



National 4
Course
Specification



National 4 Physics Course Specification (C757 74)

Valid from August 2013

First edition: April 2012
Revised: June 2013, version 1.1

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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: National 4 Physics
SCQF: level 4 (24 SCQF credit points)
Course code: C757 74

Mandatory Units

| | | |
|----------------|---|-----------------------------|
| H256 74 | Physics: Electricity and Energy (National 4) | 6 SCQF credit points |
| H25A 74 | Physics: Waves and Radiation (National 4) | 6 SCQF credit points |
| H258 74 | Physics: Dynamics and Space (National 4) | 6 SCQF credit points |

Added Value Unit

H25C 74 **Physics Assignment (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:

- ◆ National 3 Physics or relevant component Units

There may also be progression from National 3 Biology, National 3 Chemistry, National 3 Environmental Science or National 3 Science Courses.

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 is given in the *Course Support Notes*.

Progression

This Course or its Units may provide progression to:

- ◆ other 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*.

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.

Physics Courses should encourage resourcefulness, which leads to becoming a confident individual. Successful learners in physics think creatively, analyse and solve problems. Physics can produce responsible citizens, through studying the impact it makes on their lives, on the environment, and on 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 and apply knowledge and understanding of physics
- ◆ develop an understanding of the role of physics in scientific issues and relevant applications of physics in society and the environment
- ◆ develop scientific inquiry and investigative skills
- ◆ develop scientific analytical thinking skills in a physics context
- ◆ develop the use of technology, equipment and materials, safely, in practical scientific activities
- ◆ develop problem solving skills in a physics context
- ◆ use and understand scientific literacy, in everyday contexts, to communicate ideas and issues
- ◆ develop the knowledge and skills for more advanced learning in physics

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 learning across the sciences experiences and outcomes. The Course may be suitable for those wishing to study physics for the first time.

This Course has a 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.

Physics Courses are offered from SCQF level 3 to SCQF level 7. Vertical progression is possible through these levels, while lateral progression is possible to other qualifications in the sciences. This Course can also assist entry to employment, training and further education.

Course structure and conditions of award

Course structure

The Course develops skills in a physics context. Learners will gain an understanding of physics, and develop this through a variety of approaches, including practical activities.

The Course has four mandatory Units including the Added Value Unit. The first three Units listed below are designed to provide progression to the corresponding Units at National 5.

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

Units can be taught sequentially or in parallel to each other. However, learning and teaching approaches should provide opportunities to integrate skills, where possible. Each of the component Units is designed to provide progression to the related Unit at National 5.

Physics: Electricity and Energy (National 4)

In this Unit, learners develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of electricity and energy. Learners will apply these skills when considering the applications of electricity and energy on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas of generation of electricity, electrical power, electromagnetism, practical electrical and electronic circuits, gas laws and the kinetic model. Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Physics: Waves and Radiation (National 4)

In this Unit, learners develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of waves and radiation. Learners will apply these skills when considering the applications of waves and radiation on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas wave characteristics, sound, electromagnetic spectrum and nuclear radiation. Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Physics: Dynamics and Space (National 4)

In this Unit, learners develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of dynamics and space. Learners will apply these skills when considering the applications of dynamics and space on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas of speed and acceleration, relationships between forces, motion and energy, satellites and cosmology. Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Added Value Unit: Physics Assignment (National 4)

In this Unit, learners will 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 National 4 Physics 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, knowledge and understanding

Full skills, knowledge and understanding for the Course are given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section. This includes:

- ◆ demonstrating knowledge and understanding of physics by making statements, describing information and providing explanations
- ◆ applying knowledge of physics to familiar situations, interpreting information and solving problems
- ◆ planning and safely carrying out experiments/practical investigations to illustrate effects
- ◆ using information handling skills by selecting, presenting and processing information
- ◆ making predictions based on evidence/ information
- ◆ drawing valid conclusions and giving explanations supported by evidence
- ◆ suggesting improvements to experiments/practical investigations
- ◆ communicating findings/information

Skills, knowledge and understanding to be included in the Course will be appropriate to the SCQF level of the Course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level (www.sqa.org.uk/scqf).

Assessment

Information about assessment for the Course is included in the *Course Support Notes* and the *Added Value Unit Specification*.

Unit assessment

All Units are internally assessed against the requirements shown in the *Unit Specification*.

They can be assessed on an individual Unit basis or by using other approaches which combine the assessment for more than one Unit.

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: Electricity and Energy (National 4)

Learners who complete this Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit, to carry out an experiment/practical investigation
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

Physics: Waves and Radiation (National 4)

Learners who complete this Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit, to carry out an experiment/practical investigation
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

Physics: Dynamics and Space (National 4)

Learners who complete this Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding of the key areas of this Unit, to carry out an experiment/practical investigation
- ◆ draw on knowledge and understanding of the key areas of this Unit and apply scientific skills

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: <http://www.sqa.org.uk/sqa/58409.html>

In the National 4 Physics Course, the Added Value Unit will focus on challenge and application.

Learners will draw on, and apply the skills and knowledge they have developed during the Course. They will carry out an in-depth investigation in an unfamiliar and/or integrated context. This will be assessed through an assignment.

Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Course. The skills that learners will be expected to improve on and develop through the 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

Published: June 2013 (version 1.1)

History of changes to National Course Specification

| Course details | Version | Description of change | Authorised by | Date |
|----------------|---------|---|-----------------------------------|-----------|
| | 1.1 | Skills, knowledge and understanding section: amendment to wording to clarify activities | Qualification Development Manager | June 2013 |
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