

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	School of Engineering		
<b>ACADEMIC UNIT</b>	Department of Naval Architecture		
<b>LEVEL OF STUDIES</b>	Undergraduate		
<b>COURSE CODE</b>	NAOME1325	<b>SEMESTER</b>	4 <sup>o</sup>
<b>COURSE TITLE</b>	<b>SHIP RESISTANCE – PROPULSION – SHIP HYDRODYNAMICS</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS (ECTS)</b>
<b>Lectures</b>		4	5
<b>COURSE TYPE</b> <i>general background, specialbackground, specialised general knowledge, skills development</i>	Specialised		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (English)		
<b>COURSE WEBSITE (URL)</b>	<a href="https://eclass.uniwa.gr/courses/NA200/">https://eclass.uniwa.gr/courses/NA200/</a>		

### (2) COURSE GOALS / LEARNING OUTCOMES

The main goal of the course is to provide students with basic knowledge of ship resistance and propulsion evaluation. In particular the course examines the fluid dynamic mechanisms which control the flow around the hull creating resistance, the experimental techniques for measuring resistance components, the methods for predicting resistance using systematic series, the estimation of ship propulsive power, the powering process and propeller selection.

### (3) COURSE CONTENT / SYLLABUS

- Phenomenological methods, Linear wave theory
- Ship resistance, Resistance components, Coherence resistance, Pressure resistance, Friction resistance, Wave resistance and related theories.
- Ship resistance prediction based on systematic series
- Calculation of ship resistance using the FORMDATA method and the Lap-Keller method
- Similarity theory, Dimensional analysis
- Experimental determination of resistance, Froude experimental method
- Ship propulsion, Propeller geometry, Propeller operation, Propeller - hull interaction factors

- Propeller systematic series, Propeller cavitation, Selection of marine propulsion machinery systems, Propeller – Engine matching

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b> Face-to-face, Distance learning, etc.	Face-to-face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> Use of ICT in teaching, laboratory education, communication with students	<ul style="list-style-type: none"> <li>• Use of ICT in teaching.</li> <li>• Communication with students and support of learning procedure through the electronic e-class platform.</li> </ul>	
<b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail.</i> <i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	<b>Activity</b>	<b>Workload (hours)</b>
	Lectures	52
	Exercises / fieldwork	13
	Study and analysis of bibliography	78
	Course total	<b>143</b>
<b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other</i>	Evaluation: Written examination (100%) including problem solving, short-answer questions etc	

#### (5) ATTACHED BIBLIOGRAPHY

- Larsson L. and Raven C. H., 2010, Principles of Naval Architecture Series: Ship Resistance and Flow, Soc. Naval Architects & Marine Eng. (SNAME)
- Bertram, A., 2012, Practical Ship Hydrodynamics, 2nd Edition, Butterworth-Heinemann
- Lothar Birk, 2019, Fundamentals of Ship Hydrodynamics: Fluid Mechanics, Ship Resistance and Propulsion, Willey
- Rawson, K.J. and Tupper, E.C., 2001, Basic Ship Theory, Volume 2, Butterworth-Heinemann
- Harvald, S, 1983, Resistance and propulsion of ships, Wiley
- Lewis, EV (Ed), 1989, Principles of Naval Architecture, vol. 2: Resistance & Propulsion, Vibration, vol. 3: motion in waves, controllability, Soc. Naval Architects & Marine Eng. (SNAME)
- Lewandowski, E.M., 2004, The dynamics of marine craft (maneuvering and seakeeping), World Scientific

