



Physics (National 4)

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:	Physics (National 4)
SCQF:	level 4 (24 SCQF credit points)
Course code:	to be advised

Mandatory Units

Physics: Space (National 4) 6 SCQF credit points

Physics: Technology (National 4) 6 SCQF credit points

Physics: Energy (National 4) 6 SCQF credit points

Added Value Unit

Physics (National 4) 6 SCQF credit points

This Course includes six SCQF credit points for the assessment of added value in the Added Value Unit. Further information on this Unit 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 and knowledge required by one or more of the following or by equivalent qualifications and/or experience:

- ◆ Physics (Access 3) Course or relevant component Units
- ◆ Biology (Access 3) Course or relevant component Units
- ◆ Chemistry (Access 3) Course or relevant component Units
- ◆ Environmental Science (Access 3) Course or relevant component Units
- ◆ Science (Access 3) Course or relevant component Units

In terms of prior learning and experience, relevant experiences and outcomes may also provide an appropriate basis for doing this Course. Further information on relevant experiences and outcomes will be given in the *Course Support Notes*.

Progression

This Course or its components may provide progression to:

- ◆ other SQA qualifications in Physics or related areas
- ◆ further study, employment 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 an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and 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

Through learning in physics, learners develop their interest in and understanding of the world. They engage in a wide range of investigative tasks, which allows them to develop important skills to become creative, inventive and enterprising, in a world where the skills and knowledge developed by physics are needed across all sectors of society.

The Course allows learners to understand and investigate the world in an engaging and enjoyable way. It develops learners' ability to think analytically, creatively and independently, and to make reasoned evaluations. The Course provides opportunities for learners to acquire and apply knowledge, to evaluate environmental and scientific issues, to consider risk, and to make informed decisions. This can lead to learners developing an informed and ethical view of topical issues. Learners will develop skills in communication, collaborative working and leadership, and apply critical thinking in new and unfamiliar contexts to solve problems.

Purpose and aims of the Course

Science is vital to everyday life, and allows us to understand and shape the world in which we live and influence its future. Scientists play a key role in meeting society's needs in areas such as medicine, energy, industry, material development, the environment and sustainability. As the importance and application of science continues to grow and develop, more trained scientists will be required. It is also important that everyone has an informed view of science.

The Course is practical and experiential, and develops scientific understanding of issues relating to physics. It aims to generate interest and enthusiasm in physics, and to enable learners to develop confidence in recognising and communicating ideas on scientific phenomena.

Learners will develop the ability to solve problems and establish relationships in physics by acquiring a broad knowledge base, practical skills and basic mathematical skills.

The main aims of this Course are for learners to:

- ◆ develop scientific and analytical thinking skills in a physics context
- ◆ develop an understanding of the role of physics in scientific issues
- ◆ acquire and apply knowledge and understanding of concepts in physics
- ◆ develop understanding of relevant applications of physics in society

The Course gives learners an insight into the underlying nature of our world and its place in the universe. From the sources of the power we use, to the exploration of space, it covers a range of applications of the relationships that have been discovered through experiment and calculation, including those used in modern technology. Advances in physics mean that our view of what is possible is continually being updated. This Course allows learners to understand the processes behind scientific advances, and to appreciate and contribute to topical scientific debate.

The Course will therefore enable learners to become scientifically literate citizens, while developing their literacy and numeracy skills. It will also develop learners' investigative and experimental skills in a physics context. Learners will recognise the impact physics makes on their lives, the environment and society.

Through this Course, learners can develop relevant skills for learning, for use in everyday life, and across all sectors of employment. Due to the inter-disciplinary nature of science, learners benefit from studying physics along with other subjects from the sciences, technologies and mathematics curriculum areas.

Information about typical learners who might do the Course

The Course is suitable for learners who have experienced breadth of learning across Third level sciences experiences and outcomes. It is also suitable for learners who have attained Access 3 Physics, or who have an equivalent qualification. The Course may be suitable for those wishing to study physics for the first time.

This Course has practical and experiential learning opportunities, with a strong skills-based approach to learning. It takes account of the needs of all learners, and provides sufficient flexibility to enable learners to achieve in different ways.

The Course will provide opportunities for learners to develop knowledge and scientific skills that directly relate to everyday life. The development of thinking skills, inquiry and investigative skills, problem-solving and practical skills are fundamental to the Course.

This Course, or its components, may provide progression to:

- ◆ Physics (National 5)
- ◆ National 4 or 5 in another science subject
- ◆ Skills for Work Courses (SCQF level 4 or 5)
- ◆ National Certificate Group Awards
- ◆ National Progression Awards (SCQF level 4 or 5)
- ◆ employment

Course structure and conditions of award

Course structure

The Course will foster skills in scientific thinking, set in context and developed through application-led learning.

Learners will acquire knowledge of concepts in physics relevant to this level of Course, and be able to apply their understanding to practical situations. They will develop skills in making informed decisions, and be prepared to make reasoned evaluations on environmental and scientific issues. They will develop investigative and experimental skills in a physics context.

By completing this Course, learners will develop important and relevant skills, attitudes and attributes related to physics, including: scientific and analytical thinking in a physics context; an understanding of the role of physics in scientific issues; the ability to apply knowledge and understanding of concepts in physics; and an understanding of relevant applications of physics in society.

Learners will also gain valuable transferable skills for learning, life and work, including those of literacy and numeracy.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a number of ways.

The Course has four Units, totalling 24 SCQF credit points.

Physics: Space (National 4)

This Unit will explore concepts, appropriate to this level, relevant to study of the solar system and its exploration, while developing skills in investigation, experiment and analysis. It will focus mainly on relationships involving forces.

Physics: Technology (National 4)

This Unit will explore concepts, appropriate to this level, that are relevant to electrical and mechanical equipment in use in society, while developing skills in investigation, experiment and analysis. It will focus on the use of electromagnetic waves and sound waves in medicine and communications, and on kinematics.

Physics: Energy (National 4)

This Unit will explore the sources and uses of heat energy and electrical energy in our society, while developing skills in investigation, experiment and analysis. It will focus on basic concepts in heat and electricity, and introduce some electronic systems and components.

Physics: Added Value Unit (National 4)

This Unit will allow learners to draw on and extend the skills they have learned from across the other Units, and demonstrate the breadth of knowledge and skills acquired, in unfamiliar contexts and/or integrated ways.

Conditions of award

To achieve the Physics (National 4) Course, learners must pass all of the required Units, including the Added Value Unit. The required Units are shown in the Course outline section.

National 4 Courses are not graded.

Skills and knowledge

Full skills and knowledge 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 includes:

- ◆ demonstrating basic knowledge of physics by making accurate statements
- ◆ applying basic knowledge of physics to new straightforward situations by interpreting information and solving problems
- ◆ demonstrating basic understanding of physics by providing explanations of situations
- ◆ selecting relevant information from a variety of straightforward sources
- ◆ presenting information appropriately in a variety of straightforward forms
- ◆ processing basic information accurately, using calculations, where appropriate
- ◆ planning, designing and carrying out straightforward experimental procedures to test hypotheses or to illustrate effects
- ◆ evaluating straightforward experimental procedures
- ◆ drawing simple valid conclusions and giving basic explanations supported by evidence or justification
- ◆ making predictions and generalisations based on straightforward evidence/information

Assessment

Information about assessment 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 judgments are consistent and meet national standards.

The assessment of the Units in this Course will be as follows:

Physics: Space (National 4)

Learners who complete this Unit will be able to:

- ◆ demonstrate analysing and evaluating information, drawing conclusions, giving explanations and making predictions in the context of the physics of space
- ◆ demonstrate skills of applying physics knowledge and understanding related to forces and to study of the solar system

Physics: Technology (National 4)

Learners who complete this Unit will be able to:

- ◆ demonstrate planning, designing, carrying out and evaluating experimental procedures or investigations in the context of the physics of technology
- ◆ demonstrate skills of applying physics knowledge and understanding related to waves and kinematics

Physics: Energy (National 4)

Learners who complete this Unit will be able to:

- ◆ demonstrate selecting, processing, presenting and evaluating information in the context of the physics of energy
- ◆ demonstrate skills of applying physics knowledge and understanding related to heat energy and electrical energy

Added Value Unit

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 4, added value will be assessed in an Added Value Unit. The Added Value Unit will 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.

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

In this Course, the Added Value Unit will focus on breadth and application.

The learner will draw on and extend the skills they have developed during the Course. This will be assessed through both a [project](#)² and a [test](#)³. These will offer opportunities to demonstrate the breadth of knowledge and skills acquired from across the other Units, in unfamiliar contexts and/or integrated ways.

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

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

³ See link above for definition.

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 are likely to be appropriate for this 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
- 2.2 Money, time and measurement
- 2.3 Information handling

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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