Comparison document

(Version 1.1 June 2015 compared to previous version)

Higher Computing Science Course Specification (C716 76)

The purpose of this document is to give a quick, visual guide to any amendments or clarifications made during the revision process.

Valid from August 2014

This edition: ~~April 2014~~June 2015, version 1.~~0~~1

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

Course outline

Course title: Higher Computing Science

SCQF: level 6 (24 SCQF credit points)

Course code: C716 76

Mandatory Units

This Course comprises the following mandatory Units:

H223 76 Software Design and Development (Higher) 9 SCQF credit points
H226 76 Information System Design and Development (Higher) 9 SCQF credit points

Course assessment 6 SCQF credit points
This Course includes six SCQF credit points to allow additional time for preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

Recommended entry

Entry to this Course is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- National 5 Computing Science Course or relevant Units

Core Skills

Achievement of this Course gives automatic certification of the following Core Skill:

Information and Communication Technology at SCQF level 6

Progression

This Course or its Units may provide progression to:

- other qualifications in Computing Science or related areas
- further study, employment and/or training

Further details are provided in the Rationale section.

Equality and inclusion

This Course Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or

considering alternative evidence. For further information, please refer to the *Course Support Notes.*

Rationale

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide more time for learning, more focus on skills and applying learning, and scope for personalisation and choice.

In this Course, and its component Units, there will be emphasis on skills development and the application of those skills. Assessment approaches will be proportionate and fit for purpose and they will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

Relationship between the Course and Curriculum for Excellence values, purposes and principles

The Course provides an understanding of the technologies that underpin our modern, digital world and develops a wide range of transferrable skills. It brings together elements of technology, science and creative digital media and has wide-ranging social implications, providing an excellent opportunity for making links across learning in the senior phase.

At this level, the Course will cover a core of advanced concepts which underpin the study of computing science, and explore the role and impact of contemporary computing technologies, providing an insight into the challenge, excitement and reward to be found in these areas.

The Course encourages learners to become successful, responsible and creative and to continue to acquire and develop the attributes and capabilities of the four capacities, including: creativity, flexibility and adaptability; enthusiasm and a willingness to learn; perseverance, independence and resilience; responsibility and reliability; and confidence and enterprise.

The Course provides progression from the National 5 Computing Science Course.

Purpose and aims of the Course

Computing science is vital to everyday life — socially, technologically and economically; it shapes the world in which we live and its future. Computing is embedded in the world around us from systems and devices in our homes and places of work, to how we access education, entertainment, transportation and communication. At this level, learners will be introduced to an advanced range of computational processes and thinking, and learn to apply a rigorous approach to the design and development process across a variety of contemporary contexts. Learners will also gain an awareness of the importance that computing professionals play in meeting the needs of society today and for the future, in fields which include science, education, business and industry.

Because of its relevance and its focus on developing transferable skills, it will be valuable to many learners, particularly those considering a career or further study in computing science disciplines.

The aims of the Course are to enable learners to:

- develop and apply aspects of computational thinking in a range of contemporary contexts
- extend and apply knowledge and understanding of advanced concepts and processes in computing science
- apply skills and knowledge in analysis, design, implementation and evaluation to a range of digital solutions with some complex aspects
- communicate advanced computing concepts and explain computational behaviour clearly and concisely, using appropriate terminology
- develop awareness of current trends in computing technologies and their impact in transforming and influencing our environment and society

Related to these aims, and underlying the study of computing science, are a number of unifying themes, including technological progress and trends, the relationship between software, hardware and system performance, and information representation and transfer as a core component of any computation. These are used to explore a variety of specialist areas through practical and investigative tasks.

Information about typical learners who might do the Course

The Course is designed to be of value for all learners, especially those considering further study or a career in computing science and related disciplines. It provides sufficient breadth, flexibility, personalisation and choice to meet the needs of all learners.

Learners will develop an understanding of the central role of computing professionals as creative problem-solvers and designers, able to design, implement and operate hardware and software systems, and of the far-reaching impact of information technology on our environment and society. They will also continue to develop a range of transferable skills for learning, skills for life and skills for work, opening up a wide range of career and study opportunities and enabling them to develop as global citizens who can contribute effectively to their communities, society and the world.

On completing the Course, the learners will have developed and strengthened their skills in analysis and problem-solving, software and information system design, development, implementation, testing and evaluation.

Course activities also provide opportunities for learners to enhance generic and transferable skills in planning and organising, working independently and in teams, critical thinking and decision-making, research, communication and self-and peer-evaluation, in a range of contexts.

Course structure and conditions of award

Course structure

The Course enables learners to develop an extended range of computing and computational thinking skills, including skills in analysis and problem-solving, design and modelling, developing, implementing, testing and evaluating digital solutions across a range of contemporary contexts.

The Course also enables learners to develop and extend knowledge and understanding of key concepts and processes, and the ability to apply this to a variety of problems; and an understanding of the impact of contemporary computing technologies on the environment and society.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a number of ways.

In addition to the Course assessment, the Course includes two mandatory Units. Each of these Units is designed to provide progression from the related Unit at National 5 and to related Units at Advanced Higher.

Software Design and Development (Higher)
The general aim of this Unit is to develop knowledge and understanding of advanced concepts and practical problem-solving skills in software design and development through appropriate software development environments. Learners will develop programming and computational thinking skills by designing, implementing, testing and evaluating practical solutions and explaining how these programs work. They will also develop an understanding of computer architecture and the concepts that underpin how programs work. Through investigative work, learners will gain an awareness of the impact of contemporary computing technologies.

Information System Design and Development (Higher)
The general aim of this Unit is to develop knowledge and understanding of advanced concepts and practical problem-solving skills in information system design and development through a range of practical and investigative tasks. Learners will apply their computational thinking skills to implement practical solutions using a range of development tools and to develop an understanding the technical, legal, environmental, economic and social issues related to one or more information systems.

Conditions of award

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Skills, knowledge and understanding

Further information on the assessment of the skills, knowledge and understanding for the Course is given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section.

This covers:

- applying computational thinking to understand problems across a range of contexts
- analysing problems with some complex aspects within computing science across a range of contemporary contexts
- designing, implementing, testing and evaluating digital solutions (including computer programs) to problems with some complex aspects across a range of contemporary contexts
- developing skills in computer programming and the ability to communicate how a program works by being able to read and interpret code
- communicating understanding of advanced concepts related to software design and development and information system design and development, clearly and concisely, using appropriate terminology
- investigating and evaluating the legal, environmental, economic, and social impact of contemporary computing technologies
- applying computing science concepts and techniques to create solutions across a range of contexts

Skills, knowledge and understanding to be included in the Course will be appropriate to the SCQF level of the Course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level (www.sqa.org.uk/scqf).

Assessment

Information about assessment for the Course is included in the *Course Assessment Specification*, which provides full details including advice on how a learner's overall attainment for the Course will be determined.

Unit assessment

All Units are internally assessed against the requirements shown in the *Unit Specification.*

They can be assessed on a Unit-by-Unit basis or by combined assessment.

They will be assessed on a pass/fail basis within centres. SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgements are consistent and meet national standards.

The assessment of the Units in this Course will be as follows.

Software Design and Development (Higher)
For this Unit, the learner will be required to provide evidence of:

- skills in software design and development
- knowledge and understanding of software design and development
- ~~understanding of the impact of contemporary computing technologies~~

Information System Design and Development (Higher)
For this Unit, the learner will be required to provide evidence of:

- skills in information system design and development
- knowledge and understanding of information system design and development
- understanding the legal, environmental, economic and social implications involved in designing and developing an information system

Exemplification of possible assessment approaches for these Units is provided in the *National Assessment Resource.*

Course assessment

Courses from National 4 to Advanced Higher include assessment of added value. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must 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 the Higher Computing Science Course, added value will focus on:

- breadth
- challenge
- application

The learner will draw on, extend and apply the skills and knowledge they have developed during the Course. These will be assessed through a combination of an assignment and a question paper.

The assignment adds value by requiring challenge and application. Learners will apply knowledge and skills from the Units to solve an appropriately challenging computing science problem.

The question paper introduces breadth to the assessment. It requires depth of understanding and application of knowledge from the Units.

Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Course. The skills that learners will be expected to improve on and develop through the Course are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Course where there are appropriate opportunities.

2 Numeracy

2.1 Number processes
2.3 Information handling

4 Employability, enterprise and citizenship

4.2 Information and communication technology (ICT)

5 Thinking skills

5.3 Applying
5.4 Analysing and evaluating

Amplification of these skills is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills will be appropriate to the level of the Course. Further information on building in skills for learning, skills for life and skills for work for the Course is given in the *Course Support Notes*.

Employability, enterprise and citizenship skills shown in this National Course provide automatic certification of the Core Skill: Information and Communication Technology at SCQF level 6.

Administrative information

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History of changes to National Course Specification

Version	Description of change	Authorised by	Date
1.1	Evidence requirement 'Understanding of the impact of contemporary computing technologies' has been deleted to reflect the removal of Outcome 3 from the Software Design and Development Unit.	Qualifications Manager	June 2105