Open Awards Qualification Unit

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1 Unit Details

Unit Title:	Vessel Construction and Engineering
Unit Reference Number:	A/616/9141
Level:	3
GLH:	60

2 Learning Outcomes and Criteria

Learning Outcome (The Learner will):	Assessment Criterion (The Learner can):
1. Understand key features of a vessel's construction	1.1 Summarise standard ship construction terminology
	1.2 Describe the structural features of a vessel including: a) Framing systems b) Features of hull c) Features of holds d) Features of tanks e) Arrangements to ensure watertight integrity f) Arrangements in areas liable to damage by heavy weather g) Opening in hull or deck h) Continuity of strength i) Piping and pumping systems
2. Understand the properties of boat building materials	2.1 Explain the boat building principles of steel construction and protection from the marine environment
	2.2 Explain the boat building principles of Aluminium construction and protection from the marine environment

	2.3 Explain the boat building principles of fibre reinforced plastic construction and protection from the marine environment, including glass and carbon fibres and the use of different cloths, chopped strand, and fibre directions
3. Know how an internal combustion engine works	3.1 Summarise engine components
	3.2 Describe the working principles of compression and spark ignition systems
	3.3 Explain different engine configurations, including: a) In-line b) Horizontal c) Vee Engine
	3.4 Explain the meaning of the following engine terms: a) Top dead centre b) Clearance volume c) Compression ratio
	3.5 Describe engine performance
	3.6 Identify components of air function and exhaust systems, including pressure charging
4. Know how diesel engine ancillary systems work	4.1 Identify the components of the following systems and describe how they work: a) Fuel b) Cooling c) Lubrication d) Electrical e) Air compressor and starting f) Steering
	4.2 Idenitfy suitable materials for use in cooling systems
5. Know how power generated is used to propel a vessel	5.1 Describe how power is transmitted from the engine to the propellers using mechanical and electrical transmission
	5.2 Identify main propulsion layouts
	5.3 Describe developments in small vessel electrical propulsion including: a) Hybrid b) Lead Acid c) Fuel Cell d) Lithium ion power sources

6. Know the purpose of vessel environmental, service and pumping systems	6.1 Explain the purpose of: a) Heating b) Fresh and waste water c) Ventilation and air conditioning d) Pumping systems
	6.2 Outline the main legislation and statutory requirements covering marine pollution
7. Know how to maintain safe operation of a vessel's engineering systems	7.1 Describe the procedures for the safe starting, running and stopping of main propulsion engines and auxiliary systems
	7.2 Describe the procedures for continuous safe operation of vessel machinery
	7.3 Outline the key aspects of law, codes and principles and guidance relating to the continuous safe operation of vessel machinery
8. Understand ship stresses	8.1 Explain the cause and effect of ship stress in still water, including: a) Racking b) Centre loading c) Wing loading d) Dry docking e) Alternate hatch loading f) Hogging g) Sagging
	8.2 Explain cause and effect of ship stress in a seaway including: a) Panting b) Pounding c) Hogging d) Sagging e) Torsional Bending f) Longitudinal bending
	8.3 Identify common causes of rigging failure including: a.) Hull chain plate attachment and stress fracture b.) Rigging terminals c.) Common spar failure points
	8.4 Idenitfy structure features to resist stresses
	8.5 Demonstrate the use of stress calculating machines