SUBJECT TEACHING GUIDE

G1676 - Ship Theory and Naval Construction II

Degree in Nautical Engineering and Maritime Transport

Academic year 2020-2021

1. IDENTIFYING DATA					
Degree	Degree in Nautical Engineering and Maritime Transport			Type and Year	Compulsory. Year 3
Faculty	School of Maritime Engineering				
Discipline	Subject Area: Ship Theory and Naval Construction				
Course unit title and code	G1676 - Ship Theory and Naval Construction II				
Number of ECTS credits allocated	6	Term	Semester based (1)		
Web	http://personales.gestion.unican.es/martinji/TBCN2.htm				
Language of instruction	English			Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DE LA NAVEGACION Y DE LA CONSTRUCCION NAVAL
Name of lecturer	ALBERTO PORRAS DIEZ
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Other lecturers	JOSE IVAN MARTINEZ GARCIA

3.1 LEARNING OUTCOMES
- According to the International Code STCW as amended: (A-II/1 and A-II/2 sections) Know how to maintain the seaworthiness of the ship.
- Know how to inspect and report defects and damage to cargo spaces, hatch covers, and ballast tanks.
- Know how to monitor the loading, stowage, securing, care during the voyage, and the unloading of cargoes.
- Know how to respond to navigational emergencies.
- Know how to assess reported defects and damage to cargo spaces, hatch covers, and ballast tanks and take appropriate action.
- Know how to control trim, stability, and stress.

4. OBJECTIVES
Knowledge of the effect of cargo, including heavy lifts, on the seaworthiness and stability of the ship.
Knowledge of safe handling, stowage and securing of cargoes, including dangerous, hazardous and harmful cargoes, and their effect on the safety of life and of the ship.
Knowledge and ability to explain where to look for damage and defects most commonly encountered due to: Loading and unloading operations.
Knowledge* and ability to explain where to look for damage and defects most commonly encountered due to: Corrosion.
Knowledge* and ability to explain where to look for damage and defects most commonly encountered due to: Severe weather conditions.
Ability to state which parts of the ship shall be inspected each time to cover all parts within a given period of time.
Identify those elements of the ship structure which are critical to the safety of the ship.
State the causes of corrosion in cargo spaces and ballast tanks and how corrosion can be identified and prevented.
Ability to explain how to ensure reliable detection of defects and damages.
On ship stability: knowledge and practical use of cross stability tables, trim, and stresses, stress-finder equipment. Understanding the fundamental measures that should be taken in case of intact ship partial loss of buoyancy. Understanding the fundamental aspects related to tightness.
Ship construction: General knowledge of the main structural elements of the vessel and the correct nomenclature of the various parts.
Precautions when a ship grounds. Action to be taken in case of imminent grounding and after the grounding. Launching of a stranded ship, with and without any help.
Action to be carried in case of imminent and after a collision, or case of a damaged hull. Antidamaged action assessment.
Knowledge of the resistance limits of the structural parts of a bulk carrier and the ability to interpret the figures obtained with respect to the bending moment and the shear forces.
Ability to explain how to avoid the harmful effects of corrosion, fatigue, and inadequate handling of the load on bulk carrier ships.
Understanding of the fundamental principles of shipbuilding and theories and factors affecting trim and stability of the ship , and necessary measures to keep these.
Knowledge of the effects of damaged vessels, followed by flooding of a compartment, on trim and ship stability, and necessary measures to counteract such effects.
Knowledge of IMO recommendations on vessel stability.

6. COURSE ORGANIZATION

CONTENTS	
1	Displacement and drafts. Corrections. Hogging and shagging. Layer correction and Nemoto correction. Heel and specific gravity corrections. Extended draft survey. Use of Bonjean curves and advanced computational methods. Implementation with spreadsheet software.
2	Intact ship. Positive, neutral, and negative stability. Methods for determining vessel geometrical parameters. Scribanti's formula. Cross curves and tables. Initial stability. Stability at large angles of heel.
3	Heeling moments. International Maritime Organization rules. Heel due to wind, rudder, and people on board. Heel due to turning. Upsetting moments in tugs by tripping and pulling forces.
4	Weight and impaired stability. Study of the free surfaces effect. Suspended weights and heavy-lift cargo operations and their effect on ship stability. Upsetting moments due to shifting of grain in bulk.
5	Damaged ship. Flooding and grounding. Control of hull stress and use of stress-calculating equipment. Inspection of defects and damages in cargo spaces, hatches, and ballast tanks and reporting on this concerning shipbuilding. Monitor the loading, stowage, securing, care during the voyage, and the unloading of cargoes in what refers to the naval construction.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Part 1, 2, and 3.	Written exam	No	Yes	40,00
Part 4 and 5.	Written exam	No	Yes	40,00
Group work.	Work	No	No	20,00
TOTAL				100,00

Observations

In the case of remote evaluation, the exams will be done through the platform available at the University of Cantabria (Moodle or others).

Observations for part-time students

Part-time students may choose to be evaluated remotely regardless of the conditions of the rest of the students.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

José Iván Martínez García, "Problemas de Teoría del Buque. Estática", Ediciones Cartamar, 2015. La Coruña.

Alaez Zazurca, J.A., "Teoría del Buque". Class notes edited by "Escuela Técnica Superior de Ingenieros Navales de Madrid". Universidad Politécnica de Madrid.

Baxter, B. Naval Architecture. Examples and theory. Edit. C. Griffin and Cny. Ltd. London. 1977.

Byran Barrass & Derret, D. R., Ship stability for Master and Mates. Elsevier. London. 2006.

Olivella Puig, Joan, "Teoría del Buque. Flotabilidad y estabilidad". "Universidad Politécnica de Cataluña". Barcelona 1994.

Olivella Puig, Joan, "Teoría del Buque. Estabilidad, varada e inundación". "Universidad Politécnica de Cataluña". Barcelona 1996.

José Iván Martínez García, "Motonave Medusa". http://personales.gestion.unican.es/martinji/Archivos/MedusaA3.pdf

Antonio Bonilla de la Corte. "Teoría del Buque". "Librería San José". Vigo. Fourth edition. 1994

Pursey, H.J. Merchant ship stability. Brown, Son & Ferguson. Glasgow. Seventh edition. 2006.

Carlos David Verdes Jove, Manual de Teoría del Buque. Cartamar. 2013