Higher National Unit Specification

General information for centres

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

Unit code: DR2E 34

Unit purpose: This Unit is designed to enable candidates to develop knowledge and understanding and apply the principles of advanced hull reinforcement and design.

On completion of the Unit the candidate should be able to:

1 Describe and sketch the general arrangement requirements of large vessels.
2 Describe hull reinforcement and structural design features of large vessels.
3 Describe and sketch the various methods of docking large vessels.
4 Describe the various methods used in ship commissioning work during outfitting and sea trials of large vessels.

Credit points and level: 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**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.*

Recommended prior knowledge and skills: It would be an advantage for candidates to have a knowledge and understanding of the shipbuilding environment. This may be evidenced by possession of the Unit (E7WX 12) Ship Construction, or HN Unit (DR2F 34) Shipbuilding Principles: Planning, Production and Assembly or previous experience within the shipbuilding industry.

Core Skills: There may be opportunities to gather evidence towards the Core Skills of Communication and Problem Solving in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

General information for centres (cont)

Assessment: The assessment for Outcome 1 should be a written exercise involving sketches indicating the critical elements of each task. Assessment for Outcome 2 should involve written responses with accompanying diagrams. The responses provided should indicate the main requirements of each process and identify the critical elements within each task. Outcome 3 should be a written assessment with the aid of sketches indicating the docking process and essential services. Outcome 4 should be a written assessment and test procedure to demonstrate the candidate's knowledge and understanding of the commissioning aspects of a large vessel.

The total time for assessment should be two hours.

Assessment should be carried out under controlled and supervised conditions.

Higher National Unit specification: statement of standards

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

Unit code: DR2E 34

The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe and sketch the general arrangement requirements of large vessels

Knowledge and/or skills

- General arrangement layout requirements
- Accommodation spaces, sanitary spaces and general recreational areas
- Traditional build methods, modular build methods
- Block construction and build strategy

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 2

Describe hull reinforcement and structural design features of large vessels

Knowledge and/or skills

- Deck strength and reinforcement in major areas
- Hull shock and vibration precautions
- Hull protection and preservation

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 3

Describe and sketch the various methods of docking large vessels

Knowledge and/or skills

- The reasons for dry-docking large vessels
- Methods of dry-docking large vessels
- Dry-dock working processes
- Services required to support the dry-docking of a large vessel

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Outcome 4

Describe the various methods used in ship commissioning work during outfitting and sea trials of large vessels

Knowledge and/or skills

- Preliminary commissioning activities
- Main commissioning activities
- Main sea trials
- Snagging list, final finish and acceptance work

Higher National Unit specification: statement of standards (cont)

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. The evidence may be provided in response to specific questions. Each candidate will need to demonstrate that they can answer questions based on a sample of the items shown above. In any assessment of this Outcome at least 60% of the knowledge and/or skills items should be sampled.

A different sample question should be asked each time the Outcome is assessed. Candidates must provide a satisfactory response to assessed questions.

Administrative Information

Unit code:	DR2E 34
Unit title:	Shipbuilding Principles: Advanced Hull and Associated Technologies
Superclass category:	XQ
Date of publication:	August 2005
Version:	01
Source:	SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

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 has been written in order to allow candidates to develop understanding and skills in the following area:-

1 Principles of the general arrangement requirements of large vessels.

- the general arrangement layout requirements
- the principal characteristics of the following accommodation spaces: galley and mess, specialist operations, officers, senior ratings, mixed sex accommodation, sanitary spaces and general recreational areas
- traditional build methods in comparison to modular build method
- the processes required to support block construction and current approaches to the build strategy
- Principles of hull reinforcement and structural design features of large vessels
- the principles of deck strength and reinforcement in major areas
- hull shock and vibration precautions, equipment protection and structural reinforcement
- hull marine protection and preservation

2 Principles of the various methods of docking large vessels.

- the various reasons for dry-docking large vessels
- the various methods of dry-docking large vessels
- the work carried out when the vessel is in dry-dock
- the procedures and essential services required to support the dry-docking of a large vessel

3 Principles of ship commissioning during outfitting and sea trials of large vessels.

- preliminary commissioning activities: switchboard loading; main/auxiliary propulsion units; diesel generators; auxiliary pumps; steering gear and accommodation services
- main commissioning activities including quayside trials, dockside trials and basin trials
- main sea trials; detail preparation work; shipbuilder's trials and owner's trials
- snagging list and final finish and acceptance work

Higher National Unit specification: support notes (cont)

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

Guidance on the delivery and assessment of this Unit

This Unit can be delivered using group exposition, with the lecturer reviewing candidate understanding of hull reinforcement, general arrangement requirements, methods of docking and commissioning of large vessels. Topic content can be introduced through the use of notes and sketches, OHP, video, computer and other appropriate media presentations. Organised visits to local industry to view dry dock facilities and commissioning activities and to discuss commissioning programmes in practice with those involved in the activities. It is also recommended to invite guest speakers from commissioning management in local yards to outline and discuss current principles and methods. All visits should place particular emphasis on current trends used in the local industry. Assessment approaches are as noted on page 2.

Opportunities for developing Core Skills

There may be opportunities to gather evidence towards the Core Skills of Communication and Problem Solving in this Unit.

Open learning

This Unit could be delivered on an open learning basis with a candidate undertaking individual research and direct study within a large scale shipbuilding/ship repair yard under agreed monitoring arrangements.

If an open learning strategy was to be adopted it should be borne in mind that this is intended to be a dynamic Unit keeping abreast of current practices being employed in local large scale shipbuilding/ship repair yards, with visits, guest speakers and production video presentations all intended to support this aspect of topic exposition, appropriate directed study projects and research tasks under the guidance and direction of a knowledgeable industry member. Each instance will be evaluated within its own circumstances and not discounted, as alternative methods of learning can produce the required knowledge and understanding to achieve the intended aim of the Unit.

The assessing centre would take appropriate measures to ensure the authenticity of written evidence and consider controlled or supervised assessment conditions to support open learning methods adopted for the main proportion of the Unit.

Candidates with additional support needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. 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. For information on these, please refer to the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs,* which is available on the SQA website **www.sqa.org.uk.**

General information for candidates

Unit title: Shipbuilding Principles: Advanced Hull and Associated Technologies

This Unit has been designed to allow you to develop an understanding of the principles involved in modern shipbuilding. The Unit is intended to cover the various techniques, principles and practices employed, from general arrangement, design and docking, through to commissioning of a large vessel.

Outcome 1 considers the general arrangement design of a large vessel and progresses to focus on the need to support a block build method of construction, comparing this with the traditional methods of shipbuilding. It looks at the demands of combined living and functional accommodation due to various working demands such as mixed sex crews in a Royal Navy frigate.

Outcome 2 considers the various methods of hull design and structural reinforcement of large sea-going vessels. It looks at basic hull shock and vibration precautions and completing design considerations by exploring the various methods of hull marine life protection and maintenance.

Outcome 3 focuses on the various methods used to dry dock a large vessel, and the work programmed to be completed during a period in dry dock. The shore-based or mother-ship services that are required to support a docking programme should also be reviewed.

Outcome 4 draws on a wide range of activities and methods employed within the commissioning programme of a large vessel, from establishing a live electrical switchboard to the final acceptance trial for the customer of a fully functioning vessel.

The above Outcomes are designed to equip you with an overall understanding and appreciation of the shipbuilding principles involved in advanced hull and the associated design, build and commissioning technologies.

Assessment styles used through this Unit are reasonably practical and written, allowing you to research, evaluate and reflect on your own knowledge and experiences of modern ship construction. It is invaluable to those employed in an industry and on a product which is extremely large, complex and involves multiple skills and practices throughout the entire construction process. To have an overall appreciation of the background and justification assists those involved in specific roles (eg supervision, planning, design and drawing, quality control) and provides opportunity for progression within the industry.