

FU	FREDERICK UNIVERSITY		MAR513/1
	Course Outline		
Course Code:	MAR513		
Course Title:	Marine ship construction and Stability		
Level:	Postgraduate career-based course		
Credits:	6 ECTS		
Department:	Maritime Transport and Commerce / Mechanical Engineering		
Pre-requisites:	BSc or BEng Mechanical Engineering (or appropriate equivalent)		
Introduction and Rationale:			
<p>Modern merchant vessels are complex engineering structures dependent for their operation on a wide variety of mechanical, electrical and electronic systems. Good knowledge and in depth understanding of these systems therefore constitutes a major part of the marine engineering curriculum. Most of these systems are common to many types of vessels although the degree of importance and engineering complexity might vary from case to case and is subject to engineering development and progress.</p>			
Aim:			
<p>The aim of the course is to provide the fundamental engineering knowledge of common traditional marine engineering systems while introducing technology evolution as appropriate for each case, to meet the requirements of the International Maritime Organisation (IMO) Standards of Training and Certification of Watchkeepers (STCW) for Engineering Officer of the Watch (EOOW) at operational level.</p>			
Learning Outcomes:			
<p>On completion of this course the student will know:</p> <ul style="list-style-type: none"> • Solve problems to determine thrust on horizontal and vertical immersed surfaces. • Solve problems involving the use of formula pgh to establish pressure at a specified depth. • Describe centre of pressure and the centroid of an immersed surface, explaining how they differ. Solve problems involving the use of centre of pressure and centroid of immersed and partially immersed surfaces and the reaction at flat surface supports. • The reaction at surface supports of immersed and partially immersed surfaces. • The principles of Archimedes. Solve problems applying the Principles of Archimedes to floating rectangular shaped vessels. • The relationship between centre of gravity and centre of buoyancy and the significance of the relative position of these points. • The changes to the vessel's condition when weights are added, removed and moved. • Explain the relationship between centre of gravity and centre of buoyancy and the significance of the relative position of these points. • Solve problems involving simple ship shapes to establish changes relating to the changes in vessel condition when weights are added, removed or moved within the ship. 			

- Apply the formula $GM = \frac{md}{D} \tan a$
- Identify and describe the difference and functions between different standard types of ship; general cargo; heavy lift; container; ferry; ro-ro; oil, chemical and gas tankers; passenger vessels, cruise ships etc
- The six degrees of freedom of movement of a vessel.
- Static and dynamic ship stresses.
- Understands the importance of vessel stability.
- Knows how to carry out an inclining experiment to determine the basic stability parameters.
- Describe the difference between heel and list. Describe trim.
- Describe the effect of moving weights on-board a vessel.
- Describe the importance of buoyancy.
- The structural components of a vessel and the open deck drainage arrangements.
- Watertight division.
- Effects on stability of transferring fluids within the vessel.
- Describe, with sketches, major structural parts of a ship explaining their purpose. Sketch mid-ship cross sections of standard vessels.
- Know how to access the Classification Society Rules and Regulations. To be able to name the major Class Societies
- Describe freeing ports and scuppers, explaining their purpose.
- Describe the testing for water tightness of doors, hatches and bulkheads.
- Explain load lines, draft marks, the load line survey, identifying items included in the survey.
- Measurement of tonnage and displacement.
- Describes the different types of drydocking, and procedures to enter and leave a drydock.
- Knows the procedures and safety aspects of carrying out a drydock survey.
- Understands aspects and requirements of an in-water-survey (IWS)
- Describes types, manufacture and materials with respect to propellers.
- Describes types, manufacture and materials with respect to stern tubes.
- Describes types, manufacture and materials with respect to propeller shafts.
- Describes types and construction of rudders.

Assessment Details:		
Method of assessment	Weighting %	Outline detail
Coursework	40%	1 individual assignment: 1 assignment on Ship Construction This assignment will be carrying out an inclining experiment using the ship model
Examination	60%	Closed book 3 hour combined written exam: (Part A 1.5 hours – Auxiliary Marine Equipment) Part B 1.5 hours – Ship Construction