

Higher National Unit Specification

General information for centres

Unit title: Chartwork and Tides

Unit code: F0LV 34

Unit purpose: This Unit will introduce candidates to using, caring for and the correction of charts and publications carried aboard ship. It is also about position fixing using charted objects, determining the compass course to steer and counteracting tidal stream and leeway to make passage plan way points by measurement from the chart. It also covers the general theory on the cause of tides, which includes calculations involving times and heights of tides worldwide. It is primarily aimed at candidates who intend to seek sea-going employment as a Merchant Navy Deck Officer. However it could also be studied by someone with an interest in the subject area.

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

- 1 Identify recommended procedures to ensure that all charts and publications are maintained and corrected.
- 2 Use Mercator charts for visual position fixing methods.
- 3 Use chartwork techniques to amend and update the vessel's passage plan.
- 4 Use tidal terminology and calculate times and heights of tides worldwide.

Credit points and level: 2 HN Credits at SCQF level 7: (16 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: Access to this Unit is at the discretion of the centre. However candidates would benefit most from this Unit if they have successfully completed the *Marine Induction Course* associated with the HNC/D Nautical Science, or have the required seetime as laid down by the Maritime and Coastguard Agency for those candidates not following an approved training scheme.

Core Skills: There are opportunities to develop the following Core Skills in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Communication: Written at SCQF level 5

Communication: Oral at SCQF level 5

Communication: Reading at SCQF level 5

Using Information Technology at SCQF level 5

Working with Others at SCQF level 5

Numeracy: Using Number at SCQF level 6

Numeracy: Using Graphical Information at SCQF level 6

Problem Solving: Critical Thinking at SCQF level 6

General information for centres (cont)

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.

Assessment: Outcome 1 may be assessed by a closed-book assessment under supervised conditions. Outcomes 2, 3 and 4 may be assessed using a single closed-book assessment under supervised conditions or Outcome 4 may be assessed separately.

The appropriate Admiralty exercise charts will be used as necessary.

Admiralty Tide Table extracts from the SQA/MCA extracts folder will be used where appropriate.

Higher National Unit specification: statement of standards

Unit title: Chartwork and Tides

Unit code: F0LV 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

Identify recommended procedures to ensure that all charts and publications are maintained and corrected

Knowledge and/or skills

- ◆ Types of charts
- ◆ Carriage of Nautical publications
- ◆ Storage and handling of charts
- ◆ Procedures for ordering charts and publications
- ◆ Correction logs for charts and publications
- ◆ Contents and use of Chart catalogue
- ◆ Weekly and cumulative lists of *Admiralty Notices to Mariner*
- ◆ Commercial systems for maintaining charts and publications

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- 1 Identify types of charts that must be carried on board a vessel and describe the information contained in these charts.

On each assessment opportunity candidates must describe the information on a Mercator Chart and also a Gnomonic Chart **or** an Admiralty Routeing Chart

- 2 Describe the contents of publications that are required by law to be carried on board vessels.

Evidence can be produced by the candidates demonstrating their knowledge from a sample of four of the publications which are required to be carried on board a vessel as stated in the Convention on Safety of Life at Sea (SOLAS) Chapter Five.

A different sample must be used on each assessment occasion.

- 3 Describe the correct procedure for the handling, storage and ordering of charts.
- 4 Explain the procedure for ensuring that charts and publications are maintained and corrected up to date.

Higher National Unit specification: statement of standards (cont)

Unit title: Chartwork and Tides

Assessment guidelines

Outcome 1 may be assessed on a sample basis by an unseen closed-book assessment consisting of short answer questions covering the contents and correction of Admiralty charts and publications.

Alternatively candidates may be assessed by an open-book assignment or a practical demonstration. Where practical demonstration is used the appropriate Admiralty publications will need to be provided.

Outcome 2

Use Mercator charts for visual position fixing methods

Knowledge and/or skills

- ◆ Navigational Properties of a Mercator Chart
- ◆ Plotting Positions on a chart
- ◆ Chart Symbols
- ◆ True, Gyro and Compass courses
- ◆ Chartwork techniques to determine position
- ◆ Dead Reckoning and Estimated Positions using water and ground tracks
- ◆ Estimated Time of Arrival (ETA) to reach a given position

Evidence Requirements

All knowledge and skills are assessed, however there is sampling within each of the knowledge and skills.

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- 1 Use a Mercator Chart to **consistently** and **accurately** determine a given position by methods approved by the Maritime and Coastguard Agency. Accuracy must be commensurate with the chart scale in use.
- 2 Determine Compass Deviations, Variations or Gyro error by use of tables, calculations / constructions and or charted information as appropriate.
- 3 Use a Mercator Chart to establish the True course or bearing between two points, and convert this course or bearing to Gyro or Compass using the appropriate Deviations, Variation and Gyro error.
- 4 Convert given Compass or Gyro course or bearings to True using the appropriate Deviations, Variations and Gyro error and plot them on a Mercator chart.
- 5 Establish a Dead Reckoning or Estimated position from measurement of course, log speed and time taking into account the appropriate tidal information and or Leeway.
- 6 Identify Water Track and Ground Track and use them to determine the ETA at a given point.

Higher National Unit specification: statement of standards (cont)

Unit title: Chartwork and Tides

Evidence for elements 1 to 6 can be achieved by sampling **three** of the following calculations/constructions.

- (a) Determine the ship's position by use of Horizontal Sextant Angle technique.
- (b) Determine the ship's position using the distance off a light(s) or prominent object(s) and/or using Luminous range diagrams or distance tables.
- (c) Running fix calculation/construction.
- (d) Dead Reckoning or Estimated position calculation/construction.
- (e) ETA calculation/construction.

In devising assessments to meet these Evidence Requirements assessors should ensure that the Evidence Requirements 1, 2 and 4 above are covered at least once in the assessment, eg in one calculation the candidate should be required to convert gyro courses and bearings to true bearings whilst in another question compass courses and bearing should be converted to true bearing etc.

A different sample should be used on each assessment occasion.

Assessment guidelines

Outcome 2 may be assessed on a sample basis by a series of practical chartwork exercises under supervised conditions. Exercises should be devised so that the candidate has the opportunity to demonstrate to the assessor that they can clearly show all construction in the solution of the problem.

It is recommended that Outcomes 2 and 3 be combined for assessment purposes.

Admiralty exercise chart, Deviation table and Nautical Table extracts will be required as appropriate.

Outcome 3

Use chartwork techniques to amend and update the vessel's passage plan

Knowledge and/or skills

- ◆ Principles of Passage Planning
- ◆ Appropriate regulations and guidelines in Passage planning
- ◆ Adjustments to the vessel's course and speed to take account of passage plan requirements

Evidence Requirements

All knowledge and skills are assessed, however there is sampling within each of the knowledge and skills.

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- 1 Explain the four stages involved in the making of a Passage Plan, including any special requirements for specific navigational scenarios.

Higher National Unit specification: statement of standards (cont)

Unit title: Chartwork and Tides

- 2 Identify and use the content(s) of the appropriate regulations and guidelines available in relation to 1.
- 3 Find the appropriate True, Compass or Gyro course(s) to steer and or speed or ETA to reach a given waypoint taking into account tide and leeway.

In the case of 3 above this can be achieved by sampling **two** of the following calculations/construction.

- (a) Course to counteract the current and leeway.
- (b) ETA at given point with current and leeway.
- (c) Course and Speed required to counteract a current and leeway.
- (d) Actual set and Drift experienced.

Any of these two elements can for practical purposes be combined into a single calculation/construction.

Assessment guidelines

Outcome 3 may be assessed by a closed-book assessment under supervised conditions.

It is recommended that Outcomes 2 and 3 be combined for assessment purposes.

Admiralty exercise chart, Deviation table and Nautical Table extracts will be required as appropriate.

Outcome 4

Use tidal terminology and calculate times and heights of tides worldwide

Knowledge and/or skills

- ◆ Theory of tides and their causes
- ◆ Tidal definitions and calculations
- ◆ Admiralty Tide Tables and tidal software

Evidence Requirements

All knowledge and skills are assessed, however there is sampling within each of the knowledge and skills.

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- 1 Explain the causes of Spring and Neap tides.
- 2 Define tidal terms.
- 3 Perform calculations involving airdraughts and underkeel clearances and required height of tide.

Higher National Unit specification: statement of standards (cont)

Unit title: Chartwork and Tides

- 4 Use the Admiralty Tide Tables and tide curves to calculate the height of tide at a given time and/or the time the tide will reach a given height in the European or Pacific areas.

On each assessment occasion candidates will be required to perform one calculation to determine the required height of tide at a specified time and one calculation to determine the required time the tide will be at a specified height.

Elements 3 and 4 above can be combined within a single calculation.

Candidates should also give a detailed explanation of the causes of either Spring **or** Neap tides.

Assessment guidelines

Outcome 4 may be assessed by a closed-book assessment under supervised conditions. For assessment purposes Outcome 4 may be combined with Outcomes 2 and 3.

The appropriate Admiralty Tide Table extracts will be required.

Administrative Information

Unit code: F0LV 34
Unit title: Chartwork and Tides
Superclass category: ZF
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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Chartwork and Tides

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 80 hours.

Guidance on the content and context for this Unit

The content of this Unit forms part of the underpinning knowledge for an MCA Officer of the Watch *Certificate of Competency* and accordingly reflects the content of the International Maritime Organisation's *Standards for Training Certification and Watchkeeping (STCW)*.

Guidance on the delivery and assessment of this Unit

This Unit is primarily intended for candidates who are new entrants to the Merchant Navy via one of the Merchant Navy Training Board (MNTB) approved deck cadet training schemes or for seafarers who are enrolled on an Officer of the Watch (OOW) course. Ideally candidates would have accrued some shipboard experience prior to attempting this Unit although this is not a prerequisite.

The knowledge and skills contained within this Unit cover all the requirements as laid down by STCW 95 at the Operational level.

Completion of this Unit will also ensure that the candidate complies with all requirements laid down by the UK Maritime and Coastguard Agency (MCA) for the issue of an Officer of the Watch Unlimited, Certificate of Competency as a Deck Officer. The required knowledge and skills for MCA certification can be found in a document detailing the requirements for the issue of an Education and Training Certificate (A&B), which is available from the MNTB.

Candidates will benefit most if this Unit is delivered in conjunction with HN Unit F0M0 34 *Navigational Mathematics and Science*. They should also be able to draw on the knowledge gained from the *Marine Induction Course* as well as experience gained from service at sea.

The following notes give additional information on the knowledge and skills for each of the Outcomes.

Outcome 1

Candidates will understand the information contained in Nautical Charts and in Nautical Publications. They will be shown how to order, store and correct these Charts and Publications in order to keep them up to date as per the required maritime legislation.

Outcome 2

This Outcome will develop the candidate's knowledge of Mercator Charts and how to use them in Coastal Navigation.

It will also give them the required knowledge and techniques to find a vessel's position using a variety of methods utilising the geographical and topographical features on the Chart, and to fix a vessel's position using compass bearings, Radar ranges and other Coastal Navigation techniques.

Higher National Unit specification: support notes (cont)

Unit title: Chartwork and Tides

They will learn about the effect of tide and wind on the vessel and where to find and how to use this information to establish the vessel's present or future predicted positions.

Outcome 3

This Outcome follows on from the previous two, in further expanding the candidate's knowledge of the use of Navigational charts and publications, with particular reference to the Planning of a Safe passage from one place to another.

The candidate will also be shown how to counteract the effect of tide and wind to safely arrive at given points identified during the planning process.

Outcome 4

This Outcome gives the candidate the knowledge to understand the theory and causes of tides. They will also be able to calculate the times and heights of tide at primary and secondary ports throughout the world.

Candidates will also be shown various computer programmes and software available to calculate tidal heights and times.

Opportunities for developing Core Skills

The Unit provides candidates with the opportunity to develop the Core Skill of numeracy at SCQF level 6. Candidates will develop numeracy through calculation involving several variables and multiple interdependent steps. Use of graphical information will be developed at level 6 by interpreting and using that graphical information in calculations. Information Technology can be used in the Unit and Problem solving skills are required in the interpretation of information supplied and calculation required.

SCQF level 5 Communication can be developed through the reading and analysis of information and report writing. Oral communication can be assessed during Oral assessment.

Open learning

This Unit is not suited to delivery by distance learning because it requires candidates to be observed and questioned by a qualified practitioner to meet the requirements for the award of a Certificate of Competency

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. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: www.sqa.org.uk.

General information for candidates

Unit title: Chartwork and Tides

This Unit is designed to provide you with the knowledge and skills required to navigate a vessel through coastal waters to the standards laid down by STCW 95 and the MCA for Officer of the Watch.

The ability to do moderately complex arithmetical calculations and manipulate simple equations will be required, however this ability will have been more than covered in the mathematics content of the induction phase or distance learning mathematics pack.

Use of tabular and graphical information is central to much of the content of the Outcomes as is the ability to understand certain concepts of the factors which affect a vessel's movement due to tide and wind.

You will be required to be able to understand the concepts required to Plan a passage between two points, calculate the required courses between those points and adjust the course to take into account tide and wind. The time and height of tide at a given point will also be calculated.

Assessment may take the form of a written project or oral and practical demonstration for Outcome 1. Outcomes 2, 3 and 4 may be assessed individually or combined.