

Next Generation Higher National Unit Specification

Professional Practice in Computing (SCQF level 7)

Unit code: J6BD 47

SCQF level: 7 (32 SCQF credit points)

Valid from: session 2023 to 24

Prototype unit specification for use in pilot delivery only (version 3.0) January 2024

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

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Unit purpose

This specialist, project-based unit provides learners with the knowledge and skills to plan and manage a team project. This equips them to work collaboratively in a project team to design, implement and evaluate a digital solution to a real-world problem using their existing knowledge and skills in computing. Learners develop their proficiency in project management, professional development and meta-skills in a team project with a computing context, such as software development or data analysis.

Learners normally take this unit as part of HNC Computing, but they can also do it on a stand-alone basis. They should have knowledge and understanding of a broad range of computing concepts and be proficient in technical skills relating to computing before starting this unit. We recommend that learners have completed the Digital Skills unit at SCQF level 7, together with other units from the HNC Computing framework.

Learners who complete this unit:

- ◆ have team working skills, including collaboration and communication
- ◆ understand the methods and toolsets for project management
- ◆ are aware of the professional standards expected from a practitioner in the field
- ◆ can demonstrate behaviours consistent with professional practice
- ◆ have self-assessed their meta-skills and sought to improve specific skills
- ◆ can demonstrate sustainability skills in a vocational context

Unit outcomes

Learners who complete this unit can:

- 1 work in a project team
- 2 contribute to project planning and implementation
- 3 develop a digital solution
- 4 contribute to digital transformation
- 5 communicate the digital solution
- 6 exhibit professional practice and behaviours
- 7 develop meta-skills in a vocational context
- 8 evaluate their contribution to a project
- 9 develop sustainability knowledge and understanding, and skills, in a vocational context

Evidence requirements

Learners must provide evidence of professional development and meta-skills development.

Evidence of professional development takes two forms: product evidence and performance evidence.

The product evidence relates to outcomes 2, 3, 4 and 8. This evidence is a digital product that addresses a real-world problem for a business or organisation. The product must address a real-world need and contribute towards digital transformation. It must be sufficiently complex to require formal project management and development approaches. This must be produced in a project team of at least three learners. Individual learners may take lead roles at specific stages, but every learner must be involved in every stage of product development.

Learners can produce product evidence over an extended period in lightly-controlled conditions. Evidence produced in lightly-controlled conditions must be authenticated. The [Guide to Assessment](#) provides further advice on methods of authentication.

The product evidence is:

- 1 project plan, including a project timeline and record of meetings
- 2 digital product that meets the problem requirements
- 3 project report (including project evaluation)
- 4 product documentation (technical and user)
- 5 presentation of project and outcomes
- 6 personal statement

The project team must collectively produce items 1 to 5. Each learner must produce item 6 and must include a self-evaluation of their contribution to the project and evaluation of the overall performance of the team.

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The digital product must satisfy the requirements set out in the problem specification and the team must demonstrate that it works through successful testing. The technical skills that learners demonstrate must match the SCQF level of the unit.

The performance evidence addresses outcomes 1, 2, 5 and 6 and is in two parts:

- ◆ observation checklist
- ◆ recording of performance during presentation

The observation checklist records the following aspects of a learner's performance:

- ◆ The learner's participation in teamwork and their contribution to project planning and implementation
- ◆ The learner's professional practice and behaviours throughout the project.

You must ensure that assessors judge the project team's performance evidence.

The presentation must:

- ◆ explain the real-world problem being addressed
- ◆ present the digital solution
- ◆ explain how the solution resolved the problem
- ◆ explain how the solution contributes to digital transformation
- ◆ evaluate the solution

The presentation must be scheduled, timed and supervised.

You should complete an observation checklist throughout the delivery of the unit

The SCQF level of this unit provides additional context relating to the quality of evidence.

Learners must produce product evidence for outcome 7 that show they have:

- ◆ self-assessed their meta-skills baseline
- ◆ created a plan for their own meta-skills development
- ◆ carried out activities to develop and demonstrate their meta-skills
- ◆ used reflective practice to monitor and assess the meta-skills they have improved and/or developed

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Skills 4.0, a skills model to drive Scotland's future outlines three categories of meta-skills. These are:

- ◆ self-management
- ◆ social intelligence
- ◆ innovation

Each of these categories comprises four meta-skills and a number of sub-skills. See the Educator Guide for more information.

Learners must produce evidence for outcome 9 that demonstrates they can:

- ◆ identify and describe sustainability in the context of the United Nations Sustainable Development Goals (UN SDGs)
- ◆ explain how one product or process relevant to computing could be made more sustainable to help meet the aims of at least two selected UN SDGs

Grading

You can use evidence from this unit when determining a learner's overall qualification grade. Please refer to the grading model in the Next Generation Higher National Educator Guide.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
<p>Learners should understand:</p> <ul style="list-style-type: none"> ◆ roles and responsibilities in a project team ◆ team organisation and team dynamics ◆ project management concepts and methods ◆ project review and evaluation ◆ types of documentation ◆ digital transformation ◆ organisational structures ◆ business processes and process optimisation ◆ product digitisation ◆ customer or user experience ◆ legislation relating to digital transformation ◆ professional bodies ◆ professional and ethical standards ◆ body of knowledge associated with the profession ◆ professional learning and continual professional development ◆ meta-skills frameworks ◆ evaluation techniques including peer review and self-evaluation ◆ sustainability concepts ◆ the UN SDGs 	<p>Learners can:</p> <ul style="list-style-type: none"> ◆ work collaboratively in a team ◆ communicate ideas through text visualisations or oral mediums ◆ demonstrate interpersonal skills including empathy ◆ demonstrate problem solving and creativity skills ◆ demonstrate decision making and conflict resolution ◆ act on feedback ◆ plan projects using project management software ◆ manage activities in line with plan ◆ organise and conduct meetings ◆ keep records ◆ adapt activities as project progresses ◆ demonstrate computational thinking ◆ demonstrate analysis skills ◆ demonstrate design skills ◆ demonstrate technical skills ◆ write technical reports ◆ write documentation ◆ demonstrate professional and ethical conduct ◆ evaluate and critically reflect ◆ improve sustainability in a product or process

Meta-skills

Throughout the unit, learners develop meta-skills to enhance their employability in the computing sector.

Self-management

The unit gives the learner the opportunity to develop the following skills:

- ◆ focusing: demonstrating the attention to detail that developing program code and syntax demands and that is crucial to successful coding practices
- ◆ adapting: critical reflection on the processes of the project, the roles that the learner has played, and the knowledge and skills gained; self-learning, encouraged by the project based nature of the unit
- ◆ initiative: displaying independent thinking, demonstrating the self-motivation, responsibility and decision making required to reach project milestones with objectives and deliverables at each stage

Social intelligence

The unit gives the learner the opportunity to develop the following skills:

- ◆ communicating: receiving information; empathy with other learners' thoughts intentions and ideas
- ◆ collaborating: listening and conveying information
- ◆ leading: influencing, inspiring and motivating others; being a change catalyst

Innovation

The unit gives the learner the opportunity to develop the following skills:

- ◆ curiosity: information sourcing; recognising problems and devising solutions
- ◆ creativity: maker mentality; imagination; visualising; contributing positively to the creative design of a software solution; application of design principles and careful analysis of requirements
- ◆ sense making: pattern recognition; holistic thinking; analysis
- ◆ critical thinking: logical and computational thinking, decomposition, judgement

Delivery of unit

You should deliver this unit in the final phase of the HNC Computing course. Learners should only attempt it once they have completed the Digital Skills at SCQF level 7 unit and acquired sufficient knowledge and technical skills from their optional units. The distribution of time (160 hours) is less critical in this unit than other units because of its project-based nature.

The following distribution of time is suggested.

- ◆ Acquiring underpinning knowledge and skills such as project management and meta-skills (40 hours)
- ◆ Project activities (120 hours)

Additional guidance

The guidance in this section is not mandatory.

Context for delivery

This is a project-based unit that can be carried out in a variety of contexts such as:

- ◆ software development
- ◆ data analysis
- ◆ cyber security
- ◆ web development

Irrespective of the context, learners must produce a digital product, such as a piece of software, interactive website, data analysis or security analysis. For example, a group of four learners may carry out a software development project, which seeks to automate an existing manual process as part of an organisation's digital transformation.

This unit focuses on team working, project management, and developing professional behaviours and meta-skills. However, learners must demonstrate significant technical skills as part of their professional practice, and the resulting digital product must reflect this. You should emphasise throughout the unit the relationship between professionalism and technical expertise. The assessment should make that relationship explicit.

The defined knowledge and skills are developed in the context of a specific project. For example, learners should understand what 'roles and responsibilities in a project team' (knowledge) are in the context of software development, web development or whatever specific context applies to the project. 'Visualisation' (skill) will vary depending on the nature of the project. For example:

- ◆ in a data analysis project, visualisation would refer to the visuals created to provide insights into datasets
- ◆ in a software development project, visualisation would refer to the diagrams used to aid the software development process, such as Use Case and Sequence diagrams

Project and project team

Each project team should be responsible for selecting their own project. The project should contribute to real-life digital transformation. For example, a project team might choose to carry out an analysis of data held by a college on its learner population. This could provide useful insights to college management on the composition of learners and trends in recruitment that may lead to changed future practices.

The project must be carried out in a group of at least three learners. We recommend that team members are pre-selected by academic staff to reflect the diversity of age, gender, technical skills and other characteristics likely to be experienced in a typical project team.

Every team member must contribute to all stages in the project. We recommend that specific learners play a lead role in each stage. For example, in the context of a programming project,

one learner could take a lead role in analysis and design, another in development and testing, and another in implementation and documentation. However, all learners would contribute to analysis, design, development, testing, implementation and documentation.

Delivery schedule

The distribution of time (160 hours) is less critical in this unit than other units because of its project-based nature. Most of the time is spent on product design and development.

You should begin by introducing learners to the basic concepts of project planning and project management to equip them with the knowledge and skills to participate in a project team. You should introduce software tools that facilitate project management.

The professional knowledge and technical skills that are listed in the knowledge and skills section can be assumed to be covered in the mandatory and optional units of the HNC. The focus of this unit is the acquisition of project management and team-working skills and the application of existing computing knowledge and skills to a problem while working in a project team.

Assessment

The assessment for this unit may be analytic or holistic.

An analytical approach could involve marking each piece of evidence. The product evidence could contribute 50% to the overall mark, and performance evidence 50%. The marks could be distributed as follows:

◆ Project plan and project report	10%
◆ Digital product and product documentation	40%
◆ Presentation	10%
◆ Performance in presentation	10%
◆ Personal statement	10%
◆ Observation checklist	20%

Note that while the meta-skills self-assessment must be evidenced by the learner, it does not contribute to the final mark.

A holistic approach to assessment would require the development of rubrics from the defined knowledge and skills and their application to the product and performance evidence.

Meta-skills and professional development

The development of each learner's professionalism and meta-skills is a vital part of this unit. We recommend that learners should self-assess meta-skills at the start and towards the end of this unit to gauge their improvement.

Learners should make reference to recognised standards of professional practice and codes of conduct for information technology professionals, such as the [British Computer Society's Code](#). You should emphasise ethical standards when you deliver the course.

The team focus, collaboration, project management, and communication elements of this unit point to the development of social intelligence skills. Self-management is also key with the need for initiative, resilience, and focus. Critical thinking and creativity will be needed for problem solving and idea generation. Here are some ways in which you might facilitate the development of these meta-skills.

Self-management

- ◆ Encourage learners to set and regularly review personal goals for improving time management, focus, and productivity.
- ◆ Develop resilience with setbacks through the practice of troubleshooting problems.

Social Intelligence

- ◆ Get teams to share accomplishments and challenges to practice communication.
- ◆ Have each learner take a leadership role in the project to build motivation and organising skills.

Innovation

- ◆ Promote the use of brainstorming sessions to generate creative ideas for the project and prototype solutions.
- ◆ Direct teams to decompose bigger problems into computational thinking tasks and sub-problems.

You should reinforce meta-skill development throughout this unit and connect project activities to meta-skill growth.

Your approach to sustainability should raise awareness of its economic, social and environmental aspects. You should introduce learners to the UN SDGs before asking them to explain how one product or process relevant to computing could be made more sustainable to help meet the aims of at least two UN SDGs that they have selected.

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 should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

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

www.sqa.org.uk/assessmentarrangements.

Information for learners

Professional Practice in Computing (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 unit develops your professional practice in solving computing problems and involves you working as part of a team to carry out a project. The unit can contribute to whole qualification grading for HNC Computing.

You are expected to have a wide range of technical knowledge and skills before starting this unit. The focus is team working, product development, and improving your professionalism and meta-skills. You do not learn new technical skills during this unit, other than those required for project management and team working.

This is a project-based unit. Working with other learners, you develop a digital solution to a real-world problem. You and your team have scope to choose your project, that might involve:

- ◆ developing a piece of software
- ◆ producing an interactive website
- ◆ carrying out data analysis
- ◆ producing a database system
- ◆ re-designing a network

Along with other team members, you develop a digital solution that contributes to an organisation's digital transformation. You design, develop and present the solution, and are involved in every stage of product design, development and delivery.

You are assessed on your individual contribution to the problem solution and your participation as a member of the project team. You produce a reflective report on your work in the project and provide evidence of meta-skills development and an understanding of sustainability as it applies to computing.

Evidence from this unit can be used to determine your overall final grade.

When you finish this unit you can progress to other project-based units at SCQF level 7 and above.

Administrative information

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Superclass: AG

History of changes

Version	Description of change	Date
2.0	We made changes to reflect that learners are expected to have prior professional knowledge and technical skills, as this unit focuses on them applying their existing knowledge and skills in a project team. We added additional information to reflect that project management concepts and methods are taught as part of this unit.	August 2023
3.0	Added Learning for Sustainability (LFS)	January 2024

Note: please check [SQA's website](#) to ensure you are using the most up-to-date version of this document.