SD2722 Marine Structures 7.5 credits

Marina strukturer

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

The course syllabus is valid from Spring 2022 according to the school principal's decision: S-2022-0529 Decision date: 2022-02-24

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

BSc in Vehicle Engineering, Engineering Physics, Mechanical Engineering or similar and at least 12 ECTS in solid mechancs and structures.

English B / English 6

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

This course gives participants the opportunity to apply and deepen knowledge from earlier courses in solid mechanics and learn how to handle the challenges in the design of ship hull structures and other large complex structures. The objective is that students after finishing the course shall be able to:

1. describe the different loads ship hull structures are exposed to and how these are considered in hull structural design;
2. describe the principal arrangement of hull structures, explain why they are arranged as they are, describe the functions of the different structural members, and explain the interaction between different members;
3. explain the terms strength, stiffness, stability, nominal stress, stress concentration, shear lag and efficient flange width for stiffened shell and beam structures, and be able to address these aspects in structural design;
4. use knowledge and skills in beam and plate theory from earlier courses in the design of stiffened shell and beam structures;
5. explain the terms fatigue and buckling in a structural mechanics context and briefly describe how these aspects are considered in hull structural design;
6. describe the purpose and principles of classification of ships, and derive the related classification requirements based on beam and plate theory;
7. explain what is meant by direct calculations, judge for which parts of a ship structure that the code based analysis and design need to be complemented with direct calculations, and perform direct calculations based on finite element analysis for such parts;
8. design the midship section of a ship hull structure based on classification codes and complementary analysis;
9. estimate a ship hull structure weight based on the ship geometry and the midship section hull structure;
10. orally and in writing present, discuss and evaluate hull structural design related work, based on theory and established norms and principles, by using correct terminology;
11. add value as an active design team member in the early phases of hull structural design.

Course contents

Lectures and seminars on the principal layout of hull structures, the function of the different structure elements, hull loads, and classification rules. Application of beam theory, plate theory and finite element methods in the analysis of ship structures. Project where each student design the structure for a certain ship.

Examination

- ÖVN1 - Assignments, 7.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

ÖVN1 - 7,5 credits, grade scale: A, B, C, D, E, FX, F

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.