



Higher
Course
Specification



Higher Physics Course Specification (C757 76)

Valid from August 2014

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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: Higher Physics

SCQF: level 6 (24 SCQF credit points)

Course code: C757 76

Mandatory Units

H4KY 76	Physics: Our Dynamic Universe (Higher)	6 SCQF credit points
H4L0 76	Physics: Particles and Waves (Higher)	6 SCQF credit points
H4KX 76	Physics: Electricity (Higher)	3 SCQF credit points
H4L1 76	Researching Physics (Higher)	3 SCQF credit points

Course assessment **6 SCQF credit points**

This Course includes six SCQF credit points to allow additional time for preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment 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, knowledge and understanding required by the following or by equivalent qualifications and/or experience:

- ◆ National 5 Physics Course or relevant component Units

Progression

This Course or its Units may provide progression to:

- ◆ Advanced Higher Physics
- ◆ other qualifications in Physics or related areas
- ◆ further study, employment and/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 resilience, 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 Higher Physics 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 complex 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

The purpose of the Course is to develop learners' curiosity, interest and enthusiasm for physics in a range of contexts. The skills of scientific inquiry and investigation are developed throughout the Course. The relevance of physics is highlighted by the study of the applications of physics in everyday contexts. This will enable learners to become scientifically literate citizens, able to review the science-based claims they will meet.

Due to the interdisciplinary nature of science, learners benefit from studying Physics along with other subjects from the sciences, technologies, and mathematics curriculum areas.

The Course develops scientific understanding of issues relating to physics. It will enable learners to gain an in-depth knowledge of concepts in physics, and to develop confidence in the skills of scientific inquiry.

Learners will develop ability in describing and interpreting physical phenomena using mathematical skills, and will practice scientific methods of investigation from which general relationships are derived and explored.

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, including the impact these could make in society and the environment
- ◆ develop scientific inquiry and investigative skills
- ◆ develop scientific analytical thinking skills, including scientific evaluation, in a physics context
- ◆ develop the use of technology, equipment and materials, safely, in practical scientific activities
- ◆ develop planning skills
- ◆ develop problem solving skills in a physics context
- ◆ use and understand scientific literacy to communicate ideas and issues and to make scientifically informed choices
- ◆ develop the knowledge and skills for more advanced learning in physics
- ◆ develop skills of independent working

The Course gives learners a deeper insight into the structure of the subject, and aims to reinforce and extend the learner's knowledge and understanding of the concepts of physics. It also aims to develop the learner's skills in making critical and evaluative comment.

Advances in physics mean that our view of what is possible is continually being updated. This Course allows learners to deepen their understanding of the processes behind scientific advances, and thus promotes awareness that physics involves interaction between theory and practice.

The Course will therefore enable learners to become scientifically literate citizens who will recognise the impact physics makes on their lives, the environment and society, and be able to appreciate topical scientific debate. Learners will develop skills for learning beyond Higher and for employment.

Information about typical learners who might do the Course

The Course is suitable for learners who are secure in their attainment of National 5 Physics or an equivalent qualification. The Course may be suitable for those wishing to study physics for the first time.

This Course emphasises 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.

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

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 Advanced Higher Physics Course.

Physics: Our Dynamic Universe (Higher)

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of our dynamic universe. Learners will apply these skills when considering the applications of our dynamic universe 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 kinematics, dynamics and space-time.

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Physics: Particles and Waves (Higher)

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of particles and waves. Learners will apply these skills when considering the applications of particles and waves 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 particles and waves.

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Physics: Electricity (Higher)

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of electricity. Learners will apply these skills when considering the applications of electricity 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 electricity, and electrical storage and transfer.

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Researching Physics (Higher)

The general aim of this Unit is to develop skills relevant to undertaking research in Physics. Learners will collect and synthesize information from different sources, plan and undertake a practical investigation, analyse results and communicate information

related to their findings. They will also consider any applications of the physics involved and implications for society/ the environment.

The Unit offers opportunities for collaborative and for independent learning. Learners will develop knowledge and skills associated with standard laboratory apparatus and in the recording and processing of results.

Conditions of award

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

Skills, knowledge and understanding

Further information on the assessment of the skills, knowledge and understanding for the Course is 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, providing explanations and integrating knowledge
- ◆ applying physics knowledge to new situations, interpreting information and solving problems
- ◆ planning and designing experiments/practical investigations to test given hypotheses or to illustrate particular effects including safety measures.
- ◆ carrying out experiments/practical investigations safely, recording detailed observations and collecting data
- ◆ selecting information and presenting information appropriately in a variety of forms
- ◆ processing information (using calculations, significant figures and units, where appropriate)
- ◆ making predictions from evidence/information
- ◆ drawing valid conclusions and giving explanations supported by evidence/justification
- ◆ evaluating experimental procedures, identifying sources of error and suggesting improvements.
- ◆ communicating findings/information effectively

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 Assessment Specification*, which provides 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: Our Dynamic Universe (Higher)

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: Particles and Waves (Higher)

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: Electricity (Higher)

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: Researching Physics (Higher)

Learners who complete this Unit will be able to:

- ◆ apply skills of scientific inquiry and draw on knowledge and understanding to research the underlying physics of a chosen topic
- ◆ apply skills of scientific inquiry to investigate, through experimentation, the underlying physics of a chosen topic

Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)¹. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must 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.

In the Higher Physics Course, added value will focus on:

- ◆ breadth
- ◆ challenge
- ◆ application

Learners will draw on, extend and apply the skills they have learned during the Course. This will be assessed within a [question paper](#) and an [assignment](#)², requiring demonstration of the breadth of knowledge, skills and understanding acquired from across the Units and of how they can be applied in unfamiliar contexts and/or integrated ways.

¹ Definitions can be found here: <http://www.sqa.org.uk/jargonbuster>

² See link above for definitions.

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.

1 Literacy

1.2 Writing

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

5.5 Creating

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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History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date
	2.0	Page 6 – under Course structure, the information on key areas has been rewritten for clarity Page 8 – the Skills, Knowledge and Understanding section has been rewritten to better explain what is required. Page 9 – the Researching Physics Unit Outcomes have changed: Outcome 3 has been removed.	Qualifications Development Manager	April 2014
	2.1	Minor typographical correction made: inclusion of hyphen in 'space-time'	Qualifications Manager	April 2015

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