



Higher National examination-based graded unit specification

General information

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.

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Graded unit code: HT0M 35

Type of examination: Examination

Publication date: July 2017

Source: Scottish Qualifications Authority

Version: 01

Graded unit purpose

This graded unit is designed to provide evidence that the learner 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 learner with the underpinning knowledge for UK Maritime and Coastguard Agency Deck Officer Certificates of Competency.

This graded unit aims to ensure that a learner 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/Master' 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 learners for the MCA written and oral examinations.

Higher National examination-based graded unit specification: General information (cont)

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Credit points and level

1 Higher National Unit credit at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the graded unit

It is recommended that the learner should have completed or is nearing completion of the following units relating to the above principle aims prior to undertaking this graded unit:

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

The term open-book within the context of this assessment means the learner can use the supplied publications from the 'List of permitted publications'.

Core Skills

There are no Core Skills embedded in this graded unit specification.

Assessment support pack

There is no assessment support pack for this unit.

Equality and inclusion

This graded unit 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 SQA's website:
www.sqa.org.uk/assessmentarrangements

Higher National Examination-based graded unit specification: Designing the examination and assessing learners

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Assessment

This graded unit will be assessed by the use of an *open-book examination* developed by centres. The examination should provide the learner with the opportunity to produce evidence that demonstrates she/he has met the aims of this graded unit.

The assessment is an examination lasting three hours.

The examination should be designed to assess the learner's critical knowledge and understanding of the topics relating to the specific aims which this graded unit is designed to cover.

The examination will be marked out of **100**. Only whole marks should be used.

The questions and corresponding marks should be designed in accordance with the key topics (ie the critical knowledge and skills to be covered in the examination), level of demand (eg description, explanation, analysis, application) and relative mark allocation for each key topic outlined in the table below.

Key topics	Level of demand	% mark allocation for each key 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%

Higher National examination-based graded unit specification: Designing the examination and assessing learners (cont)

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Key topics	Level of demand	% mark allocation for each key topic
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 routing services and shipboard weather routing 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 routing charts, notice to mariners, merchant shipping notices, channel navigation information service, use of mariners routing 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%
Total marks for examination		100

Higher National examination-based graded unit specification: Designing the examination and assessing learners (cont)

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Conditions of assessment

The examination is *open-book*.

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

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

The assessment could be based on an examination paper consisting of six questions based on passage planning problem, involving the learners 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 learners' ability to carry out the duties of the Chief Mate/Master 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 learner has to present a reasoned argument for their choice.

The learner 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. Learners are also permitted to use only non-programmable calculators.

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

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*
- ◆ *Ships Manoeuvring Data Sheet*
- ◆ *MCA Approved Trim and Stability Data Sheets*
- ◆ *MCA Approved formulae sheets*

Higher National examination-based graded unit specification: Designing the examination and assessing learners (cont)

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Assessing and grading learners

Learners who meet the minimum evidence requirements will have their achievement graded as an A, B or C. The grade related criteria to be used to judge learner performance for this graded unit is specified in the following table.

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

The marks achieved by the learner in the examination should be aggregated to arrive at an overall mark for the examination. Assessors will then assign an overall grade to the learner for this graded unit based on the following grade boundaries.

A = 70%–100%
B = 60%–69%
C = 50%–59%

These grade boundaries are fixed and should **not** be amended.

If a learner does not achieve a pass or wishes to upgrade, then this must be done using a substantially different examination. In these circumstances, the highest grade achieved should be awarded.

More information on reasonable assistance, remediation and re-assessment may be found in the SQA publication *Guidance for the Implementation of Graded units in Higher National Certificates and Diplomas* (SQA, 2008, Publication code: CA4405).



Higher National examination-based graded unit support notes

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

Guidance on approaches to delivery and assessment of this graded unit

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

Opportunities for developing Core and other essential skills

There are no Core Skills embedded in this graded unit specification.

History of changes to graded unit

Version	Description of change	Date

© Scottish Qualifications Authority 2017

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

General information for learners

Graded unit title: Nautical Science: Graded Unit 2
(SCQF level 8)

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. Assessment will normally be before the learners appear for chief mate external examination for navigation or after completing the assessments and feedback for the three related units.

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.

Grades:

A	=	70%–100%
B	=	60%–69%
C	=	50%–59%
Fail	=	Below 50%