

Course guide

280816 - 280816 - High Speed Crafts and Special Ships

Last modified: 25/10/2023

Unit in charge: Barcelona School of Nautical Studies
Teaching unit: 742 - CEN - Department of Nautical Sciences and Engineering.

Degree: MASTER'S DEGREE IN NAVAL AND OCEAN ENGINEERING (Syllabus 2017). (Optional subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: ORIOL ADSERÀ BARBARÀ

Others: Primer quadrimestre:
ORIOL ADSERÀ BARBARÀ - MUENO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

ENO_CEE1-1. Knowledge of the existing regulations that regulate the project of pleasure and competition boats (specific competence of the specialty in Design of Yachts and Recreational Boats)

ENO_CEE1-2. Ability to design pleasure and competition boats (specific competence of the specialty in Yacht and Recreational Boat Design)

ENO_CEE1-3. Advanced knowledge of naval hydrodynamics for its application to the optimization of yacht fairings and high speed boats, their propulsion systems and appendages (specific competence of the specialty in Design of Yachts and Pleasure Boats)

ENO_CEE1-4. Ability to analyze the structural behavior and optimize the structure of pleasure and competition boats (specific competence of the specialty in Yacht and Recreational Boat Design)

ENO_CEE1-7. Knowledge of the materials used in the construction of pleasure boats. Knowledge of your working conditions and maintenance requirements. Knowledge of the mechanical behavior of these materials and their failure modes (specific competence of the specialty in Design of Yachts and Pleasure Boats)

Transversal:

CT1. ENTREPRENEURSHIP AND INNOVATION: Knowing and understanding the organization of a company and the sciences that govern the activity; be able to understand the business rules and relationships between planning, industrial and commercial strategies, quality and profit.

CT2. SUSTAINABILITY AND SOCIAL COMMITMENT: Know and understand the complexity of economic and social phenomena typical of the welfare society, being able to relate welfare to globalization and sustainability; acquire skills to use in a balanced manner compatible technology, technology, economics and sustainability.

CT3. TEAMWORK: Ability to work as a member of an interdisciplinary team, either as a member or performing management tasks, with the aim of contributing to projects pragmatically and sense of responsibility, assuming commitments considering the resources available.

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Manage the acquisition, structuring, analysis and visualization of data and information in the field of specialty, and critically evaluate the results of this management.

CT5. THIRD LANGUAGE Learning a third language, preferably English, with adequate oral and written and in line with the future needs of the graduates.

Basic:

CB6. Possess knowledge and understanding that provide a basis or opportunity be original in the development and / or application of ideas, often in a research context.

CB7. That the students can apply their knowledge and ability to solve problems in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their study area.

CB8. Students should be able to integrate knowledge and handle the complexity of making judgments based on information that, being incomplete or limited, includes reflections on the responsibilities social and ethical linked to the application of their knowledge and judgments.

CB9. That students can communicate their conclusions and the knowledge and Latest rationale underpinning to specialists and non Specialty clearly and unambiguously.

CB10. Students must possess the learning skills that enable them continue studying in a way that will be largely self-directed or autonomous.

TEACHING METHODOLOGY

Participatory exhibition class

Autonomous learning by solving exercises and problems

LEARNING OBJECTIVES OF THE SUBJECT

Know the different types of:

- High speed boats
- Propulsion systems suitable for high speed
- Methods for predicting speed, accelerations, design pressures ...
- Forms and their design parameters (living work and dead work)
- Types of materials and structures. Impact on the weight and fatigue of the boat.
- See technical versus economic criteria in decision-making (weight / money)
- Fixings and supports of elements and equipment in fast boats
- Individual protection at high speeds
- High speed irrigation
- Functional design and ergonomics

Know the theory and concepts of glide

Know the main parameters of the hull design

Get based on departure boat:

- Weight, weight position, shapes, propulsion, dead work
- Boat optimized in shapes and structure (SSC)
- Definition of alternative propulsion and study
- Power / speed estimation and dynamic parameters

STUDY LOAD

Type	Hours	Percentage
Hours large group	45,0	36.00
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

1. Hydrodynamics and aerodynamics of gliding boats

Description:

Resistance analysis
Dynamics analysis
Stability analysis
Bases for design

Full-or-part-time: 27h

Theory classes: 10h
Guided activities: 5h
Self study : 12h

2. Hydrodynamics of the hydrowings

Description:

Resistance analysis
Dynamics analysis
Stability analysis
Bases for design

Full-or-part-time: 27h

Theory classes: 10h
Guided activities: 5h
Self study : 12h

3. Vehicles with air mattress and ground effect

Description:

Resistance analysis
Dynamics analysis
Stability analysis
Bases for design

Full-or-part-time: 27h

Theory classes: 10h
Guided activities: 5h
Self study : 12h

4. Propulsion and performance of high speed boats

Description:

Methods of propulsion of fast boats
Methods of reducing resistance (steps, spray rails, ...)
Dynamic instabilities

Full-or-part-time: 27h

Theory classes: 10h
Guided activities: 5h
Self study : 12h



5. Applicable regulations and classification societies

Description:

Review of current regulations regarding high speed boats
Review of current regulations regarding special boats

Full-or-part-time: 17h

Theory classes: 5h

Self study : 12h

GRADING SYSTEM

Evaluation from the exercises based on the following aspects:

STUDY AND REASON FOR PROS / CONS

Different types of boats seen (10%)

Types of propulsion (10%)

GET IN THE DEPARTURE DATA BASE:

Structure calculation with designated material (20%)

Propulsion selection explaining the choice with weight, technical and economic criteria (20%)

Optimization of hull shapes and dead work (20%)

Speed estimation and dynamic parameters (20%)

BIBLIOGRAPHY

Basic:

- Bureau Veritas. Rules for the Classification of High Speed Craftv: NR 396 UNITAS R02 E [on line]. Paris: Bureau Veritas, 2002 [Consultation: 15/07/2021]. Available on: http://erules.veristar.com/dy/data/bv/pdf/396-NR_2002-02.pdf.
- Larsson, Lars Olof; Eliasson, Rolf E. Principles of yacht design. 3rd ed. London: Adlard Coles Nautical, 2007. ISBN 9780713678550.