side scripting language for ♦ Server connection ♦ Database selection ♦ Execution of SQL queries and extraction of results Description and exemplification of forms processing to insert and amend data. Description of structure of HTML forms, including ♦ the <form> element and its action and method attributes ♦ the <input> element and its type, name and value attributes ♦ the <button> element and its type, name and value attributes

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 rather than sequentially. 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 *Relational Database Systems* and/or *The Internet* Unit at Higher level should already have covered some or all of the content listed in the left hand column of the content grids, but may well need to revise this material before progressing to the right hand column.

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:

Internet Developments   9 hours
Database Connectivity   6 hours
Structured Query Language   9 hours
Application Development   12 hours

1½ hours would be set aside to:

♦   administer the Outcome 1 test
♦   gather evidence for Outcome 2

A further 2 ½ hours is allowed for remediation and re-assessment if required.

National Unit Specification: support notes (cont)

UNIT On-line Database Systems (Advanced Higher)

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 supervision. 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 a single extended task or a number of relatively small tasks. The task(s) will normally be undertaken by the candidate as part of 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 on-line help while completing the task(s). The practical skills should be demonstrated in the context defined in the content statements (see Information Systems (Advanced Higher) Course content).

To gain success in this Outcome, the candidate must demonstrate the following practical skills in the context of producing a data model of an existing system:

♦ use of a server-based database management tool
♦ creation of queries using SQL
♦ use of server-side scripting language

Evidence may be obtained using an open book practical exercise where candidates are presented with a server-side database with limited requirements for insertion, modification, deletion and read operations. The candidate is not required to design and implement this database.

A minimum of three scripts should be created to access and maintain the data. It is permissible to combine these scripts into one program provided suitable control structures are used.

Hard copy evidence should be provided of:

♦ Server-side scripts
♦ HTML Output (completed pages and underlying code)

A pro-forma observation checklist for Outcome 2 is provided in the National Assessment Bank materials.

All evidence for Outcome 2 should be gathered under 'open-book' conditions and must be retained by the centre. The assessment of this Unit is subject to moderation by SQA.

National Unit Specification: support notes (cont)

UNIT   On-line Database Systems (Advanced Higher)

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 document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).

National Unit Specification: general information

UNIT   Information Systems Interfaces (Advanced Higher)

NUMBER   DV51 13

COURSE   Information Systems (Advanced Higher)

SUMMARY

This Unit is designed to develop knowledge and understanding of the principles of information system interface design and practical skills in the design, development, and evaluation of an interface. This knowledge and understanding, and these practical skills, may then be applied by the candidate to design and develop an interface for an information system.

The Unit is designed as an option for candidates undertaking the Advanced Higher Information Systems Course, but is also suitable for anyone wishing to extend and deepen their experience of information systems beyond Higher level.

OUTCOMES

1   Demonstrate knowledge and understanding of the principles, features, design, development and evaluation of information system interfaces.
2   Demonstrate practical skills in the design, development and evaluation of information system interfaces.

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:

♦   Advanced Higher Database Analysis and Design Unit
♦   Advanced Higher Database Implementation and Testing Unit
♦   Higher Relational Database Systems Unit
♦   Higher Information Systems

Administrative Information

National Unit Specification: general information (cont)

CREDIT VALUE

1 credit at Advanced Higher (8 SCQF credit points at SCQF level 7*)

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

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

National Unit Specification: statement of standards

UNIT   Information Systems Interfaces (Advanced Higher)

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, design, development and evaluation of information system interfaces.

Performance criteria

(a)   A wide range of advanced information systems terminology is used appropriately.
(b)   Technically accurate descriptions and explanations are related to familiar and unfamiliar contexts.
(c)   Conclusions, predictions and generalisations are made from knowledge and understanding.

Evidence Requirements

Written or oral evidence that the candidate can describe and explain the principles, techniques and applications of human-computer interfacing 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 content (see Information Systems (Advanced Higher) Course content) in each of the following areas:

♦   interface modes
♦   intelligent interfaces
♦   interface modelling and design
♦   usability testing and evaluation

(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.

OUTCOME 2

Demonstrate practical skills in the design, development and evaluation of information system interfaces.

Performance criteria

(a)   Hardware and software is used independently, effectively and efficiently.
(b)   Practical tasks are planned and organised independently.
(c)   Practical tasks are undertaken in an appropriate range of familiar and unfamiliar contexts.

National Unit Specification: statement of standards (cont)

UNIT Information Systems Interfaces (Advanced Higher)

Evidence Requirements

Observational checklist showing that the candidate has demonstrated the following skills in the context and at a level defined by the content statements for this Unit (see Information Systems (Advanced Higher) Course content):

♦ interface design
♦ interface implementation
♦ interface evaluation

Hard copy evidence should be provided of interface design and implementation.

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

The candidate will be allowed access to books, notes and on-line help while completing the task(s).

(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

UNIT   Information Systems Interfaces (Advanced Higher)

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 in the left-hand column describe relevant content covered in an optional Unit at Higher level, and are included here to clarify the context for the new learning for this Unit. They indicate the prior learning required by the candidate before undertaking the new and assessable learning for this Unit. Content in the right-hand column is the new and assessable content of this Unit.

Content Statements: Interface modes	
Higher	**Advanced Higher**
	Description of the factors which have contributed to the development of human computer interfaces, including technological (hardware, software), economic, social
Applied Multimedia (H) *Description of multimedia delivery media and exemplification of appropriate uses: CD-ROM / DVD-ROM, kiosk, WWW, mobile communication devices, hybrids, virtual reality*	Description of a range of interfaces, including ♦ desktop operating systems ♦ web sites ♦ mobile phones ♦ palmtops or personal digital assistants (PDAs) ♦ public information kiosks ♦ cash machines In terms of ♦ mode ♦ methods of input/output ♦ typical users ♦ physical contraints

	Identification, description and exemplification of interface modes:
	♦ Graphical (graphical user interface, direct manipulation)
	♦ Textual (command line, question and answer, form filling, natural language)
	♦ Sensory:
	      — auditory (speech, sound)
	      — touch
	♦ Multimodal interfaces

	Description of the operation of a user interface in terms of syntax and semantics.

National Unit Specification: support notes (cont)

UNIT   Information Systems Interfaces (Advanced Higher)

Content Statements: Intelligent interfaces	
Higher	**Advanced Higher**
Internet (H) *Description of the use of web authoring packages in web page design (including page layout design and uploading of pages)*	Description of the trend towards increasing use of intelligent techniques in information systems interfaces. Description of the characteristics and benefits of intelligent interfaces.
	Description and exemplification of applications of intelligent interfaces, including: ♦ Predictive and adaptive user interfaces — mobile phone predictive text — grammar and spelling checkers — adaptive menus in applications and operating systems — agent-based interfaces ♦ Natural language interaction — machine translation — natural language querying — command and control systems — speech driven software

National Unit Specification: support notes (cont)

UNIT   Information Systems Interfaces (Advanced Higher)

Content Statements: Interface modelling and design	
Higher	**Advanced Higher**
	Identification and description of the stages of the LUCID (Logical User Centred Interaction Design) methodology: ♦ envision ♦ discovery ♦ design foundation ♦ design detail ♦ build ♦ release and their relationship to the stages of the stages of the systems analysis and design life cycle
	Description of the characteristics and needs of different classes of user: ♦ novice ♦ knowledgeable intermittent ♦ expert/frequent users
	Description and exemplification of the characteristics and relative merits of storyboards, state transition diagrams and prototypes as methods of interface design
	Storyboards: ♦ representation of layout, textual and graphical elements, audio, video and animated content ♦ representation of sequence of screens ♦ use as a cheap, quick, easily amended means of providing a mocked-up interface at an early stage
	State transition diagrams: ♦ representation of layout, navigational elements, links to other content and transition between screens
	Prototyping: ♦ low fidelity: paper prototyping ♦ high fidelity: rapid application development (RAD) ♦ horizontal ♦ vertical

National Unit Specification: support notes (cont)

UNIT Information Systems Interfaces (Advanced Higher)

Content Statements: Usability testing and evaluation	
Higher	**Advanced Higher**
Applied Multimedia (H) *Description and exemplification of the different types of testing that should be carried out including: screen testing, integration testing, acceptance testing, usability testing*	Description of the characteristics and uses of qualitative techniques for usability testing: ♦ thinking aloud protocol ♦ co-discovery method ♦ question-asking protocol ♦ eye tracking
	Description of the characteristics and uses of quantitative measurement techniques for usability testing: ♦ time to learn ♦ speed of task performance ♦ user error rates ♦ user retention of commands over time ♦ subjective user satisfaction
	Description and exemplification of the characteristics and uses of a range of quality inspection methods, including: ♦ heuristic evaluation ♦ walkthroughs ♦ feature set ♦ consistency inspection ♦ adherence to standards (including standard operating system design guidelines, web accessibility guidelines)
	Description of the characteristics and uses of a range of inquiry methods, including ♦ surveys ♦ questionnaires ♦ user performance data logging ♦ self reporting logs

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

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

In particular, candidates will require access to a range of suitable interfaces, which could include desktop operating systems (eg Windows®, MacOS®), web sites, mobile phones, palmtops or personal digital assistants (PDAs), games consoles, public information kiosks, cash machines.

The two Outcomes should be delivered in an integrated way rather than sequentially. For Outcome 2, the practical activities, both computer based and non-computer-based, should be taught and used to illustrate and exemplify the knowledge and understanding required for Outcome 1, whenever this is possible.

National Unit Specification: support notes (cont)

UNIT Information Systems Interfaces (Advanced Higher)

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:

Interface modes	8 hours
Intelligent interfaces	4 hours
Interface modelling and design	14 hours
Usability testing and evaluation	10 hours

1½ hours would be set aside to:

♦ administer the Outcome 1 test
♦ gather evidence for Outcome 2

A further 2 ½ 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 1of the Unit. This assessment consists of a closed book test, and must be conducted under supervision. 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 a single extended task or a number of relatively small tasks. The task(s) will normally be undertaken by the candidate as part of 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 on-line help while completing the task(s). The practical skills should be demonstrated in the context defined in the content statements (see Information Systems (Advanced Higher) Course content).

To gain success in this Outcome, the candidate must demonstrate practical skills in the following contexts:

♦ interface design
♦ interface implementation
♦ interface evaluation

Hard copy evidence should be provided of interface design and implementation.

Evidence of interface design could include paper prototypes, storyboards, or RAD prototyping.

Evidence of interface implementation could comprise screen shots of interfaces developed to model the designs above, or of an interface developed as part of the Coursework project.

National Unit Specification: support notes (cont)

UNIT   Information Systems Interfaces (Advanced Higher)

Interface evaluation should include usability testing techniques applied to a range of interfaces. Suitable interfaces include desktop operating systems (eg Windows®, MacOS®), web sites, mobile phones, PDAs, games consoles, public information kiosks, cash machines.

A pro-forma observation checklist for Outcome 2 is provided in the National Assessment Bank materials.

All evidence for Outcome 2 should be gathered under 'open book' conditions and must be retained by the centre. The assessment of this Unit is subject to moderation by SQA.

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 document Guidance *on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).