Next Generation Higher National Unit Specification

Computing Foundations (SCQF level 7)

Unit code: J893 47

SCQF level: 7 (24 SCQF credit points)

Valid from: session 2024 to 2025

Prototype unit specification for use in pilot delivery only (version 1.0) August 2024

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year. It is for lecturers and assessors and contains all the mandatory information you need to deliver and assess the unit.

This edition: August 2024 (version 1.0)

Unit purpose

This non-specialist unit delivers foundation knowledge and skills in computing and digital technologies. It is suitable for a wide range of learners who require basic computing and digital skills to support their vocational goals. Learners need no previous knowledge or experience of computing or digital technologies, beyond that gained in everyday life. Entry to this unit is at your centre's discretion. Learners should have numeracy skills at a minimum of SCQF level 5.

The unit helps learners to develop digital competencies and provides the confidence to apply them in a wide range of vocational and personal contexts. The unit also develops understanding of:

- computer hardware and software
- computer programming
- cyber security
- data analysis
- artificial intelligence (AI)

On completion of the unit, learners can use a range of digital technologies to improve their personal effectiveness, increase their productivity and enhance their collaboration skills. They may progress to a wide range of more specialist Higher National Units related to computing and digital technologies.

Unit outcomes

Learners who complete this unit can:

1 describe the purpose and function of the components of a computer system
2 manage the storage and retrieval of data in a manner that is secure, legal and ethical
3 use software tools for productivity and collaboration in vocational and personal contexts
4 apply programming methods to write, test and execute program code
5 analyse and visualise data using digital tools
6 apply AI to perform a vocational task

Evidence requirements

Learners must provide product evidence for this unit. Knowledge evidence (outcome 1) is inferred from learners' product evidence.

The product evidence is made of the following digital artefacts (at least one of which should be produced collaboratively):

- a product that shows the key components of a computer system and describes how the components function to enable the processing of information
- screenshots relating to the use of operating system functions to configure a digital device and manage data
- screenshots relating to the application of cyber-security principles in managing data and devices
- screenshots showing collaboration through a social media platform and participation in video conferencing
- documents that demonstrate advanced features of text-processing in personal and vocational contexts
- spreadsheets that demonstrate advanced features of spreadsheet organisation in personal and vocational contexts
- documented program specification, code and outputs
- data tables and associated statistical measures
- charts and/or graphs
- documented prompts and output from a generative AI tool

This evidence must demonstrate that learners:

- observe good practice relating to secure data storage and retrieval
- can collaborate using video conferencing and messaging services
- understand the syntax and semantics of a programming language
- can check data quality, analyse data and create visualisations
- can use generative AI tools to generate text or images
- observe ethical good practice in their use of computing and data

Learners may produce evidence over an extended period of time in lightly-controlled conditions. Authentication is required when the evidence is produced in lightly-controlled conditions.

The standard of evidence should be consistent with the SCQF level of this unit.

Knowledge and skills

Knowledge	Skills
Learners should understand: ♦ number representation ♦ CPU operation ♦ computer hardware components and their functions ♦ measures of capacity and performance in digital devices ♦ operating system and other systems software ♦ data and file storage systems ♦ data security and backup, including cloud ♦ risks to data security (malware, social engineering) ♦ data security methods (encryption, passwords, multi-factor authentication) ♦ application software for productivity ♦ social media and other collaboration tools ♦ programming languages ♦ programming methods ♦ syntax and semantics of a programming language ♦ algorithms ♦ value of data ♦ data quality and data bias ♦ data analysis process ♦ data visualisations ♦ machine learning and AI ♦ large language models (LLMs) and generative AI ♦ ethical issues in the applications of computing and the use of AI	Learners can: ♦ describe the purpose and function of components in a personal computer (PC) ♦ customise and use a computer and other digital devices ♦ manage files and data on a digital device ♦ secure data on a digital device ♦ use software to produce digital content for personal and vocational purposes ♦ communicate, collaborate and share data using digital technology ♦ use browser and AI tools to search ♦ design, code and execute basic computer programs to automate tasks ♦ collect, organise and analyse data ♦ visualise data ♦ generate digital artefacts using generative AI tools ♦ critique output from generative AI

Meta-skills

You must give learners opportunities to develop their meta-skills throughout this unit. We've suggested how to incorporate the most relevant ones into the unit content, but you may find other opportunities.

Self-management

This includes focusing, integrity, adapting and initiative. The most relevant are:

- focusing:
  - sorting and filtering information
  - attention to detail
- integrity:
  - understanding ethics in the applications of computing
- adapting:
  - adapting to change
  - self-learning
  - showing resilience
- initiative:
  - independent thinking
  - decision making

Social intelligence

This includes communicating, feeling, collaborating and leading. The most relevant are:

- communicating:
  - receiving information
  - listening
  - giving information
  - storytelling
- feeling:
  - demonstrating a social conscience
- collaborating:
  - teamworking and collaboration
- leading:
  - influencing others
  - being a change catalyst

Innovation

This includes curiosity, creativity, sense-making and critical thinking. The most relevant are:

- curiosity:
  - information sourcing
  - recognising problems
- creativity:
  - using imagination
  - generating ideas
  - visualising data using digital tools
  - demonstrating maker mentality
- sense-making:
  - recognising patterns
  - holistic thinking
  - synthesis
  - recognising opportunities
  - analysing data using digital tools
- critical thinking:
  - deconstructing problems
  - logical thinking
  - judgement
  - computational thinking

Learning for Sustainability

Throughout this unit, you should encourage learners to develop their skills, knowledge and understanding of sustainability.

This includes:

- a general understanding of social, economic, and environmental sustainability
- a general understanding of the United Nations Sustainable Development Goals (SDGs)
- a deeper understanding of subject-specific sustainability
- the confidence to apply the skills, knowledge, understanding and values they develop in the next stage of their life

The UN SDG 4 (quality education) references acquiring digital and computing skills. There are other opportunities to show how the applications of computing can help to meet a range of SDGs, particularly those relating to economic development and more frugal use of resources.

Delivery of unit

This is a mandatory unit in HNC Computing. It provides foundational knowledge and skills, and you should deliver it before other units in the qualification. There may also be opportunities to deliver it concurrently with one or more specialised units.

The notional time for delivery and assessment is 120 hours. The amount of time you allocate to each outcome is at your centre's discretion. We suggest the following distribution of time, including assessment:

Outcome 1 — Describe the purpose and function of the components of a computer system
(15 hours)
Outcome 2 — Manage the storage and retrieval of data in a manner that is secure, legal and ethical
(20 hours)
Outcome 3 — Use software tools for productivity and collaboration in vocational and personal contexts
(15 hours)
Outcome 4 — Apply programming methods to write, test and execute program code
(30 hours)
Outcome 5 — Analyse and visualise data using digital tools
(25 hours)
Outcome 6 — Apply AI to perform a vocational task
(15 hours)

Additional guidance

The guidance in this section is not mandatory.

Content and context for this unit

This is a non-specialist, introductory unit, suitable for a wide range of learners. It delivers foundational knowledge and skills in the use of digital technology. You should take learners' existing knowledge and skills into account. The focus is on breadth rather than depth.

Approaches for delivery

It is important that learners experience a range of digital technologies, such as PCs, tablets, and smartphones. You should help learners understand the uses and features of these devices and appreciate their underlying technologies (processors, memories, input and output devices) and typical applications.

You should teach learners the purpose of the various components of a basic PC, along with a description of how they function in the operation of a computer. You should enable learners to acquire knowledge of the features and functionality of various device operating systems (for PCs, tablets, and smartphones).

In relation to application software, learners should be familiar with the main types of software used in personal and business contexts. You should focus on raising learners' competence level in their use of such software. For example, in the context of word processing, you should introduce learners to styles, automatic table of content generation, large document handling and document review features. In the context of spreadsheets, you should introduce them to a range of functions, lookups and pivot tables, with obvious links to the data analysis elements of the unit.

The treatment of cyber security should be sufficient to give learners an understanding of the main risks to digital data and to recognise the tools and techniques that mitigate those risks. For example, in the context of a PC, learners should know the hardware and software safeguards, and be able to set up and customise security through the operating system.

You should introduce the use of pseudocode to help learners understand logical program structure and algorithms. You should then teach the basic aspects of the syntax and semantics of a contemporary programming language that aligns with the unit outcomes. You should introduce learners to an integrated development environment (IDE) where they can experiment, write code, and receive instant feedback. Your objective is that learners can design, code and test basic computer programs with straightforward algorithms and simple data structures.

Explain to learners the importance of the value of data for decision making and innovation. You should teach them the data analysis process and exemplify the process by applying it to a dataset using a data analysis tool. You should cover the calculation and use of basic statistical measures, such as measures of central tendency (mean, median, and mode), and measures of dispersion (range, inter-quartile range, and standard deviation). You should

demonstrate the most common forms of visualisation of data and highlight good practice in the use of scales and labels to avoid misleading representations.

You should introduce the concept of big data and machine learning (ML) at a basic level, focusing on the use of data to train a predictive model. You should provide a brief introduction to the technological factors driving AI development, including algorithms and computational power. You should progress to a basic explanation of natural language processing (NLP) and the use of ML to create LLMs. Provide practical experiences with generative AI tools to create text and images through prompt engineering.

You should look for opportunities to discuss with learners legislative and ethical considerations relating to the applications of computing. For example, you could make learners aware of legislation relating to data protection (particularly when learning about cyber security) and the importance of data ethics (particularly when learning about data analysis and AI).

There will be many opportunities for you to integrate learning across outcomes. For example, you could ask learners to write code to automate a task that analyses data.

Approaches to assessment

A suitable approach to assessment would enable each learner to produce a set of digital artefacts that they can store in an e-portfolio. This e-portfolio could contain the following types of evidence:

- an infographic of the components of a computer system and their function
- screenshots relating to the use of operating systems functions
- screenshots relating to data or device security
- formatted text documents
- spreadsheets
- program code and screenshots of output
- data tables and statistical measures
- charts and/or graphs
- prompts and responses from generative AI

To reduce the burden of assessment while satisfying the evidence requirements, a product in the e-portfolio could demonstrate more than one evidence requirement. For example:

- a text document could evidence knowledge of legislation and ethics, along with the importance of data security and data quality
- a spreadsheet could demonstrate the analysis and visualisation of data
- program code could evidence an understanding of syntax and semantics

Equality and inclusion

This unit is designed to be as fair and as accessible as possible, with no unnecessary barriers to learning or assessment.

You must consider the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and those with additional support needs is available on the assessment arrangements web page.

Information for learners

Computing Foundations (SCQF level 7)

This information explains:

- what the unit is about
- what you should know or be able to do before you start
- what you need to do during the unit
- opportunities for further learning and employment

Unit information

This introductory unit improves your confidence in using computers and digital technology for a range of personal and vocational purposes. You gain knowledge and skills in:

- computer hardware and software (including digital devices)
- cyber security
- computer programming
- data analysis
- artificial intelligence (AI)

You do not need prior knowledge or skills in these aspects before starting the unit. However, you should have some familiarity with digital devices, such as a personal computer (PC) or tablet, and have confidence in working with numbers.

During the unit, you develop competence in the use of a range of digital devices, such as PCs and tablets. You use common software application packages that improve your productivity, including word processing and spreadsheet software. You learn to plan, code and test basic computer programs using a modern, high-level language.

In addition to this, you secure computers and digital devices against cyber attacks and protect your data. You access data and analyse it using a software tool such as a spreadsheet, and present your findings in a visualisation. Finally, you use an AI tool to generate text and image resources, and critique the outcomes.

Your are assessed through the execution of practical tasks. You may be asked to maintain a portfolio of your work in which you store the documents, spreadsheets, and programs that you create. Alternatively, you may be asked to carry out and report on specified practical assignments.

The foundational knowledge and skills in the unit prepares you to go on to more advanced units, such as those specialising in computer programming or computer science.

Meta-skills

Throughout this unit, you develop meta-skills for the computing sector. Meta-skills are transferable behaviours and abilities that help you adapt and succeed in life, study and work. There are three categories of meta-skills: self-management, social intelligence and innovation. Your use of computers and their applications contributes to your development of meta-skills such as computational thinking and problem solving. For example, you improve your self-management skills by making decisions based on data. You also cover ethics in the unit, and develop your numerical, communication and digital skills — particularly your digital literacy.

Learning for Sustainability

Throughout this unit, you develop skills, knowledge and understanding of sustainability.

You learn about social, economic and environmental sustainability principles and how they relate to the computing sector. You also develop an understanding of the United Nations Sustainable Development Goals.

The application of computing can help nations achieve goals such as increased economic activity.

Administrative information

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Superclass: CB

History of changes

Version	Description of change	Date
1.0	♦ Title change from Digital Skills. ♦ Content adjustment to include generative AI.	August 2024

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