PROJECT CHALLENGE 4S

TRAINING CATALOGUE
Challenge transition for a Shipbuilding Sector Smart Skills change

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Responsible partner:	EnAIP FVG
Author:	Philippe Chiabai
Co-authors:	Barbara Dainelli
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The European C4S Catalogue

Foreword

This activity is part of the Work Package 3: **Prototyping, Testing & Implementation**, led by EnAIP Friuli Venezia Giulia.
Task 3.1_**Training courses prototyping**, carried out by Enaip FVG, with the participation of all partners, aims to develop a **Catalogue of upskilling and reskilling training modules**, to be tested in 4 different countries.
It complies with the following objective:
- Foster the upskilling and reskilling opportunities for people at working age in the Maritime and Shipbuilding sector, using the vocational education and training as an innovative enabler of recovery and just transition to digital economy, in cooperation with Social parties and Business companies to support micro and SME in a fair “learning region”.

The expected result consists of at least 6 prototypes of upskilling courses and 6 prototypes of reskilling courses, from level 3EQF to level 6 EQF, of a duration of at least 8 hours each. It is consistent with the research on skill gaps conducted in WP2.
The learning modules provide learner with a combination of transversal skills, and technical skills (sector-specific), with special hints on green and digital transition challenges.
The modules will be tested during the project piloting stage in Finland, Italy, Portugal and Spain, letting the providers free to adapt the contents and the delivery mode (face-to-face, blended, online) to the recipients.
The Catalogue is available in English, Finnish, Spanish, Portuguese and Italian.

Methodological note

The concept model adopted for the design of the C4S European catalogue follows the micro-credential approach in the definition given by the Council of the EU (2022).

The European Union (EU) defines a micro-credential as: the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes will have been assessed against transparent and clearly defined criteria. Learning experiences leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, and cultural or labour market needs. Micro-credentials are owned by the learner, can be shared and are portable. They may be standalone or combined into larger credentials. They are underpinned by quality assurance following agreed standards in the relevant sector or area of activity.

According to the S.O.2 of the Project (defining, within the five steps of the design thinking an innovative and shared solution to the skills shortage in the Maritime sector, both at technical level and in the so-called soft skills, designing a Prototype Catalogue for Skills for upskilling and reskilling) the concept model focuses on the following Mandatory and Optional Elements suggested by the Annex I of the EU Council Recommendation:

Mandatory elements

- Title of the micro-credential
- Learning outcomes
- Notional workload needed to achieve the learning outcomes (in ECTS credits, where possible)
- Level (and cycle, if applicable) of the learning experience leading to the micro-credential (EQF, QFEHEA), if applicable
- Type of assessment
- Form of participation in the learning activity

Optional elements

- Prerequisites needed to enrol in the learning activity

The other mandatory elements listed in the Table 5 (Identification of the learner; Country(ies)/Region(s) of the issuer; Awarding body(ies); Date of issuing; Type of quality assurance used to underpin the micro-credential)
are also adopted by the project but the analysis of this aspect concerns the implementation phase of the prototypes during the piloting (S.O.3).
The EU recommends that "Micro-credentials are measurable, comparable and understandable, with clear information on learning outcomes, workload, content, level, and the learning offer, as relevant" (Council of the EU, 2022).
In accordance with this statement, the model defines the following descriptors which identify the prototypes applicable in the maritime sector at European level:

- **Title**: title of the prototype clear and understandable.

- **Typology**: Upskilling or Reskilling.
  Upskilling definition: when an employee undertakes learning to expand their existing skill set, that learning is known as upskilling; these additional skills enhance the worker's performance in their current role, potentially advancing them along their career path.
  Reskilling definition: employee reskilling involves learning new skills outside of the worker's existing skillset; these skills are often closely adjacent to their current function, but may sometimes be geared toward a different path entirely. In particular, considering the duration range of this catalogue, reskilling should be more appropriately considered as cross-skilling: new skills applicable to different functions in an organizational task to mitigate the risk of operational errors.

- **Duration**: minimum duration required for the achievement of learning outcomes; the catalogue adopts a common range of learning hours 8-32h.

- **Skills Gaps**: identification of the reference area of skill needs (Technical Area; Transversal Area; Digital transition; Green transition).

- **Objectives**: simple and clear description of the aim: explanation addressed to the specific target groups of learners.

- **Related standard**: reference to Qualifications Frameworks (QF) or European Frameworks (EntreComp, DigiComp ...).

- **EQF level**: level based on the learning outcomes. Since the catalogue has European relevance the EQF level assigned to the single prototype should be interpreted as indicative. Considering that the classification of the EQF level depends on the NQF, when piloting the prototype there may be variations (+ / - 1) depending on the diversity of the systems in force in the application countries.

- **Learning Outcomes (LO)**: learning goals defined from the learner's perspective (what the learner knows, understands and is able to do after the completion of the learning process), described in a way that supports flexible learning paths, including the possibility to validate and recognize micro-credentials across different national systems.
  For the prototypes linked to European frameworks the LO description refers to formal taxonomies and promptly identifies the competence and the level of proficiency. When the prototype is linked to QF the competence and the level of proficiency should be interpreted as indicative as the concrete identification takes place on the basis of the application system during the piloting (NQF, RQF or competency frameworks).
  In any case knowledge and skills are described within the LO of the prototype and the taxonomy is consistent with the EQF level.

- **Contents**: the workload (theoretical and practical) is defined according to the minimum duration required for the acquisition of the LO. Contents are organized in Learning Units (LU).

- **Methodologies**: the form of participation in the learning activity is described. Teaching and learning methods are meaningfully chosen for the learners to develop the agreed learning outcomes.

- **Materials**: suggested teaching material.

- **Assessment**: assessment of learning outcomes defined in the prototype. Assessment is consistent, applied equally to all learners and carried out according to established procedures. The form of assessment is identified in the prototype (Quiz: test recall; Numerical exercises: test analytical skills; Written assessment: Test knowledge and application of knowledge to theoretical scenarios; Project or problem-based learning: Test practical problem-solving skills...).
  The criteria for marking, levels of grading and the place of assessment - authentication required will be defined during the piloting and communicated to learners in advance.

- **Participants**: clearly identifies which target group of learners the training activity is addressing (managers, designers, technical staff...).

- **Entrance requirements**: prerequisites needed to enrol in the learning activity. Access and admission of learners on the basis of entry requirements described in terms of experience and skills in the labour market (not in terms of qualifications held).

- **Trainers**: training expertise required.

1. GREEN TRANSITION

1.1. IMO and environmental regulations for internal naval outfitting

Objectives
To enhance the participant's knowledge and understanding of International Maritime Organization (IMO) and environmental regulations and the impact of their provisions on systems, components and procedures for setting up interior furnishings. To enable the participants to identify actions required to comply with the provisions of the IMO regulations and the rules for evaluating the circularity/ sustainability of products thus contributing to improving safety at sea and preventing pollution of the seas with the uniform application of international instruments.

Participants
Members of senior, middle and junior-level technical management teams from companies which offer naval outfitting.

Entrance requirements
Knowledge of the basic characteristics relating to the design, functionality and operation of naval construction and outfitting.

Typology
Reskilling

Duration
8 hours

Related standard
Qualification framework

EQF
5

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» COORDINATION OF NAVAL PRODUCTION
Coordinate production centres and shipyard operations, monitoring the progress of activities and foreseeing, where necessary, any corrective actions.

- PROFICIENCY LEVEL
  To check compliance with legislative requirements.

- SKILLS
  Ability to identify legislative requirements relating to the safety and protection of the marine environment.

- KNOWLEDGE
  - IMO and SOLAS regulations
  - Regulations relating to sustainability standards

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 – IMO REGULATIONS
  - Background and overview of IMO
  - Scope of IMO regulations and implications for naval outfitters
  - Effective handling under the regulations: examples

- LEARNING UNIT 2 – SOLAS CONVENTION
  - Background and overview of SOLAS convention
  - Mandatory SOLAS requirements for shipbuilding and outfitting
  - Practical examples from shipboard situations

- LEARNING UNIT 3 – UNI CEI EN ISO/IEC STANDARD FOR CIRCULARITY
  - Sustainable consumption and production models in line with the European Green Deal
  - Evaluation of the circularity/sustainability of products (risk assessment and verification tests)
  - Requirements for outfitting companies: examples of application of the standards

Methodologies

Delivered in interactive seminar mode, this course focuses on practical aspects relating to the implementation of the IMO and environmental regulations by building upon examples and cases arising from naval outfitting installations.

Materials

Slides from the trainer, normative texts and regulations.

Assessment

DURATION: 1h

Final test in written form. It includes solutions to practical cases and/or open or closed questions related to theory and regulations.

Trainers

Experts in IMO SOLAS and environmental regulations, eg. regulatory specialists identifiable in the Naval Registers (RINA, LR, etc.).

1.2. Alternative fuels for maritime: overview of the current state of application

Objectives
To enhance the participant's knowledge and understanding of future energy and alternative fuels in shipping. To enable the participants to identify actions required in order to face the problems that the use of alternative maritime fuels causes. Thus contributing to responding to the needs of the water transport industry and global decarbonisation challenges.

Participants
Members of senior, middle and junior-level technical management teams from maritime companies.

Entrance requirements
Understanding national, and international environmental regulations and standards related to maritime activities. Knowledge of emissions standards, waste management regulations, and marine laws. Understanding of green ship design and technologies, including fuel-efficient propulsion systems, hull design, and emission reduction technologies like exhaust gas scrubbers and selective catalytic reduction systems.

Typology
Upskilling

Duration
8 hours

Related standard
Qualification framework

EQF
6

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» COORDINATION OF NAVAL PRODUCTION
Coordinate production centres and shipyard operations, monitoring the progress of activities and foreseeing, where necessary, any corrective actions.

- PROFICIENCY LEVEL
  To understand operating principles, main problems, economic and technological aspects relating to the use of alternative fuels as an energy vector.

- SKILLS
  Ability to identify and address problems related to the maritime alternative fuel application.

- KNOWLEDGE
  - Regulatory aspects for alternative fuels
  - Technological limits
  - Mitigation actions

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 – ALTERNATIVE FUELS FOR MARITIME
  - Emission regulation targets
  - Alternative fuels compared
  - Costs, infrastructure challenges, supply of the fuels
  - Environmental, social and business impacts
  - Technology Readiness

- LEARNING UNIT 2 – RISKS AND MITIGATION ACTIONS
  - Transportation, logistics
  - Training for using alternative fuel
  - Storage (on-board, off-board)
  - Safety regulations (on-board, bunkering, storage)

Methodologies

Online training using interactive tools through LMS Platform. Delivered in interactive seminar mode, this e-learning course focuses on the practical aspects of alternative fuels in maritime transport based on examples and cases arising from the application and the problems encountered.

Materials

Slides from the trainer, normative texts and regulations.

Assessment

DURATION: 1h

Final test in written form. It includes solutions to practical cases and/or open or closed questions related to theory and regulations.

Trainers

Experts in maritime alternative fuels.

1.3. Energy demand and consumption in ships

Objectives
To enhance the knowledge of the ship's energy system (diesel-electric, LNG, hybrid, battery). To understand the basics of Ship energy demand and energy efficiency on-board. To understand measures of energy saving in shipping operations (routing, port operations, speed).

Participants
Managers operating in the maritime sector, ship owners' representatives, regulators and environmental groups actively working in the sector.

Entrance requirements
Knowledge and experience in the shipping or shipbuilding industry (ship design, product development, logistics). Basic understanding of ship energy systems, regulations and technical requirements of modern ship energy demands.

Typology
Reskilling

Duration
8 hours

Related standard
Qualification framework

EQF
6

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» ENERGY DEMANDS ONBOARD
Identify demands considering that a ship's energy consumption is determined by the ship type, the ship's hydrodynamic characteristics, weather conditions and how the ship is used.

- PROFICIENCY LEVEL
  To understand what are the fuel-saving and energy-saving measures to lower the GHG emissions in shipping.

- SKILLS
  Ability to identify the practical actions which can be taken to reduce energy demand and fuel consumption.

- KNOWLEDGE
  - Regulatory aspects
  - Technical, environmental and economical use of energy on-board

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 – SHIP'S ENERGY CONSUMPTION PRINCIPLES AND CHALLENGES
  - Basics of ship energy demand and energy efficiency
  - Maritime energy management and sustainable maritime transportation
  - Artificial intelligence (AI) in shipping operations (routing, port operations)

- LEARNING UNIT 2 – UNDERSTANDING THE CHANGES OF MODERN SHIP ENERGY DEMAND
  - Future challenges and possibilities of energy consumption and basics of IMO and EU rules and regulations
  - Transition to carbon-neutral fuels the shipping energy
  - How the industry should continue to prepare for the transition to carbon-neutral fuels the shipping energy
  - How shipping can evolve from low-cost options like speed reduction and route optimization, to increasingly digitalized systems, and energy-saving technologies

Methodologies

Lecturers of experienced trainers, discussions related to energy demands on real maritime cases: eg. discussions on different vessel types' energy demands.

Materials

Lectures and selected articles. Free online webinars of classification authorities.

Assessment

DURATION: 1h

Test in written form. It includes solutions to practical cases and/or open or closed questions related to theory and energy requirements.

Trainers

Experts in ship machinery, design and/or shipping energy systems.

1.4. Biobased materials for nautical construction and refitting

Objectives
To enhance the knowledge of the characteristics of materials for product innovation in the nautical sector. To acquire the techniques for using bio-renewable components for composites and adhesives, bio-based materials and prepregs in sailing boats and in the nautical sector and the use of bio-based adhesives for wood in strip planking technology. Thus contributing to responding to European greening objectives and reduction of the environmental impact of nautical construction and refitting.

Participants
Technical staff in the nautical construction sector.

Entrance requirements
Experience in construction and refitting.

Typology
Upskilling

Duration
16 hours

Related standard
Qualification framework

EQF
3

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» NAUTICAL FITTING
Based on the executive technical drawings and the work cycle, being able to create nautical fittings, carrying out assembly and covering operations on open decks, general internal fitting out of the vessel and fixing of deck accessories.

• PROFICIENCY LEVEL
To understand operating principles and technological aspects relating to the use of bio-based materials. To apply the techniques of using bio-renewable components to the operational procedures of nautical fittings.

• SKILLS
- Interpret technical drawings, work cycles, and technical specifications
- Apply joining techniques
- Apply assembly techniques

• KNOWLEDGE
- Types of materials for indoor and outdoor nautical fittings
- Material processing machinery
- Jointing and assembly installation techniques

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1: SUSTAINABILITY AND CIRCULARITY IN NAUTICAL PRODUCTION PRODUCTS AND PROCESSES
  - Green regulations
  - New bio-based materials and process technologies for bio-based nautical construction
  - Bio nano-based composite materials for marine applications
  - High-tech composite materials, including bio-based ones, dedicated to small series, prototyping and customisation
  - Efficient production of bio-based boats and yachts and Nano-manufacturing

- LEARNING UNIT 2: USE OF BIO-BASED MATERIALS FOR NAUTICAL FITTINGS
  - Application techniques of biological products for super-structures and minor parts
  - Application of bio-renewable components for composites and adhesives
  - Application of bio-based adhesives for wood in strip planking technology

Methodologies

Combination of theoretical lectures and practical sessions. Theoretical lessons will provide the fundamentals of bio-based materials and components and related technologies, while the practical sessions will allow the application of the installation and joining techniques of these materials. The exercises will provide the opportunity to apply the knowledge acquired to real situations in nautical construction or refitting.

Materials

Teaching material. Material for exercise activities: bio-based components, equipment, etc. Access to case studies and projects applied to the nautical sector.

Assessment

DURATION: 2h

Theoretical assessments: written examinations to evaluate the understanding of the characteristics of materials for product innovation in the nautical sector.
Practical assessments: performance test to demonstrate skills in the application of bio-based materials joining techniques.

Trainers

Experts in nautical construction and refitting with relevant experience in the bio based materials and components.

2. DIGITAL TRANSITION

2.1. Digital Well-being in the maritime industry

Objectives
To mitigate the impact of screen time on physical and psychological well-being, implementing digital safety measures against cybersecurity risks, establishing boundaries for employees working in isolated environments, promoting mindful technology use, integrating digital health solutions, enhancing communication efficiency, and cultivating a positive digital culture. These objectives collectively focus on fostering a healthy relationship with technology, safeguarding employee well-being, and navigating the unique demands of the maritime industry.

Participants
Technical staff and team leaders actively utilizing technology in the workplace, especially in operational roles.

Entrance requirements
Basic to intermediate level of knowledge in relevant technologies and digital tools is required for effective participation.

Typology
Upskilling

Duration
8 hours

Related standard
DigiComp 2.2

EQF
4

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE as foreseen by the Digital Competence Framework for Citizens - DigComp 2.2:

» 4.3 PROTECTING HEALTH AND WELL-BEING
To be able to avoid health-risks and threats to physical and mental well-being while using digital technologies. To be able to protect oneself and others from possible dangers in digital environments.

- PROFICIENCY LEVEL
  Independently, according to needs, and solving well-defined and non-routine problems:
  - explain how to avoid threats to my physical and mental health-related to the use of technology
  - select ways to protect oneself and others from dangers in digital environments
  - discuss digital technologies for social well-being and inclusion

- SKILLS
  189 – Be aware of the importance of balancing the use of digital technologies with non-use as an option, as many different factors in digital life can impact on personal health, wellbeing and life satisfaction.

- KNOWLEDGE
  197 - Know how to apply, for oneself and others, a variety of digital usage monitoring and limitation strategies.

Contents

- LEARNING UNIT 1: MANAGING SCREEN TIME IN OPERATIONS
  - Discussion on the unique demands and technical aspects of the Maritime Industry setting
  - Understanding Digital Well-being
  - Explore the specific challenges faced by maritime professionals in managing screen time
  - Discuss practical strategies that consider the dynamic nature of maritime work
  - Emphasize the role of technology in fostering a balanced and healthy use of digital devices

- LEARNING UNIT 2: SETTING BOUNDARIES WITH TECHNOLOGY
  - Define the concept of setting healthy boundaries with digital devices in the context of the maritime operation
  - Discuss challenges related to extended work hours and complex technical tasks
  - Highlight the significance of clearly defining limits on device usage for both work and personal life
  - Discuss the potential impact on mental well-being and job performance
  - Discuss ways to navigate challenges and resistance within the maritime industry

Methodologies

Online training using interactive tools through the LMS Platform.

Materials

Slides to be shared with the participants.

Assessment

DURATION: 1h

The written assessment is designed to evaluate users' comprehension and practical application of digital well-being concepts. The assessment includes open-ended questions covering understanding, application of digital usage strategies, discussion of social well-being, and reflective components.

Trainers

Clinical Psychologist with experience within the maritime industry.

2.2. Digital systems for the analysis of data relating to the coordination and control of naval production

Objectives
To apply digital intelligence tools for the management and analysis of data relating to the coordination and control of ship production activities. Promote a more active approach to data, not limited to simple reading but aimed at a more in-depth investigation, capable of providing insights to area managers and highlighting the relationships between events and results achieved.

Participants
Members of senior, middle and junior-level technical management teams responsible for coordinating and controlling ship production activities.

Entrance requirements
Knowledge and management of coordination and control activities of naval production.

Typology
Reskilling

Duration
16 hours

Related standard
DigiComp 2.2

EQF
5

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE as foreseen by the Digital Competence Framework for Citizens - DigComp 2.2:

» 1.3 MANAGING DATA, INFORMATION AND DIGITAL CONTENT
To organise, store and retrieve data, information, and content in digital environments. To organise and process them in a structured environment.

- PROFICIENCY LEVEL
  At an advanced level, according to needs and those of others, and in complex contexts:
  - adapt the management of information, data and content for the most appropriate easy retrieval and storage
  - adapt them to be organised and processed in the most appropriate structured environment

- SKILLS
  40 - Can use data tools (e.g. analysis software) designed to manage and organise complex information, to support decision-making and solving problems.

- KNOWLEDGE
  33 - Know that data collected and processed, for example by AI systems, can be used to recognise patterns in new data to further optimise and personalise the analyses.

Contents

- LEARNING UNIT 1 – DIGITAL INTELLIGENCE TOOLS
  - Digital solutions available today to support the management of coordination and control processes
  - Functions aimed at optimizing workflows, continuously monitoring the progress of the order and the use of resources
  - Integration of business intelligence tools: examples of applications to the shipbuilding sector

- LEARNING UNIT 2 – DATA-DRIVEN APPROACH
  - Collection and management of business process data
  - Centralized data collection process on the activities of different areas and functions of production control and coordination
  - Enhancement of data and use in strategic planning through business intelligence systems
  - Analysis models capable of processing data in an agile way, ensuring visibility and speed in effectively distributing information
  - Elaboration of customized reports

Methodologies

Delivered in interactive seminar mode, this course focuses on practical aspects relating to the management and analysis of data collected based on examples and concrete cases relating to the coordination and control of ship production activities.

Materials

Slides from the trainer, BI and digital intelligence tools.

Assessment

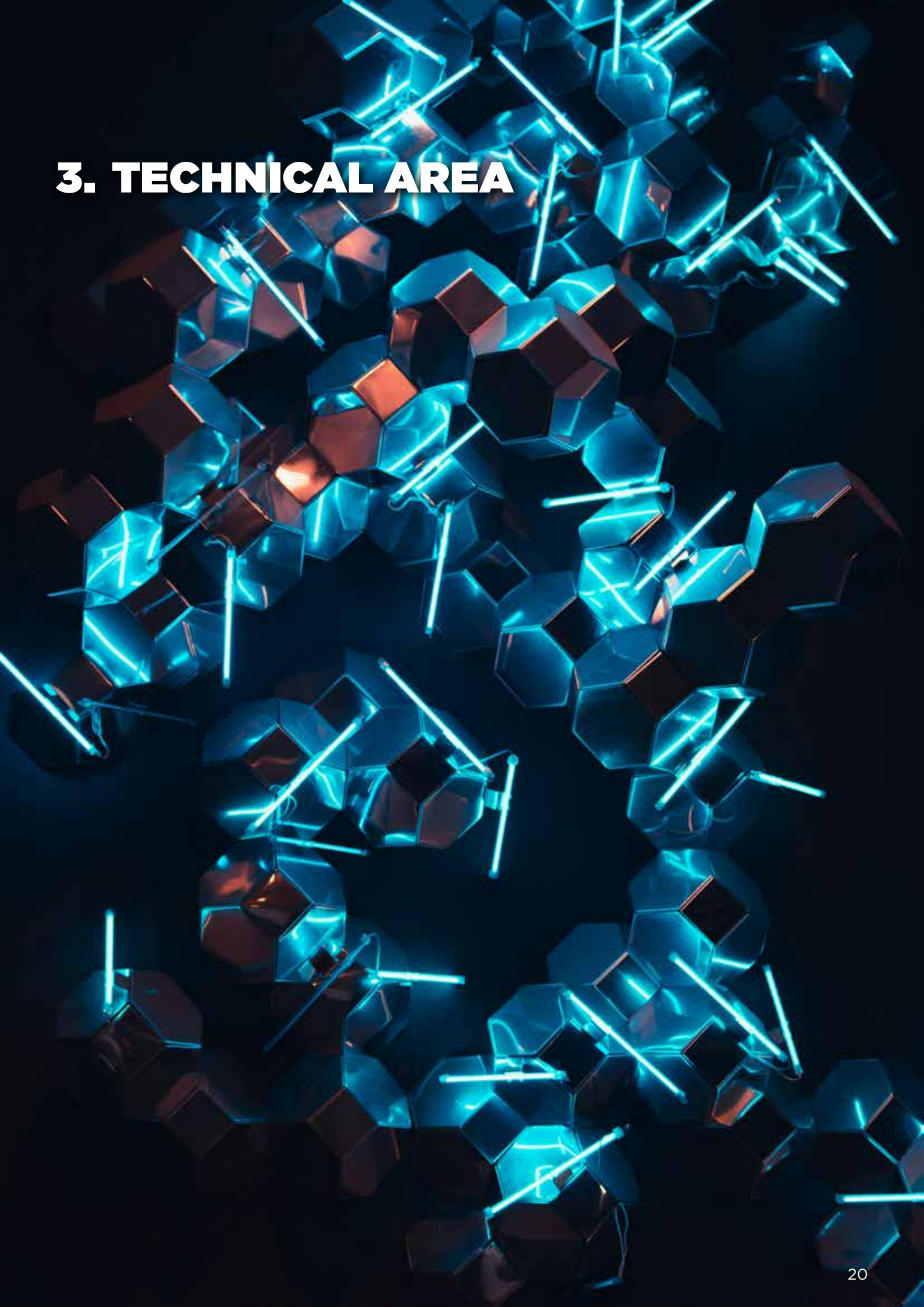
DURATION: 1h

Final test in written form. It includes solutions to practical cases and/or open or closed questions related to the functionality of digital systems.

Trainers

Data analysis experts working in production coordination and control.

3. TECHNICAL AREA



3.1. Robotization of assembly operations in the naval sector

Objectives
To enhance participants' knowledge of technologies of robots and welding systems used in the naval industry, as well as their integration in marine environments. Introduce participants to the programming, operation and maintenance of robots for specific assembly and welding tasks in the naval context.

Participants
Technical staff in the naval production area.

Entrance requirements
Basic experience in mechanical industrial automation. Basic knowledge of computer programming. Knowledge of assembly and welding operations in the naval industry.

Typology
Upskilling

Duration
32 hours

Related standard
Qualification framework

EQF
4

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» CONFIGURATION OF A ROBOTIC SYSTEM
Based on current regulations, being able to carry out the installation and configuration procedures of the robotic system, also guaranteeing the maintenance interventions condition-based, preventive and reactive maintenance.

• PROFICIENCY LEVEL
To understand operating principles and technological aspects relating to the use of robotic applications. To apply simple programmes and operation procedures for the robotic system.

• SKILLS
- Briefly define the appropriate type of robot for use
- Carry out simple instructions and commands

• KNOWLEDGE
- Firmware and software for robotic systems
- Robotic system operating techniques
- Scheduling of robotic processes

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 – OVERVIEW OF THE CURRENT STATE OF ROBOTIZATION IN THE NAVAL INDUSTRY
  - Robotization applications in the naval industry
  - Advantages and challenges of robotization in assembly and welding operations
  - Analysis of real case studies of robotization in the naval industry

- LEARNING UNIT 2 – ROBOT TECHNOLOGIES AND WELDING SYSTEMS
  - Types of robots used in assembly and welding operations
  - Welding systems used in naval structures
  - Integration of robots and welding systems in the naval environment

- LEARNING UNIT 3 – INTRODUCTION OF PROGRAMMING AND OPERATING OF ROBOTS IN NAVAL ENVIRONMENTS
  - Robot programming for specific assembly and welding tasks
  - Safety in the operation of robots in naval environments
  - Maintenance and management of robots in maritime applications

Methodologies

Combination of theoretical lectures and practical sessions (simulations). Theoretical classes will provide the fundamentals of robotization and related technologies, while practical sessions will allow the introduction of programming and operating robots in simulated naval environments. The case studies and projects applied will provide the opportunity to apply the knowledge acquired to real situations in the shipbuilding industry.

Materials

Computers or devices for programming and operating robots. Robot simulation and programming software. Teaching material. Access to case studies and projects applied in the naval sector.

Assessment

DURATION: 2h

Written examinations to evaluate the understanding of the fundamentals of robotization and related technologies. Performance test to demonstrate basic skills in programming, operation and maintenance of robots in simulated environments.

Trainers

Experts in industrial robotics, naval engineering, process automation, or professionals with relevant experience in the implementation of robotized technologies and welding in the naval industry.

3.2. Computer aided design - Ship hull structures

Objectives
Upgrade participants' skills by improving ship design techniques with the use of 3D CAD models of the hull structure. To enhance participants' knowledge of computer-aided naval design tools through the introduction and practical application of the main functions of the programs and graphics environments.

Participants
Ship designers who wish to update specific skills in designing and modelling hull structures using specialized software tools.

Entrance requirements
Knowledge of naval engineering and naval architecture to understand the principles of ship hull design. Familiarity with computer-aided design (CAD) software specific to the design of ship hull structures. Knowledge of international regulations and standards applicable to ship hull design and construction.

Typology
Upskilling

Duration
32 hours

Related standard
Qualification framework

EQF
4

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» NAVAL DESIGN
Perform the detailed technical drawings of the naval components (hull, systems, fittings, structures, interiors), using the most adequate technologies and taking care of the illustration of user manuals, providing the necessary support for processing of the production documentation.

• PROFICIENCY LEVEL
To design and prepare the technical documentation for the construction and repair of the ship, based on drafts and basic engineering instructions, complying with the technical specifications, quality standards and applicable regulations on naval matters, prevention of occupational hazards and environmental protection.

• SKILLS
- Use CAD and hull design software
- Apply three-dimensional drawing techniques
- Apply techniques for processing hull construction documentation

• KNOWLEDGE
- Hull design and international regulations and standards
- Three-dimensional digital drawing
- Hull work preparation documentation

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 – INTRODUCTION TO THE MAIN FUNCTIONS OF THE DIFFERENT DESIGN SOFTWARE
  - Overview of the main software used in naval design
  - Principal functions and application in the design of hull structures (eg. hull fairing, hydrostatic calculations, layout drawing and strength analysis)
  - Analysis and comparison between the different systems and solutions

- LEARNING UNIT 2 – 3D MODELLING OF HULL STRUCTURES
  - Design of structural elements in shipbuilding and ship repair
  - Stress analysis and optimisation of hull designs
  - Practical applications in the design of hull structures using 3D modelling SW

- LEARNING UNIT 3 - TECHNICAL DOCUMENTATION
  - International regulations and standards relevant to the design of hull structures
  - Generation of drawings and technical documentation relating to shipbuilding and ship repair

Methodologies

Combination of theoretical lectures and practical sessions. Presentation of key concepts, instructions on the use of the SW, and explanations of the tools and functions relevant to the design of hull structures. Real case studies or simulated projects may be used to provide participants with hands-on experience of using the software in real-world situations. The practical sessions could include modelling exercises and problem-solving.

Materials

SW manuals. Access to a computer with design software installed and meeting the system requirements to run the software efficiently. Any other technical requirements necessary to participate in the course.

Assessment

DURATION: 2h

Written tests or questionnaires on the concepts and tools presented during the course. Performance test to demonstrate modelling skills and problem-solving.

Trainers

Experts in Computer aided naval design and structural engineering.

3.3. Weldability aspects of materials in shipbuilding

Objectives
To enhance the knowledge of the characteristics of materials concerning different welding technologies with particular attention to steels (high strength) and aluminium alloys. To understand the theory, principles and applicability of welding and related technologies in the shipbuilding sector. To enhance the knowledge of weldability evaluation methods and instructions on measures to be taken into account.

Participants
Members of senior, middle and junior-level technical management teams from maritime companies.

Entrance requirements
Knowledge of materials, design and quality control, including a basic understanding of welding manufacturing applications.

Typology
Reskilling

Duration
8 hours

Related standard
Qualification framework

EQF
6

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE*:

» COORDINATION OF NAVAL PRODUCTION
Coordinate production centres and shipyard operations, monitoring the progress of activities and foreseeing, where necessary, any corrective actions.

- PROFICIENCY LEVEL
  To understand the factors affecting the control of weldability and know how to use the acquired knowledge in the welding production of different material classes/grades.

- SKILLS
  Ability to identify problems related to demanding tasks in welding technology and welding production.

- KNOWLEDGE
  - Enhanced problem-solving knowledge and proper technical solutions, when applying welding and related technologies in the shipbuilding sector
  - Applications of welding and related technologies in a complex context

*to be adapted according to the reference NQF

Contents

- LEARNING UNIT 1 - THEORETICAL KNOWLEDGE OF THE PROCESSES AND PROBLEMS IN SHIPBUILDING
  - Theory, principles and applicability of welding and related technologies
  - Characteristics of materials concerning welding of different types of steel
  - Innovative welding processes for the European shipbuilding industry
  - Analysis and comparison between the different materials systems and solutions

- LEARNING UNIT 2 - MATERIALS AND THEIR BEHAVIOUR DURING WELDING FOCUSING PARTICULARLY ON STEELS (HIGH STRENGTH) AND ALUMINIUM ALLOYS
  - Structural changes in the weld joint caused by fusion welding
  - Weldability evaluation methods and instructions on measures to be taken into account, especially concerning metallurgical weldability
  - Cracking phenomena in welding, causes and their avoidance (especially cold/hydrogen cracking and hot cracking)
  - Analysis of practical cases

Methodologies

Delivered in an interactive seminar mode, the course focuses on technical solutions of steel and aluminium welding and related evaluation methods. Combination of theoretical lectures discussion of practical cases and exercise during lectures.

Materials

Lecture slides. Selected articles, standards etc. Access to case studies.

Assessment

DURATION: 1h

Final test in written form. It includes solutions to practical cases and/or open or closed questions related to theory and regulations.

Trainers

Experts in naval production and welding technologies.

4. TRANSVERSAL AREA

4.1. Prevention and resolution of conflicts in the shipbuilding sector

Objectives
To enhance the knowledge of conflict prevention techniques to promote a harmonious and productive work environment. To apply effective strategies for conflict resolution (including mediation, negotiation and arbitration) to effectively address conflicts in a highly specialized environment such as the naval sector.

Participants
Naval personnel: officers, crew and technical personnel working on ships, maritime platforms or other facilities in the naval sector. Management and administrative personnel: responsible for the management of human resources, operations or logistics in shipping companies or related entities. Maritime safety professionals: individuals involved in the safety and security of maritime installations, as well as in risk management.

Entrance requirements
Experience in the naval sector or related to maritime operations. Experience in the shipping sector or human resources management, operations or logistics. Experience in maritime safety and risk management in maritime environments.

Typology
Reskilling

Duration
8 hours

Related standard
EntreComp

EQF
5

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE foreseen by the Entrepreneurship Competence Framework – EntreComp:

» 3.3 WORKING WITH OTHERS
Solve conflicts and face up to competition positively.

- PROFICIENCY LEVEL
  Can compromise where necessary.

- SKILLS
  Ability to identify, address and resolve conflicts efficiently, minimizing their impact on the work environment.

- KNOWLEDGE
  - Concepts and principles related to conflict management, including resolution and prevention techniques
  - Laws, regulations and standards in the naval field that may influence conflict management
  - Effective communication in conflict prevention and resolution

Contents

- LEARNING UNIT 1 – CONFLICTS AND EFFECTIVE COMMUNICATION IN THE NAVAL SECTOR
  - Types of conflicts
  - Impact of conflicts on the shipbuilding industry
  - Early identification of potential conflicts and prevention
  - Conflict resolution: examples of applications to the shipbuilding/naval sector

- LEARNING UNIT 2 – NEGOTIATION TECHNIQUES
  - Mediation and conciliation
  - Arbitration and legal dispute resolution
  - Analysis of case studies on common conflicts in the naval sector
  - Strategies successfully implemented in conflict resolution

Methodologies

The course will combine theoretical classes with practical exercises, case studies and simulations to provide participants with a comprehensive understanding of conflict prevention and resolution in the naval sector. Active participation and exchange of experiences among participants will be encouraged (learners could present projects or case studies on conflicts and their management experience in the naval field).

Materials

Relevant maritime legislation and international regulations. On-board conflict management procedures manuals. Materials on effective communication and negotiation. Resources on dispute resolution and mediation.

Assessment

DURATION: 1h

Final test in written form. It includes multiple-choice questions, true/false, or open-ended questions that evaluate acquired theoretical knowledge on the negotiation techniques; resolution of hypothetical or real situations related to conflicts in the naval sector.

Trainers

Experts in the naval sector with practical experience in conflict management - resolution and knowledge of maritime law.

4.2. Mental health first aid

Objectives
To enhance participants' abilities to recognize and respond to psychosocial challenges, particularly during times of crisis, within their teams. Through the principles of Psychological First Aid, participants will gain the skills to provide immediate comfort and facilitate referrals for colleagues experiencing acute stress. The program emphasizes proactive monitoring of team well-being, addressing vulnerabilities in the workplace, and seeking appropriate support in both physical and digital environments. The comprehensive approach of this MHFA training seeks to uplift participants, foster supportive team dynamics, and build resilience in the face of psychosocial challenges.

Participants
Members of senior, middle and junior level management teams from maritime companies.

Entrance requirements
A background in management roles is beneficial for optimal engagement with the course content.

Typology
Reskilling

Duration
8 hours

Related standard
EntreComp

EQF
6

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE as foreseen by the Entrepreneurship Competence Framework – EntreComp:

» 3.3 COPING WITH UNCERTAINTY, AMBIGUITY AND RISK
Make decisions when the result of that decision is uncertain, when the information available is partial or ambiguous, or when there is a risk of unintended outcomes. Include structured ways of testing ideas and prototypes from the early stages, to reduce the risks of failing.

- PROFICIENCY LEVEL
  Can pull together different viewpoints to make informed decisions when the degree of uncertainty is high. Can use strategies to reduce the risks.

- SKILLS
  Able to apply adaptive decision-making, enabling them to navigate uncertainty, manage ambiguity, and reduce risks in the mental health support they provide to their colleagues.

- KNOWLEDGE
  Strategies to manage mental health challenges in the shipbuilding industry, integrating crisis management, and psychological safety into a supportive organizational culture.

Contents

- LEARNING UNIT 1: UNDERSTANDING MENTAL HEALTH CHALLENGES IN SHIPBUILDING
  - Mental Health Challenges in Shipbuilding
  - Impact on mental health and work accidents
  - Technology Integration for Mental Health
  - Psychosocial risks in maritime operations
  - Prevention strategies for unhealthy behaviours
  - Group activity and Discussion

- LEARNING UNIT 2: IMPLEMENTING PSYCHOLOGICAL FIRST AID AND SAFETY FOCUS
  - Psychosocial Risks and Mitigation Strategies
  - Strategies for addressing and mitigating risks
  - Support in Isolated Environments
  - Employee Assistance Program (EAP) solutions for remote support
  - Case studies and practical application in shipbuilding contexts

Methodologies

Online training using interactive tools through the LMS Platform.

Materials

Slides to be shared with the participants.

Assessment

DURATION: 1h

Written test focused on understanding and practical application of mental health support concepts in the shipbuilding industry. Open-ended questions cover scenarios, critical thinking, and case studies, evaluating abilities to address challenges, apply psychological first aid, and contribute to a safety-focused culture.

Trainers

A clinical psychologist with experience within the maritime industry.

4.3. Leadership development in the maritime industry

Objectives
To enhance leadership effectiveness by refining decision-making and team management skills. It integrates a profound understanding of mental health challenges, fostering a supportive work environment. Communication strategies are tailored for the maritime sector, promoting clear interaction within diverse teams. The program cultivates a positive workplace culture, prioritizing collaboration, safety, and efficiency while addressing sector-specific organizational challenges. Stress reduction techniques are implemented to enhance well-being, and metrics are developed to measure program success and align with sustained organizational growth. It focuses on building resilient leaders equipped to successfully confront challenges, providing targeted upskilling for evolving industry demands.

Participants
Members of senior, middle and junior-level management teams from maritime companies.

Entrance requirements
Applicants should have leadership experience in the maritime sector, and demonstrate a commitment to ongoing professional development. It is fundamental to have a foundational understanding of Human resources management, Management and leadership positions and coordinating responsibilities.

Typology
Upskilling

Duration
16 hours

Related standard
EntreComp

EQF
6

Learning Outcomes
The prototype contributes to the development of the following COMPETENCE as foreseen by the Entrepreneurship Competence Framework – EntreComp:

» 2.5 MOBILISING OTHERS
Inspire and enthuse relevant stakeholders. Get the support needed to achieve valuable outcomes. Demonstrate effective communication, persuasion, negotiation and leadership.

- PROFICIENCY LEVEL
  Can inspire others, despite challenging circumstances. Can overcome resistance from those who will be affected by my team's vision, innovative approach, and value-creating activity. Can communicate the vision for my team's venture in a way that inspires and persuades external groups, such as funders, partner organisations, new members and affiliate supporters.

- SKILLS
  Able to apply leadership strategies for maritime operations, including the development of tailored communication techniques, to foster a positive workplace culture while addressing sector-specific challenges.

• KNOWLEDGE
Communication strategies capable of successfully confronting challenges and adapting to evolving industry demands.

Contents
• LEARNING UNIT 1: INTRODUCTION TO LEADERSHIP AND MENTAL HEALTH AWARENESS
- Introduction to Leadership in Maritime Context
- Case studies and practical examples illustrating effective leadership strategies in maritime contexts
- Exploration of mental health challenges unique to the maritime industry
- Strategies for approaching and addressing mental health challenges with empathy and a supportive leadership approach
- Role-playing and scenario-based exercises

• LEARNING UNIT 2: COMMUNICATION STRATEGIES AND RESILIENCE BUILDING
- Experiential activity focusing on communication challenges specific to managing maritime operations
- Resilience Building for Leaders: exploration of tools and techniques to navigate challenges with resilience in the maritime environment
- Open dialogue, active listening skills and practical exercises

• LEARNING UNIT 3: POSITIVE ORGANIZATIONAL CULTURE AND STRESS REDUCTION TECHNIQUES
- Promoting Positive Organizational Culture
- Stress Reduction Techniques for Leaders and Teams

• LEARNING UNIT 4: EMPLOYEE ENGAGEMENT AND CONFLICT RESOLUTION
- Techniques for leaders to connect with team members and foster a sense of belonging within the maritime industry
- Conflict Resolution tailored for the maritime context
- Practical exercises to strengthen leaders' conflict resolution capabilities

Methodologies
Online training, divided in 4 modules (4 hours each) with resources to experiential learning methods.

Materials
Slides to be shared with the participants.

Assessment
DURATION: 1h

Written Assessment, with objective questions and case studies to gauge theoretical knowledge of leadership and communication strategies specific to the maritime sector. With open-ended questions, to evaluate the integration and application of the concepts learned.

Trainers
Executive coach or behavioural specialist with experience within the maritime industry.

5. DISCLAIMER

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