Course Specifications
From the academic year 2016-2017 up to and including the
Hydrostatics and Propulsion of Maritime Constructions (E055270)

Course size (nominal values; actual values may depend on programme)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Study time</th>
<th>Contact hrs</th>
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<tbody>
<tr>
<td>6.0</td>
<td>180 h</td>
<td>60.0 h</td>
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</tbody>
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Course offerings and teaching methods in academic year 2018-2019

A (semester 2) Dutch
- seminar: coached exercises 12.5 h
- excursion 5.0 h
- seminar 12.5 h
- guided self-study 30.0 h

B (semester 2) English
- excursion 5.0 h
- seminar: coached exercises 12.5 h
- seminar 12.5 h
- lecture 30.0 h

Lecturers in academic year 2018-2019

- Delefortrie, Guillaume TW15 lecturer-in-charge
- Candries, Maxim TW15 co-lecturer

Offered in the following programmes in 2018-2019

<table>
<thead>
<tr>
<th>crdts</th>
<th>offering</th>
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</thead>
<tbody>
<tr>
<td>Bridging Programme Master of Science in Electromechanical Engineering (main subject Maritime Engineering)</td>
<td>6 B</td>
</tr>
<tr>
<td>Master of Science in Electromechanical Engineering (main subject Maritime Engineering)</td>
<td>6 B</td>
</tr>
<tr>
<td>Master of Science in Electromechanical Engineering (main subject Maritime Engineering)</td>
<td>6 A</td>
</tr>
</tbody>
</table>

Teaching languages
Dutch, English

Keywords
Hydrostatics of floating objects, Ship resistance, Ship propulsion, Vibrations

Position of the course
Theoretical background, practical applications and calculation methods concerning hydrostatics of floating structures: damage calculations, ship in contact with a bottom. Theoretical background and practical approach to the hydrodynamic aspects of resistance and propulsion of ships (with emphasis on screw propellers), and excitation of vibrations due to propeller action.

Contents
- Hydrostatics of floating structures: damage calculations for ships.
- Hydrostatics of floating structures: contact with bottom.
- Ship resistance: Principles, Resistance components, Extrapolation methods, Selection of standard series and statistical methods, Influence of ship geometry
- Ship propulsion: Power and efficiency, Propeller geometry, Propeller theory, Similarity laws, Propeller-hull interaction, Cavitation, Propeller design (propeller series), Special propulsion devices
- Vibration excitation: Vibrations excited by propeller, propeller shaft, engines, sea state, Vibration analysis during ship design

Initial competences
Specific elements of Introduction to maritime technology
Specific elements of Transport phenomena

(Approved)
Final competences

1. Understand and analyse the effects of supporting contact of a floating structure on the bottom (grounding, docking) on hydrostatics and stability.

2. Understand and analyse the physical background of the consequences of damage to a ship on hydrostatics and stability. Distinguish the regulatory principles on which the criteria for damaged ships are based.

3. Be capable to solve realistic problems concerning damage calculations of ships in a simplified way. Be capable of executing damage calculations by means of specialised software.

4. Be capable to solve realistic problems concerning floating structures supported by the bottom in a simplified way.

5. Distinguish and explain the different physical causes of ship resistance. Derive how ship resistance can be determined by means of experimental techniques. Apply empirical methods to approximate ship resistance.

6. Derive the power flow in the conversion from mechanical power to resistance power and define the efficiencies involved. Nominate the geometric characteristics of a screw propeller. Explain the action of a screw propeller for ship propulsion by means of impulse theory, blade element theory and circulation theory. Recognize the characteristics of a propeller in open water and behind a ship, including terms as wake fraction and thrust deduction fraction. Explain the propeller cavitation phenomenon and distinguish and apply practical cavitation criteria. Execute the concept design of a propeller by means of systematic propeller series. Describe special propeller types and make distinction between their specific application range.

7. Acquire insight in the hydrodynamic aspects of ship vibrations.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, excursion, lecture, seminar, seminar: coached exercises

Learning materials and price

English syllabus

References

Course content-related study coaching

Evaluation methods

end-of-term evaluation and continuous assessment

Examination methods in case of periodic evaluation during the first examination period

Open book examination, oral examination

Examination methods in case of periodic evaluation during the second examination period

Open book examination, oral examination

Examination methods in case of permanent evaluation

Report

Possibilities of retake in case of permanent evaluation

examination during the second examination period is possible in modified form

Extra information on the examination methods


Calculation of the examination mark

Oral closed-book exam during examination period: 50%
Written open-book exam during examination period: 25%
Project reports during semester: 25%
A student can only pass the exam if he/she has participated to the three parts.