

Course guide

280674 - 280674 - Naval System Design

Last modified: 27/05/2025

Unit in charge:	Barcelona School of Nautical Studies	
Teaching unit:	742 - CEN - Department of Nautical Sciences and Engineering.	
Degree:	BACHELOR'S DEGREE IN NAVAL SYSTEMS AND TECHNOLOGY ENGINEERING (Syllabus 2010). (Compulsory subject).	
Academic year: 2025	ECTS Credits: 9.0	Languages: Spanish

LECTURER

Coordinating lecturer:	ERIC JOSE PASCUAL SOLDEVILLA
Others:	Segon quadrimestre: JUAN CARLOS MURCIA GONZÁLEZ - DT, GESTN RAFAEL PACHECO BLAZQUEZ - DT, GESTN ERIC JOSE PASCUAL SOLDEVILLA - DT, GESTN

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Generical:

1. ABILITY TO SHAPE, DESIGN AND IMPLEMENT COMPLEX SYSTEMS IN THE FIELD OF NAVAL ENGINEERING. Ability to conception, design and implementation of processes, systems and / or services in the field of naval technical engineering, including the drafting and development of projects in the field of specialization, knowledge of basic materials and technologies, decision making, managing the activities being projects within their specialty, conducting measurements, calculations and valuations, managing specifications, regulations and mandatory standards, assessment of the social and environmental impact of technical solutions adopted, economic, material and human resources involved in the project, with a systematic and comprehensive vision assessment.

Transversal:

2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.

TEACHING METHODOLOGY

The methodology of the course is based on the work on different workshops. First, the different theoretical concepts, regulations, and practical indications related to the system are reviewed. Then the students are organized in groups to work in a practical workshop on the system design.

The classes are organized as coordination activities for the workshop. The different tasks to be carried out are reviewed and discussed.

LEARNING OBJECTIVES OF THE SUBJECT

- To identify the requirements of every system
- To generate plans to conduct the different works, and manage the work in group
- To relate knowledge among different disciplines
- Understand the different regulations to be applied in the design of naval systems
- To perform calculations and practical design of different naval systems

STUDY LOAD

Type	Hours	Percentage
Self study	135,0	60.00
Hours large group	90,0	40.00

Total learning time: 225 h

CONTENTS

Introduction

Description:

Engine room disposition. Design criteria. Accessibility and maintainability. Ergonomics and functionality. Tests and certifications. Statistical analysis of reliability.

Fuel oil system

Description:

Introduction. Estimation of range. Equipment and elements of the system. Design of the system. Design workshop.

Bilge and firefighting system

Description:

Introduction. Estimation of range. Equipment and elements of the system. Regulations. Design of the bilge system. Design of the firefighting system. Pipes supporting system. Design workshop.

Cooling water system

Description:

Introduction. Equipment and elements of the system. Regulations. Design of the cooling system. Design workshop.



Sanitary, black and grey water systems

Description:

Introduction. Equipment and elements of the system. Regulations. Design of the sanitary, and black and grey water system. Design workshop.

Hydraulic and pneumatic services

Description:

Introduction. Equipment and elements of the system. Design and calculation of the hydraulic and pneumatic services. Design workshop.

System integration

Description:

General discussion on integration and other aspects, including the review of elements related with the safety and accessibility, through hull and bulkhead fittings, vibration and noise control and materials incompatibility.

Electric power system

Description:

Introduction. Power balance of the ship. Equipment and elements of the system. Regulations. Design of the electric power system. One-line diagram. Design workshop.

GRADING SYSTEM

During the course, different practical exercises and workshops will be carried out. The average mark on those exercises (Nac) will weight a 60% of the final mark. The final exam will weight the rest 40%.

$$N_{\text{final}} = 0.6 N_{\text{pf}} + 0.4 N_{\text{ac}}$$

The re-evaluation will consist on carrying out a practical exercise defined by the professors. This work will be focused on the aspects of the matter failed by the student. The student will be required to deliver a written report on the work at the day of the exam. Furthermore, the student could be asked for an oral presentation or written exam on the work.

EXAMINATION RULES.

The student not presenting to any of the proposed exercises, workshops and exam will be qualified as "not taken"

BIBLIOGRAPHY

Basic:

- Watson, David G.M. Practical ship design. Oxford: Elsevier, 1998. ISBN 0080429998.
- Alvariño Castro, Ricardo; Azpíroz, Juan José ; Meizoso, Manuel. El proyecto básico del buque mercante. 2ª ed. Madrid: Colegio Oficial de Ingenieros Navales, 2007. ISBN 9788492175024.
- Hall, Dennis T. Practical marine electrical knowledge. 4th ed. Livingston: Witherby, 2019. ISBN 9781856098571.
- Organización Marítima Internacional. Convenio Marpol : artículos, protocolos, anexos e interpretaciones unificadas del Convenio internacional para prevenir la contaminación por los buques, 1973, modificado por el Protocolo de 1978 y 1997. Ed. refundida. Londres: Organización Marítima Internacional, 2011. ISBN 9789280131031.
- UNE-EN ISO 15749 :Embarcaciones y tecnología marina. Sistemas de desagüe en barcos y estructuras marinas. Parte 5: Desagüe de cubiertas, bodegas de carga y piscinas [on line]. 2004. Madrid: AENOR, 2006 [Consultation: 01/09/2022]. Available on: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991000617169706711.
- UNE-EN ISO 15748 :Embarcaciones y tecnología marina. Suministro de agua potable en buques y estructuras marinas. Parte 1 i 2 [on line]. Madrid: AENOR, 2003 [Consultation: 01/09/2022]. Available on: https://discovery.upc.edu/permalink/34CSUC_UPC/rdgucl/alma991000617169706711.
- Van Dokkum, Klaas. Ship Knowledge. 11th ed.. Vlissingen: Dokmar, 2024. ISBN 9789071500640.