COURSE OUTLINE

(1) **GENERAL**

SCHOOL	School of Engineering			
ACADEMIC UNIT	Department of Naval Architecture			
LEVEL OF STUDIES	Undergraduate			
COURSE CODE	NAOME1363		SEMESTER	9 th
COURSE TITLE	DYNAMIC SHIP STABILITY			
INDEPENDENT TEACHING ACTIVITIES			WEEKLY TEACHING HOURS	CREDITS (ECTS)
Lectures			4	4
COURSE TYPE general background, specialbackground, specialised general knowledge, skills development		Specialised		
PREREQUISITE COURSES:		NAOME1318 - SHIP HYDROSTATICS AND STABILITY		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:		Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS		Yes (in English)		
COURSE WEBSITE (URL)		https://eclass.uniwa.gr/courses/NA230/		

(2) COURSE GOALS / LEARNING OUTCOMES

In order to fully understand the behaviour of ships under environmental excitations in real seas, it is essential not only to consider the simplified hydrostatics approach, but also to investigate the underlying ship dynamics.

By exploring the dynamic behaviour of ships including wind and wave excitations, we may encounter interesting dynamical phenomena having a dominant non-linear nature that in many cases result in loss of stability, violent responses or even capsize.

By successful completion of the module, students will be able to:

- Understand the differences between ship hydrostatics and ship dynamic stability
- Know the basic non-linear equations during ship rolling
- Understand the significance of Added Mass, Damping and Restoring coefficients in the Pure rolling equation of motions
- Understand the basics of phenomena such as pure rolling seas resonance, pure loss of stability, parametric rolling, surf-riding and broaching-to
- To access the dynamic stability of ships in the early stages of design and means of alleviating the above-mentioned non-linear phenomena.
- Understand the nature of the existing IMO Regulations and the 2nd generation criteria

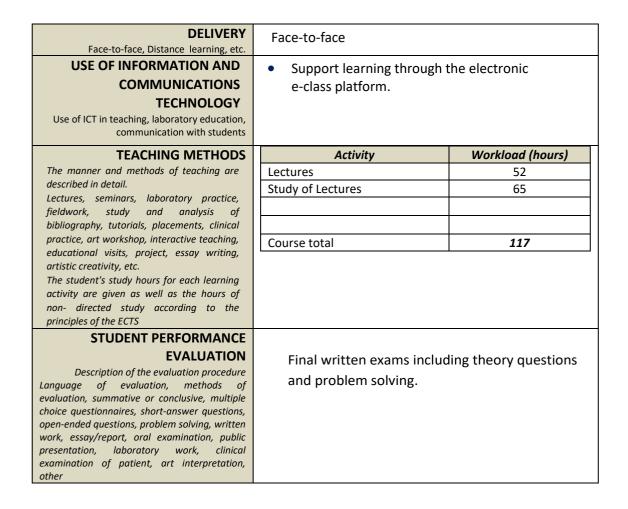
Students will learn how to search and analyse data in order to compose solutions required for decision making and develop their critical thinking regarding Ship Stability issues.

(3) COURSE CONTENT / SYLLABUS

Subject module discusses the following aspects:

- i) Introduction to Dynamic Stability of Ships
- ii) Historical Review in Stability of Ships
- iii) Revision in Intact Stability & Ship Hydrostatics at Large angles
- iv) Modelling of Wind Loads and Ship Responses under Strong Wind Excitations, including the investigation of *IMO Weather Criterion*
- v) Dynamic Stability of Ships in Pure Rolling Seas
- vi) Parametric Rolling Resonance during Longitudinal Seas and phenomena of Pure Loss of Stability
- vii) Dynamic Instabilities in Following Seas including Surf-riding and Broaching-to Applicable *IMO* Regulations and 2nd Generation Criteria

(4) TEACHING and LEARNING METHODS - EVALUATION



(5) ATTACHED BIBLIOGRAPHY

- Σπύρου, Κ. (2015) Δυναμική ευστάθεια πλοίου. [ηλεκτρ. βιβλ.], Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών, Αθήνα.
- V.L. Belenky & N.B. Sevastianov, (2007), Stability and Safety of Ships The risk of capsizing, SNAME.
- 3. Kobylinsky, L. K. and Kastner, S. (2003), Stability and Safety of Ships, (Vols. 1-2), Elsevier Ocean Engineering Book Series