Group Award Specification for:

HNC Nautical Science

Group Award Code: GM7P 15

HND Nautical Science

Group Award Code: GM7N 16

Publication date: August 2017
Version: 05 (February 2020)

Published by the Scottish Qualifications Authority
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Contents

1 Introduction

The use of the HNC and HND Nautical Science with its wide range of nautical subjects providing the academic requirements for Certificates of Competency has long been recognised.

This document was previously known as the arrangements document. The purpose of this document is to:

- assist centres to implement, deliver and manage the qualification
- provide a guide for new staff involved in offering the qualification
- inform course managers teaching staff, assessors, learners, employers and HEIs of the aims and purpose of the qualification
- provide details of the range of learners the qualification is suitable for and progression opportunities

This is the group award specification for the revised HNC and HND in Nautical Science which were validated in 2017. This document includes: the aims, guidance on access, details of the group award structure, and guidance on delivery. Background information on the development of the group award remains unchanged as the purpose and content of this award has not changed since its inception in 2006.

The document also includes details on the graded units and their relationship to the UK Maritime and Coastguard Agency (MCA) safety examinations, administered by the Scottish Qualifications Authority (SQA). In order for this award to be used towards the issue of UK Certificate of Competence, centres must also be approved by the Maritime and Coastguard Agency as per MSN 1856 (annex G). This is a requirement under the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978 as amended.

Centres who would like to gain approval to offer this award as part of the underpinning knowledge for a UK CoC must contact the MCA prior to gaining SQA approval: exams@mcga.gov.uk."

These newly revised awards replace the previous Nautical Science HNC (G8F5 15) and HND (G8E8 16).

HNC and HND provide the type of officer who is in great demand worldwide. Currently this demand exceeds supply and therefore employment opportunities are enhanced.

The use of the HNC and HND Nautical Science with its wide range of nautical subjects providing the academic requirements for Certificates of Competency has long been recognised for several reasons as follows:

- HNC and HND commands respect among young people, their parents and careers advisors.
- As part of the overall training scheme the HNC and HND works well and produces an outcome which matches the needs of employers, in that it provides officers who are adaptable to change, flexible in their roles and attitudes and able to move from ship to ship, having a thorough understanding of their duties.
- HND is recognised by higher education institutions to the extent that in many cases it enables direct progression into the 2nd year or above of many degree programmes.
- HNC and HND provide status and are seen by the industry as a valuable base for progression to shore-based employment within the individual company structure.

- HNC and HND are recognised internationally and there remains a high demand for the qualifications as part of an MN Certificate of Competency from numerous foreign nationals at all levels.
- HNC and HND Nautical Science also provide the skills and knowledge relevant to many shore-based careers in the operational aspects of shipping, including ship management, cargo handling, pilotage, towage, pollution control, surveying, port control and other marine related occupations.
- HNC and HND awards allow for great flexibility in delivery to a wider range of entry qualifications.

2 Qualifications structure

Framework of HNC Nautical Science

Summary of design principles — HNCs will:

- be at SCQF level 7 and have 96 SCQF credit points (12 SQA credits)
- have a minimum of 48 SCQF credits (6 SQA credits) at level 7
- have one graded unit of 8 SCQF points at SCQF level 7
- have a mandatory section with a minimum of 48 SCQF credit points (6 SQA credits), including the graded unit

Framework of HND Nautical Science

Summary of design principles — HNDs will:

- be at SCQF level 8 and have 240 SCQF credit points (30 SQA credits)
- have a minimum of 64 SCQF credit points (8 SQA credits) at level 8
- have one graded unit of 8 SCQF points at level 7, plus 16 SCQF credit points of graded units at level 8
- have a mandatory section with a minimum of 96 SCQF credit points, including the graded units

For a learner to achieve the HND in Nautical Science they would require attaining all the mandatory units of 240 SCQF credit points (30 SQA credits). These mandatory units are also required for certification under STCW ’78 as amended.

2.1 Structure

HNC Nautical Science — Mandatory units

For a learner to achieve the HNC in Nautical Science, they would require to attain all of the mandatory units of 96 SCQF credit points (12 SQA credits). These mandatory units are also required for certification under STCW ’78 as amended.

4 code	2 code	Unit title	SQA credit	SCQF credit points	SCQF level
HT6L	34	Chartwork and Tides	2	16	7
HR02	34	Navigational Mathematics and Science	1	8	7
HT6M	34	Marine Meteorology: An Introduction	1	8	7
HR03	34	Bridge Watchkeeping	1	8	7
HR04	34	Marine Cargo Operations	1.5	12	7
HR06	34	Ship Stability: An Introduction	1.5	12	7
HR07	34	Naval Architecture: Ship Construction	1	8	7
HR09	35	Celestial Navigation	2	16	8
HT0K	34	Nautical Science: Graded Unit 1	1	8	7
		Total	12	96	

HND Nautical Science

For a learner to achieve the HND in Nautical Science they would require to attain all the mandatory units of 240 SCQF credit points (30 SQA credits). These mandatory units are also required for certification under STCW ’78 as amended.

4 code	2 code	Unit title	SQA credit	SCQF credit points	SCQF level
HT6L	34	Chartwork and Tides	2	16	7
HR02	34	Navigational Mathematics and Science	1	8	7
HT6M	34	Marine Meteorology: An Introduction	1	8	7
HR03	34	Bridge Watchkeeping	1	8	7
HR04	34	Marine Cargo Operations	1.5	12	7
HR06	34	Ship Stability: An Introduction	1.5	12	7
HR07	34	Naval Architecture: Ship Construction	1	8	7
HR09	35	Celestial Navigation	2	16	8
HT0K	34	Nautical Science: Graded Unit 1	1	8	7
HR0C	34	Marine Emergency Response and Communication	1	8	7
HR0D	34	Marine Law and Management: An Introduction	1	8	7
D75X	34	Information Technology: Applications Software 1	1	8	7
HR0F	35	Marine Passage Planning	1.5	12	8
HR0H	35	Management of Bridge Operations	1.5	12	8
HR0J	35	Applied Marine Meteorology	1.5	12	8
HR0L	35	Ship Stability: Theory and Practical Application	1.5	12	8
HR1W	35	Marine Vessels: Structures and Maintenance	1	8	8
HR1X	35	Management of Vessel Operations	2	16	8
HR0N	35	Shipmasters Law and Business	2	16	8
HR0R	35	Shipboard Management	1	8	8
HT0M	35	Nautical Science: Graded Unit 2	1	8	8
HT0N	35	Nautical Science: Graded Unit 3	1	8	8
HT6N	35	Marine Engineering Systems	1	8	8
		Total	30	240	

Units with Embedded Core Skills

Unit/Course code	Course/Unit name	Validation decision on Embedded Core Skills/Core Skill components
HR0N 35	Shipmaster's Law and Business	PS: CT@6
HR0L 35	Ship Stability: Theory and Practical Application	PS: CT@6; NUM @6
HR06 34	Ship Stability: An Introduction	PS: CT@6; NUM: UN@6; UGI@5
HR02 34	Navigational Mathematics and Science	PS: CT@6; NUM: UN@6; UGI@5
HR07 34	Naval Architecture: Ship Construction	PS: CT@6; NUM: UGI@6

Unit/Course code	Course/Unit name	Validation decision on Embedded Core Skills/Core Skill components
HR0F 35	Marine Passage Planning	PS@6, NUM@6
HR0D 34	Marine Law and Management: An Introduction	PS: CT@5
HR0C 34	Marine Emergency Response and Communication	CT@6; NUM@6
HR1X 35	Management of Vessel Operations	PS: CT@6; P&O@6, NUM: UN@5
HR0H 34	Management of Bridge Operations	PS: CT@6;
HT6L 34	Chartwork and Tides	PS: CT@6, NUM@6;
HR09 35	Celestial Navigation	NUM@6; PS: CT@6
HR03 34	Bridge Watchkeeping	CT@6;
HR0J 35	Applied Marine Meteorology	PS: CT@ 6

3 Aims of the qualifications

The principal aim of this qualification is to provide the underpinning knowledge for MCA Deck Certificate of Competency at Officer of the Watch and Chief Mate/Master levels.

HNC and HND Nautical Science comprise an important component in the requirements for UK Officer Trainees' Certificates of Competency, to the extent that they are quoted in MSN 1856 from the MCA.

The use of the HNC and HND Nautical Science to provide the academic knowledge underpinning MCA Certificates of Competency has worked very successfully since 1984. There is no reason to suggest that this will not continue for the extended future.

The HNC and HND Nautical Science will ensure that the provision of seafarer training in the UK is standardised and allows for a diverse entry and exit profile within the industry.

It is expected that the HNC and HND will allow for easy progression to higher qualifications for those seafarers not enrolled on Officer Trainee training schemes, and in addition, those seafarers from overseas who wish to progress towards a first UK Certificate of competency and beyond. The development of new higher-level awards such as the Professional Development Award in Marine Management should allow holders of a Nautical Science HND to obtain employment ashore at later stages in the seagoing career.

Employers and the Merchant Navy training board have been consulted on the content of the proposed award and all fully support changes in this revision of the group awards.

The group awards have been rewritten. They tie in with the requirements of STCW '78 as amended and MNTB Core Skills mapping for the industry National Occupational Standards (NOS).

3.1 General aims of the qualifications

The principal aim of the HNC/HND is to provide the approved education and training programme to gain merchant navy certificates of competency in the deck department.

The HNC and HND have several general aims which can be summarised as follows:

- To develop the ability to analyse and plan tasks commonly encountered in the work place.
- To develop approaches to problem solving and critical thinking.
- To develop an evaluative and reflective approach to work and studies.
- To develop the ability to work and communicate effectively with others.
- To develop the ability to plan and organise studies and research.
- To develop skills for employability and progression to higher qualifications.
- To enable the learner to consolidate knowledge and skills to enhance career progression.
- To enable the learner to develop skills to enhance their own personal development.
- To develop Core Skills which are capable of being transferred to any type of employment.

3.2 Specific aims of the HNC

HNC units with the inclusion of two additional units of *Marine Law and Management*: *An Introduction* and *Marine Emergency Response and Communication* map all STCW mandatory requirements for regulation II/I CoC.

1 Contributes towards learners obtaining a Certificate of Competency as Deck Officer of the Watch issued by MCA. *
2 Prepares learners for the responsibility of keeping a watch at sea and in port.
3 Develops skills to enable learners to effectively navigate a vessel by traditional and modern means.
4 Develops skills to enable learners to operate a vessel in a safe and effective manner.
5 Develops skills to enable learners to work with others in a safe and effective manner.
6 Develops skills to deal with emergency situations.
7 Develops awareness of current maritime legislation.
8 Prepares learners for the MCA written and oral examinations at Officer of the Watch level.

*(two additional HN Units, *Marine Emergency Response and Communication* and *Marine Law and Management*: *An Introduction* are also required for the Certificate of Competency along with the HNC)

3.3 Specific aims of the HND

HND units map all STCW mandatory requirements for Chief Mate/Master certificate of competency as per STCW regulation II/II.

9 Develops the skills required to manage and control the safe navigation of the vessel in all conditions.
10 Develops the skills required to manage and control vessel operations in compliance with current legislation.
11 Develops a sound understanding of shipboard management issues and techniques.
12 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.
13 Develops an understanding of the vessels propulsion maintenance and engineering requirements.
14 Prepares learners for the MCA written and oral examinations at Chief Mate level.

3.4 Graded units

Graded units are a means of ensuring that learners have achieved the overall aims and objectives of the HNC/HND by assessing the integration of knowledge and skills.

There are three distinct graded units in the HND award, the first of which also features in the HNC award.

Nautical Science Graded Units 1 and 3 assess that learners have been able to assimilate sufficient information across a range of units to operate a vessel safely with regards to the stability, navigation, cargo and requirements laid down by international law.

- Graded Unit 1 assesses the above at the level of operational responsibility as defined in STCW 78 as amended.
- Graded Unit 3 assesses the above at the level of management responsibility as defined in STCW 78 as amended

Nautical Science Graded Unit 2 assesses that learners have been able to assimilate sufficient information form a range of units to navigate a vessel safely at the level of management responsibility as defined in STCW 78 as amended.

All graded units take the form of examinations under supervised conditions. Learners will have access to materials which have the approval by the UK Maritime and Coastguard Agency.

The purpose of the graded units in the qualifications is to assess the learner's ability to integrate and apply the knowledge and/or skills in the individual units to demonstrate that they have achieved the principal aims of the qualifications.

For the HNC, one single credit graded unit at SCQF 7 must be achieved. For the HND, two single credit graded units at SCQF level 8 in addition to the SCQF 7 graded unit is required.

Graded Unit 1 and Graded Unit 3 also benefit from including a practical ship loading problem which should be dealt with using information which would normally be found on board a merchant ship.

All graded units should make use of extracts of tabular data which are commonly found on board ships and which are now supplied as MCA approved extracts for use in all HND/HNC examinations within the UK.

The understanding required in interpreting and using such tables is essential for the safe operation of any vessel. Additionally, the use of the extracts in graded and other units gives learners the opportunity to practice with them prior to MCA written examinations.

The main intent of these graded units is to draw together in an holistic way, the knowledge, understanding and application of knowledge requirements of a higher education qualification whilst providing a reliable independent assessment of learner's abilities in preparation for the MCA safety papers for the certificate of competency. Therefore, previously agreed exemption based on MCA exams will not be extended to the proposed HNC and HND Nautical Science Graded Units.*

*Graded Units 2 and 3 are mandatory for the HNC/HND group award; credit transfer from MCA external exams for these units is no longer available.

4 Recommended entry to the qualifications

Entry to this qualification is at the discretion of the centre. The following information on prior knowledge, skills, experience or qualifications that provide suitable preparation for this qualification has been provided by the Qualification Design Team as guidance only.

Learners would benefit from having attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- National Certificate in Shipping and Marine Operations (with deck subject options) (SCQF level 6) or equivalent.
- At least two Higher level (SCQF level 6) passes (grade C or above) of which one should be Mathematics or a Physical Science. Learners should also have National 5 English at SCQF level 5 or better.

Learners who pass the HNC Nautical Science will gain access to the HND Nautical Science. Learners who pass the HNC and also pass two additional units (*Marine Emergency Response and Communication* and *Marine Law and Management: An Introduction*) will meet the MCA's requirements.

In addition, mature entrants must have previously been awarded an STCW '78 as amended Officer of the Watch Unlimited Certificate of Competency by a national administration which is included in the list of countries who are eligible for Certificate of Equivalent Competency from MCA.

4.1 Core Skills entry profile

The Core Skill entry profile provides a summary of the associated assessment activities that exemplify why a level has been recommended for this qualification. The information would be used to identify if additional learning support needs to be put in place for learners whose Core Skills profile is below the recommended entry level or whether learners should be encouraged to do an alternative level or learning programme.

Core Skill	**Recommended SCQF entry profile**	**Associated assessment level of activities**
Communication	SCQF 4	Learners can produce one piece of writing of at least 300 words (or many related pieces) that conveys several pieces of information and/or a clearly stated opinion. If there are many pieces, one of these must contain no fewer than 200 words. Document(s) can be hand written or word processed
Numeracy	SCQF 4	Use numerical skills, interpret data and situations involving probability to solve straight forward real-life problems involving money/time/ measurement. Use trigonometric functions to solve problems.
Information and Communication Technology (ICT)	SCQF 4	Describe the use of information and process and solve problems using Information and communication technology

Core Skill	Recommended SCQF entry profile	Associated assessment level of activities
Problem Solving	SCQF 4	Leaner can think critically and analyses a straight forward problem to identify the main factors that affect the problem; use the results to work out a sequential linear action plan to deal with the problem. Then able to evaluate how effective each stage of problem solving stage.
Working with Others	SCQF 4	Learner can use straight forward interpersonal skill; work with others to identify main roles within co-operative working activity, able to ask politely for information and support, look for ways to be helpful in providing support and information to others. Reflect on the measures used to judge how well the co-operation and contribution helped the team, ask for feedback on the role.

5 Additional benefits of the qualification in meeting employer needs

This qualification was designed to meet a specific purpose and what follows are details on how that purpose has been met through mapping of the units to the aims of the qualification. Through meeting the aims, additional value has been achieved by linking the unit standards with those defined in national occupational standards and/or trade/professional body requirements. In addition, significant opportunities exist for learners to develop the more generic skill, known as Core Skills through doing this qualification.

5.1 Mapping of qualification aims to units

Unit No	Credit	Unit title	Aim													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
HT6L 34	2.0	Chartwork and Tides	X		X			X		X						
HR02 34	1.0	Navigational Mathematics and Science	X		X				X	X						
HT6M 34	1.0	Marine Meteorology: An Introduction	X	X	X			X	X	X						
HR03 34	1.0	Bridge Watchkeeping	X	X	X	X	X	X	X	X						
HR04 34	1.5	Marine Cargo Operations	X	X		X	X	X	X	X						
HR06 34	1.5	Ship Stability: An Introduction	X	X		X	X	X	X	X						
HR07 34	1.0	Naval Architecture: Ship Construction	X			X		X	X	X						
HR09 35	2.0	Celestial Navigation	X		X			X		X						
HT0K 34	1.0	Nautical Science: Graded Unit 1	X	X		X			X	X						
HR0C 34	1.0	Marine Emergency Response and Communication	X	X	X	X	X	X	X	X						
HR0D 34	1.0	Marine Law and Management: An Introduction	X	X		X	X		X	X						
D75X 34	1.0	Information Technology: Applications Software 1		X	X	X										
HR0F 35	1.5	Marine Passage Planning									X		X	X	X	X
HR0H 35	1.5	Management of Bridge Operations									X	X	X	X	X	X
HR0J 35	1.5	Applied Marine Meteorology									X		X	X		X
HR0L 35	1.5	Ship Stability: Theory and Practical Application										X	X	X		X
HR1W 35	1.0	Marine Vessels: Structures and Maintenance										X		X	X	X
HR1X 35	2.0	Management of Vessel Operations										X	X	X		X
HR0N 35	2.0	Shipmasters Law and Business									X	X	X	X	X	X
HR0R 35	1.0	Shipboard Management										X	X	X		X
HT0M 35	1.0	Nautical Science: Graded Unit 2									X		X	X		X
HT0N 35	1.0	Nautical Science: Graded Unit 3										X	X			X
HT6N 35	1.0	Marine Engineering Systems													X	X

5.2 Mapping of National Occupational Standards (NOS) and MNTB training standards

Series A — Mapping units to national occupational standards

Standard	Title
A01	Contribute to the stability and watertight integrity of a vessel
A02	Ensure the stability and watertight integrity of a vessel
A11	Take personal emergency action on board a vessel
A12	Respond to emergencies on board a vessel
A13	Control the response to emergencies on board a vessel
A14	Direct the response to emergencies on board a vessel
A15	Take control of survival craft and rescue boats
A16	Provide medical services on board a vessel
A21	Maintain steelwork and deck equipment on board a vessel
A22	Organise the maintenance of the vessel's hull, fittings and equipment during operational activities
A31	Maintain personal health, safety and environmental standards on board a vessel
A32	Maintain safe, legal and effective working practices on board a vessel
A33	Ensure safe, legal and effective working practices on board a vessel
A34	Create, maintain and enhance productive working relationships on board a vessel
A35	Ensure compliance with the commercial obligations of a vessel

Series B — Mapping units to national occupational standards

Standard	Title
B01	Contribute to maintaining a navigational watch
B02	Maintain a navigational watch
B03	Plan a navigational voyage
B04	Control navigation and vessel-handling
B11	Initiate the response to navigation emergencies
B12	Direct the response to navigation emergencies
B13	Contribute to vessel operations
B14	Monitor and control vessel operations
B15	Plan and direct vessel operations
B21	Contribute to vessel mooring, anchoring and securing operations
B22	Control vessel mooring, anchoring and securing operations

Unit No	NOS UNIT/ HN Unit	A 01	A 02	A 11	A 12	A 13	A 14	A 15	A 16	A 21	A 22	A 31	A 32	A 33	A 34	A 35		B 01	B 02	B 03	B 04	B 11	B 12	B 13	B 14	B 15	B 21	B 22
HR09 35	Celestial Navigation	X																	X	X								
HT6L 34	Chartwork and Tides																	X	X	X								
HR02 34	Navigational Mathematics and Science																		X									
HT6M 34	Marine Meteorology: An Introduction																		X						X			
HR03 34	Bridge Watchkeeping	X		X	X							X			X	X		X	X		X				X		X	
HR04 34	Marine Cargo Operations	X		X	X					X		X			X	X									X		X	
HR06 34	Ship Stability: An Introduction	X								X					X										X			
HR07 34	Naval Architecture: Ship Construction	X								X		X			X										X			
HT0K 34	Nautical Science: Graded Unit 1																											
HR0C 34	Marine Emergency Response and Communication																	X	X	X	X	X			X		X	
HR0D 34	Marine Law and Management: An Introduction																		X		X				X		X	
D75X 34	Information Technology: Applications Software 1		X								X					X							X					

Unit No	NOS UNIT/ HN Unit	A 01	A 02	A 11	A 12	A 13	A 14	A 15	A 16	A 21	A 22	A 31	A 32	A 33	A 34	A 35		B 01	B 02	B 03	B 04	B 11	B 12	B 13	B 14	B 15	B 21	B 22
HR0F 35	Marine Passage Planning																		X	X	X	X	X		X		X	X
HR0H 35	Management of Bridge Operations																	X	X		X	X	X	X	X	X	X	X
HR0J 35	Applied Marine Meteorology																		X	X			X					
HR0L 35	Ship Stability: Theory and Practical Application																						X	X	X			
HR1W 35	Marine Vessels: Structures and Maintenance																						X	X	X		X	X
HR1X 35	Management of Vessel Operations																						X	X	X	X	X	X
HR0N 35	Shipmasters Law and Business																		X	X	X	X	X	X	X	X	X	X
HR0R 35	Shipboard Management																				X		X	X	X	X	X	X
HT0M 35	Nautical Science: Graded Unit 2																											
HT0N 35	Nautical Science: Graded Unit 3																											
HT6N 35	Marine Engineering Systems																				X					X		

MNTB training standards for Deck Officer training covered in HNC/HND

Standard	Standards of role profile, skills and behaviours
01	♦ Voyage planning; navigation; watchkeeping
02	♦ Manoeuvre and handle a vessel in a range of situations and circumstances and the effects of weather and sea state on it
03	♦ Cargo handling, stowage and securing operations
04	♦ Compliance with legislative requirements
05	♦ Safety and security of all onboard — planning for and dealing with emergency situations
06	♦ Maintain steelwork and deck equipment
07	♦ Monitor and control vessel operations
08	♦ Celestial, terrestrial and coastal navigation and the use of associated nautical charts and publications ♦ Modern bridge control equipment, its uses and limitations, including ECDIS, radar and automatic radar plotting aids, electronic position fixing and navigation systems, echo sounders, magnetic and gyro compasses
09	♦ Characteristics of weather systems and related reporting procedures and recording systems
10	♦ Watchkeeping requirements, including the International Regulations for Prevention of Collisions at Sea ♦ Bridge resource management
11	♦ Leadership and teamworking, including people management, training and related maritime conventions and legislation
12	♦ International Code of Signals and how to transmit and receive information by visual signalling
13	♦ Ensure safe, legal and effective working practices on board a vessel
14	♦ Ship construction and stability
15	♦ Ensure compliance with the commercial obligations of a vessel

Unit no	Unit title	Standards reference														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
HT6L 34	Chartwork and Tides	X	X		X				X		X					
HR02 34	Navigational Mathematics and Science	X							X		X					
HT6M 34	Marine Meteorology: An Introduction	X						X		X						
HR03 34	Bridge Watchkeeping	X	X			X		X	X	X	X	X	X			
HR04 34	Marine Cargo Operations			X	X	X		X						X	X	X
HR06 34	Ship Stability: An Introduction			X	X	X		X						X	X	X
HR07 34	Naval Architecture: Ship Construction		X	X	X	X	X								X	
HR09 35	Celestial Navigation	X						X	X		X					
HT0K 34	Nautical Science: Graded Unit 1	X		X	X		X	X	X		X				X	
HR0C 34	Marine Emergency Response and Communication		X	X	X	X		X	X	X	X		X			
HR0D 34	Marine Law and Management: An Introduction			X	X	X						X		X		X
D75X 34	Information Technology: Applications Software 1	X							X							
HR0F 35	Marine Passage Planning	X	X		X	X		X	X		X			X		
HR0H 35	Management of Bridge Operations	X	X					X	X		X	X	X			
HR0J 35	Applied Marine Meteorology	X	X					X		X						
HR0L 35	Ship Stability: Theory and Practical Application			X	X	X	X	X						X	X	X
HR1W 35	Marine Vessels: Structures and Maintenance			X	X	X	X								X	
HR1X 35	Management of Vessel Operations			X	X	X	X	X						X		X
HR0N 35	Shipmasters Law and Business			X	X	X						X		X		X
HR0R 35	Shipboard Management				X	X						X		X		X
HT0M 35	Nautical Science: Graded Unit 2	X						X	X	X	X			X		
HT0N 35	Nautical Science: Graded Unit 3			X	X			X				X		X	X	
HT6N 35	Marine Engineering Systems	X	X			X	X	X			X					X

Mapping of HN Units to MCA (STCW) requirements

Unit code	Unit title	STCW competence
HT6L 34	Chartwork and Tides	♦ Demonstrate a knowledge of charts and publications carried aboard ship ♦ Demonstrate a knowledge and use of Mercator charts ♦ Demonstrate a knowledge of chart folio systems and their care ♦ Know the procedures for and make the necessary corrections to update charts and publications including ECDIS ♦ Know and use visual methods of position fixing using charted objects and compass errors by transit ♦ Know the general theory on the causes of tides and perform calculations involving times and heights of tides worldwide ♦ Know how to adjust the vessels course and speed to take account of the passage plan requirements
HR02 34	Navigational Mathematics and Science	♦ Know navigational terms and use formulae to calculate DR and EP including great circle sailing ♦ Understand the information supplied by ships compasses ♦ Demonstrate a knowledge of the causes and nature of magnetic compass errors ♦ Know limitations of the gyro compass
HT6M 34	Marine Meteorology: An Introduction	♦ Know how to make accurate meteorological observations and use W.M.O. codes ♦ Non-instrumental meteorological observations ♦ Know the structure, and methods of heating and cooling of the troposphere ♦ Understand the forces producing winds ♦ Understand the processes of formation of cloud and precipitation, and the causes of reduced visibility ♦ Know the general circulation of the atmosphere and the main climatic zones over the oceans ♦ Identify on surface charts the main synoptic patterns and air masses, and describe the weather associated with each including local winds (Worldwide) ♦ Know the weather services available to shipping (Worldwide) ♦ Know principal ocean currents
HR03 34	Bridge Watchkeeping	♦ Understand fundamental principles of passage planning ♦ Understand routeing instructions and guidelines ♦ Know the components of steering systems, and their function ♦ Know the various forms in which steering information is relayed to the helmsman ♦ Know and use regulations and systems for the safe movement of vessels ♦ Know bridge watchkeeping procedures ♦ Understand the procedures relating to communications with bridge and engine personnel

Unit code	Unit title	STCW competence
HR03 34	Bridge Watchkeeping (cont)	♦ Understand the basic principles of and demonstrate ability to apply effective bridge watchkeeping and teamwork procedure ♦ Know action to take if ice or icing is observed or suspected ♦ Knowledge of the effects on manoeuvring, turning circles and stopping distances ♦ Know how to make the vessel manoeuvres ♦ Know how to conduct a deck watch alongside or at anchor
HR04 34	Marine Cargo Operations	♦ Know the principles and safe working practices for the proper loading, stowage and carriage of dry, refrigerated, unitised, containerised, ro-ro and bulk cargoes ♦ Know and apply the principles and safe methods of arranging for the proper loading, stowage and carriage of oil, gas and chemical cargoes and related ballasting operations ♦ Know how to conduct a deck watch alongside or at anchor
HR06 34	Ship Stability: An Introduction	♦ Understand and apply the principles of ship stability for box and ship shape vessels to routine situations ♦ Understand the causes of stress in a ship's structure
HR07 34	Naval Architecture: Ship Construction	♦ Identify the significant features of a ship's structure ♦ Understand the causes of stress in a ship's structure ♦ Identify salient features of a range of ship types
HR09 35	Celestial Navigation	♦ Know the concept of the celestial sphere and use the nautical almanac ♦ Use instruments and apply corrections to obtain true altitude and UTC ♦ Obtain latitude by meridian altitude ♦ Obtain latitude by pole star observation ♦ Obtain the direction of a position line and a position through which it passes from celestial observations ♦ Obtain compass error from celestial observations ♦ Fix the vessel's position by means of celestial observations ♦ Select suitable stars for observation
HT0K 34	Nautical Science: Graded Unit 1	Knowledge and skills from ♦ *Ship Stability: An Introduction* ♦ *Bridge Watch keeping* ♦ *Marine Cargo Operations* ♦ *Chart work and Tides* ♦ *Celestial Navigation* ♦ *Navigational Mathematics and Science* to enable the students to apply their acquired skills in each scenario

Unit code	Unit title	STCW competence
HR0C 34	Marine Emergency Response and Communication	♦ Know the meaning and type of alarms fitted to bridge equipment, and know the action to take in the event of malfunction or failure of bridge equipment ♦ Know the contingency plans and action to take as OOW in the event of emergencies at sea or in port as applicable ♦ Recognise distress, urgency and safety signals ♦ Know the further action required to comply with contingency planning and master's instructions ♦ Know the general arrangements for search and rescue ♦ Know and use the sources of phrases and codes to aid communication ♦ Send and receive signals in the 'International Code of Signals'
HR0D 34	Marine Law and Management: An Introduction	♦ Understand how the MARPOL Convention and current legislation provide knowledge of the precautions and procedures to be taken to prevent pollution of the marine environment ♦ Understand the relationship between law, codes and other forms of guidance ♦ Have an awareness of the law, codes, principles and procedures and other forms of guidance relating to international regulations ♦ Appreciate the requirements of records for commercial and legislative purposes ♦ Know that there are personal and corporate penalties, for unlawful Acts or Omissions and for breaches of company regulations ♦ Understand the fundamental principles of anti-pollution legislation ♦ Understand the principles of personnel management ♦ Understand the officer's managerial role and key responsibilities ♦ Know how to communicate effectively ♦ Understand the importance of creating a safety culture in the workplace ♦ Understand principles relating to the management of people ♦ Understand the principles of planning, directing and monitoring progress
D75X 34	Information Technology: Applications Software 1	♦ Understand stability/stress diagrams and stress calculating equipment
HR0F 35	Marine Passage Planning	♦ Know the principles of great circle sailing ♦ Obtain correct tidal information ♦ Know the principles of effective passage planning ♦ Select the appropriate charts and publications to appraise the proposed passage

Unit code	Unit title	STCW competence
HR0F 35	Marine Passage Planning (cont)	♦ Appraise the intended passage, taking into account the influential factors ♦ Prepare and document the intended passage plan ♦ Make contingency plans for emergency situations in critical navigation areas ♦ Evaluate the completed passage plan prior to commencement of the passage ♦ Accurately evaluate, plot and record necessary alterations to the passage plan due to environmental conditions ♦ Determine position and the accuracy of resultant position fix by any means ♦ Determine the reliability of celestial and terrestrial fixes; random and systematic errors, resolution of cocked-hat ♦ Select position fixing methods from those available ♦ Emergency planning
HR0H 35	Management of Bridge Operations	♦ Establish watch-keeping arrangements and procedures ♦ Bridge resource management ♦ Understand statutory and international requirements regarding navigation, navigational equipment and the qualifications and fitness of watchkeeping personnel ♦ Prepare and write standing and night orders outlining the duties and responsibilities of navigation watchkeepers ♦ Plan contingency actions ♦ Know the information which should be exchanged between the Master and Pilot in accordance with current guidance ♦ Understand the need to ensure the adequacy of an engineering watch ♦ Co-ordinate search and rescue operations ♦ Plan and prepare a search, know how to conduct a search ♦ Know how to conduct a rescue ♦ Know how to terminate SAR operations ♦ Planning for navigational and operational emergencies ♦ Know the contingency plans and action to take as Master in the event of emergencies at sea or in port as applicable ♦ Manoeuvre and handle the ship in all conditions ♦ Understand ship design features affecting the maneuverability, know other factors affecting manoeuvrability, compare manoeuvring data for a range of ship types

Unit code	Unit title	STCW competence
HR0H 35	Management of Bridge Operations (cont)	♦ Know manoeuvring procedures when berthing and unberthing, in all conditions of wind, current and tidal stream, with and without tugs ♦ Understand emergency towing arrangements and procedures ♦ Understand procedures for refloating a vessel with and without assistance ♦ Understand the information supplied by ships compasses ♦ Demonstrate a knowledge of the operation and use of the gyro compass ♦ Understand the systems under the control of the master gyro and have a knowledge of the operation and care of the main types of gyro compass ♦ Emergency planning
HR0J 35	Applied Marine Meteorology	♦ Analyse and identify the major features of surface and upper air charts establishing the factors that affect the development, decay and movement of surface pressure systems ♦ Know the weather conditions associated with the surface pressure systems ♦ Interpret and evaluate meteorological and climatological data, with the objective of forecasting the weather and sea conditions that may be encountered during a voyage ♦ Know the general surface water circulation of the oceans and adjoining seas and how the information is presented ♦ Know the main types of floating ice, their origins, distribution, movement and nomenclature ♦ Know the conditions that may cause ice accumulation on ships
HR0L 35	Ship Stability: Theory and Practical Application	♦ Control trim, stability and stress ♦ Factors affecting trim, stability and stress ♦ Understand the theories and factors affecting stability and trim ♦ Understand the factors affecting stability at moderate and large angles of heel ♦ Know the effect of damage and flooding on stability including calculations on box shaped vessels ♦ Emergency planning ♦ Know the current national and IMO regulations concerning stability
HR1W 35	Marine Vessels: Structures and Maintenance	♦ Understand the structural requirements for vessels with respect to the handling and carriage of cargo ♦ Conditions for the assignment of loadline ♦ Load line terminology and definitions ♦ Assignment of special load lines ♦ Know the ship construction features and systems that may be used to limit damage ♦ Strengthening for ice ♦ The criteria specified in SOLAS fire protection

Unit code	Unit title	STCW competence
HR1W 35	Marine Vessels: Structures and Maintenance	♦ Requirements and codes for the construction of specialised vessels ♦ Maintain the vessel ♦ Properties and protection of materials ♦ Understand the range and application of materials and processes ♦ Know the properties and safe use of maintenance equipment and materials ♦ Drydocking and survey preparation ♦ Dry-docking procedures ♦ Survey preparation
HR1X 35	Management of Vessel Operations	♦ Understand stability/stress diagrams and stress calculating equipment ♦ Know the planning and operational procedures for the stowage and securing of dry cargoes, stores and equipment ♦ Know the planning and operational procedures for handling oil, liquid and gas cargoes ♦ Know the planning and operational procedures for passenger operations plan and ensure safe loading, stowage, securing, care during the voyage and unloading ♦ Emergency planning
HR0N 35	Shipmasters Law and Business	♦ Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and the protection of the marine environment ♦ Responsibilities under international maritime law ♦ Understand agreements and conventions ♦ Maintain safety and security of the ship's crew and passengers and the operational condition of LSA, FFA and other safety systems ♦ Drills, maintenance and procedures ♦ Know the drills, and their organisation, required to comply with current national and international legislation ♦ Know the operational maintenance requirements of FFA, LSA and other safety systems ♦ ISM code, MLC, emergency planning ♦ Understand safety management and quality assurance legislation, codes and guidance ♦ Application of safety management systems ♦ UK and international legislation ♦ Understand the relationship between law, codes and other forms of guidance ♦ Understand the principles of UK and international legislation

Unit code	Unit title	STCW competence
HR0N 35	Shipmasters Law and Business (cont)	♦ Understand and apply relevant international regulations, codes and standards concerning the safe handling, stowage, securing and transport of cargoes
HR0R 35	Shipboard Management	♦ Organise and manage the crew ♦ Personnel and resource management ♦ Understand personnel management theory ♦ Understand application of management theory and skills ♦ Understand budgetary control appreciate the value of drills and other training to cope with emergencies
HT6N 35	Marine Engineering Systems	♦ Operate remote controls of propulsion plant and engineering systems and services ♦ Describe diesel plant ♦ Describe steam turbine plant ♦ Describe the function and operational limitations of the ship's machinery ♦ Understand marine engineering terms ♦ Understand the concepts of control systems ♦ Understand the need for and describe the function and operation of data loggers, displays and other sources of information ♦ Describe the principles of bridge control ♦ Understand the need to ensure the adequacy of an engineering watch ♦ Understand factors affecting fuel consumption ♦ Know the components of steering systems, and their function
HT0M 35	Nautical Science: Graded Unit 2	Knowledge and skills from ♦ *Marine Passage Planning* ♦ *Management of Bridge Operations* ♦ *Applied Marine Meteorology* to enable the students to apply their acquired skills in each scenario involving actions required on the bridge of a ship
HT0N 35	Nautical Science: Graded Unit 3	Knowledge and skills from ♦ *Ship Stability: Theory and Practice* ♦ *Management of Vessel Operations* ♦ *Shipmasters Law and Business* to enable the students to apply their acquired skills in each scenario involving ship stability, cargo and on-board management

5.3 Mapping of Core Skills development opportunities across the qualifications

S = Core Skills are signposted within the Unit
E = Core Skills or Core Skill component are embedded within the Unit and automatically certificated
CT = Critical thinking; P&O = Planning & Organisation; R&E = Review & Evaluation; WWO = Working with Others

Unit no	Unit name	Written Comms		Oral Comms	Using Graphical Info	Using Number	Using IT	Problem Solving – C T	Problem Solving – P & O	Problem Solving – R & E	WWO
		Read	Write								
HR09 35	Celestial Navigation	5 S	5 S	6 S	6 S	6 S	6 S	6 S	6 S	6 S	
HT6L 34	Chartwork and Tides	5 S	5 S	5 S	6 S	6 S	6 S	6 S			5 S
HR02 34	Navigational Mathematics and Science					6 S		6 S			
HT6M 34	Marine Meteorology: An Introduction	5 S	5 S	6 S	6 S	5 S	5 S			5 S	
HR03 34	Bridge Watchkeeping	5 S	5 S	6 S	5 S		5 S	5 S	5 S	5 S	5 S
HR04 34	Marine Cargo Operations	5 S	5 S	5 S	4 S	4 S	5 S	6 S	6 S	6 S	6 S
HR06 34	Ship Stability: An Introduction	5 S	5 S		6 S	6 S	5 S	6 S	6 S	6 S	
HR07 34	Naval Architecture: Ship Construction	5 S		5 S	6 S		5 S			5 S	

Unit no	Unit name	Written Comms		Oral Comms	Using Graphical Info	Using Number	Using IT	Problem Solving – C T	Problem Solving – P & O	Problem Solving – R & E	WWO
		Read	Write								
HR0C 34	Marine Emergency Response and Communication	5 S	5 S	6 S	4 S	4 S	6 S	6 S	6 S	6 S	6 S
HR0D 34	Marine Law and Management: An Introduction	5 S	5 S	6 S				5 S	5 S	5 S	6 S
D75X 34	Information Technology: Applications 1						6 E				
HR0F 35	Marine Passage Planning	6 S	6 S		6 S	6 S	5 S	6 S	6 S	6 S	6 S
HR0H 35	Management of Bridge Operations	6 S	6 S		6 S	6 S	5 S	6 S	6 S	6 S	6 S
HR0J 35	Applied Marine Meteorology	5 S	5 S		6 S		5 S	6 S		6 S	
HR0L 35	Ship Stability: Theory and Practical Application	6 S	6 S		6 S	6 S	5 S	6 S	6 S	6 S	
HR1W 35	Marine Vessels: Structures and Maintenance	5 S	6 S		5 S		5 S			5 S	
HR1X 35	Management of Vessel Operations	6 S	6 S		6 S		5 S	6 S	6 S	6 S	6 S
HR0N 35	Shipmasters Law and Business	6 S	6 S	6 S			5 S	6 S	6 S	6 S	6 S
HR0R 35	Shipboard Management	6 S	6 S	6 S			5 S	6 S	6 S	6 S	6 S
HT6N 35	Marine Engineering Systems	5 S	6 S		5 S	5 S	5 S	5 S	5 S	5 S	5 S

Unit no	Unit name	Written Comms		Oral Comms	Using Graphical Info	Using Number	Using IT	Problem Solving – C T	Problem Solving – P & O	Problem Solving – R & E	WWO
HT0K 34	Nautical Science: Graded Unit 1	5 S	5 S	5 S	6 S	6 S	6 S	6 S	6 S	6 S	5 S
HT0M 35	Nautical Science: Graded Unit 2	6 S	6 S		6 S	6 S	5 S	6 S	6 S	6 S	6 S
HT0N 35	Nautical Science: Graded Unit 3	6 S	6 S		6 S		5 S	6 S	6 S	6 S	6 S

Note: There are no core skills embedded in graded units

5.4 Assessment strategy for the qualifications

An appropriate assessment strategy is in place for both the HNC and HND in Nautical Science. This strategy had to reflect the needs of the award with regards to STCW and therefore MCA certification.

Unit	Assessment				
	Outcome 1	**Outcome 2**	**Outcome 3**	**Outcome 4**	**Outcome 5**
Celestial Navigation	Practical demonstration and questioning. Pass/Fail.	O2, 3 and 4 combined into an examination not exceeding three hours — 65% pass required by MCA/MNTB approvals criteria.			
Chartwork and Tides	O1, 2, 3 and 4 combined examination and should not exceed 3 hours— 65% pass required by MCA/MNTB approvals criteria.				
Navigational Mathematics and Science	O1, 2 and 3 combined examination and should not exceed two hours — O1 — 65% pass required by MCA/MNTB approvals criteria; O2, 3 50%.				
Marine Meteorology: An Introduction	O1/2/3/4 combined examination and should not exceed two hours — 50% pass required by MCA/MNTB approvals criteria.				
Bridge Watchkeeping	O1, 2 and 3 — multi choice/short answer test — 65% pass required by MCA/MNTB approvals criteria.				
Marine Cargo Operations	O1/2/3 /4 combined examination and should not exceed three hours — 50% pass required by MCA/MNTB approvals criteria.				
Ship Stability: An Introduction	O1/2 two hour examination O3/4 — two hour examination — 60% Pass required by MCA/MNTB approvals criteria.				
Naval Architecture: Ship Construction	O1, 2, and 3 combined examination and should not exceed three hours — 50% Pass required by MCA/MNTB approvals criteria.				
Nautical Science: Graded Unit 1	As detailed in unit specification with grades A to C.				
Marine Emergency Response and Communication	O1/2 — short answer questions — 50% pass required by MCA/MNTB approvals criteria. Outcome 3 Standard Signals examination.				

Unit	Assessment				
	Outcome 1	**Outcome 2**	**Outcome 3**	**Outcome 4**	**Outcome 5**
Marine Law and Management: An Introduction	O1/2/3 short answer questions — 50% pass mark required by MCA/MNTB approvals criteria.				
Marine Passage Planning	O1/2/4 can be course work/assignment and O 3/5 2-hour exam: pass mark for both 65% required by MCA/ MNTB approvals criteria.				
Management of Bridge Operations	O1 65% pass mark required by MCA/ MNTB approvals criteria. O2/3 50% pass mark.				
Applied Marine Meteorology	O1/2/3/4 short answer questions, practical forecasting exercise — 50% pass required by MCA/MNTB approvals criteria.				
Ship Stability: Theory and Practical Application	O1/2/3 — two and a half hour examination — 60% pass required by MCA/MNTB approvals criteria				
Marine Vessels: Structures and Maintenance	O1/2 and 3 — two-hour examination — 50% pass required by MCA/MNTB approvals criteria				
Management of Vessel Operations	O1 or 2 and 4 — Course work/cargo loading assignment or extended response questions — 50% pass required by MCA/MNTB approvals criteria. O 2 or 1 and 3 — two hour examination of short answer questions 50% pass required by MCA/MNTB approvals criteria.				
Shipmasters Law and Business	O1, 2 and 3 may be assessed by individual closed-book examinations or by short answer questions. 50% pass required by MCA/MNTB approvals criteria				
Shipboard Management	O1, 2 and 3 may be assessed by individual closed-book examinations or by short answer questions. 50% pass required by MCA/MNTB approvals criteria				
Marine Engineering Systems	O1/2/3 can be assessed by shot answer questions — two hour or multiple-choice with explanation/definition/description choice questions one hour. 60% pass mark required by MCA/MNTB approvals criteria.				
Nautical Science: Graded Unit 2	As detailed in unit specification with grades A to C.				
Nautical Science: Graded Unit 3	As detailed in unit specification with grades A to C.				

6 Guidance on approaches to delivery and assessment

All tutors must ensure that they deliver this course using teaching methods that engage students in 'active learning' to encourage them to participate in the learning activities set. All SQA qualifications are designed to enable students to develop their knowledge and skills and then they are required to apply this new knowledge/skill to a new situation. Criterion-referenced assessments assume that all parties are fully informed of the criteria that students must achieve and the assessment conditions under which the students carry out the assessment activity.

To ensure that students are fully prepared it is essential that tutors provide as many opportunities as possible for students to be actively engaged throughout the learning process. Students should:

- be fully informed of the criteria they must achieve.
- be offered a range of learning activities to research, analyse and apply new knowledge/skills to new situations.
- be offered opportunities to experience the type of activity that they will be required to carry out as part of the summative assessment.
- can critically evaluate their personal contribution and to receive feedback from the tutor on how to enhance their understanding.

Tutors should develop a learning, teaching and assessment plan for each unit within the course and provide activities that students should undertake.

Each unit should have a master folder containing the unit specification, teaching materials, the teaching and assessment plan along with assessment exemplars and re-assessments. The teaching materials and teaching plan should provide details of activities that students should undertake. Typically, they include activities such as small group/whole class discussion, group problem solving, eg analysing a case study and offering solutions based on the new learning, group project work to find.

For further information about different assessment activities — whether they be for formative or summative purposes, tutors may wish to complete the new online course: Produce HN assessments for successful prior verification or read the SQA *Guide to Assessment*.

The following is a list of learning activities but it is not exhaustive:

- Lectures
- Tutorials
- Study packs
- Problem based scenarios
- Case studies
- Group/team work
- Online materials
- IT based teaching materials
- Projects
- Quizzes
- Research and presentation of findings to fellow students
- Role play
- Short response questions, multiple choice questions
- Create questions for other students (with answers), etc

Tutors should consider the nature of the assessment method as well as the assessment content when planning learning activities so that students are appropriately prepared. It is the tutor's responsibility to explain to students what is required of them and then to direct, encourage, co-ordinate and support them to complete the activity. It is also the tutor's responsibility to ensure the resources needed are available. Materials should be reviewed on a regular basis to ensure they are still relevant.

Some activities could require students to work in pairs or small groups to discuss issues or to solve a given problem. Other activities could require the student to undertake some independent research out with the classroom and to bring their findings to the next lesson and present this to the class in a report or presentation format. Some units will require the student to undertake independent reading and students should be prepared to discuss key issues within the classroom as organised and led by the tutor.

In practical skills classes, students should be directed to use practice exercises to enable them to become proficient. Tutors may demonstrate the skill first and then coach the students individually when unsure. In terms of developing independent learners, in the case of information technology, students should be encouraged to independently use the online Help facilities within applications. It should be noted that even in practical classes, students should be encouraged to work in small groups and to support one another as part of the learning process — by explaining to another, a student should reformulate and communicate the learning point thus deepening their learning.

When undertaking group work, students should be encouraged/directed to work with different groups each time they attempt a new task so that they get to know and work with a wide range of individuals. The groups should be given clear task activities. Tutors should note the various roles assigned to the group members and they should set a time limit for the completion of the task.

At the end of each activity tutors should make time to receive feedback from each group so that they can assess knowledge and understanding and use the feedback session to repeat important key points and to clear up any misunderstandings. Tutors must also provide feedback to students on their performance in activities, etc.

Where centres have access to electronic resources such as virtual learning environments, blogs, wikis, etc — tutors/lecturers are encouraged to use these collaborative tools in the learning process.

Re-assessment

Formative assessment should be used throughout the delivery of units to reinforce learning, build learners' confidence and prepare them for summative assessment.

Re-assessment should operate in accordance with a centre's assessment policy and the professional judgement of the assessor. SQA advises that there should normally be at least one re-assessment opportunity.

Assessment instrument used for re-assessment must be substantially different from the assessment instruments used previously.

Please refer to SQA's *Guide to Assessment and Quality Assurance for Colleges of Further Education*, **www.sqa.org.uk**.

Content and context

The HNC and HND Nautical Science are designed to allow learners to develop appropriate technical and practical skills, which will meet the requirements of employers, prepare learners for the level of responsibility on board ship and allow future progression to higher rank within the industry or to enter higher education.

It is not possible to quantify such technical and practice skills in exact detail. However, the best way to prepare learners to meet the changing technical and practical requirements of the modern maritime industry is to ensure learners have a solid foundation of theory and practice upon which they can build new knowledge, understanding and skills.

Transferable skills and Core Skills have been built into the awards to allow easy progression between HNC and HND and thence onto higher education. Information technology has been included into the HND Nautical Science in order that the requirements of ship owners can be met.

Open learning

All nautical science units within these group awards could be delivered by open or distance learning. However, it would require planning by the centre to ensure sufficiency and authenticity of learner evidence. Arrangements would have to be made to ensure that closed-book assessments were conducted under supervision.

Centres should be aware that if the HNC/HND are used to deliver the underpinning knowledge required for STCW ’78 as amended, leading to the award of a UK Certificate of Competency via open/distance learning, then their programmes will require further approval by the Maritime and Coast Guard agency.

6.1 Sequencing/integration of units

When centres are planning the delivery of the HNC or HND Nautical Science, the following guidance is worthy of note:

HNC

Year 1

All units at SCQF level 7 should be delivered prior to delivery of units at SCQF level 8, preferably in year 1 of the HND by centres wishing to gain MNTB approval. The exception to this is unit *Celestial Navigation*. This should be included in the group of units delivered in year 1 as it is a requirement for the award of an Officer of the Watch Certificate of Competency under STCW ’78 as amended.

It should also be noted that HN Unit *Navigational Mathematics and Science* should be delivered either before or in conjunction with the *Celestial Navigation* unit. *Navigational Mathematics* contains all the basic mathematical knowledge and concepts required for completion of *Celestial Navigation*. The contents of the units complement each other and a firm understanding of the navigational concepts in *Navigational Mathematics* should enable learners to pick up the theoretical concepts of *Celestial Navigation* much more quickly.

Prior to undertaking Graded Unit 1, it is recommended that learners have completed or are nearing completion of the following units:

- *Ship Stability: An Introduction*
- *Bridge Watc keeping*
- *Marine Cargo Operations*
- *Chartwork and Tides*
- *Celestial Navigation*
- *Navigational Mathematics and Science*

HND

Year 2

Centres are strongly recommended to deliver the following units in conjunction with one another. The content of all three are complementary to each other and each will have some common teaching strands, eg visibility/ice/severe weather and its effect on both passage planning and bridge manning and routines:

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

Likewise, the following units are complementary to each other and would benefit from being delivered in conjunction with one another.

- *Management of Vessel Operations*
- *Shipmasters Law and Business*
- *Ship Stability: Theory and Practical Application*

Prior to undertaking to Graded Unit 2, it is recommended that learners have completed or are nearing completion of the following units:

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

Prior to undertaking to Graded Unit 3, it is recommended that learners have completed or are nearing completion of the following units:

- *Ship Stability: Theory and Practice*
- *Management of Vessel Operations*
- *Shipmasters Law and Business*

Management of graded units

The timing of the delivery of graded units will vary from centre to centre and depending on the group taking the award will most likely be focused on the second half of the academic year towards the end of a phase.

It is recommended that learners study the key contributing HN Units prior to sitting the graded unit examinations.

However, it is in the best interest of learners to introduce the concept of graded units as early as possible. It is best practice and in the best interest of learners for course teams to take responsibility for the graded units and to introduce the relevance of the individual nautical science units to the graded units.

This should include keeping learners advised of where each Nautical Science unit lies in relation to the graded units, including the different knowledge and skills that the graded units integrate. Tutors can aid this by referring to and comparison with practical solutions to problems likely to be encountered whilst on a ship.

Dates for graded unit examinations should be set at the start of each course/phase and these dates should be clearly indicated to learners.

Support for learners

All tutors delivering on a course have a collective responsibility to ensure that all students are supported in a manner that meets their individual needs as they progress through the course. Each individual tutor has a role to monitor an individual student's understanding and progress at unit level and feed comments to the course team. At individual unit level, tutors may wish to use a range of mechanisms to support students and to establish if students are progressing well on the course

6.2 Recognition of prior learning

SQA recognises that learners gain knowledge and skills acquired through formal, non-formal and informal learning contexts.

In some instances, a full group award may be achieved through the recognition of prior learning. However, it is unlikely that a learner would have the appropriate prior learning and experience to meet all the requirements of a full group award.

The recognition of prior learning may **not** be used as a method of assessing in the following types of units and assessments:

- HN Graded Units
- Course and/or external assessments
- Other integrative assessment units (which may or not be graded)
- Certain types of assessment instruments where the standard may be compromised by not using the same assessment method outlined in the unit
- Where there is an existing requirement for a licence to practice
- Where there are specific health and safety requirements
- Where there are regulatory, professional or other statutory requirements
- Where otherwise specified in an assessment strategy

More information and guidance on the *Recognition of Prior Learning* (RPL) may be found on our website **www.sqa.org.uk**.

The following sub-sections outline how existing SQA unit(s) may contribute to this group award. Additionally, they also outline how this group award may be recognised for professional and articulation purposes.

6.2.1 Articulation and/or progression

- Successful learners who achieve the HND Nautical Science Group Award will be eligible to apply for many marine related degree programmes offered by a variety of higher education institutions. These include Strathclyde, Newcastle, Liverpool John Moors, Cardiff, Southampton and Plymouth Universities.
- Learners successfully completing the HND Nautical Science may also articulate to an MSc programme in Marine Operations delivered at the City of London University.
- Successful learners who achieve the HNC Nautical Science Group Award as a means of gaining a UK MCA 'Officer of the Watch' Unlimited Certificate, will be eligible to progress to complete the full HND Nautical Science Group Award at Chief Mate Unlimited level once they have gained the relevant industrial experience specified by the MCA.
- In addition, those learners who wish to change career and work ashore may, depending on academic performance in the HNC, be allowed to proceed directly onto Part 2 of the HND Nautical Science. These learners whilst eligible for Certification at OOW level would not be able to use HND Part 2 as a route to Certification at Chief Mate level without first gaining the relevant industrial experience.

The HNC and HND in Nautical Science aim to equip you with the skills to gain employment at both the operational and management level in the following vocational areas:

- Ship management
- Port and harbour operations
- Freight and transportation operations
- Marine insurance industry
- Ship broking and chartering
- The wider maritime safety industry, eg safety equipment manufacturers
- Meteorological services, pollution prevention services, etc

6.2.2 Professional recognition

Centres wishing to use the HNC/HND Nautical Science as a vehicle for delivering the underpinning knowledge required for MNTB approved cadet training programme for MCA certification should consider contacting the Merchant Navy training board when designing programmes as these will be subject to MNTB approval.

Learners who require an Officer of the Watch Certificate of Competency will require the following additional units over and above the HNC 96 SCQF credits:

- *Marine Emergency Response and Communication*
- *Marine Law and Management: An Introduction*

6.2.3 Transitional arrangements

The HNC Nautical Science legacy qualification (G8F5 15) will finish on 31 July 2019 to accommodate part-time and distance learning students as well as for re-assessment.

The HND Nautical Science legacy qualification (G8E8 16) will finish on 31 July 2020, to accommodate learners progressing from the legacy HNC qualification, part-time and distance learning students as well as for re-assessment.

However, centers may use credit mapping arrangements in Section 6.2.4 to transfer legacy HNC learners onto the revised HND programme.

6.2.4 Credit transfer

Credit transfer can be given where there is a broad equivalence between the subject related content of the unit (or combination of units).

All decisions relating to credit transfer remain with centres, however the table below provides details and guidance on credit transfer arrangements agreed by the Qualification Development Team. Units that have not been included in this table do not attract full or partial credit transfer.

Centres must retain proof of all credit transfer arrangements (normally a photocopy of the learner's Scottish Qualification Certificate) for the purposes of internal and external verification.

New unit code	New unit title	Old unit code	Old unit title	Credit transfer	Comments
HT6L 34	Chartwork and Tides	F0LV 34	Chartwork and Tides	Yes	
HR02 34	Navigational Mathematics and Science	F0M0 34	Navigational Mathematics and Science	Yes	
HT6M 34	Marine Meteorology: An Introduction	F0LH 34	Marine Meteorology: An Introduction	Yes	
HR03 34	Bridge Watchkeeping	F0LR 34	Bridge Watchkeeping	Yes	
HR04 34	Marine Cargo Operations	F0LM 34	Marine Cargo Operations	Yes	
HR06 34	Ship Stability: An Introduction	F0LD 34	Ship Stability: An Introduction	Yes	
HR07 34	Naval Architecture: Ship Construction	F0LF 34	Naval Architecture: Ship Construction	Yes	
HR09 35	Celestial Navigation	F0LS 35	Celestial Navigation	Partial	Partial credit transfer is because of the added content of 'principles of navigation' in the new unit
HR0C 34	Marine Emergency Response and Communication	F0LK 34	Marine Emergency Response and Communication	Yes	
HR0D 34	Marine Law and Management: An Introduction	F0LJ 34	Marine Law and Management	Yes	

New unit code	New unit title	Old unit code	Old unit title	Credit transfer	Comments
D75X 34	Information Technology: Applications Software 1	D75X 34	Information Technology: Applications Software 1	No	
HR0F 35	Marine Passage Planning	F0LG 35	Marine Passage Planning	Yes	
HR0H 35	Management of Bridge Operations	F0LW 35	Management of Bridge Operations	Yes	
HR0J 35	Applied Marine Meteorology	F0LP 35	Applied Marine Meteorology	Yes	
HR0L 35	Ship Stability: Theory and Practical Application	F0LC 35	Ship Stability: Theory and Practical Application	Yes	
HR1W 35	Marine Vessels: Structures and Maintenance	F0LY 35	Marine Vessels: Structures and Maintenance	Yes	
HR1X 35	Management of Vessel Operations	F0LX 35	Management of Vessel Operations	Yes	
HR0N 35	Shipmasters Law and Business	F0LN 35	Shipmasters Business	Yes	
HR0R 35	Shipboard Management	F0LB 35	Shipboard Management	Yes	
HT6N 35	Marine Engineering Systems	D78P 35	Marine Engineering Systems	Yes	

6.3 Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this group award. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

6.4 Support materials

There are no ASPs available for this award.

6.5 Resource requirements

Many units within this group award require a practical element to be delivered. Therefore, centers must have access to the following equipment:

- Appropriate training charts and materials for chart work
- Suitable desk space for chart work
- Sufficient number of computers with relevant software
- Ship loading computer software
- Staff delivering units in this group award should have a minimum of an HND in a subject appropriate to the unit being delivered or related industrial experience
- Appropriate teaching and learning resources for different learning styles for example, a well-stocked library of books, videos and journals
- Use of bridge and engine room simulators may enhance the students' learning experience

7 General information for centres

Equality and inclusion

The unit specifications making up this group award have been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners will be considered when planning learning experiences, selecting assessment methods or considering alternative evidence. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Internal and external verification

All assessments used within this/these qualification(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

All graded unit assessments may be prior verified by SQA before using as assessment instrument.

Further information on internal and external verification can be found in *SQA's Guide to Assessment* **(www.sqa.org.uk/GuideToAssessment)**.

8 Glossary of terms

Embedded Core Skills: is where the assessment evidence for the unit also includes full evidence for complete Core Skill or Core Skill components. A learner successfully completing the unit will be automatically certificated for the Core Skill. (This depends on the unit having been successfully audited and validated for Core Skills certification.)

Finish date: The end of a group award's lapsing period is known as the finish date. After the finish date, the group award will no longer be live and the following applies:

- learners may not be entered for the group award
- the group award will continue to exist only as an archive record on the Awards Processing System (APS)

Graded unit: Graded units assess learners' ability to integrate what they have learned while working towards the units of the group award. Their purpose is to add value to the group award, making it more than the sum of its parts, and to encourage learners to retain and adapt their skills and knowledge.

Lapsing date: When a group award is entered its lapsing period, the following will apply:

- the group award will be deleted from the relevant catalogue
- the group award specification will remain until the qualification reaches its finish date at which point it will be removed from SQA's website and archived
- no new centres may be approved to offer the group award
- centres should only enter learners whom they expect to complete the group award during the defined lapsing period

SQA credit value: The credit value allocated to a unit gives an indication of the contribution the unit makes to an SQA group award. An SQA credit value of 1 given to an SQA unit represents approximately 40 hours of programmed learning, teaching and assessment.

SCQF: The Scottish Credit and Qualification Framework (SCQF) provides the national common framework for describing all relevant programmes of learning and qualifications in Scotland. SCQF terminology is used throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at **www.scqf.org.uk**.

SCQF credit points: SCQF credit points provide a means of describing and comparing the amount of learning that is required to complete a qualification at a given level of the Framework. One National Unit credit is equivalent to 6 SCQF credit points. One National Unit credit at Advanced Higher and one Higher National Unit credit (irrespective of level) is equivalent to 8 SCQF credit points.

SCQF levels: The level a qualification is assigned within the framework is an indication of how hard it is to achieve. The SCQF covers 12 levels of learning. HNCs and HNDs are available at SCQF levels 7 and 8 respectively. Higher National Units will normally be at levels 6–9 and graded units will be at level 7 and 8. National Qualification Group Awards are available at SCQF levels 2–6 and will normally be made up of National Units which are available from SCQF levels 2–7.

Subject unit: Subject units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Signposted Core Skills: refers to opportunities to develop Core Skills arise in learning and teaching but are not automatically certificated.

MCA: Maritime and Coastguard Agency which is the UK Administration (Regulatory body) responsible to implement IMO regulations ratified by UK Government

MNTB: Merchant Navy Training Board is the professional body which approves all cadet training programmes in the UK

STCW: Standards of Training, Certification and Watchkeeping which is the IMO code to standardise merchant navy certification internationally.

History of changes

It is anticipated that changes will take place during the life of the qualification and this section will record these changes. This document is the latest version and incorporates the changes summarised below. Centres are advised to check SQA's APS Navigator to confirm they are using the up to date qualification structure.

NOTE: Where a unit is revised by another unit:

- No new centres may be approved to offer the unit which has been revised.
- Centres should only enter learners for the unit which has been revised where they are expected to complete the unit before its finish date.

Version Number	Description	Date
05	Clarification made to the GAS in relation to gaining MCA approval when using the award as part of the underpinning knowledge for a UK CoC	12/02/20
04	Further clarification made to combining outcomes and examination length in the Assessment Strategy section	21/02/19
03	Amendments made to clarify Assessment Strategy for the qualification	12/10/18
02	Grid showing units with Embedded Core Skills added	August 2017

Acknowledgement

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of this qualification.

9 General information for learners

This section will help you decide whether this is the qualification for you by explaining what the qualification is about, what you should know or be able to do before you start, what you will need to do during the qualification and opportunities for further learning and employment.

The revised HNC and HND in Nautical Science are specifically designed to equip you to enter employment in the Merchant Navy in the capacity of a Deck Officer.

The HNC/HND in Nautical Science has been designed as a component of a Merchant Navy Deck Officer training scheme. This five or more-phase training scheme consists of alternating college and sea phases. The duration of the training scheme is approximately three years. A minimum of 12 months of the training will take place at sea.

If you wish to go to sea you should be aware that you must meet the medical standards laid down by the Maritime and Coastguard Agency. Please refer to MSN 1822 (correct at the time of writing this GA specification).

Entry to this qualification is at the discretion of the centre; however, you would benefit from having attained the skills, knowledge and understanding required by one or more of the following or equivalent qualifications and/or experience:

- National Certificate in Shipping and Marine Operations (with Deck subject options) (SCQF level 6)
- At least two Higher level (SCQF level 6) passes (grade C or above) of which one should be Mathematics or a Physical Science. Learners should also have National 5 English at SCQF level 5 or better.

Where non-UK qualifications are used to measure suitable entry level, then you would have equivalent qualifications to the above, including English language at the appropriate level.

Whilst the sea service articulated is an integral element of the certification to MCA Certificate of Competency, it does not form part of the HN award. For MCA certification sea service is required.

They have also been designed to enable you to develop the skills required to gain employment within the wider UK maritime sector including shore based positions.

Both the HNC and HND in Nautical Science aim to develop your practical, interpersonal and social skills which have been identified in our research as important requirements for a career in the maritime sector.

There are opportunities to develop core skills to SCQF Level 6 within the units (except graded units as these are exams) of this group award. For details, please refer to mapping of core skills within section 5.

Assessments within this group award may include written/oral exams, course work or portfolio evidence depending on assessment strategy of the centres delivering this qualification. Assessment guidelines are available within each unit specification which are freely available from SQA's website. Pass mark required for each unit to obtain MCA certificate of competency is given in section 5.4.

Centres delivering these qualifications for merchant navy certificate of competency must obtain approval from MCA and MNTB.

The structure of the awards

The HNC and HND in Nautical Science are designed to equip you with the knowledge, understanding and skills to allow you to gain employment in the maritime sector, gaining professional qualifications en route or to progress to further studies or degree programmes.

The HNC Nautical Science is made up of 12 SQA credits (96 SCQF points), all of which are mandatory. The award with two additional units of *Marine Law and Management*: *An Introduction* and *Marine Emergency Response and Communication* provides you with all the underpinning knowledge that is required for obtaining a Certificate of Competency at the operational level, ie at Officer of the Watch level.

The HND is made up of 30 SQA credits (240 SCQF points). In addition to the topics covered in the HNC, the mandatory section also covers areas such as, passage planning, bridge and vessel operations, ship stability and structure and shipmasters business and management skills. To achieve the award, you will need to complete the 30 mandatory SQA credits.

HNC includes a mandatory graded unit (Graded Unit 1) and Graded Units 2 and 3 are required to complete the HND group award. These units are designed to assess your ability to retain and integrate the knowledge and skills gained in the award and to grade your achievement.

There are three grades:

A if you achieve 70% or over;
B if you achieve between 60% and 69% and
C if you achieve between 50% and 59%

For both the HNC and HND the assessment instrument for the graded unit takes the form of an examination.

Possible employment pathways

The HNC and HND in Nautical Science aim to equip you with the skills to gain employment at both the operational and management level in the following vocational areas:

- Ship management
- Port and harbour operations
- Freight and transportation operations
- Marine insurance industry
- Ship broking and chartering
- The wider maritime safety industry, eg safety equipment manufacturers, meteorological services, pollution prevention services, etc

Progression to university

The HN Nautical Science awards offer you a wide range of articulation routes to higher education. Depending on the HE institution, learners with HNC and HND awards can apply for entry to degree programmes. Entry to these programmes is usually dependent on a satisfactory UCAS reference and specific conditions of either HNC or HND graded units.

You should approach individual centres regarding possible articulation options.