

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II  
**DOTTORATO DI RICERCA / PHD PROGRAM IN  
INFORMATION TECHNOLOGY AND ELECTRICAL ENGINEERING**

***Ad hoc course announcement***

**Title: Sustainable ship for the energy transition of maritime transport**

**Lecturer: Prof. Tommaso COPPOLA**

*Federico II University of Naples  
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**Credits: 4 CFU**

Short CV

**Degrees:**

MSc in Naval Architecture, Marine and Mechanical Engineering, 1990-University of Naples "Federico II".

PhD in Naval Architecture, Marine and Mechanical Engineering, 1995.

**Current academic position** (University of Naples "Federico II"):

2011-2022 Associate professor of Ship Construction and Ship Safety.

2001-2014 Associate professor of Ship Safety.

1995-2001 Researcher.

## Overview

The aim of the course is to introduce the topic of the energy needs of a complex system such as that of a ship during its normal operation. The course provides PhD students with the basic and specialist knowledge of ship design and management from an energy point of view propulsion and on-board services, with increased use of electric and hydrogen technologies, as required by the objectives of the ecological transition.

There will be a final assessment.

## Schedule

Lecture	Date	Time	Topics
1	22/09/2022	10.30:12.30	Engine systems of ship
2	29/09/2022	10.30:12.30	Fuel cells for marine applications
3	06/10/2022	10.30:12.30	Environmental regulations for ships
4	13/10/2022	10.30:12.30	Hydrogen Storage and Production on board
5	20/10/2022	10.30:12.30	Propulsion equipment and services cruise ship
	TBD	TBD	Assessment test



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**I Lesson**

Definitions and Classifications of the engine systems of ships; Elements of design choice for on-board electricity generation systems: torque and power.

**II Lesson**

Fuel cells for marine applications; Ship safety and reliability regulations;

**III lesson**

Environmental regulations for ships; NO<sub>x</sub> and SO<sub>x</sub> concentration limits in emissions; Emission Control Areas (ECAs); EEDI (Energy Efficiency Design Index); CII (Carbon Intensity Index);

**IV Lesson**

Electric propulsion and on-board electrical services / systems. Fuels in the naval field; Hydrogen storage and hydrogen production methods on board, in comparison with traditional propulsion

**V Lesson**

Energy properties of different innovative fuels. The propulsion equipment and services on board cruise ships.

For information: Prof. Tommaso COPPOLA (DII, UniNA) – [tommaso.coppola@unina.it](mailto:tommaso.coppola@unina.it)

Participants are requested to send an e-mail to prof. Coppola with the following information:  
Student name and surname, name of the PhD course, PhD cycle