Higher National Unit Specification

General information for centres

Unit title: Systems Development: Structured Design Methods (Introduction)

Unit code: DH3H 34

Unit purpose: This Unit is about developing an awareness of different approaches that can be taken to systems development and applying current structured techniques. This Unit should develop the candidates' awareness of important issues such as project management, analysis and design techniques. It is primarily intended to prepare candidates who expect to gain employment in an IT/Computing-related post at technician or professional level in a software development role.

On completion of this Unit the candidate should be able to:

1. Describe structured systems analysis and design techniques.
2. Use structured systems analysis techniques.
3. Use systems design techniques.

Credit value: 1 HN credits at SCQF level 7: (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.*

Recommended prior knowledge and skills: Access to this Unit is at the discretion of the Centre, however it is desirable that the candidate possesses good communication and problem solving skills as well as the ability to manipulate text and graphical information, gained through either workplace experience or training at an appropriate level. A knowledge and understanding of Information Systems is also desirable. This may be evidenced by the possession of HN Unit DH3F 34 *Systems Development: Introduction* or HN Unit DH37 34 *Information Technology: Information Systems and Services.* Workplace experience in, eg database design and /or data flow modelling would also provide suitable prior knowledge.

Core skills: There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

General information for centres (cont)

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

Assessment: Outcome 1 will be assessed by a number of multiple choice questions testing all knowledge and/or skills. Outcomes 2 and 3 can be assessed by a number of assignments set within the context of one or more case studies scenarios.

There is no requirement to use a single case study throughout. Indeed, this is discouraged. This Unit is geared towards the acquisition of structured techniques with which to carry out the analysis and design of information systems.

Assessors should assure themselves of the authenticity of each candidate's submission.

Some of the evidence requirements may be produced using e-assessment. This may take the form of e-testing (for knowledge and understanding) and/or e-portfolios (for practical abilities). There is no requirement for you to seek prior approval if you wish to use e-assessment for either of these purposes so long as the normal standards for validity and reliability are observed. Please see the following SQA publications for further information on e-assessment: (1) "SQA Guidelines on Online Assessment for Further Education" (March 2003) and (2) "Assessment and Quality Assurance in Open and Distance Learning" (Feb. 2001).

If a centre is presenting Outcome 1 of these assessments on-line the following assessment methods, where appropriate, may be selected –

- Multiple-choice
- Drag and drop
- Multiple response
- Mix and match
- A combination of the above

It is expected that the questions will be of the multiple choice variety. Centres may consider the use of alternative questions types, particularly if using Computer Assisted Assessment approaches. However, care should be taken that the questions are valid and at an appropriate level. The use of simple true/false question responses is unlikely to achieve this.

Higher National Unit specification: statement of standards

Unit title: Systems Development: Structured Design Methods (Introduction)

Unit code: DH3H 34

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

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

Outcome 1

Describe structured systems analysis and design techniques

Knowledge and/or skills

- The main stages of the traditional life cycle model
- Structured system development life cycle model
- Fact-finding methods
- Requirement specification terminology
- Project planning
- Issues involved in systems implementation and changeover

Evidence requirements

The candidate will need evidence to demonstrate his/her knowledge and/or skills by showing that s/he can:

- Identify and describe the six main stages of the traditional life cycle Model: Project set-up and planning, Analysis, Logical design, Physical design, Implementation and Maintenance/Review
- Identify and describe the main stages of structured systems analysis and design methodology
- Describe appropriate use of the following fact finding methods: interview, questionnaire, observation, document sampling, background reading
- Identify requirement specification terminology: terms of reference, functional requirements, non-functional requirements, prioritisation of requirements, user interface requirements.

- Project planning scope and boundaries, roles and responsibilities of team members
- Describe what is involved in the stages of system implementation: installation, data conversion, testing, documentation, training, changeover methods (direct, parallel, phased, pilot)

Evidence for all the knowledge and/or skills in this Outcome will be assessed using 20 multiple-choice questions. All knowledge and skills bulleted points must be covered. Closed book conditions apply. There should be four questions covering bullet points one and two with the remainder spread equally over the remaining bullet points. Candidates should not know in advance the items on which they will be assessed and the questions presented must change on **each** assessment occasion.

Assessment must be undertaken in supervised conditions and is closed book. A candidate should complete this assessment within one hour. Candidates may not bring to the assessment event any notes, textbooks, handouts or other material.

Candidates must answer at least 60% of the questions correctly.

Assessment Guidelines

There is an opportunity for a candidate to be assessed on-line subject to meeting the prescribed assessment conditions.

If a centre is presenting this assessment on-line the following assessment methods, where appropriate, may be selected –

- Multiple-choice
- Drag and drop
- Multiple response
- Mix and match
- A combination of the above

Outcome 2

Use structured systems analysis techniques

Knowledge and/or skills

- Techniques used in the definition and analysis of data items
- Organisational standards for documents and their content

Higher National Unit specification: statement of standards (cont)

Unit title: Systems Development: Structured Design Methods (Introduction)

Evidence Requirements

The candidate must produce the evidence specified in A and B below.

A. Data Flow

The candidate will produce evidence to show that s/he can construct Current Physical Data Flow Diagrams **and** a Current Logical Data Flow Diagram, using agreed organisational standards, showing processes, external entities, data stores and data flows. At least a Level 1 diagram and one Level 2 diagram must be constructed. Optionally, these may be supplemented with a Context Diagram and\or additional Level 2 or lower diagrams.

The Assessor should be looking for consistency as well as correctness. The following items will be assessed:

- Descriptive names for flows and processes, with nouns and adjectives only for data flows and process names beginning with a verb
- No store-to-store, store-to-entity or entity-to-entity data flows
- Consistency in the flows crossing a diagram boundary between diagram Levels.

No more than **two** errors should be identified for an acceptable attempt. Repeated errors should not be counted more than once.

B. Algorithm Development

The candidate will produce evidence to show that s/he can use the following methods to describe existing procedures, using agreed organisational standards:

- Structured English - limited-entry decision table(s) and extended-entry decision table(s)
- Two Structured English definitions must be written and include conditional or repetitive statements. Pre-conditions and post-conditions for the process and any input or returned data must be identified.

The same process can be used for **both** of the decision tables. Limited-entry decision tables must be checked for completeness. There will be a minimum of four entries in the limited-entry table's condition stub.

One minor error in the assessment of this outcome is acceptable.

This assessment is open book. Assessors should assure themselves of the authenticity of each candidate's submission.

Higher National Unit specification: statement of standards (cont)

Unit title: Systems Development: Structured Design Methods (Introduction)

Assessment Guidelines

A number of assignments set within the context of one or more case studies are recommended.

The achievement requirements are inherent in the evidence requirements.

Outcome 3

Use systems design techniques

Knowledge and/or skills

- Logical Data and Process Design techniques
- Physical Data and Process Design techniques

Evidence requirements

The candidate must produce the evidence specified for A and B below -

A. Traditional Structured Design

   The candidate will produce evidence to show that s/he can normalise at least **three** data sources to Third Normal Form (3NF) using agreed organisational standards and construct a Data Model derived from the 3NF relations.

B. Basic Data Modelling

   The candidate will produce evidence to show that s/he can construct a refined ER Model using agreed organisational standards, showing entities and only one-to-many relationships. The model should have a minimum of **six** entities. At least **two** many-to-many relationship must be refined.

Assessors should assure themselves of the authenticity of each candidate's submission.

Assessment guidelines

A number of assignments set within the context of one or more case studies scenarios are recommended. Where possible, the assignment should be open book but held in supervised conditions.

Administrative Information

Unit code:	DH3H 34
Unit title:	Systems Development: Structured Design Methods (Introduction)
Superclass category:	CB
Date of publication:	June 2004
Source:	SQA

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.)

Higher National Unit specification: statement of standards

Unit title: Systems Development: Structured Design Methods (Introduction)

Unit code: DH3H 34

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

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

Guidance on the content and context for this Unit

This Unit is about developing an awareness of different approaches that can be taken to systems development and applying current structured techniques. This Unit should develop the candidates' awareness of important issues such as project management, analysis and design techniques. It is primarily intended to prepare candidates who expect to gain employment in an IT/Computing-related post at technician or professional level in a software development role. Candidates undertaking this Unit may be working towards HNC in Computing, HND Computing: Software Development or HND Computing: Technical Support. On completion of this Unit candidates may wish to further their knowledge in this area by undertaking the HN Unit: *Systems Development: Structured Design Methods* and/or HN Unit: *Systems Development: Object Oriented Design*.

Outcome 1 looks at a range of different system development life cycle models, the initial stages of a systems development project (ie project set-up and planning), initial requirements analysis and the common stages of implementation and changeover.

Outcomes 2 and 3 introduce candidates to several common techniques used in structured systems analysis and design. Suitable case scenarios should be used to introduce and practice the techniques. Where facilities exist, candidates should be encouraged to use a CASE tool or other appropriate piece of software to create diagrams.

Higher National Unit specification: support notes (cont)

Unit title: Systems Development: Structured Design Methods (Introduction)

Guidance on the delivery and assessment of this Unit

This Unit is about developing an awareness of different approaches that can be taken to systems development and applying current structured techniques. This Unit should develop the candidates' awareness of important issues such as project management, analysis and design techniques. It is primarily intended to prepare candidates who expect to gain employment in an IT/Computing-related post at technician or professional level in a software development role. Candidates undertaking this Unit may be working towards HNC in Computing, HND Computing: Software Development or HND Computing: Technical Support. On completion of this Unit candidates may wish to further their knowledge in this area by undertaking the HN Unit: *Systems Development: Structured Design Methods* and/or HN Unit: *Systems Development: Object Oriented Design*.

The Unit should be delivered in as candidate-centred, resource-based way as possible. Candidates should get opportunity to practice the techniques covered before being assessed at an appropriate point. Candidates should be encouraged to use a CASE tool or other appropriate piece of software to create diagrams. Visiting speakers may be invited to describe their experience of the system development process, or to describe how a particular model and/or techniques work in practice.

Outcome 1 will be assessed by 20 multiple choice questions presented under closed book conditions. Outcomes 2 and 3 should be assessed under controlled conditions, using a number of assignments based on one or more system development case study scenarios.

Assessors should assure themselves of the authenticity of each candidate's submission.

Open learning

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance.
A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes. For further information and advice, please see *Assessment and Quality Assurance for Open and Distance Learning* (SQA, February 2001 — publication code A1030).

Higher National Unit specification: support notes (cont)

Unit title: Systems Development: Structured Design Methods (Introduction)

Special needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, 2001).

General information for candidates

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This Unit is about developing an awareness of different approaches that can be taken to systems development and applying current structured techniques. This Unit should develop the candidates' awareness of important issues such as project management, analysis and design techniques. It is primarily intended to prepare candidates who expect to gain employment in an IT/Computing-related post at technician or professional level in a software development role. Candidates undertaking this Unit may be working towards HNC in Computing, HND Computing: Software Development or HND Computing: Technical Support.

On completion of this Unit you should be able to:

1. Describe structured systems analysis and design techniques
2. Use structured systems analysis techniques
3. Use systems design techniques

You will look at a range of different systems development life cycle models, the initial stages of a systems development project (ie project set-up and planning), initial requirements analysis and the common stages of implementation and changeover.

You will be introduced to several common techniques used in structured systems analysis and design. Suitable case scenarios should be used to introduce and practice the techniques. Where facilities exist, you should be encouraged to use a CASE tool or other appropriate piece of software to create diagrams.

Outcome 1 will be assessed by a number of multi-choice questions testing all knowledge and/or skills. Outcomes 2 and 3 can be assessed by a number of assignments set within the context of one or more case studies scenarios.