

# Higher National Graded Unit Specification

## General Information for Centres

This Graded Unit has been validated as part of the HND Nautical Science. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

**Graded Unit Title:** Nautical Science: Graded Unit 2

**Graded Unit Code:** F13C 35

**Type of Graded Unit:** Examination

**Assessment Instrument:** Examination

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

*\*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.*

**Purpose:** This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HND Nautical Science:

The main aim and objective of the HND Nautical Science is to provide a candidate with the underpinning knowledge for both the SVQs in Merchant Vessel Operations and UK Maritime and Coastguard Agency Deck Officer Certificates of Competency.

This Graded Unit aims to ensure that a candidate can draw together the information gained from the HN Units listed below with respect to the management of safe navigation of a vessel and both analyse and process it at a level appropriate for the 'Chief Mate' Unlimited Certificate of Competency. The aims are stated below.

- ◆ Develops the skills required to manage and control the safe navigation of the vessel in all conditions.
- ◆ Develops the skills required to manage and control vessel operations in compliance with current legislation.
- ◆ Develops a sound understanding of shipboard management issues and techniques.
- ◆ Develops a sound understanding of the ship Master's role with respect to the legal aspects of managing the navigation and operation of the vessel.
- ◆ Develops an understanding of the vessel's propulsion maintenance and engineering requirements.
- ◆ Prepares candidates for the MCA written and Oral examinations.

## General Information for Centres (cont)

**Recommended Prior Knowledge and Skills:** It is recommended that the candidate should have completed or be in the process of completing the following Units relating to these specific aims prior to undertaking this Graded Unit:

F0LG 35 *Marine Passage Planning*

F0LW 35 *Management of Bridge Operations*

F0LP 35 *Applied Marine Meteorology*

**Core Skills:** The achievement of this Unit gives automatic certification of the following:

Critical Thinking at SCQF level 4

**Assessment:** This examination-based Graded Unit is open-book. It will consist of a written examination of three hours.

## Administrative Information

**Graded Unit Code:** F13C 35

**Graded Unit Title:** Nautical Science: Graded Unit 2

**Original date of publication:** August 2006

**Version:** 01

### History of Changes:

Version	Description of change	Date

**Source:** SQA

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## **Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates**

**Graded Unit Title:** Nautical Science: Graded Unit 2

### **Conditions of Assessment**

The assessment is based on an **open-book** examination lasting three hours.

If a candidate does not achieve a pass or if a candidate wishes to upgrade, this must be based on a significantly different examination from that given originally. A candidate's grade will be based on his/her achievement on the new assessment event using a significantly different examination, if this results in a higher grade.

The examination should be unseen and the assessment should be conducted in controlled and supervised conditions.

At all times, the security, integrity and confidentiality of examinations must be ensured.

The assessment could be based on an examination paper consisting of a passage planning problem, involving the candidates solving problems covering the following HN Units or it could be a set of questions designed to assess individual subjects as shown below.

*Marine Passage Planning*  
*Management of Bridge Operations*  
*Applied Marine Meteorology*

The paper should be designed to thoroughly test the candidates ability to carry out the duties of the Chief Mate whilst in charge of a navigational watch and responsible to the Master for the safe navigation of the vessel. In particular all questions should consist of an element of analysis and evaluation, eg an environmental emergency where there are several possible options and the candidate has to present a reasoned argument for their choice.

Candidates will require access to MCA approved data tables and approved formulae sheets as listed below.

The candidate will be expected to answer examination questions without the aid of reference and/or source materials with the exception of marine publications and data sheets readily available on board ships as listed below and as specifically indicated for each assessment. Candidates are also permitted to use only non programmable calculators.

### **List of Permitted Publications:**

*Nautical Tables*  
*MCA Approved Extracts from the Nautical Almanac*  
*MCA Approved Extracts from Admiralty Tide Tables*  
*Navigational Charts/Chartlets*  
*Weather Charts*  
*Compass Deviation Cards*  
*Radar Plotting Sheets*  
*Co Tidal/Co Range Diagrams*

## Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

*Ships Manoeuvring Data Sheet*

*MCA Approved Trim and Stability Data Sheets*

*MCA Approved formulae sheets*

### Instructions for designing the assessment task:

The examination should be designed to assess the candidate's critical knowledge and understanding of the topics relating to the specific aims which this Graded Unit is designed to cover. The questions and corresponding marks should be designed in accordance with the ranges indicated in the table that follows. However, the overall total mark for the examination is 100.

Key Topics	Level of demand	Percentage weighting for each topic
Graphical or numerical solution of problems involving vessels having to rendezvous with each other. (Could involve search and rescue scenarios, sunrise/sunset rendezvous, fastest time to rendezvous).	Analysis calculation and graphical presentation.	20%
Solution and evaluation of astronomical observations including resolution of the systematic errors involved. (Could involve calculation/evaluation of azimuths vs amplitudes, resolution of sights (including Polaris), criteria for selection of stars for star sights, plotting and evaluation of star sights, resolution of the, 'cocked hat', problem).	Analysis, evaluation, calculation and graphical presentation.	15%
Analysis, evaluation and action to be taken on receiving meteorological/climatological data relevant to the safety of the vessel. (Could include warning signs of a TRS, determination of vessel's position in relation to centre of TRS, action to be taken to avoid TRS. Alternatively question could cover operating procedures in areas of dangerous ice/ice accretion.).	Analysis, evaluation, and graphical presentation.	20%
Use, evaluation and benefits of Weather Routeing Services and Shipboard Weather Routeing procedures.	Analysing and evaluating.	15%
Promulgation and reporting of Navigational Information and Warnings. (Could include Navtex, Worldwide Navigation Warning Service, use of Hydrographic Notes, Navigational Warnings Regulations, contents of Routeing Charts, Notice to Mariners, Merchant Shipping Notices, Channel Navigation Information Service, use of Mariners Routeing Charts, use of Nautical Publications).	Recalling, explaining, and interpreting.	20%
Tidal Stream problems and use of Co-Tidal/Co-Range Charts.	Interpreting and analysing	10%

## Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)

The examination will be marked out of 100. Assessors will aggregate the marks achieved by the candidate to arrive at an overall mark for the examination. Assessors will then assign a grade to the candidate for this Graded Unit based on the following grade boundaries:

- ◆ A = 70% — 100%
- ◆ B = 60% — 69%
- ◆ C = 50% — 59%

Candidates who meet the minimum Evidence Requirements will have their achievement graded as a C (competent), A (highly competent), or B (somewhere between A and C). The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table:

Grade A	Grade C
<p>Is a seamless, coherent piece of work or exam script which consistently:</p> <ul style="list-style-type: none"> <li>◆ Demonstrates the candidate has a substantial depth of understanding of the topics stated above.</li> <li>◆ Analyses situations for other options prior to selecting a possible solution.</li> <li>◆ Presents clear and annotated diagrams when answering questions and refers to the diagrams in the solution.</li> <li>◆ Develops clear steps towards the eventual solution of the problem, especially when dealing with complex mathematical problems.</li> </ul>	<p>Is a co-ordinated piece of work or exam script which:</p> <ul style="list-style-type: none"> <li>◆ Demonstrates the candidate has an understanding of the subject area.</li> <li>◆ Can analyse a situation and arrive at a solution.</li> <li>◆ Presents clear diagrams when arriving at a solution.</li> <li>◆ Can solve complex mathematical problems.</li> </ul>

### Support Notes

The examination should be conducted under open-book, supervised conditions, similar to those required for the Maritime and Coastguard Agency (MCA) written examinations at Officer of the Watch level.

There are opportunities to develop the following Core Skills in this Unit.

**Communication:** Written, Reading at SCQF level 6 can be developed by candidates by analysing information which may be presented in tabular format, such as extracts from the Nautical Almanac or extracts from various nautical publications selected from the permitted material. The clarity and relevance of responses will be reflected in the final grade awarded.

**Numeracy:** Using Number, Using Graphical Information at SCQF level 6 can be developed by candidates performing calculations involving spherical and plane trigonometry involving several

## **Higher National Graded Unit specification: Instructions for designing the assessment task and assessing candidates (cont)**

variables and having to present the final answer in graphical format. Alternatively they may have to solve problems by graphical means and then calculate a final position for the vessel.

Problem Solving across the range at SCQF level 6 can be developed by candidates having to consider navigational problems involving environmental hazards such as Tropical Revolving Storms and other related phenomena. Candidates will have to evaluate information provided and arrive at possible solutions. They will then form a plan of action to resolve the situation and subsequently review the action taken and if necessary amend the plan in light of further developments.

### **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](http://www.sqa.org.uk)).

## **General information for candidates**

This Graded Unit is designed to ensure that you can draw together the knowledge and skills across the range of HN Units that are sampled in the assessment.

The format of the assessment is an open-book examination in which you will have access to MCA approved data and formulae sheets. Programmable calculators will not be permitted in the examination.

Questions will be structured so that they are, as far as possible, relevant to the actual responsibilities which you will take on in the role of the Officer of the Watch, whilst keeping a deck watch at sea.

You may be required to interpret information presented in graphical format and you will be asked to produce sketches. Sketches should be clear and in the correct proportion.

In the case of calculations all working should be shown and intermediate steps should be shown. Distances should be calculated to the nearest nautical mile and times to the nearest minute. Positions, when obtained by calculation, should be given to the nearest tenth of a minute of latitude and longitude.

Where information is given in the form of extracts and chartlets you are advised to analyse these carefully as reference to the contents, of the extracts, within your answer may be reflected in the final grade awarded.