

Mathematical Models in Ship Theory

Syllabus WS2022/23

- Lectures: Wednesday, 1-3 pm, Online / Prof. Dr.-Ing. habil. Nikolai Kornev
- Exercises: Tuesday, 9-11 pm, Online / Luise Draheim, M.Sc.
- **Attention:** The Lectures and exercises starts at full hour, please be on time!

Literature:

1. N. Kornev: Lectures on ship manoeuvrability
(<https://bookboon.com/de/lectures-on-ship-manoevrability-ebook>).
2. N. Kornev: Propellertheorie.
3. N. Kornev: Schiffstheorie I.
4. N. Kornev: Ship dynamics in waves.

No.	Date	Lecture	Date	Exercise
1	12.10.22	Kirchhoff equations of body motion in liquid Chapter 1 [1]	11.10.22	Introduction to naval architecture: - Different types of ships - Ship description - Geometric parameters - Kinematic parameters - Hydrodynamic forces - Resistance forces decomposition
2	19.10.22	Equations of ship motion in the horizontal plane Chapter 2 [1]	18.10.22	Resistance and propulsion: - Model tests within design process - Specific issues
3	26.10.22	Added mass theory Chapter 3 [1]	25.10.22	Chapter 1 with exercises [1] derivation of Eq. (1.4)-(1.7) from manuscript
4	02.11.22	Experimental determination of forces, Chapter 4 [1]	01.11.22	Exercises from chapter 3 [3]
5	09.11.22	Propeller hydrodynamics	08.11.22	Exercises from chapter 2 [1]
5	16.11.22	Rudder hydrodynamics Chapter 6 [1], [2]	15.11.22	Exercises from Propeller theory
6	23.11.22	Yaw ship stability Chapter 8 [1]	22.11.22	Exercises from chapter 6 [1]
7	30.11.22	Experimental study of the ship manoeuvrability Chapter 9 [1]	29.11.22	Chapters 8.6, 8.7, 8.8 [1]
8	07.12.22	Ship oscillations. Equation and Forces	06.12.22	Introduction to program "MANIS"
9	14.12.22	Free ship oscillations Chapter 1 [4]	13.12.22	Exercises from chapter 1 [4]
10	21.12.22	Oscillations in waves Chapter 3 [4]	20.12.22	Exercises from chapter 2 [4]
11	04.01.22	Oscillations in irregular waves Chapter 3 [4]	03.01.22	Damping of ship oscillations
12	11.01.22	Experimental methods Chapter 7 [4]	10.01.22	Control of assignments
13	18.01.22	Overview of the course	17.01.22	Control of assignments (MANIS calculations)



No.	Date	Lecture	Date	Exercise
14	25.01.22	Consultation	24.01.22	Control of assignments (MANIS calculations)