



Higher Computing and Information Science

Draft National Course Specification



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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

Course title: Higher Computing and Information Science

SCQF: level 6 (24 SCQF credit points)

Course code: to be advised

Mandatory Units

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

Course assessment 6 SCQF credit points

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. 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:

- ◆ Computing and Information Science (National 5) Course
- ◆ Numeracy (SCQF level 5) Unit

Progression

This Course or its components may provide progression to:

- ◆ other SQA qualifications in Computing and Information 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* and the *Course Assessment Specification*.

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 the digital world and develops transferrable skills. It brings together elements of technology and science 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 common core of concepts which underpin the study of computing and information science, and provide insight into the challenge, excitement and fascination 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 Computing and Information Science (National 5) Course.

Purpose and aims of the Course

Computing and information science is vital to everyday life; it shapes the world in which we live and its future. Computer scientists play key roles in meeting the needs of society today and for the future, in fields which include science, communications, entertainment, education, business and industry. Our society needs more computer scientists and for all young people to have an informed view of the IT industry and its contribution to the economy.

The aims of the Course are to enable learners to:

- ◆ extend and apply knowledge and understanding of key concepts in computing and information science
- ◆ develop and apply aspects of computational thinking in a range of contexts
- ◆ apply analysis, design, modelling and evaluation to a range of problems with some complex aspects
- ◆ communicate clearly and concisely, using appropriate terminology
- ◆ develop a greater understanding of the impact of computing and information technology in transforming and influencing our environment and society

Related to these aims, and underlying the study of computing and information science, are a number of unifying themes, including computational thinking, 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 for learners who have a general interest in computing and information science, as well as those considering further study or a career in computing and information science and related disciplines. It provides sufficient breadth, flexibility and choice to meet the needs of all learners.

Learners will develop a deeper understanding of the central role of computer scientists as problem solvers and designers, able to design, implement and operate hardware and software systems, and the far-reaching impact of information technology on our society and the environment. 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, design and modelling, developing and implementing solutions, and evaluating digital solutions.

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 and extend, across a range of contemporary contexts related to the design and development of software and information systems, a range of skills including analysis and problem solving, design and modelling, developing, implementing and evaluating digital solutions.

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 and evaluation of the impact of computing and information technology 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 variety of ways.

Each of the component Units of the Course is designed to provide progression to related Units at Advanced Higher.

Software Design and Development (Higher)

This Unit explores an appropriate range of key facts and ideas relating to software design and development, including algorithms with some complex aspects, data handling, and human computer interaction. Learners will develop skills in problem solving, modelling and evaluating through practical tasks, using appropriate programming environments in a range of contemporary contexts such as games development and intelligent systems. These tasks will involve complex features and both familiar and unfamiliar contexts, which will require interpretation on the part of the learner. Learners will also explore trends in software development and the impact of emerging and innovative technologies on the environment and society.

Information System Design and Development (Higher)

This Unit explores an appropriate range of key facts and ideas relating to information system design and development. Learners will develop their knowledge and understanding of information system hardware, security, database systems, web-based information systems and multimedia information systems through a range of practical and investigative tasks. These tasks will involve complex features and both familiar and unfamiliar contexts, which will require interpretation on the part of the learner. Learners will also explore legal and economic issues, as well as the impact of emerging and innovative technologies on the environment and society.

Conditions of award

To gain the award of the Course, the learner must pass all 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

Full skills, knowledge and understanding for the Course will be 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 in understanding problems
- ◆ analysing problems with some complex aspects within computing and information 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 key concepts related to software design and development and information system design and development, clearly and concisely, using appropriate terminology
- ◆ investigating and evaluating the role and impact of emerging and innovative technologies on the environment and society
- ◆ applying computing and information 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 standards for the Course will be included in the *Course Assessment Specification*, which will provide 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 technologies on the environment and society

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 of the impact of technologies on the environment and society

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

Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. 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 this Course, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

¹ Definitions can be found here: www.sqa.org.uk/sqa/45528.html

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 a [project](#)² and a [question paper](#)³.

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

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

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² Definitions can be found here: www.sqa.org.uk/sqa/45528.html

³ See link above for definitions.

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

(Note: The information given below reflects the initial thinking on significant opportunities for development of skills for learning, skills for life and skills for work. These may be subject to change as the development process progresses.)

It is expected that learners will also 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*.

Administrative information

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Superclass: to be advised

History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date

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