



Aalto University
School of Engineering

MEC-E1004 Principles of Naval Architecture

Course introduction

Naval Architecture

- Design, construction, maintenance, and operation of ships
 - *Ships are needed for cargo transport, passenger transport, fishing, offshore, leisure, research, military,...*
- Long history
 - *Traditionally more based on craftsmanship than on science*
- Multiple subfields
 - *Hydrodynamics, stability, structures, ship arrangements, propulsion, ...*

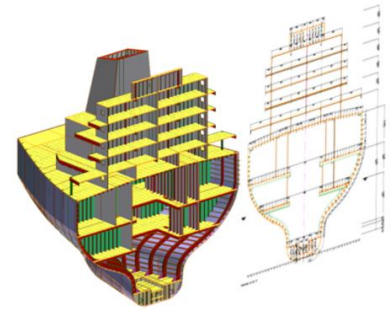


Image credit NAPA

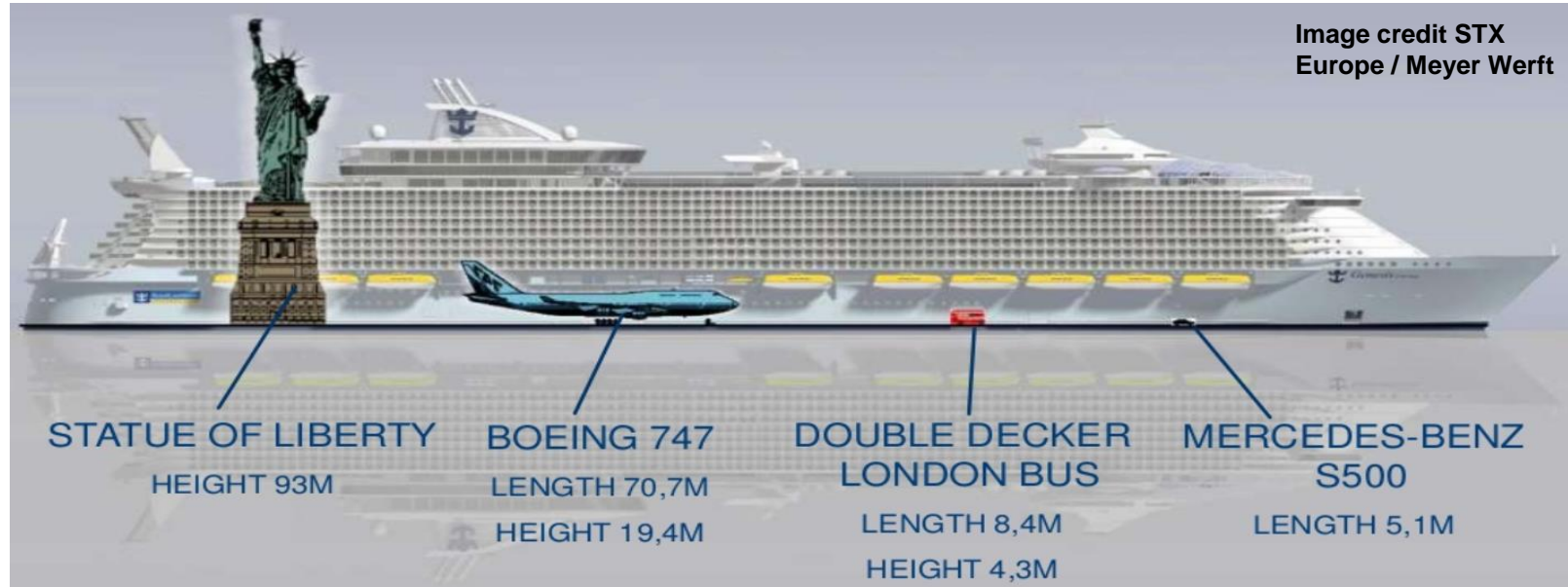


Image credit Meyer Turku



Image credit Arctia

Course introduction – About Ships !



- Ships are among the largest, most complex, and most valuable moveable structures .
- Their design is expensive, conservative and targets long life time
- They are manufactured in short series under strict HSE standards
- They are regulated by international rules and regulations

Ship Design and Construction is...

- Multidisciplinary
- Iterative

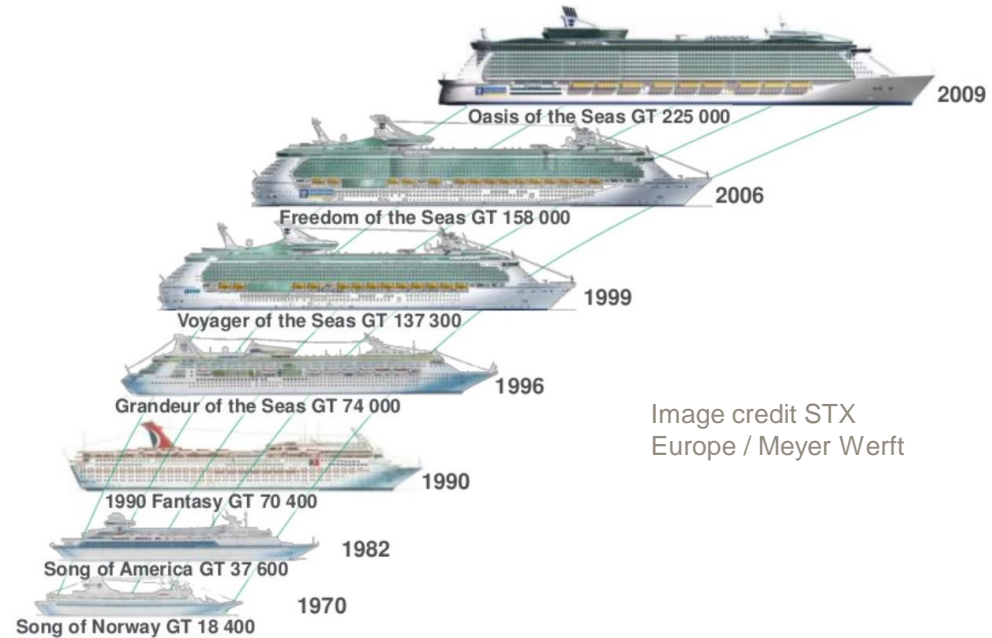
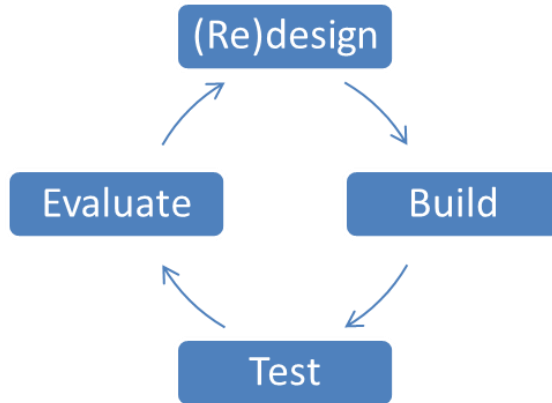


Image credit STX Europe / Meyer Werft

Course introduction

Course name and credits

- MEC-E1004 - Principles of Naval Architecture, 5 cr

Schedule

- 11.09.2020 - 18.12.2020 (Periods I-II)

Course registration

- <https://oodi.aalto.fi> (Remember to register, otherwise you cannot attend the exam!)

Course information, material

- <https://mycourses.aalto.fi/course/view.php?id=29499§ion=2>
- Teacher : Prof. Spyros Hirdaris

Examination

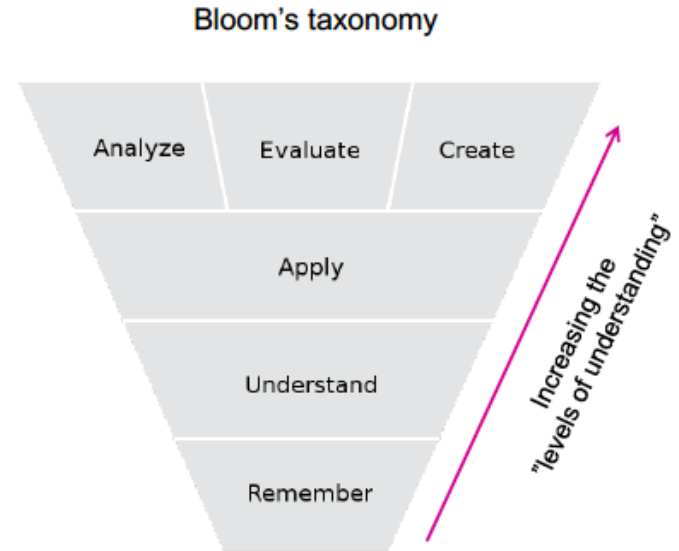
- 50 % exam (two intermediate exams, 25 % each), 50 % assignments, scale 0-5
- Final seminar (mandatory participation)

Schedule and work load

- <https://mycourses.aalto.fi/mod/folder/view.php?id=600145>

Our target

- *Understand the fundamental principles of naval architecture*
 - Explain basic naval architecture terminology
 - Know about design methods and tools
 - Explain the connection between different ship design disciplines
 - Appreciate the iterative nature of naval architecture
- *Create, analyze, and evaluate a state-of-the-art ship concept*



Course characteristics

- Problem-based learning
 - *Participants work in groups developing a new ship concept*
- Interlinked courses
 - *Ship concepts can be further developed in ship design portfolio, ship dynamics and NAPA courses early next year*
- Multidisciplinary approach
- Final seminar (Ship Gala)

Prerequisites

- Naval architecture is a systems engineering discipline
- A lot of simple, uncertain and undefined stuff
- *The work load is high BUT....*
 - *Each lecture contributes to your knowledge*
 - *Each assignment develops your skills*
 - *The team design exercise will help you demonstrate your professional attitude*



How to get the most ?

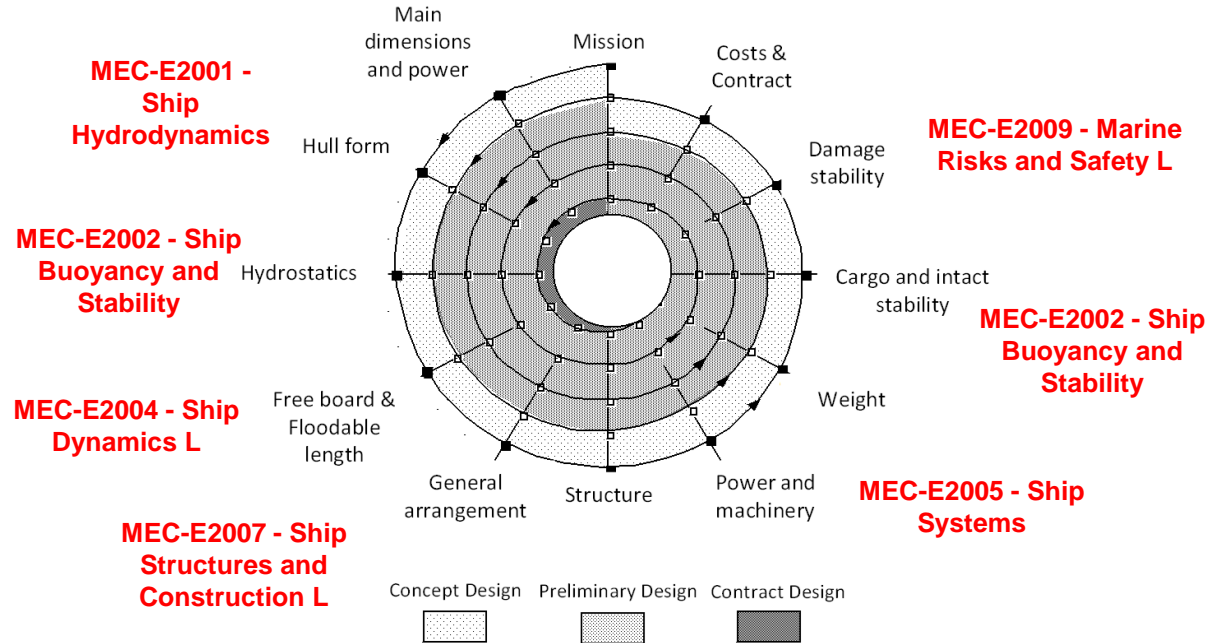
- Consider the course as training for your future professional life
- Teachers are here only to help you
- You are responsible for asking questions and for learning new stuff



Lecture Topics

1. Design context (ship mission)
2. Reference ship/data
3. Main dimensions
4. Hull form
5. Hydrostatics
6. General arrangement
7. Ship structures
8. Power and machinery, Equipment
9. Weight and stability
10. Economic assessment

The lectures are mainly introductory. To successfully complete your ship project, you need to synthesize contents of various courses:



Tutorial After lunch !!

Groups and Assignments

- How to get started?
 1. *Form a group of 3-5 students*
 2. *Select one of the proposed ship concept ideas*
 3. *Develop the selected ship concept idea by executing the given assignments*
- You decide on the details
- Apply a multidisciplinary approach = apply and integrate contents of different courses

