

National 4 Skills for Work Building Services Engineering Course Specification (C278 74)

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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).

Course outline

Course title: National 4 Skills for Work Building Services Engineering Course Specification

SCQF credit points: (24 SCQF credit points)

Course code: C278 74

Mandatory units

The course comprises the following mandatory units:

J13G 74	<i>Building Services Engineering: Introduction to Safe Working Practices (National 4)</i>	6 SCQF credit points
J13H 74	<i>Building Services Engineering: Introduction to Energy (National 4)</i>	6 SCQF credit points
J13J 74	<i>Building Services Engineering: Introduction to Science (National 4)</i>	6 SCQF credit points
J13K 74	<i>Building Services Engineering: An Introduction (National 4)</i>	3 SCQF credit points
J13L 74	<i>Building Services Engineering: Employability Skills (National 4)</i>	3 SCQF credit points

Recommended entry

While entry is at the discretion of the centre, learners would normally be expected to have attained Core Skills at SCQF level 3 or equivalent.

Progression

The National 4 Skills for Work Building Services Engineering course has been designed as the starting point of a Building Services Engineering (BSE) career pathway. The course can lead directly on to the National Progression Award: Building Services Engineering at SCQF level 5, and then to the NC Building Services Engineering at SCQF level 6, which will be delivered in the college environment. Successful learners would also be able to apply for employment within the sector, as appropriate.

Achievement of the course will also allow learners the opportunity to move to allied occupational areas, such as construction, should they so wish.

Core Skills

Achievement of this course gives automatic certification of the following Core Skills component:

Core Skill component Critical Thinking at SCQF level 4

There are also opportunities to develop aspects of Core Skills which are highlighted in the support notes of the unit specifications.

Links to National Occupational Standards

National Occupational Standards (NOS) are developed by the key employment sectors of the United Kingdom. These standards set the competences required for job roles within a particular employment sector. The relationship between the NOS and the units is shown below:

Skills for Work unit	NOS (base unit)	SummitSkills Reference
Building Services Engineering: An Introduction (National 4)	Introduction to Building Services Engineering	ACC 04
Building Services Engineering: Introduction to Safe Working Practices (National 4)	Understand and demonstrate fundamental safe working practices in building services engineering	ACC 01
Building Services Engineering: Introduction to Energy (National 4)	Understand fundamental environmental protection measures within Building Services Engineering	ACC 02
Building Services Engineering: Introduction to Science (National 4)	Understand fundamental scientific principles within building services engineering	ACC 03
Building Services Engineering: Employability Skills (National 4)	No specific provision	N/A

Further details are provided in the 'Rationale' section.

Equality and inclusion

This Course Arrangements 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 www.sqa.org.uk/assessmentarrangements.

Common rationale for Skills for Work Courses

Skills for Work Courses are designed to help learners to develop:

- ◆ skills and knowledge in a broad vocational area
- ◆ skills for learning, skills for life and skills for work
- ◆ Core Skills
- ◆ an understanding of the workplace
- ◆ positive attitudes to learning
- ◆ skills and attitudes for employability

A key feature of these courses is the emphasis on *experiential learning*. This means learning through practical experience and learning by reflecting on experience.

Learning through practical experience

Teaching/learning programmes should include some or all of the following:

- ◆ learning in real or simulated workplace settings
- ◆ learning through role play activities in vocational contexts
- ◆ carrying out case study work
- ◆ planning and carrying out practical tasks and assignments

Learning through reflecting at all stages of the experience

Teaching/learning programmes should include some or all of the following:

- ◆ preparing and planning for the experience
- ◆ taking stock throughout the experience, reviewing and adapting as necessary
- ◆ reflecting after the activity has been completed, evaluating and identifying learning points

The Skills for Work Courses are also designed to provide learners with opportunities for developing *Core Skills*, and *Skills for Learning*, *Skills for Life* and *Skills for Work* with a focus on enhancing skills and attitudes for *employability*.

Core Skills

The five Core Skills are:

- ◆ Communication
- ◆ Numeracy
- ◆ Information and Communication Technology (ICT)
- ◆ Problem Solving
- ◆ Working with Others

Employability

The skills and attitudes for employability, including self-employment, are outlined below:

- ◆ generic skills/attitudes valued by employers
- ◆ understanding of the workplace and the employee's responsibilities, for example, time-keeping, appearance, customer care, etc
- ◆ self-evaluation skills
- ◆ positive attitude to learning
- ◆ flexible approaches to solving problems
- ◆ adaptability and positive attitude to change
- ◆ confidence to set goals, reflect and learn from experience
- ◆ specific vocational skills/knowledge
- ◆ course specifications highlight the links to NOS in the vocational area and identify progression opportunities

Opportunities for developing these skills and attitudes are highlighted in each of the course and unit specifications. These opportunities include giving young people direct access to workplace experiences or, through partnership arrangements, providing different learning environments and experiences which simulate aspects of the workplace. These experiences might include visits, visiting speakers, role play and other practical activities.

A Curriculum for Excellence (Scottish Executive 2004) identifies aspirations for every young person. These are that they should become:

- ◆ successful learners
- ◆ confident individuals
- ◆ responsible citizens
- ◆ effective contributors

The learning environments, the focus on experiential learning and the opportunities to develop employability, Skills for Learning, Skills for Life, Skills for Work and Core Skills in these courses contribute to meeting these aspirations.

Course rationale for National 4 Skills for Work Building Services Engineering

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 Skills for Work course is also designed to provide learners with opportunities for developing Core Skills and Skills for Learning, Skills for Life and Skills for Work, with a strong focus on enhancing skills and attitudes for employability.

The BSE sector is acutely aware of the demographic issues facing Scotland whereby the working population is ageing and there are (relatively) too few young people to replace them.

It was recognised that many young people miss the opportunity to enter the BSE sector because they simply don't know about it at the crucial decision-making points of their lives. Many young people will have an awareness of the construction sector and many will consider it as a viable career option. However, evidence suggests that young people are not aware of the BSE sector or the many opportunities it affords for development and progression through the professional levels.

In order to address this situation the Skills for Work (SfW) qualification has been developed to make the 14–16 age group aware of the BSE sector and to allow them the opportunity to develop some basic knowledge and skills relevant to the industries. It is based on NOS. Environmental aspects are covered at the appropriate level and are likely to be attractive to the target population.

This course is not designed to train people to full industrial competence and is aimed at those who do not necessarily have any prior experience or knowledge of the BSE sector and are therefore classed as 'new entrants'. Learners can then build on the skills, knowledge and employability skills gained and, along with other awards, have a progression route through to an SVQ (which does confer full industrial competence), should they wish to do so.

More generally, the BSE sector will make a crucial contribution to the achievement of the Scottish Government 2020 Energy targets and clearly this can only happen through appropriately qualified people. Areas such as microgeneration and renewables are within the BSE footprint. It is anticipated that these areas in particular will raise the BSE sector profile over the next 10–15 years and that those working in the sector must be appropriately qualified and skilled.

This course is a vocationally-related qualification at a basic, introductory level. The main aim is to make learners aware of, and prepare for employment within, the BSE sector in any of the main occupational areas of plumbing; electro-technical; heating and ventilating; refrigeration and air conditioning.

Purposes and aims of the course

The general aims of the course are to:

- ◆ widen participation in vocationally-related learning
- ◆ allow learners to experience vocationally-related learning
- ◆ provide learners with a broad introduction to the building services engineering sector
- ◆ encourage learners to foster a good work ethic, including time-keeping, a positive attitude and other relevant employability skills
- ◆ provide opportunities to develop a range of Core Skills in a realistic context
- ◆ encourage learners to take charge of their own learning and development
- ◆ provide a range of teaching, learning and assessment styles to motivate learners to achieve their full potential
- ◆ facilitate progression to further education and/or training

In particular, the aims of this course are to:

- ◆ give learners the technical knowledge, skills and understanding associated with a range of building services engineering career opportunities at this level
- ◆ develop an awareness that health and safety issues are central to the workplace
- ◆ encourage learners to interact with their peers and tutors to complete practical tasks
- ◆ encourage learners to develop a positive attitude to waste minimisation and environmental issues
- ◆ enable learners to develop and apply practical, technical and communication skills as a foundation for future learning and progression
- ◆ encourage learners to apply their knowledge and understanding of construction by using skills of evaluation and problem-solving in a vocational context
- ◆ encourage learners to plan their work and review their progress
- ◆ prepare learners for further learning opportunities, study and training for employment

Information about typical learners who might do the course

The primary target group for this course is school learners in S3 and S4. The National 4 Skills for Work Building Services Engineering course is designed at a level and scope such that it can be delivered in schools, if the school has suitable facilities and teaching expertise.

Due to the specialist expertise and facilities available in further education colleges and with training providers, it is anticipated that the course will rely on, and build on, existing partnerships between schools and colleges (or other agencies). A partnership approach will enable the course to be delivered in a variety of appropriate learning environments enhancing the learning experience.

The course is also suitable for adult learners who are seeking to enhance their employability and develop introductory vocational skills in the construction sector.

Course structure and conditions of award

Summary of course content

Basic knowledge and skills relevant to the BSE industries based on NOS and environmental aspects are covered at the appropriate level and are likely to be attractive to the target population.

The course is a vocationally-related qualification at a basic, introductory level which is intended to make learners aware of, and prepare for, employment within the BSE sector in any of the main occupational areas of: plumbing, electro-technical, heating and ventilating, refrigeration and air conditioning.

Summary of unit content

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways; however Skills for Work units are designed to provide an experiential learning process.

Building Services Engineering: An Introduction (National 4)

This unit is suitable for learners with no previous engineering, technical or employment experience. Learners will recognise the main industries (plumbing, electrical, heating and ventilating, refrigeration and air conditioning) and will develop an understanding of the job opportunities and the career progression opportunities. Learners will be taught the basic systems associated with each of the main industries whilst recognising the importance and nature of legislation and codes of practice. Learners then focus on the employability aspect by reviewing their own position in the context of future job opportunities within the BSE sector.

Building Services Engineering: Introduction to Safe Working Practices (National 4)

This unit is suitable for learners with no previous engineering, technical or employment experience. The learner will identify the fundamental health and safety requirements of the BSE sector and how to recognise and respond appropriately to common hazards and accidents in the BSE environment. Learners will also learn how to apply safe working practices relevant to the BSE sector.

Building Services Engineering: Introduction to Energy (National 4)

This unit is suitable for learners with no previous engineering, technical or employment experience. The learner will be able to identify the main types of energy and their sources as well as the fundamentals of energy conservation as they apply to the BSE sector. Learners will also become familiar with the main types of material disposal used within the sector.

Building Services Engineering: Introduction to Science (National 4)

This unit is suitable for learners with no previous engineering, technical or employment experience. The unit is designed to enable the learner to recognise the mechanical and electrical SI units commonly used within the BSE sector and to carry out simple calculations to enhance that understanding. Learners will also learn to recognise fundamental properties of solid materials as well as the fundamental principles of heat, mechanical and electrical applications used within the BSE sector.

Building Services Engineering: Employability Skills (National 4)

This unit is suitable for learners with no previous engineering, technical or employment experience. Learners will develop work practices and attitudes that enhance their employability in the context of the BSE sector. Learners will also have an opportunity to review the skills they have developed.

Conditions of award

To achieve the award of National 4 Skills for Work Building Services Engineering course, learners must achieve all the required units as outlined in the course outline. They will be assessed pass/fail within centres. Skills for Work Courses are not graded.

Assessment

Assessment objectives

Assessment across the units of the course will ensure that the learner achieves all outcomes and performance criteria and to ensure that the learner has an understanding of the BSE industries, safe working practices and opportunities for progression.

An integrated approach to assessment across the course and units is suggested. In addition, the project-based approach may be used to gather evidence of learner achievement; this would allow integration across a number of units. Centres may also wish to develop the employability skills of the learners through role-play techniques where appropriate.

A suitable instrument of assessment covering all performance criteria could be practical exercises, undertaken in supervised and controlled conditions, where learner achievement is recorded by means of an observation checklist completed by the teacher/lecturer.

Performance evidence, supported by learner review sheets and assessor observation checklists are required to show that all outcomes and performance criteria have been achieved.

Learners will demonstrate the appropriate working practices and attitudes in practical contexts. They will then review and evaluate their own performance on learner review sheets and plan for improvement. Learners will also demonstrate basic skills in interpreting drawings and undertake practical measurement tasks.

Unit assessment

An integrated approach to assessment across the outcomes in all units is suggested. In addition, the project-based approach may be used to gather evidence of learner achievement. Centres may also wish to develop the employability skills of the learners through role-play techniques where appropriate.

Further details about unit assessment for this course can be found in the unit specifications.

Exemplification of possible assessment approaches for these units will be provided in the assessment support pack.

Quality assurance

All instruments of assessment used within this course should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* (www.sqa.org.uk/GuideToAssessment).

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

- 1.1 Reading
- 1.2 Writing
- 1.3 Listening and talking

2 Numeracy

- 2.2 Money, time and measurement

3 Health and Wellbeing

- 3.1 Personal learning
- 3.2 Emotional wellbeing
- 3.4 Planning for, and making, choices and changes

4 Employability, enterprise and citizenship

- 4.1 Employability
- 4.3 Working with others
- 4.4 Enterprise

5 Thinking Skills

- 5.1 Remembering
- 5.2 Understanding
- 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.

Employability skills profile

Employability skills covered in this course are detailed in the table below. For the purposes of the table, the units are referred to as A, B, C, D and E as indicated.

Building Services Engineering: An Introduction (National 4) = A

Building Services Engineering: Introduction to Safe Working Practices (National 4)=B

Building Services Engineering: Introduction to Energy (National 4) = C

Building Services Engineering: Introduction to Science (National 4) = D

Building Services Engineering: Employability Skills (National 4) = E

Employability skill/attitude	Evidence
◆ Positive attitude and willingness to learn	A, B, C, D, E
◆ Good time-keeping and attendance	A, B, C, D, E
◆ Appropriate appearance	A, B, C, D, E
◆ Good communication skills – listening and talking	A, B, C, D, E
◆ Ability to follow instructions	A, B, C, D, E
◆ Understanding roles and responsibilities in the workplace	A
◆ Working co-operatively with others – showing consideration and respect for others	A, B, C, D, E
◆ Ability to multi-task – flexible and adaptable	A, B, C, D, E
◆ Seeking feedback and advice from others	B
◆ Planning and organising	B
◆ Reviewing and evaluating own skills development	A, B, E
◆ Awareness of the BSE sector and job opportunities	A
◆ Learn about the basic systems associated with each of the main industries	A
◆ Learn about the main types of energy and their sources and conservation	C
◆ Recognise the importance of following legislative requirements for the BSE sector, including the appropriate methods of material disposal	A, B, C
◆ Health and safety awareness, including maintaining a tidy, organised and safe working environment	A, B
◆ Recognise and respond appropriately to common hazards and accidents.	B
◆ Carry out simple calculations to enhance understanding of mechanical and electrical SI units used within the BSE sector	D

Assessment evidence in all units:

A & B = Questioning method such as restricted response/short answer questions and assessor observation checklist of practical activities.

C & D = Questioning method such as restricted response/short answer questions.

E = Performance evidence, supported by learner review sheets and assessor observation checklists.

Course support notes

Course support notes are not mandatory; they provide advice and guidance on approaches to delivering and assessing the Skills for Work course. They are intended for teachers and lecturers who are delivering the course and its units.

Guidance on approaches to delivery and assessment for this course

The National 4 Skills for Work Building Services Engineering course is designed as a starting point to equip students with the knowledge, understanding and skills required for success in employment or further study/training within the Scottish BSE sector. The course focuses on the development of learner awareness of this sector, which is supported by some practical skills. It is mainly aimed at school age learners (14–16) who are interested in pursuing a career in one of the BSE sector industries.

This course is not designed to train people to full industrial competence. There is an emphasis on developing the pre-vocational and employability skills normally taught to an apprentice at the very early stages of time-serving, and these basic skills will be very attractive to employers. Learners can then build on these skills when working towards achieving an SVQ award relevant to their interest and capabilities.

The course is designed to allow the learner to develop an understanding of the BSE sector, the industries within it and the types of career opportunities presented by each of these industries. It is also designed to underline the importance of safety in the workplace as it applies to the learner and to others. The course also allows the learner to understand the technical (or applied science) nature of the work that takes place within the BSE sector and introduces the concept of energy sources in terms of their carbon 'footprint'.

The programme should be delivered in the context of familiarisation with terminology, basic concepts and working practices and disciplines, including health and safety and sustainability. It is intended that the course will develop a broad appreciation of topics based on accepted BSE sector practices.

Health and safety considerations and the age profile of learners may present a challenge to centres. However, in order that the quality and integrity of assessments are maintained, centres are reminded that all practical assessments should take place in a realistic working or training environment with appropriate use of simulation where health and safety considerations are key. In addition, appropriate levels of supervision should be applied at all times.

Sequencing/integration of units

There are opportunities for integrated delivery of units within the course. Learning and teaching for the *Building Services Engineering: Introduction to Safe Working Practices* (National 4) could be integrated across the other units. Similarly, *Building Services Engineering: Introduction to Energy* (National 4) could be integrated with *Building Services Engineering: An Introduction* (National 4). The unit specifications will identify specific opportunities for integration with other units.

Guidance on approaches to delivery

This unit is suitable for learners with no previous engineering, technical or employment experience. Learners will develop work practices and attitudes that enhance their employability in the context of the BSE sector. Learners will also have an opportunity to review the skills they have developed.

Industry links

Centres are encouraged to establish links with local industry. Local companies, trades associations and chambers of commerce may be happy to offer support, for example, in the form of visits from representatives of their organisations. Visitors from industry will be able to give learners a realistic view of jobs and conditions in the BSE sector.

It may be possible for centres to arrange visits to sites as part of the learners' learning experience.

Visits to employer sites are often particularly useful because work in progress will be at different stages and learners can see all of the different engineers working at the same time. Visits should be carefully arranged, organised and authorised. It would be preferable for those responsible for such visits to have prior knowledge of the site which would be visited.

Health and safety

Risk assessment and compliance with health and safety legislation is of paramount importance in this course. Due to the health and safety implications involved, legislation effectively precludes work placement for 14–16 year olds on building sites. The Building Services Engineering units have been designed so that they can be taught and assessed in a classroom environment and this means that the course does not require work placement.

It is the centre's responsibility to produce risk assessments. Centres should ensure that they comply with all current legislation.

The course requires access to safe and suitably equipped classrooms, workshops or work areas to deliver and assess the units. These areas should be of an appropriate size and have sufficient tools, equipment and resources to deliver and assess the units for the number of learners in the class group.

This may take the form of a combined workshop/project area divided into suitable work areas for each learner. Storage areas for materials and personal protective equipment (PPE) should be provided.

It is recognised that some centres will not have facilities available to deliver all of the content in these qualifications; in these cases, appropriate partnership arrangements would provide the learning environments and/or expertise necessary to deliver the course. In such

situations, all partners involved should discuss health and safety and safe systems of work as a priority. They should also set up arrangements for ongoing communication between partners on health and safety.

Guidance on approaches to assessment

The approach to assessment for the National 4 Skills for Work Building Services Engineering course is designed to ensure an appropriate level of rigour whilst not imposing excessive demands on centres or learners. The design principles for the course encourage a holistic approach to assessment, and this has been adopted in each unit specification for the course.

An integrated approach to assessment across the outcomes in this unit, and other relevant units, is suggested. In addition, the project-based approach may be used to gather evidence of learner achievement. Centres may also wish to develop the employability skills of the learners through role-play techniques where appropriate.

Each unit specification includes guidance on delivery and assessment and, where appropriate, any potential opportunities for integrated delivery and assessment with other units.

Centres can decide the order in which units are delivered, based on learner recruitment patterns, mode of delivery, resource issues and logical progression dictated by topics and unit content and level.

Throughout all units, emphasis should be placed where appropriate on the application of health and safety. Safe working practices should be considered in accordance with current safety codes of practice and regulations.

The assessments for this course will be challenging and meaningful, but nonetheless still achievable for all learners who are prepared to work to achieve the course. They are designed to familiarise learners with a culture of attainment where assessments will challenge them, but they don't put unreasonable obstacles between the learner and real achievement.

For all Skills for Work units, assessment is based primarily on testing of knowledge, supported where appropriate by practical activities, supervised where appropriate. Integrated assessment is encouraged.

Opportunities for e-assessment

There may be opportunities for the introduction of e-learning during the teaching and delivery of the course. The learning and assessments of the knowledge-based outcomes can be conducted either by using e-learning methods (this could also be used for teaching) or by traditional teaching techniques. For example, formal assessments may make use of IT systems and facilities when available, or alternatively can use the standard mode of supervising learners during classroom paper-based assignments.

Opportunities for developing Core Skills

The units making up this course give automatic certification of Critical Thinking at SCQF level 4.

Throughout the course there may also be opportunities for learners to develop the Core Skills of Communication, Problem Solving, Numeracy and Working with Others.

Learners will benefit from practical experience of how these Core Skills can be developed in the workplace.

General information for learners

The Building Services Engineering (BSE) sector provides many opportunities for career progression. The National 4 Skills for Work Building Services Engineering course will provide you with the basic knowledge and skills relevant to the industries and is based on National Occupational Standards (NOS).

This course is not designed to train you to full industrial competence, and you do not need to have any prior experience or knowledge of the BSE sector. It is a vocationally-related qualification at a basic, introductory level. The course is intended to make you aware of, and prepare for, employment within the BSE sector in any of the main occupational areas of: plumbing, electro-technical, heating and ventilating, refrigeration and air conditioning.

During the course, you will demonstrate the appropriate working practices and attitudes in practical contexts. You will review and evaluate your own performance on learner review sheets and plan for improvement. You will also demonstrate basic skills in interpreting drawings and undertake practical measurement tasks.

After you finish the National 4 Skills for Work Building Services Engineering course, you can go on to apply for an apprenticeship as an air conditioning engineer; domestic plumber; ductwork installer; gas fitter; heating installer; industrial and commercial plumber; installation electrician; maintenance electrician; refrigeration engineer; service and maintenance engineer.

You may also go on to higher levels of education, for example National Progression Award, or National Certificate awards.

Administrative information

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History of changes to national course specification

Version	Description of change	Date
2.0	2015 — course re-coded as part of CfE development programme but no change to course and unit content.	August 2015
3.0	Course specification moved to a new template. No change to content. Units re-coded to align with corresponding course 2 code.	October 2018

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