

National Unit Specification: general information

UNIT Engineering Skills: Manufacture and Assembly (Intermediate 1)

CODE F19H 10

COURSE Engineering Skills (Intermediate 1)

SUMMARY

This Unit is a mandatory Unit of the *Engineering Skills (Intermediate 1)* Course. The Unit integrates the mechanical, electrical/electronic and fabrication skills developed in the other mandatory Units of the course. The candidates will learn to select and use the correct tools and materials required to manufacture, test, evaluate and report their findings on the manufacture and assembly of an artefact.

Candidates will have the opportunity to review the employability skills they have developed across the range of practical experiences.

The Unit forms part of the *Engineering Skills (Intermediate 1)* Course but can also be taken as a free-standing Unit.

The primary target group for this Unit is school candidates in S3 and above.

OUTCOMES

- 1 Identify, select and use tools, materials and equipment to manufacture an artefact.
- 2 Identify and use practical tests on the assembled artefact.
- 3 Evaluate and report on the manufacture and assembly of an artefact.
- 4 Review and evaluate own employability skills in practical engineering contexts.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

Engineering Skills: Mechanical (Intermediate 1)

Engineering Skills: Electrical/Electronic (Intermediate 1)

Engineering Skills: Fabrication (Intermediate 1)

Administrative Information

Superclass: WB

Publication date: April 2007

Source: Scottish Qualifications Authority

Version: 01

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CREDIT VALUE

1 credit at Intermediate 1 (6 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

UNIT Engineering Skills: Manufacture and Assembly (Intermediate 1)

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

Identify, select and use tools, materials and equipment to manufacture an artefact.

Performance Criteria

- (a) Identify, select and safely use a range of relevant tools, materials and equipment correctly.
- (b) Safely and correctly manufacture and assemble an artefact from simple drawings and specifications.
- (c) Complete the artefact accurately and within specified tolerances.
- (d) Safe working practices are correctly observed in all activities.

OUTCOME 2

Identify and use practical tests on the assembled artefact.

Performance Criteria

- (a) Identify and use dimensional checks on the completed artefact correctly.
- (b) Test the functional use of the completed artefact correctly.
- (c) Safe working practices are correctly observed in all activities.
- (d) Complete a quality check on own finished artefact.

OUTCOME 3

Evaluate and report on the manufacture and assembly of an artefact.

Performance Criteria

- (a) Complete an evaluation on the functionality of the artefact correctly.
- (b) Produce a report which includes a valid conclusion on the functionality of the artefact.
- (c) Communicate clearly the findings of the report on the manufacture and assembly of the artefact to a specified audience.

OUTCOME 4

Review and evaluate own employability skills in practical engineering contexts.

Performance Criteria

- (a) Review and evaluate own employability skills.
- (b) Seek and record feedback on own performance in employability skills.
- (c) Make a judgement on own strengths, weaknesses and learning points in relation to employability skills.
- (d) Identify action points for improvement in relation to employability skills.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

Performance and written/oral evidence is required to show that all Outcomes and Performance Criteria have been achieved.

Performance evidence will be supported by assessor checklists. This evidence will be generated from an integrated assignment consisting of practical activities carried out in supervised workshop conditions.

The evidence may be gathered at different points throughout the Unit.

Candidates can, if appropriate, work in teams of no more than three to produce an assembled artefact. It is essential that the artefact produced by such a team will be of sufficient complexity and scope to allow all members of the team to make a contribution equal to the manufacture and assembly of an artefact by an individual candidate.

Where this occurs the assessor must be satisfied that each individual candidate has produced evidence to demonstrate achievement of all Outcomes and Performance Criteria.

The practical activities in the manufacture of an artefact in a safe manner will cover:

- ◆ interpretation of drawings and specification for the given artefact
- ◆ selection and safe use of the correct tools, materials and equipment as required, to manufacture and assemble an artefact

Candidates will be required to carry out:

- ◆ dimensional checks on the completed artefact
- ◆ functionality tests on the completed artefact to check for quality, robustness, fitness for purpose before submitting their work for final assessment.

Candidates are required to:

- ◆ complete an evaluation on the functionality of the artefact using a given pro forma checklist
- ◆ complete a short report of between 150 and 400 words that includes a valid conclusion on the functionality of the artefact
- ◆ communicate the findings of the report to a peer group

National Unit Specification: statement of standards (cont)

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Written/oral evidence

Candidates will complete a self-evaluation review of their own performance against the following employability skills:

- ◆ following instructions
- ◆ seeking advice
- ◆ working co-operatively with others
- ◆ showing health and safety awareness
- ◆ preparing appropriately to carry out tasks
- ◆ following basic drawings and specifications
- ◆ checking own work, identifying own strengths and weaknesses
- ◆ identifying learning points from practical experiences

A signed record of the review must be retained by the assessor as assessment evidence.

The National Assessment Bank item (NAB) for this Unit provides an appropriate practical assignment, an appropriate candidate review sheet and assessor checklists. These exemplify the national standard. Centres wishing to develop their own assessments should refer to the NAB to ensure a comparable standard.

National Unit Specification: support notes

UNIT Engineering Skills: Manufacture and Assembly (Intermediate 1)

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 40 hours.

GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT

This Unit covers manufacture, test evaluation, report and presentation activities at a basic level. The candidate is required to select materials, tools and equipment correctly and safely in the manufacture and assembly of the artefact.

It is likely that this Unit will be delivered as part of the Intermediate 1 Engineering Skills Course. In this context candidate will build on the content covered in the three mandatory Units:

Engineering Skills: Mechanical (Intermediate 1)

Engineering Skills: Electrical/Electronic (Intermediate 1)

Engineering Skills: Fabrication (Intermediate 1)

This Unit provides candidates with the opportunity to integrate the skills developed in those Units.

It is 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 adhere to these at all times.

Candidates will work on a range of activities which will enable them to become familiar with a variety of dimensional and functionality tests. During the process of the artefact manufacture the candidate will use engineering terminology and will be able to demonstrate a basic knowledge and understanding of the terminology in everyday practice.

It would be beneficial if candidates were introduced to basic presentation and reporting techniques in order to plan, prepare and deliver a short report and presentation to their peers on the use and functionality of the artefact.

This Unit provides opportunities to develop engineering employability skills such as:

- ◆ maintaining good time-keeping
- ◆ maintaining good attendance
- ◆ maintaining a tidy workplace
- ◆ following instructions
- ◆ seeking advice
- ◆ working co-operatively with others
- ◆ sourcing and use of tools in a correct and safe manner
- ◆ using tools solely for the purpose for which they are designed
- ◆ cleaning and storing tools correctly after use
- ◆ recognising common materials
- ◆ showing health and safety awareness
- ◆ wearing appropriate personal protective equipment
- ◆ preparing appropriately to carry out tasks

National Unit Specification: support notes (cont)

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- ◆ following basic drawings and specifications
- ◆ checking own work
- ◆ identifying own strengths and weaknesses
- ◆ positive attitude to learning
- ◆ identifying learning points from practical experiences

In this Unit candidates will perform simple calculations and take measurements. These activities provide good opportunities to develop the Core Skill of Numeracy.

Candidates will also share workspace, tools and equipment, and this will provide them with a good context in which to learn to work co-operatively with others.

Candidates will develop written and/or oral communication skills when reporting on the functionality of the artefact.

Candidates will also have the opportunity to develop practical problem solving skills when working on the manufacture and assembly of an artefact.

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, current Control of Substances Hazardous to Health (COSHH) Regulations 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.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

It is important that there is an induction to the Unit that will include employability skills and health and safety awareness. This Unit involves experiential learning through the various practical experiences and presentation activities in the manufacture, assembly and testing of an artefact. Candidates should experience workshop conditions and should be encouraged to perform tasks and conduct themselves in a manner appropriate to the workplace.

General vocational skills, such as selecting and maintaining manufacturing and test tools and equipment, are integrated within the Unit. As well as carrying out practical tasks, candidates will also learn from brief lessons on health and safety and workshop protocol. Teaching and learning approaches will also include demonstrations of artefact functionality and usage tests by tutors. Short lessons on specific aspects of industrial practice and the correct use of tools and equipment will prove invaluable at intervals throughout the learning experience. These may be followed by brief practical sessions in which the candidates practise the testing skills emphasised by demonstrations.

Teaching and learning on reporting and presentation skills such as recording of relevant test data, valid conclusions derived from test data, selection and use of the appropriate presentation techniques, planning and preparation of a simple presentation and use of basic presentation equipment, if appropriate, will also be experienced.

