

Boatmasters' Licence

Generic Syllabus

Categories A to D, and to Limited Coastal Sea Waters

**Syllabus requirements for the issue of
Boatmasters' Licence – Tier 1 Level 2**

Maritime & Coastguard Agency

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Introduction

The mandatory requirements for the issue of Boatmasters' Licence and the standards of competence to be achieved are set out in relevant Statutory Instrument. The Maritime and Coastguard Agency (MCA) has agreed with the relevant sectors that the specifications described in this document will satisfy those requirements for Boatmasters' training and certification undertaken in the United Kingdom.

Health and Safety: Conduct of training

Training relevant to the certification and if undertaken must adhere to applicable regulations made under the Health and Safety at Work etc Act 1974 and take proper account of the advice given in associated guidance documents and 'Approved Codes of Practice'.

Organisations or Centres providing related training are required to make assessments of any potential risks to the health and safety of staff and trainees that may be associated with their activities. They are also required to identify, implement, monitor and review effective measures for minimising and controlling them. In addition, centres will be required to make effective arrangements for dealing with any emergency, incident or accident that may occur during the course of training. In the UK, the foregoing is required in accordance with the Management of Health and Safety at Work Regulations 1999.

Training Guidance

It is expected that participants would spend at least 180 hours of full time study to complete the syllabus.

GENERIC SYLLABUS – Tier 1 Level 2

1. Bridge watchkeeping

- a) Describes the process of pre-sailing checks including the methods of securing openings such as weather deck hatches, tank lids, ventilators, air and sounding pipes prior to departure
- b) Describes the process of pre-arrival checks and preparations
- c) Demonstrates a knowledge of securing a vessel for departure
- d) Describes the procedures for relief, maintenance, takeover and handover of a watch
- e) Explains and describes the responsibilities of a lookout
- f) Recognises sound and light signals
- g) Describes the reporting procedures
- h) Demonstrates a knowledge of good navigational practice while underway
- i) Describes routine communication procedures with other members of the watch/crew on matters relating to watchkeeping
- j) Demonstrates a working knowledge of the English language in marine terminology

2. Meteorology

- a) Explains meteorological terms in sufficient depth to interpret weather conditions
- b) Explains use of non-instrumental observations
- c) Describes wind force, Beaufort scale, direction, true and apparent wind
- d) Describes types of cloud, cloud cover and precipitation
- e) Identifies on surface charts the main synoptic patterns and describes the associated weather (UK only)
- f) Defines visibility including horizontal visibility
- g) Describes waves, sea and swell state

- h) Demonstrates a knowledge of the weather services available to shipping

3. Ship Manoeuvring

Steering by compass

- a) Demonstrates a knowledge of steering a vessel including helm orders and altering course by helm orders
- b) Demonstrates a knowledge of course keeping, altering course by compass and the procedure for making large alterations including maintaining of course by shore marks
- c) Explains the effect of weather, ship's speed and condition of loading on steering

Steering Systems and their function

- a) Demonstrates a knowledge of the components of steering systems and their function including selection of information from instruction manual
- b) Describes the steering wheel or lever, helm indicators, steering motor, rudder, rudder indicators and rate of turn indicators including functioning of the rudder and propeller
- c) Describes emergency steering systems including the change over procedures

Manoeuvring

- a) Explains the effects on manoeuvring, turning circles and stopping distances of deadweight, draught, trim, speed, rudder angle and propeller/transverse thrust
- b) Explains the effects on vessel manoeuvring of single, twin, controllable pitch and fixed propellers
- c) Describes the effects of wind, current and tidal stream on vessel manoeuvring/handling
- d) Describes the effects of underkeel clearance, squat and shallow water on vessel manoeuvring
- e) Demonstrates the knowledge of manual depth finding
- f) Describes the effects of vessel to vessel and vessel / bank interaction
- g) States the precautions to be taken when grounding and; during and after a collision including minimising of collision damage

- h) Demonstrates a knowledge of the manoeuvres for turning short round, emergency stop and man overboard

Regulations and systems for the safe movement of vessels

- a) Demonstrates a knowledge of the content and application of the International and National Regulations for Preventing Collisions at Sea as appropriate for vessels in inland waterways, harbours and coastal sea waters.
- b) Describes IALA Buoyage System A
- c) Demonstrates a knowledge of the direction of buoyage, recognition of marks from shape, colour, top mark and light
- d) Describes the procedure for taking the correct action on meeting marks

Visual Signalling

- a) Recognises and demonstrates a knowledge of the use and meaning of single letter code flags listed in the 'international Code of Signals' (Code flags that are considered essential for the tests are :- A, B, C, D, E, F, J, K, L, M, N, O, U, V, Y and Z)
- b) Identifies 'Distress Signals'
- c) Describes the use of phonetic alphabets

Communications and alarm systems

- a) Describes routine and emergency communication procedures
- b) Demonstrates knowledge of the use of telephones, hand held radios, other signalling devices and emergency signals

4. Vessel Handling in Extreme Weather

- a) Describes the precautions and procedures required to be carried out when heavy weather is expected including the rigging of safety lines, restriction of access to the weather deck
- b) Describes how and when to make report on the conditions of seaworthiness
- c) Demonstrates a knowledge of pitching, pounding, rolling, racing and broaching to (turning sideways or having stern sea in surf)
- d) Demonstrates a knowledge of turning a vessel in rough sea

5. Mooring and Unmooring a Vessel

- a) Demonstrates a knowledge of the safety precautions and safe working practices to be observed in securing the vessel when mooring/unmooring including mooring terminology
- b) Demonstrates a knowledge of relevant sections of Merchant Shipping and HSE regulations, M notices, Company regulations and requirements, manufacturers recommendations
- c) Explains the need for personal safety equipment during mooring and safe positions when towing and mooring ropes under strain
- d) Explains the dangers of rope bights during towing, securing and mooring operations
- e) Explains the characteristics, safe handling and use of ropes including heaving lines in mooring operations
- f) Explains preparation and safe operation of winches, windlass, drum ends and similar machineries in all weather situation
- g) Identifies head and stern ropes, breast ropes, towing springs, back springs, shore moorings, mooring bitts, fairleads and Panama roller leads
- h) Describes routine and emergency communication procedures
- i) Explains the need to keep moorings clear of thrusters and propellers
- j) Explains the procedures for making fast to fixed terminals and jetties, mooring to buoys, single point moorings and exposed location buoys
- k) Demonstrates a knowledge of adjusting moorings when alongside, warping along a quay, use of fenders, overboard discharge covers

6. Rope work, Access and Lifting Gear

- a) Demonstrates a knowledge of safe use of man-made fibre, wire and combination ropes
- b) Demonstrates a knowledge of correct use of basic knots, splices, stoppers, friction turns in stopping and mooring a vessel
- c) Demonstrates a knowledge of the safety requirements to rig, recover and maintain gangways and other safe means of access to a vessel
- d) Describes the methods available to ensure safe movement onboard ship

- e) Describes the effects of tide, wind, waves, swell, changes of draught, trim and passing vessels while alongside
- f) Outlines the care and maintenance of lifting gears including derricks, cranes and other gears
- g) States the precaution to take when using lifting gears
- h) States the precautions to be taken when fork-lift trucks or similar devices are used
- i) States that all cargo gear should be inspected before the start of operations each day
- j) Identifies lubrication schedules for deck machinery and equipment including correct lubrication of moving parts

7. Ship Knowledge and Publications

Ship Knowledge

- a) Demonstrates a knowledge of terms and definitions used in connection with vessel operations and vessel construction
- b) Demonstrates a knowledge of use of various types of paints and correct lubrication of moving parts including scheduling of lubrication for deck machinery and equipment
- c) Prepares surfaces for coating i.e. steel, aluminium and wood
- d) Explains the maintenance of fire fighting and life saving equipment
- e) Demonstrates a knowledge of the need for preparation of work area and resources for maintenance
- f) Identifies work area, tools and materials including safe stowage and use of materials
- g) Explains 'Permit to Work' procedures
- h) Identifies plans, specifications, materials and equipment and the need to ensure availability

Stability and structure

- a) Describes the basic principles of ship stability including the principles of floatation
- b) Defines mass, volume, density and relative density

- c) Defines volume, displacement, deadweight, buoyancy, waterline length, breadth, draught, Length overall, Length between perpendicular, freeboard (freeboard deck/deck line to water line) and identifies hydrostatic data
- d) Defines Centre of buoyancy, Centre of Gravity, free surface, transverse metacentre, up-righting lever, up-righting moment at small angle of heel
- e) Explains stable, neutral and unstable equilibrium, stiff and tender vessels
- f) Explains the effect on Centre of Gravity (G) on loading, discharging, moving weights, ballasts or bunkers and changes (if any) in stability during voyage
- g) Explains the dangers and effect of free surface at small angle of heel
- h) Explains the causes of stress in a ship's structure including loads that create stress and strain in still water and a seaway
- i) Describes water and weather tightness, watertight integrity and reserve buoyancy, watertight doors, ports, windows, deadlights and doors
- j) Demonstrates a knowledge of ship construction features for various ship types sufficient to assist with ensuring watertightness and sea worthiness including the function and structure of tanks
- k) Identifies structures to resist pounding, panting including the parts of structure liable to sustain damage due to heavy weather, vibration, shifting cargo, grounding or collision
- l) Describes the siting and securing of air and sounding pipes, bilge and ballast piping systems from tanks/holds to engine rooms including non return valves, sea chests and mud boxes
- m) Explains the methods of ensuring watertightness/ seaworthiness when closing openings in deck, bulkheads, deck machinery and lifting devices, ventilators, air and sounding pipes including features to aid the shedding of water

Publication and General

- a) Explains the relationship between law, codes and other forms of guidance
- b) Demonstrates a knowledge of legislation, Codes of Practice and M Notices
- c) Demonstrates an awareness of the law, codes, principles and procedures and other forms of guidance relating to:

- maintaining a safe working environment on board ship
 - safe movement to, from and around the vessel
 - reporting of accidents and dangerous occurrences
 - safety management systems
 - risk assessment
 - using chemicals or other hazardous materials, COSHH (Control of Substances Hazardous to Health) Regulations
 - personal protective clothing and equipment
- d) Appreciates the requirements of records for commercial and legislative process
- e) Describes the recording methods available – written records
- f) Explains the requirement for accuracy, brevity and clarity in record keeping

8. Basic Engineering Knowledge and Machinery

- a) Plans engineering practices and procedures for small vessel propulsion machinery, auxiliaries and services in compliance with safety regulations including the use of machinery schedules and instructions (to include manufacturer's instructions).
- b) Explains system operation and principles involved including the appropriate sequence and timing of activities for machinery and auxiliary operations
- c) Describes how to locate common faults including the causes of machinery malfunctions and actions required to be taken
- d) Describes measures to avoid pollution of the marine environment
- e) Describes how to operate the control systems, possible problems and how to identify and correct minor deviations
- f) Describes emergency shut down sequence, timing and hazards
- g) Describes how to make adjustments to achieve and safe operation including the use of instruments to monitor conditions

Pumping and associated Control Systems

- a) Describes routine pumping operations, bilge, ballast and operational pumping systems, equipment and machinery operations and possible problems that could occur
- b) Demonstrates a knowledge of precautions to prevent pollution of the marine environment, anti-pollution procedures and associated equipment
- c) Demonstrates a knowledge of relevant safety regulations, conditions, manufacturer's instructions and maintenance schedules with respect to pumping and associated control systems

Electrical Equipment

- a) Describes the basic principles and operation of electrical machines (to include alternators or generators and control systems)
- b) Describes electrical systems, protection arrangements, circuits and circuit breakers, instruments to monitor conditions
- c) Describes the maintenance of electrical supply within given conditions, possible problems and irregularities that could occur
- d) Explains fault detection system operation and isolating procedures including simple fault diagnosis, location of common faults on plant and control systems and actions to prevent damage

9. Health and Safety

a) Demonstrates a knowledge of the safety precautions, regulations, codes of practice and guidelines relating to :

- use of powered cleaning devices, hand and powered tools
- working at a height or over side
- operating lifting plant and the slinging of heavy equipment
- use and storage of chemical or other hazardous materials
- entry into and working in enclosed spaces
- protective equipment and clothing
- cargo access equipment
- the section of MARPOL relating to the disposal of waste
- maintenance of batteries

10. Emergency Action

- a) Identifies the nature of emergency and takes initial action to conform to the vessel's emergency procedure
- b) Takes appropriate action on recognising an alarm signal in accordance with emergency procedure including the raising of alarm promptly by the most appropriate method available
- c) Communicates information to the relevant personnel promptly and accurately
- d) Explains the operation of distress signalling devices including pyrotechnics including precautions to take when using signalling devices.
- e) Describes how to avoid sending false distress signals and the remedial action to take if false signal is sent
- f) Demonstrates a knowledge of basic Search and Rescue as would be applicable to inland waterways, harbours and coastal sea waters.
- g) Describes the assistance which may be given by authorities around the coast of the United Kingdom, and on inland waterways in addition to assisting other vessels
- h) States the contingency plans and action to take in the event of emergencies at sea or in port as applicable, including imminent collision, collision, stranding, grounding, beaching, shoring, flooding, man overboard and abandon ship

11. Pollution Prevention and handling and Waste management

- a) Describes how current guidance and legislation provides knowledge of the precautions and procedures to be taken to prevent pollution of the marine environment
- b) Demonstrates a knowledge of pro-active and re-active policies, vessel operations, bunkering, hazardous substances on board, garbage and tank residual disposal, noise and clean air

Section 2

1. Generic Chartwork and Navigation

- a) Demonstrates a knowledge of Navigation and routing charts, sailing directions, chart catalogue, notices to mariners, nautical almanac, tide tables and tidal atlases carried aboard the vessel including distance tables
- b) Describes the procedures for and makes necessary corrections to update charts and publications including ECDIS.
- c) Demonstrates a knowledge of the use of Navigation drawing instruments, parallel rulers, dividers and compasses
- d) Describes natural scale, distance measurement and chart co-ordinates
- e) Plots the position of the vessel on a chart using latitude and longitude, or position lines derived from charted objects including the use of bearing, range, cross bearings, transits, running fixes, vertical sextant angles, procedures and limitations of navigation by GPS
- f) Demonstrates a knowledge of the meaning of chart symbols and abbreviations
- g) Explains the effects of set, drift and leeway (drift due to wind) and how to counteract
- h) Explains navigational terms, international nautical mile, position line and position circle
- i) Identifies charted objects/shore marks suitable for position fixing
- j) Calculates dead reckoning (DR) and estimated position (EP)
- k) Demonstrates a knowledge and use of regulations and systems for the safe movement of vessels
- l) Explains and describes the procedures for appraisal, planning, execution and monitoring of a passage plan
- m) Describes the basic operational features and controls of marine Radar and ARPA
- n) Demonstrates a knowledge of the use of radar and ARPA to maintain safety of navigation
- o) Demonstrates a knowledge of the use of satellite positioning systems such as GPS

- p) Demonstrates a knowledge of the proper use of Echo sounder and Electronic Log
- q) Describes reliability, common errors and limitations of Radar, ARPA, Satellite positioning systems, Echo sounder and electronic log

2. Locks and Bridges

- a) Demonstrates knowledge of entering and leaving a dock or a lock in all stream conditions
- b) Demonstrates a knowledge of passing through (under) bridges and navigating in close proximity within a canal

Section 3

1. Tides and Currents

- a) Demonstrates a knowledge of tide tables and tidal stream atlases
- b) States the causes of spring and neap tides
- c) Defines height of tide, Mean High Water Spring, Mean Low Water Spring, range of tide, chart datum, height of charted objects, drying heights, spring and neap ranges
- d) Describes the use of tidal diamonds when using charts
- e) Finds the height and time of high water and low water using tide tables
- f) Calculates the height of tide at a given time using tide tables and tidal curves
- g) Calculates the time the tide will reach a given height using tide tables and tidal curves
- h) Calculates the correction of soundings to chart datum

2. Compass Work

- a) Demonstrates a knowledge of Magnetic Compass:
 - card graduation in degrees
 - compass bowl and binnacle
 - dangers of magnetic material in the vicinity of the compass
 - standard compass/steering compass
- b) Calculates compass error and deviation by means of transits
- c) Demonstrates a knowledge of Gyro compass and repeaters
 - compass alarm and off course alarm
- d) Converts compass or gyro courses to true courses
- e) Determines variation and deviation using charts, curves and tables
- f) Demonstrates the use of azimuth mirror, pelorus etc. for taking bearings

3. Anchor Work

- a) Describes the types of anchor in common use on vessels operating in inland waterways, harbours and coastal sea areas.
- b) Describes various parts of anchors, spurling and hawse pipes, connection and marking of anchor cables, chain lockers and connections, bow stoppers and other securing devices.
- c) Demonstrates a knowledge of connections and markings of anchor cables, chain lockers and connections
- d) Explains the securing of anchors and cables for passage and the importance of ensuring watertight integrity
- e) Explains anchoring terminology and describes lights, shapes and sound signals for vessels at anchor
- f) Demonstrates a knowledge of preparations and procedures for anchoring operations including in an emergency
- g) Demonstrates a knowledge of maintaining an anchor watch including checks made for anchor dragging
- h) Describes the safety precautions when anchoring, securing anchors including the safe use of machinery