

National Unit Specification: general information

UNIT Construction Crafts: Electrical Installation (Intermediate 1)

CODE DM7T 10

COURSE Construction Crafts (Intermediate 1)

SUMMARY

This Unit is suitable for candidates who have no experience in or knowledge of craft practices in electrical work. Candidates will become familiar with a range of basic hand-tools and accessories commonly used in the installation of electrical systems, and will work with an introductory range of cable types and sizes. The Unit is based on practical workshop activities and candidates will develop the skills to complete a number of activities such as connecting a range of lighting and power fittings. They will also develop safe working practices and general skills that will enhance employability.

The Unit is an optional Unit in the Intermediate 1 Construction Craft Course but can also be taken as a freestanding Unit. Candidates who achieve this Unit should feel confident in progressing to further Units in electrical work at Intermediate 1 or Intermediate 2.

OUTCOMES

- 1 Select and use basic hand-tools required in the electrical installation industry.
- 2 Select and use a range of accessories required in the electrical installation industry.
- 3 Connect a range of electrical fittings and appliances.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

Administrative Information

Superclass: TH

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CREDIT VALUE

0.5 credits at Intermediate 1 (3 SCQF credit points at SCQF level 4*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

CORE SKILLS

There is no automatic certification of Core Skills in this Unit.

Opportunities for developing aspects of Core Skills are highlighted in *Guidance on Learning and Teaching Approaches for this Unit*.

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 the Scottish Qualifications Authority.

OUTCOME 1

Select and use basic hand-tools required in the electrical installation industry.

Performance Criteria

- (a) The selection of basic hand-tools tools is appropriate for the work to be done.
- (b) The tools are used in the correct manner.
- (c) The tools are used solely for the purpose which they are intended.
- (d) The tools are maintained and stored correctly.
- (e) Health and safety requirements are complied with during all activities.

OUTCOME 2

Select and use a range of accessories required in the electrical installation industry.

Performance Criteria

- (a) The selection of accessories is appropriate for the work to be done.
- (b) The accessories are used in the correct manner.
- (c) The accessories are maintained and stored correctly.
- (d) Health and safety requirements are complied with during all activities.

OUTCOME 3

Connect a range of electrical fittings and appliances.

Performance Criteria

- (a) Appropriate tools, accessories and flexible cord are selected.
- (b) The cord cores for termination are prepared in compliance with safe working practices.
- (c) The cord cores to the accessories are terminated using safe working practices.
- (d) All terminations are checked to ensure that they are mechanically and electrically sound.
- (e) Health and safety requirements are complied with during all activities.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

Performance evidence and additional evidence is required to show that all Outcomes and Performance Criteria have been achieved.

Performance evidence will be supported by an assessor checklist. This evidence will be generated from an assignment consisting of practical activities carried out in supervised workshop conditions. The evidence may be gathered at different points throughout the Unit. The practical activities will cover:

- ◆ selecting the correct tools, accessories and flexible cord for particular applications
- ◆ preparing correctly flexible cord cores for termination
- ◆ terminating correctly the prepared flexible cord to the required connection accessories
- ◆ using tools correctly throughout all activities
- ◆ in particular, candidates selecting each of a load connection accessory, a control accessory, a supply connection accessory and appropriate flexible cord for each
- ◆ candidates carrying out a quality check on their own work before submitting for final assessment
- ◆ candidates maintaining a clean and tidy workplace and adhering to health and safety requirements throughout all activities

The National Assessment Bank item (NAB) for this Unit provides an assessor checklist and details of the practical assignment to exemplify the national standard. Centre wishing to develop their own assessments should refer to the NAB to ensure a comparable standard.

National Unit Specification: support notes

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This part of the Unit Specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

The content in this Unit covers practical electrical work activities at an introductory level. The candidate is required to develop the ability to select and use tools and accessories correctly and safely. It is therefore important that the learning takes place in a supervised workshop environment. Basic safe working practices will be included in the content as it is important that candidates learn to adhere to these at all times.

During the process of practical work, the candidate will become accustomed to the use of electrical work terms and will be able to demonstrate knowledge and understanding of these terms in everyday practice. The main content of the Unit will be learning the skills required in preparing and connecting flexible cord to electrical appliances and fittings. Selection of the correct tools and flexible cord will be an essential prerequisite to the practical activities. Candidates should be taught good working practices at each stage and should learn how to carry out a quality check on their own work throughout the tasks and on completion.

It is envisaged that many candidates will have little or no experience of working with the range of tools and materials associated with this Unit. Underpinning the practical skills is the need to ensure the candidate appreciates the reasons for carrying out the tasks in the manner directed. They will learn the reasons for using specific tools for specific materials. They will also learn the importance of good health and safety practice in the workshop.

Tools are likely to include some of the following: cable insulation strippers, cable side-cutters, cable-cutting pliers, a variety of screwdrivers, grips and pliers as well as spanners hacksaws and hammers. Accessories are likely to include some of the following: plug-tops, industrial connector, ceiling roses, various fuses, switches, lamp holders and bell Units. Candidates should also be able to select the appropriate sizes and types of flexible cable associated with the accessories.

Candidates will have the opportunity to develop practical skills in using hand-tools during electrical work exercises. Candidates should select an appropriate load connection accessory and choose the most suitable flexible cord in terms of its current rating and the environmental conditions in which it is to operate. An appropriate control accessory and supply connection accessory (including cartridge fuse where appropriate) will also be selected. The cores of the flexible cord will be prepared for termination.

The prepared flexible cord will be terminated to the load connection, control and supply connection accessories respectively. The cord terminations will be checked for mechanical and electrical soundness and all in compliance with good electrical trade practices.

In addition to the vocational content, candidates should be encouraged to focus on the general work practices and attitudes which employers value. These should be delivered as an integral part of the Unit. Opportunities will arise in various practical contexts to discuss the value of, for example, good time-keeping and attendance thorough planning and preparation, working co-operatively, maintaining a clean, tidy and organised workplace, checking own work to ensure it is of an appropriate standard; adopting a positive attitude to learning, demonstrating a willingness to follow instructions and taking

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a positive attitude to receiving feedback on performance. The context for learning should include the requirement to be clean, presentable and appropriately dressed for the workshop, wearing personal protective equipment (PPE) including protective clothing when required.

Relevant aspects of current health and safety legislation, and any systems of work relevant to the candidates' workshop/workplace should be explained and adhered to as part of the work of this Unit.

Employability Skills

On completion of this Unit the candidate will have had opportunities to develop the following employability skills:

- ◆ timekeeping
- ◆ attendance
- ◆ following instructions
- ◆ taking advice and dealing with constructive feedback
- ◆ maintaining a tidy work area
- ◆ working co-operatively with others
- ◆ planning and preparation*
- ◆ checking quality of own work*
- ◆ positive attitude to learning
- ◆ review and self-evaluation
- ◆ awareness of health and safety issues*
- ◆ interpretation of graphic information

Achievement in a number of these employability skills (those marked with an asterisk) will be clearly identified as a result of the evidence generated through the assessment activities for this Unit. There are opportunities to develop the remaining skills.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Experiential learning is the main approach recommended for this Unit. This involves learning through practical experiences and activities. Candidates should experience workplace conditions and should be encouraged to perform tasks and conduct themselves in a manner appropriate to the workplace.

Experiential learning also involves reflecting on experiences/activities, identifying strengths and areas for improvement. It is important to encourage candidates throughout the Unit to evaluate their own work and progress. They should be encouraged to seek advice and set themselves goals to build competence and confidence in undertaking tasks.

Candidates must learn about the correct tools and accessories to be used for different tasks, and this should be through the actual use of the items rather than through diagrams or illustrations. Candidates should be encouraged to handle and examine the tools and accessories throughout delivery of this Unit so that they become familiar with these items, their use, capabilities and limitations. The safe and correct use of tools in preparing cords for termination should first be demonstrated prior to providing the candidates with opportunities to carry out the required cord termination exercises.

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Candidates should be taught to appreciate the limitations in the use of tools and the correct applications of these. They should also be taught an appreciation of the relationship between the rating of load devices and the cord/cable and accessories being used to supply and control these loads.

This Unit should be delivered in a wholly practical manner, ideally in a workshop environment adopting an experiential approach to learning. This involves learning through practical experiences and activities. Candidates should experience workplace conditions and should be encouraged to perform tasks and conduct themselves in a manner appropriate to the workplace.

If this Unit is delivered as part of the Construction Craft Course lecturers should seek every opportunity to build up an understanding of work practices, behaviours and attitudes required of employees and employers. Checking standards of work is a very useful skill and habit that candidates can develop during their work. For example, candidates should be encouraged to check all terminations to ensure they are neat and no bare wires are showing. The construction and electrical industries are very keen on producing work that is 'right first time' and quality checks are an inherent part of the work in these industries. Candidates can be encouraged to approach their work with care and build in a checking process as part of good practice.

Responsible, safe behaviour in the workplace can be demonstrated and practised as part of the routine essential work, eg candidates will learn that leaving ladders, tools, cables accessories and equipment around the workspace could be a tripping hazard; they will learn how to use a wide range of tools in a safe manner and how to maintain these tools; daily routines in the workplace will include maintaining a clean and tidy workspace.

Opportunities for developing the Core Skills of Communication, Numeracy, Information Technology, Working with Others and Problems Solving should be incorporated where they arise naturally in the teaching and learning process. For example, candidates should be encouraged to do simple fuse rating calculations using the equation $P = VI$. Such calculations will help to develop numeracy skills. Candidates will also be required to read instructions for work activities; they will also take part in discussions with peers and tutors regarding work activities, interpretation of drawings, materials, use of tools and workshop protocols. They will need to demonstrate, at all times, clear and courteous communication with their peers, supervisors and technicians. All of these activities present opportunities for developing oral and reading communication skills.

Where this Unit is taken alongside the *Construction Crafts: Employability Skills* Unit, candidates will have additional opportunities to develop an awareness of the general work practices and attitudes which employers value. Integrated activities may involve the candidate assessing his/her own performance on time-keeping and attendance, planning and preparation, working co-operatively, maintaining a tidy and safe work area, checking own work, demonstrating a positive attitude to learning, showing a willingness to follow instructions and responding positively to feedback on performance. Candidates may also seek the views of tutors/supervisors and identify areas for improvement and take responsibility for action plans. These activities can add value to the candidate's experience and help to enhance employability.

Core Skills

There are opportunities to develop aspects of the Core Skills *Problem Solving* in this Unit. Candidates are required to check their own practical work against given standards and criteria and are required to review and evaluate their work.

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GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

It is expected that candidates will be given as much practice as possible in electrical work techniques, prior to being set the assessment tasks. The National Assessment Bank items for the Unit detail the quality and quantity of practical work to be carried out for the Unit assessment. The use of the standards and quality checking introduced in this Unit helps candidates to appreciate the kind of quality regime they will experience if and when they pursue a career as a tradesperson in the construction industry.

An observation checklist should be used when gathering performance evidence. The NAB item for this Unit provides an observation checklist. Centres may develop their own instruments of assessment but these must be of a comparable standard to the NAB.

The assessment of all three Outcomes can be integrated, since completing the practical activities required for Outcome 3 also provides evidence that candidates can meet the requirements of the first two Outcomes.

Examples of the kind of activities which could be used for the assessment of this Unit would be:

- ◆ Connect a brass bayonet-cap lamp holder (table lamp) to a flexible cord switch and a plug and socket
- ◆ Connect a moulded (non-metallic) bayonet-cap lamp holder to a ceiling rose.
- ◆ Connect a fused switch to a 13A plug-top.

For each activity, the candidate would be expected to:

- ◆ select an appropriate accessory and flexible cord
- ◆ select tools appropriate for the exercise
- ◆ prepare the cord cores for termination in compliance with safe working practices
- ◆ terminate the cord cores to the accessories using safe working practices
- ◆ ensure that all terminations are mechanically and electrically sound

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (www.sqa.org.uk).