



National Unit Specification

General information

Unit title: Artificial Intelligence (SCQF level 5)

Unit code: J8E0 45

Superclass: CB

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Source: Scottish Qualifications Authority

Version: 01

Unit purpose

The purpose of this non-specialist unit is to introduce learners to Artificial Intelligence (AI). This unit focuses on the history, current applications, ethics, risks and opportunities posed by AI technology. This unit is designed for individuals with a general interest in AI. It is suitable for all learners.

The unit introduces learners to the history of AI, how it is used in contemporary settings and the opportunities and risks posed by the technology. Learners will explore the relationship between AI, data science and machine learning. They will also cover categories of AI and the training paradigms used. Practical skills are also developed in training and testing simple models.

On completion of this unit, learners will understand the core principles of Artificial Intelligence covering the history, current applications, opportunities and risks posed by the technology.

Learners could progress to J8E0 46 Artificial Intelligence at SCQF level 6.

National Unit Specification: General information (continued)

Unit title: Artificial Intelligence (SCQF level 5)

Outcomes

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

1. Describe the historical development of Artificial Intelligence.
2. Describe current applications of Artificial Intelligence.
3. Describe ethical issues relating to the use of Artificial Intelligence, and the risks and opportunities posed by the technology.
4. Train and test an AI model.

Credit points and level

1 National Unit credit at Scottish Credit and Qualifications Framework (SCQF) level 5: (6 SCQF credit points at SCQF level 5).

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 5, it will follow the mandatory unit J8DW 45 Computing Foundations (SCQF Level 5) and may contribute towards J8DY 45 Computing: Project (SCQF level 5).

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](http://www.sqa.org.uk/assessmentarrangements) (www.sqa.org.uk/assessmentarrangements).

National Unit Specification: Statement of standards

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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

Describe the historical development of Artificial Intelligence.

Performance criteria

- (a) Describe the purpose of AI.
- (b) Describe the origins of AI.
- (c) Describe the difference between narrow and general AI.
- (d) Describe the history of AI including key milestones.
- (e) Describe the technological advancements that enable the development of AI.

Outcome 2

Describe current applications of Artificial Intelligence.

Performance criteria

- (a) Describe how contemporary applications of AI have impacted different sectors.
- (b) Describe how generative AI differs from traditional AI systems.
- (c) Describe the relationship between AI, data science and Machine Learning.
- (d) Describe Machine Learning paradigms including supervised, unsupervised and reinforcement learning.

Outcome 3

Describe ethical issues relating to the use of Artificial Intelligence, and the risks and opportunities posed by the technology.

Performance criteria

- (a) Describe the impact of AI on employment across multiple sectors.
- (b) Describe the ethical concerns of how generative AI produces content.
- (c) Describe the factors that can lead to an AI system presenting a bias.
- (d) Describe the risks and opportunities posed by the AI alignment problem.
- (e) Describe the risks and opportunities posed by a potential AI explosion.

National Unit Specification: Statement of standards (continued)

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Outcome 4

Train and test an AI model.

Performance criteria

- (a) Select a model to solve a problem.
- (b) Prepare training data for an AI model.
- (c) Train the model to solve a defined problem.
- (d) Develop and execute a test plan for the model.
- (e) Identify improvements and modify the model.

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 outcome 1, 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 milestones, 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).

The 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 should demonstrate that learners can:

- define a real-world problem that could be solved with AI.
- create or source an appropriate data set.
- use an existing system or construct a close approximation to train their own AI model.

- create a test plan for the model.
- test the model and identify areas for enhancement.

National Unit Specification: Statement of standards (continued)

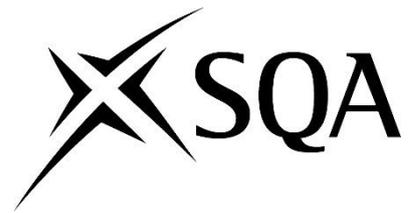
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The problem may be familiar and non-complex but must be consistent with the level of this unit.

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 5) 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 5)

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

This unit is intended for learners who are new to AI and those looking to further develop their existing knowledge and skills. However, it is recommended basic competency in digital literacy is required. This may be evidenced by possession of the Core Skills units in Information and Communication Technology (ICT) or Digital skills related unit at SCQF level 4 or level 5.

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.

Descriptions of machine learning paradigms should be clear, simple and only focus on the fundamental concepts.

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/) (<https://teachablemachine.withgoogle.com/>)
- [Machine Learning for Kids](https://machinelearningforkids.co.uk) (<https://machinelearningforkids.co.uk>)
- [Lobe](http://www.love.ai) (www.love.ai)
- [Obviously AI](http://www.obviously.ai) (www.obviously.ai)
- [Runway](http://www.runwayml.com/ai-tools/ai-training/) (www.runwayml.com/ai-tools/ai-training/)

National Unit Support Notes (continued)

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The data sets used should be large, varied and include familiar and unfamiliar contexts. Familiar data would be appropriate to use in the early stages of the unit, but unfamiliar data should be introduced to reinforce learning in new and unfamiliar contexts.

Learners can use pre-existing data sets or create their own. Data sets are available online from various sources, including:

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

Guidance on approaches to delivery of this unit

This unit is a mixture of theory and practical. Outcome 1, outcome 2 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 \(www.aiedu.org\)](http://www.aiedu.org)
- [The Alan Turing Institute \(www.turing.ac.uk/courses\)](http://www.turing.ac.uk/courses)
- [Raspberry Pi Foundation \(www.experience-ai.org\)](http://www.experience-ai.org)
- [Machine Learning for Kids \(https://machinelearningforkids.co.uk\)](https://machinelearningforkids.co.uk)
- [AI 4 All \(www.ai-4-all.org/resources\)](http://www.ai-4-all.org/resources)
- [NCCE \(www.teachcomputing.org/artificial-intelligence\)](http://www.teachcomputing.org/artificial-intelligence)
- [Scottish AI Alliance \(www.scottishai.com/resources\)](http://www.scottishai.com/resources)

National Unit Support Notes (continued)

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

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

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 familiar and unfamiliar contexts. For example learners could:

- Train an image recognition model to differentiate between three objects, for example:
 - Types of animal
 - Types of fruit
- Train an audio recognition model to differentiate between three sounds, for example:
 - Voices
 - Emotions
- Train a pose recognition model to differentiate between three poses, for example:
 - Sitting, standing and lying
 - Yoga poses
- Train a predictive model to predict missing data in a CSV file, for example:
 - Illness based on symptoms
 - Salary based on career details

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.

National Unit Support Notes (continued)

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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 descriptions and explanations 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 problem. Learners would create their own test plan and source their own data set.

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.
- Modifications to the model after testing.

National Unit Support Notes (continued)

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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](http://www.sqa.org.uk/SQA_e-Assessment). ([www.sqa.org.uk/Guide to best practice.pdf](http://www.sqa.org.uk/Guide%20to%20best%20practice.pdf)).

Opportunities for developing Core and other essential skills

This unit provides opportunities to develop Core Skills, particularly 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 core AI concepts.

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

History of changes to unit

Version	Description of change	Date

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Unit template: February 2024

General information for learners

Unit title: Artificial Intelligence (SCQF level 5)

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 cover concepts of Artificial Intelligence. It will explore the history, current applications, ethical issues (including risks and opportunities) while also building the skills to train an AI model.

In outcome 1 you will cover key AI concepts and build your understanding of AI classifications.

In outcome 2, you'll examine AI's role in contemporary society, delving into its present-day applications and its influence on various industries. Additionally, you'll enhance your comprehension of generative AI, data science, machine learning.

In outcome 3 you will reflect on the ethical considerations surrounding AI. This entails examining content generation, the alignment problem and the prospect of AI super intelligence.

In outcome 4, you'll acquire the skills to develop your own AI systems. You'll have the chance to engage with various categories, including AI recognition and prediction.

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 46 Artificial Intelligence at SCQF level 6.