



# **Computing and Information Science (National 5)**

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## **Draft National Course Assessment Specification**

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This edition: November 2011, draft version 1.0

Please refer to the note of changes at the end of this Course Specification for details of changes from previous version (where applicable).

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# Course outline

<b>Course title:</b>	Computing and Information Science (National 5)
<b>SCQF level:</b>	5 (6 SCQF credit points)
<b>Course code:</b>	to be advised
<b>Course assessment code:</b>	to be advised

The purpose of the Course Assessment Specification is to ensure consistent and transparent assessment year on year. It describes the structure of the Course assessment and the mandatory skills, knowledge and understanding that will be assessed.

## Course assessment structure

Component 1 — question paper	90 marks
Component 2 — assignment	60 marks
<b>Total marks</b>	<b>150 marks</b>

This Course includes six SCQF credit points for 40 additional programmed hours to allow preparation for Course assessment. The Course assessment covers the added value of the Course.

## Equality and inclusion

This Course Assessment Specification has been designed to ensure that there are no unnecessary barriers to assessment. Assessments have been designed to promote equal opportunities while maintaining the integrity of the qualification.

For guidance on assessment arrangements for disabled learners and/or those with additional support needs, please follow the link to the Assessment Arrangements web page: <http://www.sqa.org.uk/sqa/14977.html>.

Guidance on inclusive approaches to delivery and assessment of this Course will be provided in the *Course Support Notes*.

# Assessment

To gain the award of the Course, the learner must pass all the Units as well as the Course assessment. Course assessment will provide the basis for grading attainment in the Course award.

## Course assessment

SQA will produce and give instructions for the production and conduct of Course assessments based on the information provided in this document.

## Added value

The purpose of the Course assessment is to assess added value of the Course as well as confirming attainment in the Course and providing a grade. The added value for the Course will address the key purposes and aims of the Course as defined in the Course Rationale. It will do this by addressing one or more of breadth, challenge, or application.

In this Course assessment, added value will focus on the following:

- ◆ breadth — drawing on knowledge and skills from across the Course
- ◆ challenge — requiring greater depth or extension of knowledge and/or skills
- ◆ application — requiring application of knowledge and/or skills in practical or theoretical contexts as appropriate

This added value consists of the following.

Through the Units, learners will develop individual computing and information science skills, and knowledge and understanding of key concepts in a variety of contexts, including software development and information system development. To achieve success in the Course, learners must show that they can apply this knowledge and these skills to solve problems in both practical and theoretical contexts.

The assignment requires learners to demonstrate aspects of challenge and application in a practical context. Learners will apply knowledge and skills from the Units to solve an appropriately challenging, practical computing and information science problem.

The question paper requires learners to demonstrate aspects of breadth and application in theoretical contexts. Learners will apply breadth of knowledge from across the Units and depth of understanding to answer appropriately challenging questions in computing and information science contexts.

## Grading

Course assessment will provide the basis for grading attainment in the Course award.

The Course assessment is graded A–D. The grade is determined on the basis of the total mark for all Course assessments together.

A learner's overall grade will be determined by their performance across the Course assessment.

**Grade description for C**

For the award of Grade C, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated successful performance in relation to the mandatory skills, knowledge and understanding for the Course.

**Grade description for A**

For the award of Grade A, learners will have demonstrated successful performance in all of the Units of the Course. In the Course assessment, learners will typically have demonstrated a consistently high level of performance in relation to the mandatory skills, knowledge and understanding for the Course.

**Credit**

To take account of the extended range of learning and teaching approaches, remediation, consolidation of learning and integration needed for preparation for external assessment, six SCQF credit points are available in Courses at National 5 and Higher, and eight SCQF credit points in Courses at Advanced Higher. These points will be awarded when a grade D or better is achieved.

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## **Structure and coverage of the Course assessment**

The Course assessment will consist of two Components: a question paper and an assignment, titled 'Developing a Computing and Information System Solution'. The question paper will have two Sections.

### **Component 1 — question paper**

The purpose of the question paper is to assess breadth of knowledge from across the Units, depth of understanding, and application of this knowledge and understanding to solve problems.

This question paper will give learners an opportunity to demonstrate the following skills, knowledge and understanding:

- ◆ applying aspects of computational thinking across a range of contexts
- ◆ analysing problems within computing and information science across a range of contemporary contexts
- ◆ the ability to communicate how a program works
- ◆ communicating understanding of key concepts related to software design and development, and information system design and development, clearly and concisely using appropriate terminology
- ◆ understanding of the role and impact of contemporary technologies on the environment and society
- ◆ applying computing and information concepts and techniques to create solutions across a range of contexts

The question paper will have 90 marks (60% of the total mark).

Approximately 50% of the marks will be awarded for questions related to Software Design and Development.

Approximately 50% of the marks will be awarded for questions related to Information System Design and Development.

This question paper has two Sections.

**Section 1** will have 20 marks and will consist of short answer questions.

This Section will give learners an opportunity to demonstrate recall of knowledge using any of the knowledge and understanding specified in the table provided in the 'Further mandatory information on Course coverage' section at the end of this Course Assessment Specification.

**Section 2** will have 70 marks and will consist of extended response questions.

This Section will give learners an opportunity to demonstrate application of knowledge and understanding to solve problems using any of the knowledge and understanding specified in the table provided in the 'Further mandatory information on Course coverage' section at the end of this Course Assessment Specification.

## Component 2 — assignment

The purpose of the assignment is to assess practical application of knowledge and skills from the Units to solve an appropriately challenging computing and information science problem.

This assignment will give learners an opportunity to demonstrate the following skills, knowledge and understanding.

The assignment will assess learners' skills in analysing a problem, designing a solution to the problem, implementing a solution, and testing and reporting on that solution.

The assignment will have 60 marks (40% of the total mark).

The assignment will be a meaningful and appropriately challenging task, requiring challenge and application.

Time will be required for:

- ◆ preparation for the assignment, which could include considering exemplar assignments and practising required skills
- ◆ carrying out the stages of the assignment, with teacher guidance and support
- ◆ assessing the process and completed solution

The assignment should clearly demonstrate application of knowledge and skills, at an appropriate level, drawing significantly from both the *Software Design and Development* and *Information Systems Design and Development* Units (as defined in the 'Further mandatory information on Course coverage' section of this document).

The teacher/lecturer will provide overall guidelines for the assignment and a list of questions/tasks/prompts which will lead learners through the assignment in clear stages.

Marks will be awarded for:

- |                             |          |
|-----------------------------|----------|
| ◆ Analysing the problem     | 10 marks |
| ◆ Designing a solution      | 10 marks |
| ◆ Implementing a solution   | 20 marks |
| ◆ Testing the solution      | 10 marks |
| ◆ Reporting on the solution | 10 marks |

Evidence should include:

- ◆ the completed solution
- ◆ a record of progress through the assignment (such as an informal log or blog produced by the learner)
- ◆ a short report on the testing of the solution (in written, electronic or oral form)

## **Setting, conducting and marking of assessment**

### **Question paper**

This question paper will be set and marked by SQA, and conducted in centres under conditions specified for external examinations by SQA. Learners will complete this in 1 hour and 30 minutes.

### **Controlled assessment — assignment**

This assignment is:

- ◆ set by SQA
- ◆ conducted under a high degree of supervision and control/conducted under some supervision and control

Evidence will be internally marked by centre staff in line with SQA marking instructions.

All marking will be quality assured by SQA.

A bank of assignments will be provided and there will be a choice from this bank. The assignment will be carried out under supervised open book conditions, to ensure that the work presented is the candidate's own work.

The teacher/lecturer may also give learners support and guidance to help them progress through each stage of the assignment; where a significant amount of support is provided, this should be reflected in the marks awarded.

Once the assignment has been completed and assessed, it should not be returned to the candidate for further work to improve their mark.

The assignment is designed to discriminate between candidates, and therefore would be expected to provide a wide range of marks. Stronger candidates should be able to complete the assignment successfully with minimal support and guidance. Weaker candidates may not be able to complete all aspects of the assignment within a reasonable time, or may require significant assistance, and so would achieve a lower total mark.

## Further mandatory information on Course coverage

The following gives details of mandatory skills, knowledge and understanding for the Computing and Information Science (National 5) Course. Course assessment will involve sampling the skills, knowledge and understanding. This list of skills, knowledge and understanding also provides the basis for the assessment of Units of the Course.

The Course assessment will require learners to draw on and apply knowledge and understanding of the concepts listed below. This table should be read in conjunction with the descriptions of the question paper and assignment.

<b>Software Design and Development</b>
<b>Body of knowledge to be assimilated, understood and used in context:</b>
<b>Programming constructs</b>
<ul style="list-style-type: none"><li>◆ expressions to assign values to variables</li><li>◆ expressions to return values using arithmetic operations (+, -, *, /)</li><li>◆ execution of lines of code in sequence demonstrating input — process — output</li><li>◆ use of selection constructs including simple and complex conditional statements (IF) and logical operators (AND, OR, NOT)</li><li>◆ iteration using fixed and conditional loops</li></ul>
<b>Data types</b>
<ul style="list-style-type: none"><li>◆ string, numeric (integer and real) and Boolean variables</li><li>◆ 1D arrays</li></ul>
<b>Testing digital solutions</b>
<ul style="list-style-type: none"><li>◆ normal, extreme and exceptional testing</li><li>◆ syntax, execution and logic errors in programs</li></ul>
<b>Design and development methodology</b>
<ul style="list-style-type: none"><li>◆ design notations (graphical, pseudocode)</li><li>◆ readability of code (internal commentary; meaningful identifiers, indentation)</li></ul>
<b>Software development environments</b>
<ul style="list-style-type: none"><li>◆ graphical, text-based</li><li>◆ editing features</li></ul>
<b>Information Systems Design and Development</b>
<b>Practical skills in developing information systems using database, web (or multimedia) contexts as appropriate to tasks undertaken:</b>
<b>Data structures (database)</b>
<ul style="list-style-type: none"><li>◆ field types including: text, numbers, date, time, graphics, calculated, link, Boolean</li><li>◆ field lengths and range</li><li>◆ primary keys</li><li>◆ validation</li><li>◆ operations including: insert, amend, delete, query, sort, search, input/output, reporting</li></ul>
<b>Data structures (website)</b>
<ul style="list-style-type: none"><li>◆ wireframe/ page layouts, navigation</li><li>◆ page elements including: head, title, body, text</li><li>◆ internal and external hyperlinks</li></ul>

- ◆ media types: text, audio, graphics, video
- ◆ URLs

### **Code**

- ◆ scripting languages
- ◆ mark-up languages

**Exemplification, knowledge and understanding of the following as appropriate to context:**

### **User interface design**

- ◆ layout, colour, graphics, readability (accessibility)

### **Hardware and software platforms**

- ◆ types of computer, processor, main memory, backing storage, input and output devices and networking capabilities
- ◆ comparison of current input/output devices using the following criteria where appropriate: speed of data transfer, resolution, cost, capacity
- ◆ mobile devices
- ◆ interfacing
- ◆ operating systems

### **Storage**

- ◆ relative advantages of local/cloud
- ◆ standard file formats
- ◆ factors affecting file size and quality:
  - resolution, bit depth for graphics
  - sampling rate, depth for audio
- ◆ detailed explanation of need for compression

### **Connectivity**

- ◆ networks: LAN, WAN, internet, web, cloud
- ◆ peer-to-peer versus client/server
- ◆ transmission modes: wired, wireless

### **Security risks**

- ◆ viruses
- ◆ online fraud
- ◆ hacking
- ◆ identity theft

### **Security precautions**

- ◆ passwords/encryption
- ◆ biometrics
- ◆ digital certificates and signatures
- ◆ security protocols and firewalls
- ◆ use of security suites

### **Impact of information systems**

- ◆ examples of environmental and social impacts (positive and negative)
- ◆ examples of legal implications

# Administrative information

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**Superclass:** to be advised

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## History of changes

Course details	Version	Description of change	Authorised by	Date

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Note: You are advised to check SQA's website ([www.sqa.org.uk](http://www.sqa.org.uk)) to ensure you are using the most up-to-date version of the Course Specification.