National Unit Specification

General information

Unit title: Artificial Intelligence (SCQF level 4)

Unit code: J8E0 44

Superclass: CB

Publication date: July 2024

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

The purpose of this non-specialist unit is to introduce learners to the basics of Artificial Intelligence (AI). This unit focuses on fundamentals, including the history, applications and ethical issues relating to AI. This unit is designed for individuals with a general interest in AI. No previous knowledge or experience of AI is required. This unit is suitable for all learners.

The unit covers the fundamental concepts of AI, its applications in various contexts, and potential risks of misuse. Learners will explore different types of AI and the technologies behind them, such as Machine Learning and Large Language Models. Additionally, they will develop practical skills in training and testing simple models.

On completion of this unit, learners will possess a basic understanding of the field of Artificial Intelligence including terminology, historical roots, practical applications, and ethical implications.

Learners could progress to J8E0 45 Artificial Intelligence at SCQF level 5.

National Unit Specification: General information (continued)

Unit title: Artificial Intelligence (SCQF level 4)

Outcomes

On successful completion of the unit the learner will be able to:

1. Identify the key stages in the development of Artificial Intelligence.
2. Describe the applications of Artificial Intelligence.
3. Describe ethical issues relating to the use of Artificial Intelligence.
4. Train and test a simple AI model.

Credit points and level

1 National Unit credit at Scottish Credit and Qualifications Framework (SCQF) level 4: (6 SCQF credit points at SCQF level 4).

Recommended entry to the unit

No previous knowledge or experience of AI is required. A familiarity with digital devices is assumed.

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this unit specification. There is no automatic certification of Core Skills or Core Skill components in this unit.

Context for delivery

If this unit is delivered as part of a group award, it is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

For example, if this unit is delivered as part of the National Progression Award in Computing Technologies at SCQF level 4, it will follow the mandatory unit J8DW 44 Computing Foundations (SCQF level 4) and may contribute towards J8DY 44 Computing: Project (SCQF level 4).

Equality and inclusion

This unit 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. Further advice can be found on our website: SQA Assessment Arrangements (www.sqa.org.uk/assessmentarrangements).

National Unit Specification: Statement of standards

Unit title: Artificial Intelligence (SCQF level 4)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Identify the key stages in the development of Artificial Intelligence.

Performance criteria

(a) State the definition of AI.
(b) State the origins of AI.
(c) Identify categories of AI.
(d) Identify key stages in the development of AI.

Outcome 2

Describe the applications of Artificial Intelligence.

Performance criteria

(a) Describe the applications of AI in different sectors.
(b) Describe the role of Machine Learning within AI.
(c) Describe Large Language Models.
(d) Describe uses of generative AI.
(e) Describe current and potential future benefits of AI.

Outcome 3

Describe ethical issues relating to the use of Artificial Intelligence.

Performance criteria

(a) Describe the impact of AI on employment.
(b) Describe privacy concerns relating to the use of AI.
(c) Describe how AI can produce incorrect results.
(d) Describe how AI systems can be biased.
(e) Describe how AI bias can lead to discriminatory outcomes.

National Unit Specification: Statement of standards (continued)

Unit title: Artificial Intelligence (SCQF level 4)

Outcome 4

Train and test a simple AI model.

Performance criteria

(a) Apply a model to solve a problem.
(b) Prepare training data for the model.
(c) Train the model to solve a defined problem.
(d) Test the model against the problem.
(e) Modify the model after testing.

Evidence requirements for this unit

Evidence is required to demonstrate that learners have achieved all outcomes and performance criteria. The evidence requirements for this unit will take two forms.

1. Knowledge evidence.
2. Product evidence.

The knowledge evidence will relate to outcome1, outcome 2 and outcome 3. The knowledge evidence may be written or oral or a combination of these. All performance criteria must be evidenced. Minimal evidence may be used to infer competence. The statements and descriptions for the key stages, applications and ethical issues may be straightforward but examples should be provided where appropriate. Knowledge evidence may be produced over the life of the unit, in lightly controlled conditions, with access to reference materials.

The knowledge evidence may be sampled when testing is used. Testing must be carried out under supervised conditions and must be controlled in terms of location and time. Access to reference material is not permitted. The sampling frame, on all occasions, must include outcome 1, outcome 2 and outcome 3 (but not every performance criterion within each outcome).

Product evidence will relate to outcome 4. It will take the form of an AI model that has been through the stages of the AI model life cycle.

The product evidence for outcome 4 must demonstrate that learners can:

1. Define a problem that could be solved with AI.
2. Create or source an appropriate data set.
3. Use an existing system or construct a close approximation to train their own AI model.
4. Test the model’s performance in addressing the original problem to gauge effectiveness and identify areas for enhancement.

National Unit Specification: Statement of standards (continued)

Unit title: Artificial Intelligence (SCQF level 4)

The problem may be familiar and simple to solve.

When evidence is produced in loosely controlled conditions it must be authenticated. The guide to assessment provides further advice on methods of authentication.

The SCQF level of this unit (level 4) provides additional context on the nature of the required evidence and the associated standards. Appropriate level descriptors should be used when making judgements about the evidence.

The Support Notes section of this specification provides specific examples of instruments of assessment that will generate the required evidence.

National Unit Support Notes

Unit title: Artificial Intelligence (SCQF level 4)

Unit support notes are offered as guidance and are not mandatory.

While the exact time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this unit

The purpose of this unit is to develop learners' knowledge of artificial intelligence and build practical skills for training AI models. This unit can be undertaken using a variety of AI tools that do not require coding experience.

Learners will require access to appropriate software to undertake this unit. Coding a model is not required and there is a range of software that could be used to provide the required functionality including:

- Teachable Machine (https://teachablemachine.withgoogle.com)
- Machine Learning for Kids (https://machinelearningforkids.co.uk)
- Lobe (www.lobe.ai)
- Obviously AI (www.obviously.ai)
- Runway (www.runwayml.com/ai-tools/ai-training/)

The data sets used should be large and from a familiar context. Learners can use pre-existing data sets or create their own. Data sets are available online from various sources, including:

- Kaggle (www.kaggle.com)
- UC Irvine (www.archive.ics.uci.edu)
- Hugging Face (www.huggingface.co)
- Trello NPA Data Science (www.trello.com/b/TGMf9U4S/npa-curricular-resources)
- data.world (www.data.world/datasets/open-data)

National Unit Support Notes (continued)

Unit title: Artificial Intelligence (SCQF level 4)

Guidance on approaches to delivery of this unit

This unit is a mixture of theory and practical. outcome1, outcome2 and outcome 3 relate to theory and outcome 4 relates to practical work.

It is recommended that the outcomes are taught in sequence. Outcome 1 provides an introduction to the field, outcome 2 introduces applications and technical detail, outcome 3 presents the ethical issues surrounding the technology and outcome 4 applies this knowledge to train an AI model to solve a problem. However delivering outcome 3 after outcome 4 could provide learners with the practical experience to inform their discussion around the ethical considerations.

There are many sources of engaging content on AI to help achieve outcome 1, outcome 2 and outcome 3.

- The AI Education Project (www.aiedu.org)
- The Alan Turing Institute (www.turing.ac.uk/courses)
- Raspberry Pi Foundation (www.experience-ai.org)
- Machine Learning for Kids (https://machinelearningforkids.co.uk)
- AI 4 All (www.ai-4-all.org/resources)
- NCCE (www.teachcomputing.org/artificial-intelligence)
- Scottish AI Alliance (www.scottishai.com/resources)

The theory content for outcome 1, outcome 2 and outcome 3 could be reinforced with practical experience with existing AI tools such as:

- ChatGPT (www.openai.com/chatgpt)
- Gemini (https://gemini.google.com/app)
- Copilot (https://copilot.microsoft.com)
- Akinator (www.akinator.com)
- AI Dungeon (www.aidungeon.com)
- This Person Does Not Exist (www.thispersondoesnotexist.com)
- Magic Sketchpad (www.magic-sketchpad.glitch.me)
- Magenta (https://magenta.tensorflow.org/demos)
- Quick Draw (https://quickdraw.withgoogle.com)
- Hugging Face (www.huggingface.co/spaces)
- Suno (www.suno.com)

National Unit Support Notes (continued)

Unit title: Artificial Intelligence (SCQF level 4)

It is recommended that a problem solving approach is taken to teaching and learning for outcome 4. Learners should develop their skills and knowledge by solving various problems across different contexts. Problems should be familiar, for example learners could:

- Train an image recognition model to differentiate between two objects.
- Train an audio recognition model to differentiate between two voices.
- Train an pose recognition model to differentiate between two poses.
- Train a predictive model to predict missing data in a CSV file.

A suggested distribution of time, across the outcomes, is:

Outcome 1: 8 hours.
Outcome 2: 8 hours.
Outcome 3: 8 hours.
Outcome 4: 16 hours.

Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Summative assessment may be carried out at any time. However, when testing is used (see evidence requirements) it is recommended that this is carried out towards the end of the unit (but with sufficient time for remediation and re-assessment). When continuous assessment is used (such as the use of a portfolio), this could commence early in the life of the unit and be carried out throughout the unit.

A traditional approach to assessment might involve the use of a test for knowledge evidence and a practical exercise for performance evidence. The test could comprise a selected response (multiple-choice) test of learners' knowledge of outcome 1, outcome 2 and outcome 3. The questions would relate to the identifications, statements and descriptions defined in the performance criteria. The test would sample from the knowledge domain (outcome 1, outcome 2 and outcome 3). An appropriate pass mark would be set. The practical exercise would lead learners through the steps required to train and test an AI model to solve a simple problem. Learners can be provided with a test plan template. The data set would be provided and a written report produced for the evaluation.

National Unit Support Notes (continued)

Unit title: Artificial Intelligence (SCQF level 4)

A contemporary approach to assessment might involve the creation of a portfolio. The portfolio would be produced over the life of the unit. The completed portfolio would have to satisfy all performance criteria. The product evidence could include written reports or captured video of learner produced AI models with:

- a description of the model purpose.
- an explanation of how the model was trained.
- a demonstration of the functioning model.
- testing results.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at SQA e-Assessment. (www.sqa.org.uk/Guide to best practice.pdf).

Opportunities for developing Core and other essential skills

This unit provides opportunities to develop Core Skills, particulary Information and Communication Technology (ICT), Problem Solving and Communication.

Communication skills will be used throughout the unit. In particular outcome 1, outcome 2 and outcome 3 where learners have to demonstrate their understanding of fundamental Artificial Intelligence concepts.

Information and Communication Technology (ICT) and Problem Solving skills will be used throughout the unit, particulary outcome 4 when learners work with data sets and create Artificial Intelligence models.

History of changes to unit

Version	Description of change	Date

Unit template: February 2024

General information for learners

Unit title: Artificial Intelligence (SCQF level 4)

This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit will provide a basic introduction to Artificial Intelligence. It will explore the history, applications and ethical issues of AI while also offering an overview of how to create your own AI models.

In outcome 1 you will cover the history of AI, laying a foundation of knowledge while familiarising yourself with essential terminology. You will also discover the events that have shaped the evolution of the field.

In outcome 2 you will explore the versatile applications of AI across various industries. Additionally, you will enhance your technical comprehension of diverse AI models, such as Large Language Models and Generative AI.

In outcome 3 you will reflect on the ethical considerations surounding AI. This entails examining potential flaws within the technology and its potential impact on employment opportunities.

In outcome 4 you will learn how to create your own AI. There will be a variety of tasks that your AI could perform such as prediciting missing values in a spreadsheet or recognising objects and sounds.

The assessment for this unit might include a test of your knowledge and a demonstration of your practical skills.

When you complete this unit, you could progress to J8E0 45 Artificial Intelligence at SCQF level 5.