**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Introduction to Information Technologies | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| CMP102 | I | Spring | 3 | 3 | 3 | 0 | 0 |
| **Course type:** Compulsory Elective | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | - | - | - | 100 |
| **Course Venue and Time** | | | | Wednesday / 08:30 – 11:20 | | | |
| **Instructor information** | | | | **Aydoğan Erkan**<br>Faculty of Maritime Studies<br>Friday / 09:00 – 12:00<br>+90 (392) 650 26 00 / 4060<br>aydogan.erkan@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

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| **Course Description** | This course provides a comprehensive introduction to the fundamental concepts and applications of information technologies. Students will explore the internal components of computer systems, understand the roles of hardware and software, and examine the principles of system and application software. The course also covers the use of input/output and storage devices, the organization and management of data, and the fundamentals of the Internet and the World Wide Web.<br><br>Practical skills in commonly used productivity software, including Microsoft Word and Excel, are emphasized to develop students' ability to create, format, manage, and present digital documents and data effectively. By the end of the course, students will have a solid foundation in both the theoretical and practical aspects of information technologies, enabling them to apply IT skills in academic, professional, and everyday contexts. |
| **Course Aims and Objectives** | The aim of this course is to provide students with a solid understanding of the principles, components, and applications of information technologies. It seeks to develop both theoretical knowledge and practical skills, enabling students to effectively use digital tools and software for personal, academic, and professional purposes. The course also emphasizes the critical role of IT in modern society and introduces students to best practices in data management, document preparation, and digital communication.<br>• Understand the internal structure and components of computer systems, including the system unit, input/output, and storage devices.<br>• Explain the functions and types of system software and application software.<br>• Navigate and utilize the Internet and the World Wide Web for information retrieval and communication.<br>• Develop proficiency in word processing, including document creation, editing, formatting, and management using Microsoft Word.<br>• Apply spreadsheet skills in Microsoft Excel to organize, analyze, and present data effectively.<br>• Demonstrate the ability to integrate graphical objects, tables, and other visual elements into digital documents.<br>• Apply IT knowledge to solve practical problems and complete tasks efficiently in academic and professional contexts. |
| | **CLO1 – Computer Systems Fundamentals:** Demonstrate a clear understanding of the basic components and functions of computer systems, including the system unit, input/output devices, and storage technologies. |

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| **Course Learning Outcomes** | **CLO2 – System and Application Software:** Explain the roles, functionalities, and practical applications of system software and application software in computing environments.<br>**CLO3 – Internet and Web Navigation:** Navigate and utilize the Internet and the World Wide Web effectively for research, communication, and information retrieval.<br>**CLO4 – Word Processing – Basic:** Create, edit, format, and manage documents using Microsoft Word, including tables, graphical objects, and print-ready layouts.<br>**CLO5 – Word Processing – Advanced:** Apply advanced document management techniques, such as organizing, revising, and sharing digital documents.<br>**CLO6 – Spreadsheet Skills – Basic:** Use Microsoft Excel for data entry, formatting, basic calculations, and creating charts and visual representations of data.<br>**CLO7 – Spreadsheet Skills – Advanced / Data Analysis:** Apply formulas, functions, and analytical tools in spreadsheets to solve practical problems and visualize data.<br>**CLO8 – Problem-Solving and Critical Thinking:** Develop problem-solving and critical thinking skills through practical exercises and the application of IT tools.<br>**CLO9 – IT for Academic and Professional Tasks:** Demonstrate proficiency in using IT applications to support academic, professional, and personal tasks.<br>**CLO10 – Integrated IT Applications:** Combine multiple IT skills and software tools to increase productivity, organize information, and communicate effectively across various contexts. |

## Content of the Course

| Week | *Subject* |
|---|---|
| 1 | **Course Introduction and Syllabus Overview**<br>• Overview of the course objectives, learning outcomes, and assessment methods<br>• Importance of information technologies in modern society and professional life<br>• Understanding basic IT terminology and concepts |
| 2 | **Inside the System Unit**<br>• Components of a computer system: CPU, memory, motherboard, and power supply<br>• Types of computers: desktops, laptops, servers, embedded systems<br>• How the system unit interacts with input/output devices and storage |
| 3 | **Input, Output, and Storage Devices**<br>• Input devices: keyboard, mouse, scanner, digital cameras<br>• Output devices: monitors, printers, speakers<br>• Storage devices: HDDs, SSDs, optical disks, flash drives, cloud storage<br>• Comparison of storage technologies and their performance metrics |
| 4 | **System Software**<br>• Operating systems: purpose, types, and examples (Windows, Linux, macOS)<br>• Utility software: file management, antivirus programs, disk management<br>• Boot process and system configuration |
| 5 | **Application Software**<br>• Difference between system software and application software<br>• Categories: productivity software, multimedia software, database software<br>• Overview of common office applications and specialized software |
| 6 | **The Internet and the World Wide Web**<br>• History and development of the Internet<br>• Internet services: email, VoIP, cloud computing, file sharing<br>• Web technologies: browsers, search engines, websites, web security basics |
| 7 | **Midterm Exam**<br>• Review of Weeks 1–6<br>• Assessment covering theory and practical knowledge of computer components, software, and internet basics |
| 8 | **Introduction to Word**<br>• Basic interface and navigation of Word<br>• Creating, opening, saving, and closing documents<br>• Understanding document templates and styles |
| 9 | **Editing Documents**<br>• Selecting, copying, cutting, and pasting text<br>• Using Undo, Redo, Find, and Replace features<br>• Inserting symbols, hyperlinks, and page breaks |
| 10 | **Formatting Text**<br>• Font styles, sizes, and colors<br>• Paragraph formatting: alignment, indentation, spacing<br>• Applying bullets, numbering, and multilevel lists |
| 11 | **Managing Documents & Working with Tables**<br>• Using headers, footers, and page numbers<br>• Creating, formatting, and modifying tables |

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|---|---|
| | • Sorting and calculating data in tables |
| **12** | **Working with Graphical Objects**<br>• Inserting and formatting images, shapes, and SmartArt<br>• Using WordArt, text boxes, and charts<br>• Arranging objects and layering techniques |
| **13** | **Printing Documents & Revision**<br>• Document layout and page setup<br>• Print preview, printing options, and print settings<br>• Revision strategies: reviewing changes, comments, and track changes |
| **14** | **Introduction to Excel**<br>• Understanding spreadsheet concepts and the Excel interface<br>• Creating and saving workbooks<br>• Entering data, basic formulas, and simple functions<br>• Introduction to charts and basic data visualization |
| **15** | **Final Exam**<br>• Comprehensive assessment covering Word, Excel, and general IT concepts<br>• Practical exercises and problem-solving tasks |

## Methods and Techniques used in the Course

**Lectures and Interactive Presentations:** Detailed explanations of IT concepts, system components, and software applications, supported by slides, diagrams, and live demonstrations.

**Hands-on Laboratory Exercises:** Practical sessions in computer labs for students to apply concepts, including document creation in Word and spreadsheet operations in Excel.

**Guided Tutorials:** Step-by-step instruction on performing tasks, troubleshooting errors, and mastering software functions.

**Case Studies and Problem-Solving Exercises:** Real-world scenarios to develop critical thinking and application skills.

**Group Work and Collaborative Projects:** Encouraging teamwork to complete tasks and projects using IT tools.

**Quizzes and Formative Assessments:** Regular in-class or online quizzes to reinforce understanding and track progress.

**Independent Assignments and Practice Tasks:** Homework and exercises to consolidate skills learned in class.

**Discussion and Question-Answer Sessions:** Opportunities for students to clarify concepts, discuss challenges, and explore advanced applications.

**Demonstrations of Internet and Web Tools:** Practical exposure to searching, browsing, and using web-based resources effectively.

## Sample Questions

**Multiple Choice Questions (MCQs):**

- Which of the following is an example of an input device?
  a) Monitor
  b) Keyboard
  c) Printer
  d) Speaker
- What is the primary function of system software?
  a) Create documents
  b) Control and manage hardware
  c) Browse the internet
  d) Format spreadsheets

**True/False Questions:**

- The CPU is considered the brain of the computer. (True/False)
- Excel cannot be used for data analysis. (True/False)

**Short Answer Questions:**

- Explain the difference between system software and application software.
- List three types of storage devices and briefly describe each.

**Practical/Applied Questions:**

- Create a Word document including a table and insert a graphical object.
- Using Excel, create a simple spreadsheet to calculate the total cost of items and apply a formula for automatic summation.

**Scenario-Based Questions:**

- Your manager asks you to prepare a report including text, tables, and images. Which software would you use, and which steps would you follow to ensure proper formatting and presentation?
- A company wants to organize its employee data in a spreadsheet. Explain how you would structure the data and which Excel functions could help in summarizing information.

**Essay/Long Answer Questions:**

- Discuss the role of the Internet and World Wide Web in modern business and education.
- Explain the components of a system unit and their functions in detail.

## Materials Used in the Course

**Textbooks and Reference Books:**

- Shelly, G. B., Vermaat, M. E. *Discovering Computers 2019: Digital Technology, Data, and Devices.* Cengage Learning.
- Frydenberg, Mark. *Microsoft Office 2019 Step by Step.* Microsoft Press.
- Tanenbaum, Andrew S. *Structured Computer Organization.* Pearson.

**Software Applications:**

- Microsoft Word (2010 or later)
- Microsoft Excel (2010 or later)
- Web browsers (Chrome, Firefox, Edge) for Internet and WWW exercises
- Operating systems: Windows or MacOS

**Hardware Tools:**

- Desktop or laptop computers
- Input devices: keyboard, mouse, scanner
- Output devices: monitor, printer
- Storage devices: external hard drives, USB flash drives

**Online Resources and Tutorials:**

- Microsoft Office official tutorials and help guides
- Online IT courses (e.g., Coursera, Khan Academy) for additional practice
- Interactive simulations for understanding system units, storage, and networking

**Lecture Materials and Handouts:**

- Instructor-prepared lecture slides and notes
- Step-by-step manuals for Word and Excel exercises
- Sample projects and templates for hands-on practice

**Multimedia Tools:**

- Videos demonstrating software usage
- Interactive exercises and quizzes for reinforcing concepts

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** | **CLO7** | **CLO8** | **CLO9** | **CLO10** |
| **PO1** | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| **PO2** | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 |
| **PO3** | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 |
| **PO4** | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 |
| **PO5** | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| **PO6** | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO8** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **PO10** | 1 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 3 |
| **PO11** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1 – Computer Systems Fundamentals** | Lecture, Multimedia Presentation, Demonstration | Quizzes, Midterm Exam, Assignments |
| **CLO2 – System and Application Software** | Lecture, Tutorials, Case Studies | Quizzes, Assignments, Midterm Exam |
| **CLO3 – Internet and Web Navigation** | Lecture, Hands-on Practice, Online Exercises | Practical Exercises, Assignments, Quizzes |
| **CLO4 – Word Processing – Basic** | Lecture, Demonstration, Hands-on Training | Lab Reports, Practical Exams, Assignments |
| **CLO5 – Word Processing – Advanced** | Guided Exercises, Project Work, Workshops | Project Reports, Practical Exams, Lab Exercises |
| **CLO6 – Spreadsheet Skills – Basic** | Lecture, Hands-on Training, Tutorials | Lab Reports, Practical Exercises, Quizzes |
| **CLO7 – Spreadsheet Skills – Advanced / Data Analysis** | Problem-Solving Exercises, Case Studies, Hands-on Practice | Lab Reports, Project Work, Practical Exams |
| **CLO8 – Problem-Solving and Critical Thinking** | Scenario-Based Exercises, Group Discussions, Hands-on Practice | Assignments, Practical Exams, Quizzes |
| **CLO9 – IT for Academic and Professional Tasks** | Lecture, Guided Projects, Tutorials | Project Reports, Assignments, Quizzes |
| **CLO10 – Integrated IT Applications** | Integrated Exercises, Case Studies, Group Projects | Project Reports, Practical Exams, Lab Exercises |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **3** | **45** |
| Midterm Exam | **1** | **3** | **3** |
| Preparation for Midterm Exam | **1** | **20** | **20** |
| Final Exam | **1** | **3** | **3** |
| Preparation for Final Exam | **1** | **20** | **20** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Research for Project(s)/Essay(s) | - | - | - |
| Project Writing | - | - | - |
| Group Work | - | - | - |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory | - | - | - |
| Assignment(s)/Homework/Class Works | - | - | - |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **106** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | - | - |
| Field Work | - | - |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | - | - |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 40 |
| Final/Oral Exams | 1 | 60 |
| Total | **2** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** English II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| ENG102 | I | Spring | 3 | 3 | 3 | 0 | 0 |
| **Course type:** Compulsory Elective | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | - | - | - | 100 |
| **Course Venue and Time** | | | | Wednesday / 13:30 – 16:20 | | | |
| **Instructor information** | | | | **Aydoğan Erkan**<br>Faculty of Maritime Studies<br>Friday / 09:00 – 12:00<br>+90 (392) 650 26 00 / 4060<br>aydogan.erkan@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

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|---|---|
| **Course Description** | *English II (ENG 102)* is designed to enhance students' ability to communicate effectively in English by focusing on language use in everyday life situations. The course introduces vocabulary, expressions, and basic grammatical structures at the A2/B1 level of the Common European Framework of Reference for Languages (CEFR). Emphasis is placed on developing functional language skills for real-life communication, including greetings, introductions, describing people and routines, asking for information, expressing preferences, and making simple social interactions.<br>Students will engage in a variety of communicative activities such as role-plays, dialogues, and listening comprehension exercises to improve fluency, accuracy, and confidence in using English. The course also aims to raise awareness of how language conveys meaning in specific contexts, enabling learners to respond appropriately in both familiar and new situations. By the end of the course, students will be able to participate in basic conversations, understand spoken English in common contexts, and use everyday vocabulary effectively in speaking and listening tasks. |
| **Course Aims and Objectives** | The primary aim of *English I (ENG 101)* is to provide students with the fundamental linguistic tools and communicative strategies needed to interact in everyday situations at an A2/B1 level of the CEFR. The course aims to build students' confidence in using English as a medium of communication by focusing on functional language use, vocabulary expansion, and listening and speaking skills.<br>• Understand and use everyday expressions and basic phrases related to immediate needs and familiar topics.<br>• Introduce themselves and others, ask and answer questions about personal details, and describe daily routines.<br>• Use appropriate vocabulary and expressions to interact in contexts such as shopping, travel, health, socializing, and work.<br>• Demonstrate the ability to ask for and give directions, make arrangements, and express likes, dislikes, and preferences.<br>• Apply strategies to maintain conversations in English, including making invitations, offers, suggestions, and responding politely.<br>• Develop basic listening comprehension skills for real-life communication scenarios.<br>• Strengthen oral fluency and accuracy through practice in dialogues, role-plays, and discussions.<br>• Gain cultural awareness by comparing customs, traditions, and social practices across cultures. |

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| **Course Learning Outcomes** | **CLO1:** Communicate effectively in everyday contexts using appropriate vocabulary, expressions, and structures at an A2/B1 CEFR level.<br>**CLO2:** Introduce themselves and others, and exchange personal information accurately in both spoken and written forms.<br>**CLO3:** Describe daily routines, habits, hobbies, and preferences using common verbs, adjectives, and frequently used expressions.<br>**CLO4:** Ask for and give directions, make requests, and express needs in everyday situations such as shopping, travel, and dining.<br>**CLO5:** Demonstrate comprehension of short oral texts, including conversations and dialogues, through listening-based tasks.<br>**CLO6:** Express personal opinions, likes, dislikes, and preferences in social and interpersonal communication.<br>**CLO7:** Participate actively in role-plays and dialogues that simulate real-life communication settings (e.g., health, work, travel, social interactions).<br>**CLO8:** Apply basic grammatical structures—including present, past, and future tenses; prepositions; and question forms—to produce accurate and meaningful sentences.<br>**CLO9:** Use English appropriately for intercultural communication, demonstrating awareness of cultural similarities and differences in daily life and traditions.<br>**CLO10:** Show improved confidence and fluency in speaking, listening, and engaging in conversations in English. |

## Content of the Course

| Week | *Subject* |
|---|---|
| 1 | **Introduction & Course Orientation**<br>• Course overview and objectives<br>• Importance of English in daily life<br>• Introduction to basic greetings and self-introduction<br>• Classroom language and expressions |
| 2 | **Talking About Yourself and Others**<br>• Describing yourself, family, and friends<br>• Asking and answering personal questions<br>• Common verbs and adjectives for description |
| 3 | **Daily Routines and Habits**<br>• Vocabulary for everyday activities<br>• Talking about routines using simple present tense<br>• Time expressions (e.g., always, usually, sometimes) |
| 4 | **Places and Directions**<br>• Vocabulary for locations in town and transportation<br>• Asking for and giving directions<br>• Prepositions of place and movement |
| 5 | **Food and Drinks**<br>• Vocabulary related to meals, groceries, and restaurants<br>• Ordering food and drinks<br>• Expressing likes, dislikes, and preferences |
| 6 | **Hobbies and Free Time**<br>• Vocabulary for hobbies, sports, and leisure activities<br>• Talking about routines and preferences<br>• Using frequency adverbs |
| 7 | **Shopping and Money**<br>• Vocabulary for shopping, products, and prices<br>• Asking for information and making purchases<br>• Expressing quantity and cost |
| 8 | **Health and Illness**<br>• Vocabulary for body parts, symptoms, and medical situations<br>• Expressing how you feel and giving advice<br>• Making simple requests for help |
| 9 | **Work and Professions**<br>• Vocabulary for jobs, workplaces, and daily tasks<br>• Talking about duties and responsibilities<br>• Asking and answering about someone's work |
| 10 | **Travel and Transportation**<br>• Vocabulary for travel, tickets, and accommodations<br>• Asking for travel information and making arrangements<br>• Discussing past and future travel plans |
| 11 | **Weather and Environment**<br>• Vocabulary for weather conditions, seasons, and nature<br>• Describing the environment and climate |

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|---|---|
| | • Making small talk about the weather |
| **12** | **Socializing and Making Plans**<br>• Invitations, offers, and suggestions<br>• Accepting and refusing politely<br>• Talking about future arrangements using “will” and “going to” |
| **13** | **Culture and Daily Life**<br>• Vocabulary for festivals, traditions, and cultural activities<br>• Comparing your culture with others<br>• Expressing opinions and preferences |
| **14** | **Review of Key Functions and Vocabulary**<br>• Revision of greetings, daily routines, hobbies, and travel<br>• Practice dialogues in simulated real-life situations<br>• Listening and speaking exercises for comprehension |
| **15** | **Final Assessment & Speaking Practice**<br>• Oral presentations or dialogues<br>• Listening comprehension assessment<br>• Review and feedback on progress |

## Methods and Techniques used in the Course

**Communicative Language Teaching (CLT):** Focus on real-life communication and functional language use through role-plays, pair work, and group activities.

**Task-Based Learning:** Students complete meaningful tasks such as dialogues, presentations, and problem-solving activities to practice authentic language.

**Listening and Speaking Practice:** Regular listening comprehension exercises, oral drills, and speaking activities to improve fluency and accuracy.

**Interactive Activities:** Games, simulations, and discussions that engage learners in authentic use of vocabulary and expressions.

**Reading and Writing Integration:** Short texts, dialogues, and written tasks are used to reinforce vocabulary, grammar, and comprehension.

**Audio-Visual Aids:** Use of multimedia materials, including videos, audio recordings, and digital tools, to enhance listening and speaking practice.

**Formative Assessment Techniques:** Continuous evaluation through class participation, quizzes, oral practice, and feedback sessions.

## Sample Questions

***Speaking / Oral Practice:***

- Can you introduce yourself and talk about your family?
- What do you usually do on weekends?
- How do you ask for directions to the nearest bus station?
- Could you order a meal at a restaurant?
- How would you make plans with a friend for next Saturday?

***Listening Comprehension:***

- Listen to a short dialogue between two people in a shop. What are they buying?
- Listen to a weather forecast. What will the weather be like tomorrow?
- Listen to a conversation at a train station. Where is the person traveling?

***Reading Comprehension:***

- Read a short text about a person's daily routine. What time does he wake up?
- Read a menu from a restaurant. What is the price of the chicken salad?
- Read a travel advertisement. Where is the trip going and how many days does it last?

***Writing:***

- Write a short paragraph about your favorite hobby.
- Write an email to a friend inviting them to your birthday party.
- Write 5–6 sentences describing your city or town.

## Materials Used in the Course

**Textbooks**

- *English for Everyday Life* – Basic A2/B1 Level
- *Oxford English Grammar and Vocabulary for Students*

**Reference Books**

- *English Vocabulary in Use: Elementary & Pre-Intermediate*
- *Collins Easy Learning English Grammar & Practice*
- *Oxford Practice Grammar*

**Online Resources & Platforms**

- Interactive English learning websites (e.g., BBC Learning English, Cambridge English)
- Online quizzes and exercises related to vocabulary, grammar, and listening comprehension
- Video and audio materials for listening practice

**Supplementary Materials**

- Handouts for weekly topics, dialogues, and exercises
- Flashcards for vocabulary practice
- Role-play and simulation activity sheets for oral communication practice

**Tools & Equipment**

- Multimedia classroom with projector and audio system
- Computers or tablets for interactive exercises and online practice
- Whiteboard for in-class explanations and group activities

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** | **CLO7** | **CLO8** | **CLO9** | **CLO10** |
| **PO1** | 3 | 3 | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 |
| **PO2** | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 2 | 3 | 2 |
| **PO3** | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 |
| **PO4** | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 |
| **PO5** | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| **PO6** | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO8** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **PO10** | 1 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 3 |
| **PO11** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1** | Lecture, Question–Answer | Midterm Exam, Final Exam |
| **CLO2** | Lecture, Pair/Group Work | Midterm Exam, Final Exam |
| **CLO3** | Lecture, Practice Activities | Midterm Exam, Final Exam |
| **CLO4** | Lecture, Role-Play, Simulations | Quizzes, Midterm Exam, Final Exam |
| **CLO5** | Lecture, Listening Activities | Quizzes, Midterm Exam, Final Exam |
| **CLO6** | Lecture, Interactive Tasks | Midterm Exam, Final Exam |
| **CLO7** | Lecture, Role-Play, Dialogues | Performance Tasks, Final Exam |
| **CLO8** | Lecture, Grammar Practice | Quizzes, Midterm Exam, Final Exam |
| **CLO9** | Lecture, Cultural Activities | Assignments, Midterm Exam, Final Exam |
| **CLO10** | Lecture, Communication Practice | Oral Exam, Midterm Exam, Final Exam |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **3** | **45** |
| Midterm Exam | **1** | **3** | **3** |
| Preparation for Midterm Exam | **1** | **20** | **20** |
| Final Exam | **1** | **3** | **3** |
| Preparation for Final Exam | **1** | **20** | **20** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Research for Project(s)/Essay(s) | - | - | - |
| Project Writing | - | - | - |
| Group Work | - | - | - |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory | - | - | - |
| Assignment(s)/Homework/Class Works | - | - | - |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **106** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | - | - |
| Field Work | - | - |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | - | - |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 40 |
| Final/Oral Exams | 1 | 60 |
| Total | **2** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Workshop II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MED102 | I | Spring | 2 | 3 | 1 | 2 | 0 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 20 | 30 | 30 | 20 |
| **Course Venue and Time** | | | | Wednesday 09.30-12.20 | | | |
| **Instructor information** | | | | **Chf. Eng. Volkan Varışlı**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4095<br>volkan.varisli@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | This course provides students with a comprehensive understanding of shipboard safety principles, maintenance strategies, and material handling practices in maritime operations. The course covers safe working principles on board ships including the engine room, deck, and enclosed compartments, emphasizing international regulations and risk assessment methodologies.<br><br>Students will gain knowledge on onboard repair and investigation procedures, permit-to-work systems, and root-cause analysis techniques used in maintenance and emergency situations. A significant part of the course focuses on the selection and characteristics of marine materials (steel, iron, bronze, admiralty brass) and their mechanical properties such as ductility, hardness, flexibility, and strength relations.<br><br>Practical aspects include the theory and safe operation of lathe and other bench machinery, cutting methods, welding quality control, and surface protection techniques to ensure the longevity of shipboard structures and components. Additionally, the course addresses maintenance planning, cost optimization, stock management, and procurement processes, integrating both manual and electronic documentation systems in modern ship operations.<br><br>Through case studies, practical applications, and hands-on exercises, students develop a holistic understanding of maintenance economy, safe workspace practices, and sustainable shipboard material management aligned with industry standards. |
| **Course Aims and Objectives** | **Course Aims**<br>The course aims to provide students with a **comprehensive understanding of shipboard safety, maintenance procedures, and material management** in maritime operations. It focuses on developing students' ability to **apply safety regulations, risk assessment methods, and permit-to-work systems** while maintaining operational efficiency. The course also emphasizes the **selection, handling, and protection of marine materials** to ensure structural integrity and prolonged service life of ship components.<br>**Course Objectives**<br>By the end of the course, students will be able to:<br>• Understand and apply **safe working principles** in engine rooms, decks, and enclosed ship compartments.<br>• Perform **risk assessments** and implement **permit-to-work systems** in compliance with international maritime regulations.<br>• Analyze **mechanical properties of marine materials** and select appropriate materials for maintenance and repairs.<br>• Demonstrate **competence in the use of bench machinery** (lathe, milling machines) and understand **welding techniques** for shipboard applications.<br>• Plan, execute, and monitor **maintenance procedures**, including stock management, consumables handling, and cost-effective solutions.<br>• Conduct **case studies and practical exercises** to reinforce safe, efficient, and sustainable shipboard operations. |

| | |
|---|---|
| **Course Learning Outcomes** | **CLO1:** Apply principles of safety and workspace management in engine rooms, decks, and ship compartments to ensure safe and efficient working environments.<br>**CLO2:** Perform risk assessments, implement permit-to-work systems, and manage maintenance tasks in compliance with international maritime safety standards.<br>**CLO3:** Identify and evaluate marine materials—such as steel, iron, bronze, and admiralty brass—by understanding their mechanical properties including hardness, ductility, and durability.<br>**CLO4:** Operate bench machinery (including lathes and milling machines) safely and effectively for shipboard maintenance applications.<br>**CLO5:** Demonstrate welding skills and apply surface protection techniques to maintain the longevity and structural integrity of ship components.<br>**CLO6:** Plan and manage maintenance operations onboard, including material handling, stock management, and cost-effective resource utilization. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | Principle of safety working and workspace safety / engine room, deck and compartments |
| **2** | Repair onboard, access, investigation and permit to work system |
| **3** | Risk Matrixes, international permit mechanism, critical thinking of maintenance, root-cause analysis |
| **4** | Materials, material choice, structure of mechanical parts, measurement limitation, tolerances and fitting clearances |
| **5** | Marine machine components' materials, technical characteristics of marine materials, steel, iron, bronze and admiralty brass, flexibility, ductility, hardness and durability. Different engine materials and force-strength relation |
| **6** | Lathe theory and other bench rotatable machinery (milling), Lathe safety, structure of Lathe, running limitations and workpiece alignment |
| **7** | Lathe tools, cutting, manual and automatic operating |
| **8** | Mid-Term Exam<br>Application (Case Study - Risk management and permitting) |
| **9** | Understanding of final product and controls (welding and surface quality) |
| **10** | Surface protection, long-lasting solutions & lifetime of steel/other shipboard materials |
| **11** | Maintenance planning, consumables and cost |
| **12** | Requirements for handling, stock, a new order and understanding of technical purchase |
| **13** | Economy of handling, protection, stock management, handing-over |
| **14** | Maintenance and stock management, written and electronic management systems |
| **15** | Final exam<br>Application (Case-study Workspace economy and shipboard long-lasting) |

## Methods and Techniques Used in the Course

**Lectures:**

- Presentation of theoretical principles of marine safety, workspace regulations, and maintenance concepts.
- Explanation of marine materials, mechanical components, and technical characteristics.

**Laboratory and Practical Applications:**

- Hands-on exercises in engine rooms, ship compartments, and workshops.
- Use of measurement tools such as vernier calipers, micrometers, dial gauges.
- Bench work including fitting, grinding, surface finishing, and alignment checks.

**Case Studies:**

- Analysis of risk assessment and permit-to-work systems.
- Evaluation of maintenance strategies and decision-making in real shipboard scenarios.

**Technical Demonstrations:**

- Operation of lathes, milling machines, and other rotatable bench machinery.
- Welding techniques, Oxy-acetylene cutting, and surface protection demonstrations.

**Assignments and Reports:**

- Written exercises and reflection reports on practical sessions and case studies.
- Application of theoretical knowledge to problem-solving tasks.

**Group Work and Collaborative Learning:**

- Team-based projects for planning maintenance, stock management, and long-term shipboard safety solutions.

**Quizzes and Exams:**

- Mid-term and final assessments to evaluate both theoretical understanding and practical skills.

## Sample Questions

### Theoretical Questions

- Explain the principles of workspace safety onboard ships, particularly in engine rooms and compartments.
- Define the permit-to-work system and describe its importance in marine maintenance operations.
- Discuss the properties of marine materials such as steel, bronze, and admiralty brass and their impact on shipboard machinery performance.
- Describe the basic principles of lathe operation, including safety precautions and alignment of workpieces.
- Explain the difference between temporary and permanent repairs onboard and provide examples of each.
- Outline the key elements of a risk assessment matrix and its application to shipboard maintenance.

### Practical / Application Questions

- Given a damaged pipe fitting, describe the steps to inspect, repair, and verify alignment and surface finishing.
- Demonstrate the safe use of vernier calipers, micrometers, and dial gauges in measuring shipboard components.
- Analyze a case study of maintenance planning for engine components and identify cost-effective solutions for materials and stock management.
- Propose a workflow for welding repairs, including preparation, equipment selection, and quality verification.
- Assess a scenario involving fuel or oil handling and explain measures to ensure environmental and personnel safety.

### Case Study / Critical Thinking Questions

- Evaluate a shipboard incident caused by improper maintenance and describe how following the permit-to-work system could have prevented it.
- Using a hypothetical ship survey, identify non-conformities in machinery and propose corrective actions according to safety and quality standards.
- Design a maintenance schedule for a marine auxiliary system, incorporating risk assessment, stock management, and inspection intervals.

## Materials Used in the Course

**Textbooks / Reference Books**

- **"Marine Engineering"** – D.A. Taylor, latest edition
- **"Shipboard Maintenance and Repair Handbook"** – Practical guidance for marine engineers
- **"Safety Management and ISM Code for Seafarers"** – IMO guidelines and practical applications
- **"Marine Materials and Corrosion"** – Properties, applications, and protection methods
- **"Workshop Technology"** – Lathe operations, fitting, cutting, and welding techniques

**Laboratory / Practical Materials**

- Vernier calipers, micrometers, dial gauges
- Hand tools: wrenches, hammers, files, screwdrivers
- Bench tools: lathe, milling machine, drill press
- Welding equipment: Oxy-acetylene, MIG/TIG welding machines
- Fittings, bolts, nuts, rivets, and other mock-up components for hands-on exercises

**Shipboard / Simulation Tools**

- Engine room mock-ups or training simulator setups
- Pipework models for fitting, cutting, and assembly exercises
- Safety signage and PPE for simulations of onboard maintenance procedures

**Digital / Online Resources**

- IMO circulars, ISM Code documentation, and safety management guidelines
- Maintenance and stock management software or spreadsheets for exercises
- Online tutorials or simulation videos for lathe operations, welding, and machinery inspections

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | |
|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** |
| **PO1** | 1 | 2 | 2 | 2 | 3 | 2 |
| **PO2** | 2 | 3 | 3 | 3 | 3 | 3 |
| **PO3** | 1 | 2 | 2 | 2 | 2 | 2 |
| **PO4** | 1 | 2 | 2 | 2 | 2 | 2 |
| **PO5** | 3 | 1 | 1 | 1 | 1 | 2 |
| **PO6** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO8** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO10** | 0 | 2 | 2 | 2 | 2 | 3 |
| **PO11** | 2 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 3 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1** | Lecture, Question-Answer, Discussion, Productional application, | Application, Quiz, Midterm Exam, Final Exam |
| **CLO2** | Lecture, Problem-Solving Sessions, Group Discussion, Production | Assignments, In-Class Application, Term Project, Midterm Exam |
| **CLO3** | Lecture, Problem-Solving, Hands-on Practice, Brainstorming, Production | Project, Assignments, Quizzes, Midterm Exam, Final Exam |
| **CLO4** | Lecture, Demonstration, Hands-on Practice | Productional applicationi Assignments, Midterm Exam, Final Exam |
| **CLO5** | Lecture, Practice Sessions, In-Class Activities | Application, Assignments, Quizzes, Midterm Exam, Final Exam |
| **CLO6** | Lecture, Question-Answer, Discussion, Brain Storming | Midterm Exam, Final Exam |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **3** | **30** |
| Midterm Exam | **1** | **2** | **2** |
| Preparation for Midterm Exam | **1** | **6** | **6** |
| Final Exam | **1** | **2** | **2** |
| Preparation for Final Exam | **1** | **6** | **6** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | - | - | - |
| Group Work | **1** | **4** | **4** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | **6** | **5** | **30** |
| Assignment(s)/Homework/Class Works | **2** | **4** | **8** |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **103** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | 6 | 20 |
| Field Work | 1 | 10 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 2 | 10 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **11** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Maritime English I | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MED104 | I | Spring | 2 | 3 | 2 | 0 | 0 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | - | - | - | 100 |
| **Course Venue and Time** | | | | Wednesday 09.30-12.20 | | | |
| **Instructor information** | | | | **Prof. Dr. Deniz Ünsalan**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4095<br>deniz.unsalan@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | **Maritime English I** is designed to introduce students to the specialized English language and terminology used in the maritime industry, focusing on both technical and operational aspects of merchant shipping. The course provides foundational knowledge of ships, their types, tonnage, and structural characteristics, as well as an understanding of the roles and functions of shipping companies and corporations.<br><br>Students will explore the principles and operations of internal combustion engines, diesel engines, and auxiliary machinery, including starting air, lubrication, cooling, shafting, and propeller systems. The course also covers essential shipboard systems such as pumps, compressors, boilers, turbines, freshwater generators, oily water separators, heating, refrigeration, and air conditioning systems. Operational procedures related to maneuvering, berthing, fuel and lubrication management, and safety systems—including fire, ballast, bilge, and tank systems—will be introduced.<br><br>The curriculum incorporates maritime communication skills using Standard Marine Communication Phrases (SMCP), focusing on onboard instructions, emergency situations, accident reporting, pollution prevention procedures, firefighting, man overboard, and abandon ship protocols. Students will develop the ability to read and interpret technical manuals for main and auxiliary engines, turbochargers, rudders, generators, and electrical systems, while practicing clear and effective communication in English in various operational and emergency scenarios.<br><br>This course emphasizes both comprehension and practical usage of maritime English, preparing students for effective communication on board and ensuring safety, operational efficiency, and regulatory compliance in a professional maritime environment. |
| **Course Aims and Objectives** | The aim of **Maritime English I** is to equip students with the foundational English language skills required for effective communication in maritime environments. The course focuses on the technical, operational, and safety aspects of merchant shipping, enabling students to understand and use specialized maritime terminology accurately. It also aims to develop students' ability to interpret technical manuals, follow operational procedures, and respond appropriately in emergency situations on board ships.<br>• Recognize and use basic English vocabulary related to ships, shipping companies, and maritime operations.<br>• Describe ship types, tonnage, structures, and onboard machinery in English.<br>• Understand and communicate technical information regarding main engines, auxiliary engines, propulsion, and other shipboard systems.<br>• Demonstrate comprehension of maritime manuals and technical documents.<br>• Apply Standard Marine Communication Phrases (SMCP) in routine operations, safety procedures, and emergency scenarios.<br>• Communicate effectively during onboard operations, including fueling, maneuvering, maintenance, and safety drills.<br>• Report accidents, fires, pollution incidents, and other emergencies accurately in English.<br>• Develop confidence in both written and oral maritime communication to ensure operational efficiency and safety compliance. |

| | |
|---|---|
| **Course Learning Outcomes** | **CLO1:** Identify, define, and correctly use maritime English vocabulary and terminology related to ships, ship types, tonnage, and merchant shipping operations.<br>**CLO2:** Explain in English the structure, functions, and operation of main engines, auxiliary engines, propulsion systems, and other onboard machinery.<br>**CLO3:** Read, understand, and accurately interpret technical manuals, operational instructions, and maintenance-related documentation.<br>**CLO4:** Apply IMO Standard Marine Communication Phrases (SMCP) effectively during routine shipboard operations such as maneuvering, docking, berthing, and cargo handling.<br>**CLO5:** Communicate clearly and effectively during emergency situations—including fire, man-overboard, pollution prevention, and abandonment scenarios—using appropriate maritime English terminology.<br>**CLO6:** Prepare clear, concise, and accurate written reports in English regarding onboard incidents, maintenance issues, and operational irregularities. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | Basic English, ships and types of merchant ships, size of the ships and tonnage |
| **2** | Technical and merchant management, knowledge about shipping companies, the functions of the corporation related to the concern, types of ships, types of constructions and description of the equipment's |
| **3** | Internal combustion engines and principle of running, stationary and running parts of diesel engines, fuels and combustions, lubrication oil system |
| **4** | Starting air systems for diesel engines, cooling systems, shafting and propeller systems, pumps and compressors, boilers and turbines |
| **5** | Fresh water generators and oily water separator, heating, refrigeration and air conditioning system, Operation for maneuvering (Preparation, berthing and departure), fuel and lubricating systems |
| **6** | Air compressor, air receives systems, and the reciprocating unit is more capable of developing the pressures required for the starting air systems, Exhaust systems, Ballast and Bilge systems, Fire system and Fire plan, Tanks and Tanks plan |
| **7** | Mid-Term Examination |
| **8** | Instruction Main engine and Aux. Engines and equipment's books read and understanding, Types of Turbochargers principle of running and parts |
| **9** | Types of rudders and rudder systems, Generators, alternators (alternating current generators) generated power is transmitted to load and distribution (Generators, Distribution, Motors, Batteries) |
| **10** | Internal communication on board standard sentences (SMCP-Episode B), Safety on board |
| **11** | Accident report and communication, Pollution prevention procedure in the fuel and ballast operation |
| **12** | General Emergency situation |
| **13** | Firefighting fire prevention and reporting, Man overboard reports |
| **14** | Abandon the ship and role trainings |
| **15** | Final Exams |

## Methods and Techniques Used in the Course

### Lectures & Interactive Discussions

Instructor-led presentations to introduce shipboard systems, machinery, and maritime terminology.

Interactive Q&A sessions to clarify technical concepts and terminology in English.

### Multimedia and Visual Aids

Use of diagrams, schematics, and videos of ship operations, machinery, and emergency procedures.

3D models and virtual tours of ship compartments to enhance spatial understanding.

### Practical Language Exercises

Role-playing exercises simulating onboard communication (bridge, engine room, safety drills).

Scenario-based dialogues using Standard Marine Communication Phrases (SMCP).

### Technical Documentation Analysis

Reading and interpreting manuals for engines, auxiliary machinery, and ship systems.

Understanding charts, operation logs, and maintenance reports in English.

### Problem-Based Learning (PBL)

Case studies of accidents, pollution incidents, and emergency situations.

Group discussions to identify correct reporting and communication procedures.

### Written Assignments and Reporting

Preparing shipboard reports: accident reports, maintenance logs, and operational records.

Summarizing technical information in clear, structured English.

### Simulation and Onboard Procedure Practice

Mock exercises for fire drills, man-overboard, abandonment, and emergency communication.

Supervised practice in using communication systems and safety protocols.

### Assessments and Feedback

Continuous feedback on language use, clarity, and technical accuracy.

Oral presentations to assess comprehension and effective maritime communication skills.

## Sample Questions

**Multiple Choice / True-False**

- Which of the following is **not** a main component of a diesel engine's fuel system?
  a) Fuel injection pump
  b) Fuel filters
  c) Lubricating oil cooler
  d) Fuel injectors
- True or False: The Standard Marine Communication Phrases (SMCP) are used only for emergency situations on board.
- Which of the following terms describes the system used to prevent oil contamination of seawater?
  a) Ballast system
  b) Oily Water Separator
  c) Freshwater generator
  d) Turbocharger
- The main purpose of a shipboard **fire plan** is to:
  a) Describe cargo handling procedures
  b) Outline locations of fire equipment and emergency routes
  c) Manage ballast operations
  d) List crew shift schedules

**Short Answer / Terminology**

- Define the purpose of the **starting air system** in a marine diesel engine.
- List three key responsibilities of the **engine room personnel** during normal operation.
- What is meant by **"abandon ship"** in maritime emergency procedures?
- Name two types of **rudder systems** used in modern merchant vessels.

**Scenario-Based / Case Study**

- You are the officer on watch when a **man overboard** incident occurs. Using SMCP, write a brief communication to the bridge and other nearby vessels.
- During routine inspection, you notice a minor fuel leak in an auxiliary engine. Write a **short report** describing the situation, actions taken, and recommendations.
- A container ship experiences an engine room fire. Describe the **sequence of emergency communications** that should be made on board.

**Practical / Applied**

- Identify and explain the steps for **reporting pollution incidents** while transferring fuel or ballast water.
- Simulate a **radio communication** between a ship and the shore for requesting towing assistance in English.
- Translate a technical description of a **marine refrigeration system** from Turkish into English.
- Using a ship's **engine log**, summarize the operational status of the main engine over a 24-hour period.

## Materials Used in the Course

### Textbooks and Reference Books

- **"Ship Knowledge 4: Marine Engineering"** – D. House, 2019
  *Covers main and auxiliary engines, propulsion systems, and shipboard machinery terminology in English.*
- **"Marine Auxiliary Machinery"** – H.D. McGeorge, 2018
  *Provides detailed explanations of pumps, compressors, boilers, and engine room equipment.*
- **"Standard Marine Communication Phrases (SMCP)"** – IMO, 2017
  *Official guideline for onboard English communication in routine and emergency operations.*
- **"Marine Engineering Workbook"** – S. Jones, 2020
  *Practical exercises on engine operation, troubleshooting, and report writing.*
- **"Maritime English for Engineers"** – J. Taylor, 2019
  *Focus on English vocabulary and phrases specific to marine engineering and technical reports.*

### Supplementary Materials

- **Technical manuals and operation books** of ship engines and auxiliary systems
- **IMO Conventions and Guidelines**, e.g., SOLAS, MARPOL, ISM Code
- **Engine logbooks, maintenance logs, and operational reports** for practical exercises
- **Audio-visual materials**: Recorded SMCP dialogues, emergency simulations, and instructional videos
- **Interactive software and online platforms** for marine communication exercises and vocabulary building

### Practical Materials

- Sample **engine room reports** and **accident reports** for writing exercises
- **Charts and diagrams** of propulsion systems, auxiliary machinery, and ship layouts
- Access to **simulators or virtual engine room tools** for emergency drills and operational scenarios

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | |
|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** |
| **PO1** | 1 | 2 | 2 | 2 | 3 | 2 |
| **PO2** | 2 | 3 | 3 | 3 | 3 | 3 |
| **PO3** | 1 | 2 | 2 | 2 | 2 | 2 |
| **PO4** | 1 | 2 | 2 | 2 | 2 | 2 |
| **PO5** | 3 | 1 | 1 | 1 | 1 | 2 |
| **PO6** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO8** | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO10** | 0 | 2 | 2 | 2 | 2 | 3 |
| **PO11** | 2 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 3 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1** | Lecture, Question-Answer, Discussion, Productional application, | Application, Quiz, Midterm Exam, Final Exam |
| **CLO2** | Lecture, Problem-Solving Sessions, Group Discussion, Production | Assignments, In-Class Application, Term Project, Midterm Exam |
| **CLO3** | Lecture, Problem-Solving, Hands-on Practice, Brainstorming, Production | Project, Assignments, Quizzes, Midterm Exam, Final Exam |
| **CLO4** | Lecture, Demonstration, Hands-on Practice | Productional applicationi Assignments, Midterm Exam, Final Exam |
| **CLO5** | Lecture, Practice Sessions, In-Class Activities | Application, Assignments, Quizzes, Midterm Exam, Final Exam |
| **CLO6** | Lecture, Question-Answer, Discussion, Brain Storming | Midterm Exam, Final Exam |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **3** | **45** |
| Midterm Exam | **1** | **3** | **3** |
| Preparation for Midterm Exam | **1** | **6** | **6** |
| Final Exam | **1** | **3** | **3** |
| Preparation for Final Exam | **1** | **6** | **6** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | **1** | **3** | **3** |
| Group Work | **3** | **3** | **9** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | - | - | - |
| Assignment(s)/Homework/Class Works | **2** | **3** | **6** |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **96** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | - | - |
| Field Work | 3 | 15 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 2 | 10 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | 1 | 15 |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **8** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Marine Diesel Engines I | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MED106 | I | Spring | 3 | 4 | 2 | 2 | 0 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 20 | 30 | 30 | 20 |
| **Course Venue and Time** | | | | Wednesday 09.30-12.20 | | | |
| **Instructor information** | | | | **Chf. Eng. Volkan Varışlı**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4095<br>volkan.varisli@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | Marine Diesel Engines I provide students with a comprehensive introduction to the principles, components, and operational procedures of marine diesel engines. The course integrates theoretical knowledge with practical applications to develop competencies in engine operation, maintenance, and safety onboard ships.<br><br>The course begins with an overview of shipboard maintenance practices, ship safety, and fundamental approaches in marine engineering. Students study internal combustion theory, diesel engine cycles, and the thermodynamic analysis of engine operation, including P-V and T-S diagrams. Concepts of charge air, scavenging, supercharging, and turbochargers are covered, along with compliance with IMO Tier limitations and Annex VI regulations.<br><br>Engine types—including low, medium, and high-speed diesel engines, trunk piston engines, and crosshead engines—are examined, highlighting their stationary and moving components. Students learn about cylinder valve mechanisms, crankshaft and bearing systems, lubrication, timing mechanisms, camshafts, and fuel injection systems. Engine auxiliary systems such as high and low-temperature cooling, seawater systems, compressed air starting mechanisms, and air distributors are also explored.<br><br>The course emphasizes engine load and speed control, fuel balancing, automatic operational safety devices, measurement systems, and remote control. Practical sessions and case studies allow students to apply theoretical knowledge, analyze engine performance, and understand environmental considerations, including the use of various fuel types.<br><br>By the end of the course, students will have gained both theoretical understanding and practical skills necessary for the operation, maintenance, and safe management of marine diesel engines in real-world maritime environments. |
| **Course Aims and Objectives** | **Course Aims**<br>The course aims to provide students with a solid foundation in marine diesel engine theory, operation, and maintenance. It integrates theoretical knowledge with practical skills to ensure students understand engine design, function, performance, and safety measures onboard ships.<br>**Course Objectives**<br>By the end of the course, students will be able to:<br>• Understand the fundamental principles of internal combustion and diesel engine cycles.<br>• Identify and describe the main components of marine diesel engines, including trunk piston and crosshead engines.<br>• Explain the operation of engine auxiliary systems, fuel injection systems, and lubrication systems.<br>• Apply theoretical knowledge to practical engine operations, including start-up, load control, and monitoring.<br>• Evaluate engine performance and implement maintenance procedures according to best practices and safety regulations.<br>• Understand environmental considerations, including emission controls and fuel efficiency in line with IMO regulations. |

| | |
|---|---|
| | • Develop problem-solving skills through case studies and practical engine applications. |
| **Course Learning Outcomes** | **LO1.** Explain internal combustion principles, diesel engine cycles, and the operational characteristics of trunk piston and crosshead diesel engines.<br>**LO2.** Identify and describe the major components and auxiliary systems of marine diesel engines, including lubrication, fuel injection, scavenging, and air management systems.<br>**LO3.** Analyze engine performance using P–V and T–S diagrams, evaluate the effects of different fuels and combustion methods, and interpret performance parameters for operational decision-making.<br>**LO4.** Apply safe and effective operational practices for starting, controlling load, monitoring engine conditions, and ensuring reliable engine performance.<br>**LO5.** Perform maintenance and troubleshooting procedures for marine diesel engines, including preventive measures, identification of common faults, and application of IMO environmental and emissions regulations.<br>**LO6.** Demonstrate the ability to solve practical engineering problems through hands-on exercises and case studies, while communicating technical information accurately using proper marine engineering terminology. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | Shipboard Maintenance and ship safety, approach of marine engineering methods |
| **2** | Internal combustion theory, fuels, cycles and diesel cycles, Pre-combustion & combustion chambers of diesel engines, P-V, T-S diagrams |
| **3** | Charge air concept and scavenging types, supercharging, turbocharger and their application to diesel engines including exhaust (IMO Tier limitations and ANNEX VI) |
| **4** | Engine types and Low, medium, high speed diesel engines and other engines |
| **5** | Types of Trunk piston engines, stationery and running parts of trunk motors |
| **6** | Types of Crosshead motors. Stationary and running parts of crosshead diesel engines |
| **7** | Mid-Term examination<br>Applications (Study of basic engine theory) |
| **8** | Cylinder valve mechanism, their components and operational principles |
| **9** | Engine Crankshaft and bearings, lubrication system and components |
| **10** | Timing mechanism, chains, gear mechanism and camshaft |
| **11** | Fuel system, Fuel injection pumps and valves & boosting system |
| **12** | Engine's auxiliary system, HT-LT, SW systems, compressed air starting mechanism and air distributor |
| **13** | Engine load/speed control, fuel balancing and fuel governors, standard and automatic operational safety devices, measurement system and remote control |
| **14** | Operating diesel engines in different applications onboard and environmental applications and different fuel types |
| **15** | Final Exam<br>Applications (Study of extensive engine theory) |

## Methods and Techniques Used in the Course

**Lectures** – Conceptual and theoretical explanations of internal combustion engines, marine diesel engine operation, and auxiliary systems.

**Laboratory / Practical Sessions** – Hands-on exercises on engine components, operational procedures, fuel systems, and measurement tools.

**Case Studies** – Application-based discussions analyzing real-world scenarios onboard ships, engine failures, and maintenance planning.

**Assignments / Homework** – Problem-solving exercises and technical calculations related to engine performance, thermodynamic cycles, and fuel efficiency.

**Group Work** – Collaborative projects focusing on engine system analysis, operational safety, and environmental compliance (IMO Tier standards).

**Interactive Discussions / Q&A** – Encouraging students to critically evaluate engine operations, fuel management, and safety protocols.

**Simulation and Engine Modeling** – Where available, the use of software simulators to model engine behavior, fuel consumption, and performance optimization.

## Sample Questions

**Multiple Choice Questions (MCQs)**

- Which of the following is a primary function of the scavenging system in a marine diesel engine?
  a) Reduce friction losses
  b) Remove exhaust gases and supply fresh air
  c) Control fuel injection timing
  d) Lubricate cylinder liners
- The pre-combustion chamber in a diesel engine is used to:
  a) Increase thermal efficiency
  b) Facilitate fuel-air mixing and ignition
  c) Reduce crankshaft load
  d) Cool the cylinder head
- IMO Tier III emission regulations mainly limit:
  a) $CO_2$ emissions
  b) $SO_x$ emissions
  c) $NO_x$ emissions
  d) Particulate matter

**Short Answer Questions**

- Explain the difference between trunk piston and crosshead diesel engines.
- Describe the main components of a marine diesel engine fuel injection system and their functions.
- How does turbocharging improve the performance of a marine diesel engine?

**Problem-Solving / Calculation Questions**

- Given a diesel engine operating at a specific load, calculate the indicated mean effective pressure (IMEP) using P-V diagram data.
- A medium-speed diesel engine consumes 200 g/kWh of fuel. Determine its fuel consumption for 12 hours at 1500 kW.
- Analyze the effect of charge air temperature on engine efficiency and power output.

**Case Study / Essay Questions**

- Discuss the maintenance planning strategy for a marine main engine to ensure reliability and compliance with environmental regulations.
- Evaluate the potential risks and safety measures when operating diesel engines with alternative fuels onboard a commercial vessel.

## Materials Used in the Course

**Textbooks:**

- *Marine Diesel Engines* – H. D. McGeorge & C. H. W. Nicholls, 4th Edition, Butterworth-Heinemann, 2016.
- *Marine Engineering* – R. N. Harrison, 3rd Edition, Butterworth-Heinemann, 2018.
- *Shipboard Engineering Practice* – J. T. O'Brien, 2nd Edition, Witherby Seamanship International, 2015.

**Reference Books / Handbooks:**

- *Diesel Engine Handbook* – Bosch, 2nd Edition, SAE International, 2013.
- *Principles of Naval Engineering* – US Navy, NAVSEA, 2018.
- *International Maritime Organization (IMO) Conventions and Annexes* – IMO Publications.

**Journals and Articles:**

- *Journal of Marine Engineering & Technology (IMarEST)*
- *Marine Structures and Ship Systems*

**Software / Simulation Tools:**

- Engine performance simulation software (e.g., Wärtsilä Engine Simulator, MAN Diesel & Turbo Simulators)
- Thermodynamic calculation tools (MATLAB/Simulink, EngineCalc)

**Laboratory Equipment / Hands-on Tools:**

- Diesel engine laboratory setup (trunk piston & crosshead models)
- Fuel injection system demonstration kits
- Pressure, temperature, and torque measurement instruments
- Maintenance tools for engine components (pumps, valves, bearings, crankshafts)
- Safety equipment for engine room practice

**Online Resources:**

- IMO Tier III and MARPOL Annex VI guidelines
- Manufacturer manuals and operational handbooks for marine engines

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **4** | **60** |
| Midterm Exam | **1** | **2** | **2** |
| Preparation for Midterm Exam | **1** | **4** | **4** |
| Final Exam | **1** | **2** | **2** |
| Preparation for Final Exam | **1** | **6** | **6** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | - | - | - |
| Group Work | **1** | **4** | **4** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | **2** | **4** | **8** |
| Assignment(s)/Homework/Class Works | **3** | **4** | **12** |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **113** |
| **ECTS Credit** | | | **3** |

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | |
|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** |
| **PO1** | 3 | 3 | 3 | 3 | 2 | 2 |
| **PO2** | 2 | 2 | 2 | 3 | 3 | 3 |
| **PO3** | 1 | 2 | 2 | 2 | 3 | 3 |
| **PO4** | 1 | 2 | 2 | 3 | 2 | 2 |
| **PO5** | 1 | 1 | 2 | 3 | 2 | 3 |
| **PO6** | 2 | 2 | 2 | 2 | 3 | 3 |
| **PO7** | 1 | 1 | 1 | 2 | 3 | 2 |
| **PO8** | 1 | 1 | 1 | 1 | 2 | 2 |
| **PO9** | 1 | 1 | 1 | 1 | 2 | 2 |
| **PO10** | 1 | 1 | 1 | 2 | 2 | 2 |
| **PO11** | 1 | 1 | 1 | 2 | 2 | 2 |
| **PO12** | 2 | 2 | 2 | 2 | 2 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1** | Lecture, Multimedia Presentation, Demonstration | Written Exam, Quiz, Oral Questioning |
| **CLO2** | Lecture, Lab Demonstration, Hands-on Practice | Practical Test, Lab Report, Assignment |
| **CLO3** | Lecture, Simulation, Case Study | Written Exam, Case Study Analysis |
| **CLO4** | Laboratory, Practical Sessions, Group Exercises | Practical Assessment, Project Work, Observation |
| **CLO5** | Workshop, Hands-on Training, Safety Drills | Performance Evaluation, Practical Exam, Logbook Review |
| **CLO6** | Case Studies, Project Work, Supervised Practice | Project Report, Oral Presentation, Practical Demonstration |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | 2 | 15 |
| Field Work | 1 | 10 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 3 | 15 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **8** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Marine Auxiliary Machinery I | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MED108 | I | Spring | 3 | 3 | 2 | 2 | 0 |
| **Course type:** Compulsory Elective | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 20 | 30 | 30 | 20 |
| **Course Venue and Time** | | | | Wednesday 09.30-12.20 | | | |
| **Instructor information** | | | | **Chf. Eng. Volkan Varışlı**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4095<br>volkan.varisli@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | This course introduces students to the fundamental principles, components, and operational aspects of marine auxiliary machinery, with a particular focus on piping systems, pumps, compressors, and heat exchangers. Students will explore the design and function of liquid and gas transfer systems, including valves, fittings, and safety mechanisms. Emphasis is placed on pump theory, control methods, and maintenance practices, as well as the application of heat exchangers in shipboard systems such as coolers, heaters, boilers, evaporators, and condensers. The course also covers compressed air production, auxiliary piping systems, and specialized shipboard systems including thermal oil units, incinerators, separators, and air handling units. Case studies and practical exercises are used to strengthen understanding of real-world marine engineering applications. By the end of the course, students will have developed both theoretical knowledge and practical skills related to the operation, troubleshooting, and maintenance of marine auxiliary machinery. |
| **Course Aims and Objectives** | The aim of this course is to provide students with comprehensive knowledge and practical understanding of marine auxiliary machinery and systems essential for safe and efficient ship operation. Students will learn the principles, design, operation, and maintenance of piping systems, pumps, compressors, and heat exchangers, as well as other auxiliary equipment used on board ships.<br>• Understand the fundamental design and operational principles of marine piping systems, valves, and fittings.<br>• Explain the theory, types, and operational characteristics of pumps, compressors, and heat exchangers used in marine systems.<br>• Develop knowledge of liquid and gas transfer systems, including safe operation and system protection methods.<br>• Apply planned maintenance practices to auxiliary machinery and recognize common failure modes.<br>• Analyze and evaluate the use of auxiliary systems such as evaporators, incinerators, separators, thermal oil systems, and air handling units.<br>• Gain hands-on experience in identifying, operating, and troubleshooting auxiliary machinery through practical applications and case studies.<br>• Foster awareness of safety procedures and best practices for the effective operation of auxiliary systems on board ships. |

| | |
|---|---|
| **Course Learning Outcomes** | **LO1 – Knowledge and Understanding**<br>Identify and explain the main components, functions, and operational principles of marine piping systems, valves, pumps, heat exchangers, compressors, and auxiliary machinery. Describe the principles of liquid and gas transfer, heat exchange, and compressed air systems in shipboard applications.<br>**LO2 – Application of Knowledge**<br>Apply basic design concepts, operational practices, and safety procedures to the operation and management of auxiliary systems. Perform planned maintenance, inspections, and troubleshooting on piping systems, pumps, compressors, and heat exchangers.<br>**LO3 – Analytical and Technical Skills**<br>Analyze the operational performance and limitations of different auxiliary machinery under various marine conditions. Interpret and use technical diagrams, symbols, and system drawings for piping and auxiliary systems.<br>**LO4 – Evaluation and Critical Thinking**<br>Evaluate case studies of shipboard auxiliary systems, including water and wastewater systems, evaporators, refrigeration, air handling units, separators, and incinerators. Identify potential issues and propose informed solutions.<br>**LO5 – Teamwork and Communication**<br>Work effectively in teams during group projects and practical applications to address challenges related to auxiliary machinery. Communicate technical information clearly to peers and supervisors.<br>**LO6 – Problem-Solving and Decision-Making**<br>Develop problem-solving and decision-making skills in operating, maintaining, and managing marine auxiliary systems, ensuring compliance with safety regulations and operational standards. Demonstrate independent judgment in addressing complex system challenges. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | Fundamentals of piping systems and components of liquid circuit lines, primary valves, valve types |
| **2** | Basic piping system design, pipe materials, valve types and symbols and discussions of different piping systems in engine room/onboard with fittings |
| **3** | Pump theory and liquid transfer, pump types and functions of different pumps in ship machinery systems and auxiliaries |
| **4** | Pump transfer control and safe transfer management in operation, limitations and system protection, |
| **5** | Basic principles of pump anatomy and pump maintenance, sealing system and Planned maintenance (PMS) requirements |
| **6** | Theory of heat exchanging, heat exchangers, cooling and heating facilitations, superheating. Use of heat exchange in different ship systems (Coolers, heaters, pre-heaters, boilers, superheaters, evaporators, condensation systems) |
| **7** | Auxiliary ship systems and use of heat exchanging with liquid circulating methods. |
| **8** | Mid-term<br>Application (Understanding of liquid transfer and limitations) |
| **9** | Fundamentals of air and gas transfer, piping systems, materials, fittings |
| **10** | Production of Compressed air, compressors and auxiliary systems, storage of air and delivery systems |
| **11** | Case study 1<br>Ship main & auxiliary piping systems (water and wastewater systems) |
| **12** | Case Study 2<br>Evaporators, gas compressors, freezing systems, air handling unit |
| **13** | Case study 3<br>Thermal oil systems, Incinerators and separators |
| **14** | Maintenance principles of piping, components and related machinery, safe operational procedures of auxiliaries |
| **15** | Final Exam<br>Application (Marine auxiliary systems and principles) |

## Methods and Techniques Used in the Course

**Lectures & Theoretical Instruction** – Delivery of fundamental knowledge on marine piping, pumps, compressors, and auxiliary systems through classroom teaching.

**Laboratory / Practical Applications** – Hands-on sessions involving inspection, operation, and maintenance of auxiliary machinery and components (minimum 4 applications).

**Case Studies** – Analysis of real shipboard auxiliary systems (e.g., water/wastewater, evaporators, refrigeration, separators, incinerators) to strengthen applied understanding.

**Group Work & Projects** – Collaborative problem-solving tasks to design, evaluate, or troubleshoot auxiliary systems.

**Assignments / Homework** – Individual tasks to reinforce theoretical knowledge and connect it to real-world ship applications.

**Problem-Solving Exercises** – Technical calculations and scenario-based questions related to fluid transfer, heat exchange, and system efficiency.

**Midterm and Final Exams** – Evaluation of students' knowledge and ability to apply concepts to theoretical and practical situations.

**Classroom Discussions & Q&A** – Active participation and exchange of ideas to deepen understanding of operational procedures and safety aspects.

## Sample Questions

**Theoretical Questions:**

- Explain the main differences between **gate valves, globe valves, and check valves**. In which ship systems are each of these commonly used?
- Define **positive displacement pump** and **centrifugal pump**. Discuss their advantages and limitations in marine auxiliary systems.
- Describe the working principle of a **plate-type heat exchanger**. How does fouling affect its efficiency?
- What are the main safety precautions during **compressed air production and storage** onboard?
- Discuss the importance of **Planned Maintenance Systems (PMS)** in relation to ship auxiliary machinery.

**Calculation / Problem-Solving Questions:**

- A centrifugal pump is required to deliver 200 $m^3$/h of seawater against a total head of 20 meters. If the pump efficiency is 70% and water density is 1025 kg/$m^3$, calculate the **required power**.
- A boiler feedwater heater uses a shell-and-tube heat exchanger. If seawater enters at 20°C and leaves at 35°C while the flow rate is 30 tons/hour, calculate the **heat absorbed** (assume Cp = 4.18 kJ/kg·K).
- A ship's compressed air receiver has a volume of 3 $m^3$ and is charged to 30 bar at 25°C. Calculate the **mass of air stored** (assume ideal gas, R = 287 J/kg·K).

**Case Study / Application Questions:**

- During operation, an auxiliary seawater pump shows reduced flow rate and unusual vibration. List the possible causes and the corrective actions that should be taken.
- The cooling water system of a main engine is showing rising outlet temperatures. How would you troubleshoot the system considering pumps, heat exchangers, and piping components?
- A ship's evaporator system is not producing sufficient fresh water. Explain how you would systematically investigate the fault.
- Compare the operational challenges of **incinerators** and **separators** on board. Suggest safe operational practices for both.

## Materials Used in the Course

**Primary References / Textbooks:**

- *Marine Auxiliary Machinery* – H.D. McGeorge, Elsevier/Butterworth-Heinemann.
- *Introduction to Marine Engineering* – D.A. Taylor, Butterworth-Heinemann.
- *Marine Engineering Practice (Volumes 1 & 2)* – Institute of Marine Engineers.
- *Marine Auxiliary Machinery and Systems* – Richard P. Turton.

**Supplementary Resources:**

- Manufacturer manuals and technical documentation of pumps, compressors, heat exchangers, and piping systems used on board ships.
- International Maritime Organization (IMO) conventions and codes (e.g., SOLAS, MARPOL) relevant to auxiliary machinery operation and safety.
- Planned Maintenance System (PMS) software documentation and case studies.
- Class society rules (e.g., Lloyd's Register, DNV, ABS) for marine piping and auxiliary systems.

**Practical and Laboratory Materials:**

- Demonstration units of centrifugal and reciprocating pumps.
- Cutaway models of different valve types (gate, globe, butterfly, check valves).
- Heat exchanger and evaporator training rigs.
- Air compressor and auxiliary piping system simulation kits.
- Measurement and testing equipment: pressure gauges, flow meters, thermometers, vibration analyzers.

**Digital / Multimedia Materials:**

- Educational videos and animations explaining pump operation, heat exchangers, compressors, and piping arrangements.
- Computer-based simulation software for piping systems, pump performance, and heat exchanger analysis.
- E-learning modules and case studies on troubleshooting auxiliary machinery failures.

**Classroom Materials:**

- Lecture slides and handouts prepared by the instructor.
- Technical drawings, piping diagrams, and system schematics.
- Problem sets, calculation exercises, and case study worksheets.

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | |
|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** |
| PO1 | 3 | 3 | 2 | 2 | 3 | 2 |
| PO2 | 1 | 1 | 2 | 2 | 1 | 2 |
| PO3 | 2 | 2 | 2 | 1 | 2 | 2 |
| PO4 | 1 | 1 | 1 | 1 | 2 | 3 |
| PO5 | 3 | 1 | 3 | 2 | 2 | 2 |
| PO6 | 2 | 2 | 2 | 2 | 3 | 2 |
| PO7 | 1 | 1 | 1 | 1 | 1 | 1 |
| PO8 | 1 | 1 | 1 | 1 | 0 | 1 |
| PO9 | 1 | 1 | 1 | 1 | 1 | 1 |
| PO10 | 1 | 1 | 2 | 3 | 3 | 2 |
| PO11 | 1 | 1 | 1 | 1 | 1 | 1 |
| PO12 | 1 | 1 | 1 | 1 | 1 | 1 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method (Öğretim Yöntemi)** | **Assessment Method (Değerlendirme Yöntemi)** |
| CLO1 – Knowledge & Understanding | Lectures, Demonstrations, Multimedia Presentations | Written Exams, Quizzes, Oral Tests |
| CLO2 – Application of Knowledge | Laboratory Sessions, Workshops, Hands-on Exercises | Practical Exams, Assignments, Lab Reports |
| CLO3 – Analytical & Technical Skills | Case Studies, Simulations, Technical Workshops | Problem-Solving Exercises, Reports, Presentations |
| CLO4 – Evaluation & Critical Thinking | Group Discussions, Case Analysis, Scenario-Based Learning | Case Study Reports, Critical Essays, Oral Presentations |
| CLO5 – Teamwork & Communication | Group Projects, Team-Based Practical Exercises, Peer Learning | Group Project Reports, Peer Assessment, Presentations |
| CLO6 – Problem-Solving & Decision-Making | Problem-Based Learning, Simulations, Scenario Exercises | Practical Problem-Solving Tasks, Decision-Making Reports, Project Evaluation |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **4** | **60** |
| Midterm Exam | **1** | **1** | **1** |
| Preparation for Midterm Exam | **1** | **4** | **4** |
| Final Exam | **1** | **1** | **1** |
| Preparation for Final Exam | **1** | **4** | **4** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | - | - | - |
| Group Work | **1** | **3** | **3** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | **4** | **4** | **16** |
| Assignment(s)/Homework/Class Works | **2** | **4** | **8** |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **112** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | - | - |
| Application | 4 | 20 |
| Field Work | 1 | 5 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 2 | 10 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | 1 | 5 |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **10** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Physics for Mariners II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MPH102 | I | Spring | 4 | 4 | 3 | 0 | 2 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 50 | 30 | - | 20 |
| **Course Venue and Time** | | | | Wednesday 12.30-16.20 | | | |
| **Instructor information** | | | | **Assist. Prof. Dr. Engin Ata**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4060<br>engin.ata@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | This course builds upon foundational physics concepts and emphasizes their applications in maritime and navigational contexts. Students will explore advanced topics in electricity, magnetism, and optics, integrating theoretical understanding with practical examples relevant to shipboard systems and marine technology.<br><br>The course begins with a review of electric fields, flux, and potential, introducing capacitance and dielectric materials, followed by the analysis of current, resistance, and DC circuits. Students will learn to design and evaluate simple electrical circuits and understand the behavior of components under various conditions.<br><br>The second part of the course covers magnetic fields, the sources and effects of magnetism, Faraday's law, and inductance, extending to AC circuits and the principles of electromagnetic waves. Applications of these principles in marine navigation, communication, and energy systems will be emphasized.<br><br>In the latter part of the course, students will study the principles of ray optics, image formation, wave optics, diffraction, and polarization, providing insights into optical systems used onboard ships and in maritime instrumentation. Finally, the course introduces basic concepts of relativity to develop an appreciation of modern physical principles and their implications for high-precision measurements.<br><br>Laboratory sessions, exercises, and case studies will reinforce theoretical knowledge, develop problem-solving skills, and illustrate real-world maritime applications. Assessment includes a combination of midterm exams, laboratory work, and a final exam. |
| **Course Aims and Objectives** | **Course Aims:**<br>The aim of this course is to provide students with an in-depth understanding of advanced physics concepts, particularly in electricity, magnetism, and optics, with a focus on their practical applications in maritime environments. The course seeks to strengthen analytical thinking, problem-solving, and the ability to apply physical principles to shipboard systems, navigation, and marine technology.<br>**Course Objectives:**<br>By the end of the course, students should be able to:<br>• Understand and apply concepts of electric fields, potential, capacitance, and dielectric materials in marine systems.<br>• Analyze current, resistance, and DC circuits, and understand the practical implications for shipboard electrical systems.<br>• Explain magnetic fields, Faraday's law, inductance, and AC circuits, and apply these principles to maritime instrumentation and electrical machinery. |

| | |
|---|---|
| | • Understand the properties and behavior of electromagnetic waves and their applications in communication and navigation systems.<br>• Apply principles of ray optics, wave optics, diffraction, and polarization to optical devices used in maritime operations.<br>• Recognize the relevance of relativistic concepts to high-precision measurements and advanced navigational systems.<br>• Develop problem-solving skills by integrating theory with laboratory experiments and practical maritime applications. |
| **Course Learning Outcomes** | **CLO1 – Electric Fields and Potential:** Explain and apply the principles of electric fields, electric flux, and electric potential in marine electrical systems.<br>**CLO2 – Capacitors and Dielectrics:** Analyze capacitors, dielectrics, and their applications in shipboard electrical circuits.<br>**CLO3 – DC Circuits and Ohm's Law:** Solve problems related to current, resistance, and direct current (DC) circuits in maritime electrical equipment.<br>**CLO4 – Magnetic Fields and Induction:** Interpret and apply Faraday's law, magnetic fields, and inductance to practical maritime scenarios.<br>**CLO5 – AC Circuits and Electromagnetic Waves:** Analyze alternating current (AC) circuits and electromagnetic waves relevant to shipboard communication and navigation systems.<br>**CLO6 – Optics – Ray and Wave Principles:** Apply ray optics and wave optics principles to shipboard optical instruments and measurements.<br>**CLO7 – Diffraction, Interference, and Polarization:** Understand and interpret diffraction, interference, and polarization effects in maritime applications.<br>**CLO8 – Special Relativity Concepts:** Explain basic concepts of special relativity and their relevance to precision measurements and instrumentation at sea.<br>**CLO9 – Laboratory Skills and Experimental Analysis:** Conduct laboratory experiments safely, record data accurately, and correlate experimental results with theoretical predictions.<br>**CLO10 – Integrated Problem Solving:** Integrate theoretical knowledge with practical maritime applications to solve real-world engineering and operational problems onboard ships. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | Introduction, Electric field, flux and potential |
| **2** | Capacitance and dielectrics |
| **3** | Current and resistance |
| **4** | DC circuits |
| **5** | Midterm Exam |
| **6** | Magnetic fields, sources of magnetic fields |
| **7** | Faraday's law and Inductance |
| **8** | AC circuits |
| **9** | Electromagnetic waves |
| **10** | Midterm Exam |
| **11** | Principles of ray optics and image formation |
| **12** | Wave optics |
| **13** | Diffraction patterns and Polarization |
| **14** | Relativity |
| **15** | Final Exam |

## Methods and Techniques used in the Course

**Lectures:**

- Structured classroom lectures covering fundamental physics concepts and maritime applications.
- Use of diagrams, animations, and simulations to visualize electric, magnetic, and optical phenomena.

**Laboratory Applications:**

- Hands-on experiments to measure voltage, current, magnetic fields, and wave properties.
- Verification of theoretical concepts through practical work with shipboard-relevant equipment.

**Problem-Based Learning (PBL):**

- Solving applied physics problems related to ship systems, navigation, and communication.
- Emphasis on calculations for circuits, fields, and optics.

**Case Studies:**

- Real-life maritime scenarios for AC/DC circuits, electromagnetic waves, and optical systems.
- Analysis of practical engineering challenges on ships.

**Group Work:**

- Collaborative exercises in laboratory and problem-solving sessions.
- Application of theoretical knowledge to team-based projects.

**Simulation Tools and Software:**

- Use of simulation software for electrical circuits, wave propagation, and optics.
- Visualization of electromagnetic and optical behaviors.

**Quizzes and In-Class Exercises:**

- Regular short quizzes to reinforce understanding.
- In-class problem-solving to engage students actively.

**Homework and Assignments:**

- Individual exercises reinforcing lecture and lab material.
- Numerical problems, derivations, and conceptual questions.

**Midterm and Final Examinations:**

- Combination of theoretical questions and problem-solving exercises.
- Application of concepts to realistic maritime scenarios.

## Sample Questions

**Electric Fields and Capacitance**

- Calculate the electric field at a point 2 m from a point charge of 5 μC.
- A parallel-plate capacitor has a plate area of 0.5 m² and a separation of 2 mm. Find its capacitance in vacuum.
- Explain how dielectrics improve the performance of shipboard capacitors.

**Current, Resistance, and DC Circuits**

- Determine the total resistance of a series-parallel network with resistors: 5 Ω, 10 Ω, 15 Ω.
- A shipboard DC circuit draws 10 A at 24 V. Calculate the power consumed.
- Discuss precautions for preventing short circuits in maritime electrical systems.

**Magnetic Fields and Induction**

- Calculate the magnetic force on a 2 m long wire carrying 5 A current in a 0.3 T magnetic field.
- A coil with 50 turns experiences a change in flux of 0.02 Wb in 0.1 s. Find the induced EMF.
- Explain the significance of Faraday's Law for shipboard generators.

**AC Circuits and Electromagnetic Waves**

- For an AC circuit with R = 10 Ω, L = 0.05 H, and C = 100 μF at 50 Hz, calculate the impedance.
- Discuss the importance of electromagnetic wave propagation for ship communication.
- Sketch the waveform of a sinusoidal AC voltage and indicate peak, RMS, and frequency.

**Ray and Wave Optics**

- Determine the image location for a concave mirror with focal length 20 cm when an object is 30 cm away.
- Explain constructive and destructive interference using the double-slit experiment.
- Describe how polarization can improve navigational instruments on ships.

**Diffraction, Polarization, and Relativity**

- A diffraction grating has 5000 lines/cm. Calculate the angle for the first-order maximum of light with λ = 600 nm.
- Explain the effect of relativistic time dilation on satellite-based navigation systems.
- Describe a scenario on a ship where diffraction or polarization phenomena may be observed.

## Materials Used in the Course

### Textbooks & Reference Books

- Serway, R.A. & Jewett, J.W., *Physics for Scientists and Engineers*, 10th Edition, Cengage.
- Halliday, D., Resnick, R., & Walker, J., *Fundamentals of Physics*, 11th Edition, Wiley.
- Tipler, P.A., & Mosca, G., *Physics for Scientists and Engineers*, 6th Edition, W.H. Freeman.
- Kinsler, L.E., Frey, A.R., Coppens, A.B., & Sanders, J.V., *Fundamentals of Acoustics*, 4th Edition.

### Lecture Notes & Online Resources

- Instructor-prepared lecture slides and notes
- MIT OpenCourseWare: Electricity & Magnetism, Waves, Optics
- Interactive simulations (PhET Physics Simulations) for electric circuits, magnetic fields, wave interference, and diffraction

### Laboratory Materials & Equipment

- Power supply units (DC and AC)
- Multimeters and ammeters
- Resistors, capacitors, inductors
- Helmholtz coils and magnetic field sensors
- Optical bench, lenses, mirrors, and diffraction gratings
- Oscilloscope and function generators
- Laser and light sources for wave optics experiments
- Polarizers and prisms for polarization studies

### Software & Tools

- MATLAB or Python for numerical simulations of circuits and wave phenomena
- Circuit simulators (e.g., LTSpice, TINA-TI)
- Spreadsheet software for data collection, plotting, and analysis

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** | **CLO7** | **CLO8** | **CLO9** | **CLO10** |
| **PO1** | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| **PO2** | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 |
| **PO3** | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 |
| **PO4** | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 |
| **PO5** | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| **PO6** | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO8** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **PO10** | 1 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 3 |
| **PO11** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1 – Electric Fields and Potential** | Lecture, Multimedia Presentation, Guided Exercises | Quizzes, Midterm Exam, Assignments |
| **CLO2 – Capacitors and Dielectrics** | Lecture, Problem-Solving Exercises, Lab Demonstration | Lab Reports, Quizzes, Assignments |
| **CLO3 – DC Circuits and Ohm's Law** | Lecture, Tutorials, Hands-on Circuit Practice | Lab Reports, Practical Exams, Quizzes |
| **CLO4 – Magnetic Fields and Induction** | Lecture, Case Studies, Lab Experiments | Lab Reports, Midterm Exam, Assignments |
| **CLO5 – AC Circuits and Electromagnetic Waves** | Lecture, Simulation, Problem-Solving Exercises | Lab Reports, Practical Exams, Assignments |
| **CLO6 – Optics – Ray and Wave Principles** | Lecture, Demonstration, Hands-on Experiments | Lab Reports, Quizzes, Practical Exercises |
| **CLO7 – Diffraction, Interference, Polarization** | Lecture, Guided Experiments, Simulations | Lab Reports, Assignments, Quizzes |
| **CLO8 – Special Relativity Concepts** | Lecture, Case Studies, Problem-Solving | Quizzes, Assignments, Midterm Exam |
| **CLO9 – Laboratory Skills and Experimental Analysis** | Hands-on Lab, Data Recording, Safety Training | Lab Reports, Observations, Practical Exams |
| **CLO10 – Integrated Problem Solving** | Scenario-Based Exercises, Projects, Group Work | Project Reports, Practical Exams, Assignments |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **2** | **30** |
| Lectures | **15** | **4** | **60** |
| Midterm Exam | **1** | **2** | **2** |
| Preparation for Midterm Exam | **1** | **6** | **6** |
| Final Exam | **1** | **2** | **2** |
| Preparation for Final Exam | **1** | **6** | **6** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | - | - | - |
| Group Work | **1** | **4** | **4** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | **2** | **4** | **8** |
| Assignment(s)/Homework/Class Works | **4** | **4** | **16** |
| Preparation for laboratory sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| In-class discussions / Q&A sessions | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **134** |
| **ECTS Credit** | | | **4** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | 2 | 10 |
| Application | - | - |
| Field Work | 1 | 10 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 4 | 20 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **9** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Calculus II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| MTH102 | I | Spring | 4 | 6 | 4 | 0 | 0 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 50 | - | - | 50 |
| **Course Venue and Time** | | | | Wednesday 12.30-16.20 | | | |
| **Instructor information** | | | | **Assist. Prof. Dr. Engin Ata**<br>Faculty of Maritime Studies<br>Wednesday / 09:00 - 12:00<br>+90 (392) 650 26 00 / 4060<br>engin.ata@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | This course provides an in-depth study of advanced mathematical concepts building upon Calculus I. Topics include geometry, area and volume calculations, trigonometry, complex numbers, measurement and uncertainty, vectors, conic sections, and the use of mathematical tables. Emphasis is placed on practical applications in engineering, physics, navigation, and problem-solving. Students will develop analytical skills and the ability to apply mathematical methods to real-world problems, preparing them for further studies in mathematics, science, and engineering disciplines. |
| **Course Aims and Objectives** | The course aims to deepen students' understanding of mathematical concepts introduced in Calculus I, providing them with the tools and techniques to solve complex problems in mathematics, physics, engineering, and related disciplines. It emphasizes the practical application of advanced calculus, analytical thinking, and problem-solving skills.<br>• Apply geometric principles to calculate areas, volumes, and other spatial properties.<br>• Solve problems using trigonometry, including spherical trigonometry.<br>• Work confidently with complex numbers in mathematical and applied contexts.<br>• Understand measurement techniques and evaluate uncertainties in calculations.<br>• Utilize vectors in solving multidimensional problems.<br>• Analyze and solve problems involving conic sections such as ellipses and hyperbolas.<br>• Use mathematical tables effectively for computation and problem-solving.<br>• Develop logical reasoning and analytical skills for advanced mathematical applications. |
| **Course Learning Outcomes** | **CLO1 – Areas and Volumes:** Calculate areas and volumes using advanced geometric techniques and integration methods.<br>**CLO2 – Trigonometry and Spherical Trigonometry:** Solve trigonometric and spherical trigonometry problems relevant to practical engineering and scientific applications.<br>**CLO3 – Complex Numbers:** Perform operations with complex numbers and apply them to mathematical and engineering problems.<br>**CLO4 – Measurement and Uncertainty:** Apply principles of measurement and quantify uncertainties in real-world calculations.<br>**CLO5 – Vector Analysis:** Utilize vectors to analyze and solve problems in two- and three-dimensional spaces.<br>**CLO6 – Conic Sections:** Analyze and work with conic sections, including ellipses, hyperbolas, and parabolas, in applied contexts.<br>**CLO7 – Mathematical Tables and Functions:** Interpret and use mathematical tables for logarithmic, trigonometric, and other functions in problem-solving.<br>**CLO8 – Logical Reasoning and Critical Thinking:** Demonstrate logical reasoning and critical thinking in solving advanced calculus and applied mathematics problems. |

| | |
|---|---|
| | **CLO9 – Integration of Mathematical Knowledge:** Integrate knowledge from different mathematical areas to model, analyze, and solve applied engineering and scientific problems.<br>**CLO10 – Applied Problem Solving:** Apply mathematical tools and techniques to develop solutions for real-world engineering, technological, and scientific challenges. |

**Content of the Course**

| Week | *Subject* |
|---|---|
| 1 | **Geometry Review and Basics**<br>• Fundamental concepts of geometry<br>• Points, lines, planes, and angles<br>• Distance, midpoint, and section formulas |
| 2 | **Area and Volume Calculations**<br>• Calculation of areas of plane figures<br>• Volume of solids: prisms, cylinders, cones, spheres<br>• Applications in physical problems |
| 3 | **Trigonometry I**<br>• Trigonometric functions and identities<br>• Solving basic triangles<br>• Applications in calculus |
| 4 | **Trigonometry II and Spherical Trigonometry**<br>• Law of sines and law of cosines<br>• Spherical triangles and their properties<br>• Applications in navigation and astronomy |
| 5 | **Complex Numbers I**<br>• Definition and representation of complex numbers<br>• Algebraic operations: addition, subtraction, multiplication, division<br>• Polar form of complex numbers |
| 6 | **Complex Numbers II**<br>• Powers and roots of complex numbers<br>• De Moivre's theorem<br>• Applications in engineering and physics |
| 7 | **Measurement and Units**<br>• Systems of measurement<br>• Conversion between units<br>• Dimensional analysis |
| 8 | **Measurement Uncertainty**<br>• Sources of measurement errors<br>• Absolute and relative uncertainties<br>• Propagation of errors in calculations |
| 9 | **Mathematical Tables and Tools**<br>• Use of mathematical tables for logarithms, trigonometry, and exponentials<br>• Applications in solving real-world problems<br>• Approximations and rounding |
| 10 | **Vectors I**<br>• Definition and basic operations: addition, subtraction, scalar multiplication |

| | |
|---|---|
| | • Dot product and cross product<br>• Geometric interpretation |
| **11** | **Vectors II**<br>• Applications of vectors in geometry and physics<br>• Lines and planes in vector form<br>• Vector calculus fundamentals |
| **12** | **Conic Sections: Ellipses**<br>• Standard equations of ellipses<br>• Properties and foci<br>• Applications in physics and engineering |
| **13** | **Conic Sections: Hyperbolas**<br>• Standard equations of hyperbolas<br>• Properties and asymptotes<br>• Applications in navigation and orbits |
| **14** | **Applications of Calculus in Geometry**<br>• Using calculus to compute areas and volumes<br>• Surface area and arc length<br>• Optimization problems in geometry |
| **15** | **Review and Integration of Topics**<br>• Summary of all topics<br>• Problem-solving sessions<br>• Preparation for final exams |

## Methods and Techniques used in the Course

**Lectures** – Structured presentations to introduce and explain theoretical concepts and problem-solving techniques.

**Interactive Problem-Solving Sessions** – Step-by-step guidance on exercises, focusing on practical application of formulas and methods.

**Group Discussions and Peer Learning** – Collaborative learning to enhance understanding of complex topics such as vectors, conic sections, and spherical trigonometry.

**Mathematical Software Tools** – Use of calculators, MATLAB, or similar software to perform complex computations and visualize functions.

**Worked Examples and Case Studies** – Realistic problems from physics, engineering, and navigation to connect theory with practice.

**Homework Assignments** – Regular exercises to reinforce concepts and develop problem-solving skills.

**Quizzes and Formative Assessments** – Short assessments to track comprehension and provide feedback for improvement.

**Demonstrations** – Step-by-step demonstrations of geometric constructions, vector operations, and use of mathematical tables.

## Sample Questions

**Geometry & Measurement**

- Calculate the area of a triangle given its vertices in 3D space.
- Determine the volume of a solid obtained by rotating a given function around the x-axis.

**Trigonometry & Spherical Trigonometry**

- Solve for missing sides and angles of a right-angled triangle using trigonometric identities.
- Given three points on a sphere, compute the spherical triangle area.

**Complex Numbers**

- Simplify $(3+4i)^2$ and represent the result in polar form.
- Solve $z^2+1=0$ for complex solutions.

**Vectors**

- Find the magnitude and direction of the resultant vector given $\vec{A}=2\hat{i}+3\hat{j}$ and $\vec{B}=-\hat{i}+4\hat{j}$.
- Calculate the dot product and cross product of two vectors.

**Ellipse & Hyperbola**

- Determine the foci of the ellipse $\frac{x^2}{9}+\frac{y^2}{4}=1$.
- Find the vertices and asymptotes of the hyperbola $\frac{x^2}{16}-\frac{y^2}{9}=1$.

**Error & Uncertainty in Measurement**

- A measurement of 5.2 m ± 0.1 m is recorded. Calculate the relative and percentage uncertainty.

**Use of Mathematical Tables**

- Using a logarithmic table, evaluate $\log 5.67$.
- Solve $\sin 45^\circ$ and $\tan 30^\circ$ using trigonometric tables.

## Materials Used in the Course

**Textbooks & Reference Books**

- Calculus textbooks covering geometry, trigonometry, complex numbers, vectors, and conic sections.
- Mathematical tables for logarithms, trigonometric functions, and other reference tables.
- Manuals on measurement, error analysis, and spherical trigonometry.

**Software & Tools**

- Graphing calculators for visualizing functions, vectors, and conic sections.
- Computer algebra systems (e.g., MATLAB, Mathematica, or GeoGebra) for calculations and modeling.

**Supplementary Materials**

- Lecture notes and handouts provided by the instructor.
- Problem sets and solution manuals for practice.
- Online resources and interactive modules for geometry, vectors, and trigonometry.

**Practical Tools**

- Rulers, compasses, and protractors for geometric constructions.
- Measuring instruments for practical exercises in error analysis.
- Visual aids such as charts and 3D models to illustrate complex numbers, vectors, and conic sections.

***All the above listed books are available at UoK's Grand Library***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** | **CLO7** | **CLO8** | **CLO9** | **CLO10** |
| **PO1** | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| **PO2** | 1 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 3 | 2 |
| **PO3** | 2 | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 2 | 2 |
| **PO4** | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 2 |
| **PO5** | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| **PO6** | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 | 2 |
| **PO7** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| **PO8** | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| **PO9** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 |
| **PO10** | 1 | 1 | 2 | 3 | 3 | 2 | 1 | 1 | 1 | 3 |
| **PO11** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |
| **PO12** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| **CLO1 – Areas and Volumes** | Lecture, Problem-Solving Exercises, Tutorials | Quizzes, Assignments, Midterm Exam |
| **CLO2 – Trigonometry and Spherical Trigonometry** | Lecture, Guided Exercises, Hands-on Practice | Quizzes, Assignments, Practical Exercises |
| **CLO3 – Complex Numbers** | Lecture, Tutorials, Problem-Solving | Quizzes, Assignments, Midterm Exam |
| **CLO4 – Measurement and Uncertainty** | Lecture, Demonstrations, Hands-on Calculations | Lab Reports, Quizzes, Assignments |
| **CLO5 – Vector Analysis** | Lecture, Tutorials, Problem-Solving Sessions | Quizzes, Assignments, Midterm Exam |
| **CLO6 – Conic Sections** | Lecture, Guided Exercises, Case Studies | Quizzes, Assignments, Practical Problems |
| **CLO7 – Mathematical Tables and Functions** | Lecture, Tutorials, Exercises | Quizzes, Assignments, Midterm Exam |
| **CLO8 – Logical Reasoning and Critical Thinking** | Problem-Solving Sessions, Case Studies, Group Work | Assignments, Quizzes, Midterm Exam |
| **CLO9 – Integration of Mathematical Knowledge** | Lecture, Integrated Exercises, Projects | Project Work, Assignments, Practical Exams |
| **CLO10 – Applied Problem Solving** | Scenario-Based Exercises, Group Projects, Case Studies | Project Work, Assignments, Practical Exams |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **2** | **30** |
| Lectures | **15** | **4** | **60** |
| Midterm Exam | **1** | **2** | **2** |
| Preparation for Midterm Exam | **1** | **10** | **10** |
| Final Exam | **1** | **2** | **2** |
| Preparation for Final Exam | **1** | **10** | **10** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Case Studies / Critical Thinking | - | - | - |
| Project Writing | - | - | - |
| Group Work | **1** | **10** | **10** |
| In-class Discussion(s) | - | - | - |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory / Practical Applications | **2** | **10** | **20** |
| Assignment(s)/Homework/Class Works | **4** | **10** | **40** |
| Preparation for laboratory sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| In-class discussions / Q&A sessions | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **184** |
| **ECTS Credit** | | | **6** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | - | - |
| Laboratory | 2 | 10 |
| Application | - | - |
| Field Work | 1 | 10 |
| Special Course Internship (Work Placement) | - | - |
| Homework/Assignments | 4 | 20 |
| Providing reliability and motivation of the individual homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 30 |
| Final/Oral Exams | 1 | 30 |
| Total | **9** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check frequently the instructor's web page for the course announcements.<br>• University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |

**University of Kyrenia**

**Faculty of Maritime Studies**

**Marine Engineering**

**Syllabus**

| **Course name:** Maritime Safety II | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Code** | **Year** | **Semester** | **Credit** | **ECTS** | **Course application, Hour/Week** | | |
| | | | | | **Theoretical** | **Application** | **Laboratory** |
| SAF102 | I | Spring | 3 | 3 | 2 | 2 | 0 |
| **Course type:** Compulsory | | | | **Prerequisite: x** | | **Language:** English | |
| **% Contribution to the Professional Fundamental Component** | | | | **Basic Sciences** | **Engineering Science** | **Engineering Design** | **General Education** |
| | | | | 30 | - | - | 70 |
| **Course Venue and Time** | | | | Wednesday 14.30-17.20 | | | |
| **Instructor information** | | | | **Cpt. Çağrı Deliceırmak**<br>Faculty of Maritime Studies<br>Wednesday / 08:00 – 12:20<br>+90 (392) 650 26 00 / 4060<br>cagri.deliceirmak@kyrenia.edu.tr<br>www.kyrenia.edu.tr | | | |

| | |
|---|---|
| **Course Description** | The course will be conducted in accordance with the IMO Model Courses 1.19, 1.20, and 1.23, as well as the national regulation "Egitim Sinav Yonergesi 2025" of the Turkish Republic. Successful students will be eligible to obtain mandatory STCW certificates of (1); Personal Survival Techniques, (2); Fire Prevention and Fire Fighting, (3); Proficiency in Survival Crafts and Rescue Boats (Other than Fast Rescue Boats). The course contents include Mustering in emergencies onboard. The operation, maintenance, launching, and recovery of Survival Crafts and Rescue Boats. Evacuation procedures and survival techniques at sea. Dangers, life, and best practices in survival crafts. Preventing and fighting fires onboard. Firefighting methods, operations, and maintenance of the firefighting equipment. |
| **Course Aims and Objectives** | This course aims to train students with the essential knowledge, skills, and competencies required for maritime safety, emergency response, and safe working practices on board and in emergencies. The course provides a foundation for understanding personal survival techniques at sea, fire prevention and firefighting on board, and the operation of survival craft.<br>• Demonstrate proficiency in the operation, maintenance, launching, and recovery of survival crafts and rescue boats aboard the vessel.<br>• Identify potential hazards and implement preventive measures to ensure safety on board.<br>• Demonstrate knowledge and proficiency in fire prevention and firefighting methods on ships.<br>• Demonstrate knowledge and proficiency in muster and evacuation procedures during onboard emergencies.<br>• Demonstrate knowledge and proficiency in personal survival techniques at sea. |
| **Course Learning Outcomes** | **LO1:** Proper utilization of survival craft and rescue boats on vessels, encompassing launching, recovery, and operational procedures.<br>**LO2:** Assess potential hazards and implement preventive measures to ensure a safe environment on board.<br>**LO3:** Proficiency in fire prevention and firefighting onboard, including the use and maintenance of firefighting equipment, alarms, and detection systems.<br>**LO4:** Proficiency in mustering, response, and evacuation procedures during emergencies aboard the vessel.<br>**LO5:** Proficiency and requisite skills in personal survival techniques at sea. |

## Content of the Course

| Week | *Subject* |
|---|---|
| **1** | **Fire Prevention and Firefighting**<br>Terminology and related maritime English terms.<br>Description of fire. Ignition, spreading, and extinguishing of fire.<br>Prevention and the most common reasons for fire onboard.<br>Classification of fire and appropriate extinguishing agents. |
| **2** | **Fire Prevention and Firefighting**<br>Terminology and related maritime English terms.<br>Firefighting equipment and systems which used on board.<br>Fixed and portable extinguishers.<br>Fire main, hydrants, hoses, nozzles, and pumps. |
| **3** | **Fire Prevention and Firefighting**<br>Terminology and related maritime English terms.<br>Fireman outfit and Breathing Apparatus (SCBA).<br>Detection systems<br>Fire doors, escape routes, and procedures. |
| **4** | **Fire Prevention and Firefighting (Practical)**<br>Practical Training<br>Operation of Portable Fire Extinguishers<br>Operation of Fire control systems, including fire pumps, hoses, and nozzles<br>Operation of Fixed Fire Extinguishers (Detection and Sprinkler Systems) |
| **5** | **Fire Detection and Alarm Systems (Practical)**<br>Operation of Fixed Fire Extinguishers ($CO_2$ System)<br>Donning and use of Fireman's Outfit and BA Set<br>Fire in enclosed spaces<br>Rescue from enclosed spaces |
| **6** | **Survival Techniques at Sea**<br>Terminology and related maritime English terms.<br>Emergencies on board and survival methods<br>Life Saving Appliances onboard, including survival crafts and personal life saving appliances<br>Musters, training, and drills<br>Launching - Recovery Operations and maintenance of Lifeboats |
| **7** | **Survival Techniques at Sea**<br>Terminology and related maritime English terms.<br>Use of life jackets<br>Use of immersion suits<br>Use of Thermal Protective Equipment<br>Use of lifebuoys |
| **8** | **Survival Techniques at Sea**<br>Terminology and related maritime English terms.<br>Mustering and Abandoning Ship Procedures<br>Survival techniques and dangers in survival crafts<br>Survival techniques, dangers, and correct actions in the sea |
| **9** | **Survival Techniques at Sea (Practical)** |

| | |
|---|---|
| | Use of Personal Life Saving Appliances.<br>Correct use of life jackets, immersion suits, and TPA<br>Mustering and Abandoning Ship practice<br>Jumping and swimming methods in the sea |
| **10** | **Survival Techniques at Sea (Practical)**<br>Use of Personal Life Saving Appliances.<br>Correct use of life jackets, immersion suits, and TPA<br>Mustering and Abandoning Ship practice<br>Jumping and swimming methods in the sea |
| **11** | **Proficiency in Survival Crafts and Rescue Boats**<br>Terminology and related maritime English terms.<br>Lifeboats, the types, structure, and specifications<br>Lifeboat Equipment and purposes<br>Launching and Recovery Appliances of Lifeboats<br>Launching - Recovery Operations and maintenance of Lifeboats |
| **12** | **Proficiency in Survival Crafts and Rescue Boats**<br>Terminology and related maritime English terms.<br>Liferafts, the types, structure, and specifications<br>Liferaft Equipment and purposes<br>Launching Appliances of Liferafts<br>Launching Operations and maintenance of Liferafts |
| **13** | **Proficiency in Survival Crafts and Rescue Boats**<br>Terminology and related maritime English terms.<br>Survival techniques in Lifeboats and Liferafts<br>Use of pyrotechnics, EPIRB, and SART in survival craft.<br>Importance of food and water in survival crafts<br>Dangers in Survival Crafts<br>Rescue operations in Survival Crafts |
| **14** | **Proficiency in Survival Crafts and Rescue Boats (Practical)**<br>Abandoning Ship with Lifeboats<br>Preparing Lifeboat for Launching<br>Launching and Recovering of Lifeboats<br>Starting the engine and operating the release mechanism<br>Use of lifeboat equipment, including painter line, sea-anchor, and pyrotechnics |
| **15** | **Proficiency in Survival Crafts and Rescue Boats (Practical)**<br>Abandoning Ship with Liferafts<br>Preparing Lifeboat for Launching<br>Launching and inflating Liferafts<br>Boarding Liferaft<br>Use of liferaft equipment, including painter line, sea-anchor, and pyrotechnics |

## Methods and Techniques used in the Course

**Lectures and Interactive Discussions:**

- Lecturer Notes, Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- SOLAS Consolidated Edition, LSA Code, FSS Code, PST Workbook, The Fire Fighting System Guidance, Fire Prevention and Fire Fighting
- Presentation of theoretical concepts related to maritime safety, first aid, and emergency procedures.
- Encouraging active participation and Q&A sessions to deepen understanding.

**Supplementary Resources**

- Instructional videos demonstrate emergency response techniques, personal safety, and the use of protective equipment.
- Interactive simulations of onboard emergency scenarios, including collision, flooding, fire, and piracy attacks.
- Online resources from the International Maritime Organization (IMO) and maritime safety training platforms.
- Survival Crafts (Lifeboat and Liferaft) and Rescue Boats.
- Personal life-saving appliances (PPE) such as life jackets, lifebuoys, immersion Suits, and TPA.
- Firefighting equipment: portable extinguishers, fire hoses, fire nozzles, Fireman's Outfit and BA Set, fire blankets, fire detection and alarm systems, fixed CO2 System, and Foam Applicators.

## Sample Questions

Fire Prevention and Fire Fighting

- What type of portable fire extinguishers are used on ships?
- What are the extinguishing methods of a fire?

**Survival Techniques at Sea**

- Which personal LSA are used to protect body-core temperature in sea?
- What type of personal life saving appliances are used onboard?

**Proficiency in Survival Crafts:**

- What type of lifeboats are used on cargo ships?
- What is HRU?
- What are the launching methods of liferafts?

## Materials Used in the Course

**Textbooks & Reference Books:**

- Lecturer Notes, Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- SOLAS Consolidated Edition, LSA Code, FSS Code, PST Workbook, The Fire Fighting System Guidance, Fire Prevention and Fire Fighting
    - SOLAS Consolidated Edition
    - LSA Code
    - FSS Code
    - PST Workbook
    - The Fire Fighting System Guidance
    - Fire Prevention and Fire Fighting

**Supplementary Resources**

- Instructional videos demonstrate emergency response techniques, personal safety, and the use of protective equipment.
- Interactive simulations of onboard emergency scenarios, including collision, flooding, fire, and piracy attacks.
- Online resources from the International Maritime Organization (IMO) and maritime safety training platforms.
- Survival Crafts (Lifeboat and Liferaft) and Rescue Boats.
- Personal life-saving appliances (PPE) such as life jackets, lifebuoys, immersion Suits, and TPA.
- Firefighting equipment: portable extinguishers, fire hoses, fire nozzles, Fireman's Outfit and BA Set, fire blankets, fire detection and alarm systems, fixed CO2 System, and Foam Applicators.

***All the above-listed books are available at UoK's Grand Library.***

**Program Outcomes Matrix**

| | Program Outcomes | *Level of Contribution | | | | Targeted Competence Areas |
|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | |
| **1** | Demonstrate comprehensive knowledge of marine engineering principles, systems, and machinery operations, and effectively apply this knowledge to ensure safe, efficient, and sustainable vessel performance in compliance with IMO and STCW standards. | | | | ✓ | Technical Knowledge & Applied Sciences |
| **2** | Apply advanced engineering design principles to develop, adapt, and optimize mechanical, electrical, and control systems onboard ships and in shore-based industrial contexts, integrating safety, cost-efficiency, and environmental considerations. | | | | ✓ | Analytical & Computational Skills |
| **3** | Perform engineering watchkeeping duties and operational management with professional responsibility, situational awareness, and adherence to international maritime conventions and best practices. | | | | ✓ | Sustainable Design & Safe Operating |
| **4** | Identify, formulate, and analyze complex engineering problems using appropriate theoretical, computational, and experimental techniques to derive sound, data-driven solutions in marine and related engineering domains. | | | ✓ | | Research & Experimentation |
| **5** | Integrate principles of safety culture, risk assessment, and environmental protection into all engineering practices, promoting sustainable operations aligned with IMO conventions such as MARPOL and SOLAS. | | | ✓ | | Innovation & Digital Competence |
| **6** | Employ advanced digital tools, diagnostic systems, and automation technologies for monitoring, control, and performance assessment of marine and industrial systems, in line with the requirements of the evolving maritime digitalization era. | | | | ✓ | Regulatory Frameworks & Safety |
| **7** | Demonstrate competence in planning, executing, and managing engineering projects, including resource allocation, budgeting, and maintenance planning, while ensuring quality, safety, and compliance with regulatory frameworks. | | | | ✓ | Teamwork & Leadership |
| **8** | Function effectively as a leader and member of multidisciplinary and multicultural teams, fostering collaboration, ethical conduct, and efficient communication in dynamic and often high-stress maritime environments. | | | | ✓ | Project Management & Entrepreneurship |
| **9** | Communicate effectively in both written and oral forms with clarity, professionalism, and technical precision in English and other relevant languages within maritime and industrial contexts. | | | ✓ | | Ethics & Professionalism |
| **10** | Adhere to the ethical and professional standards of the engineering and maritime professions, demonstrating accountability, integrity, and a commitment to continuous professional development and lifelong learning. | | | | ✓ | Lifelong Learning & Adaptability |
| **11** | Evaluate and implement sustainable engineering practices and emerging green technologies to minimize the environmental footprint of marine and industrial operations. | | | ✓ | | Communication Competence |
| **12** | Exhibit the flexibility and interdisciplinary mindset required to transfer marine engineering knowledge and skills to diverse sectors, contributing effectively to innovation and technological advancement beyond the maritime industry. | | | ✓ | | Global Vision & Societal Impact |

***0:** No Contribution **1:** Little Contribution **2:** Partial Contribution **3:** Full Contribution

| **Program Outcomes /Course Learning Outcomes Matrix**<br>**Level of Contribution**:**0**-No Contribution **1**-Little Contribution **2**-Partial Contribution **3**-Full Contribution | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **PO** | **CLO1** | **CLO2** | **CLO3** | **CLO4** | **CLO5** | **CLO6** | **CLO7** | **CLO8** | **CLO9** | **CLO10** |
| **PO1** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO2** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO3** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO4** | 2 | 2 | 2 | 2 | 2 | x | x | x | x | x |
| **PO5** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO6** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO7** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO8** | 2 | 2 | 2 | 2 | 2 | x | x | x | x | x |
| **PO9** | 1 | 2 | 1 | 1 | 1 | x | x | x | x | x |
| **PO10** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO11** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |
| **PO12** | 3 | 3 | 3 | 3 | 3 | x | x | x | x | x |

| **Course Learning Outcomes/ Evaluation Method** | | |
|---|---|---|
| **CLO** | **Teaching Method** | **Assessment Method** |
| LO1 | Lectures, Practical Applications, Case Studies, and Discussions | Midterm Exam, Practical Exam, Final Exam, Assignment |
| LO2 | Lectures, Practical Applications, Case Studies, and Discussions | Midterm Exam, Practical Exam, Final Exam, Assignment |
| LO3 | Lectures, Practical Applications, Case Studies, and Discussions | Midterm Exam, Practical Exam, Final Exam, Assignment |
| LO4 | Lectures, Practical Applications, Case Studies, and Discussions | Midterm Exam, Practical Exam, Final Exam, Assignment |
| LO5 | Lectures, Practical Applications, Case Studies, and Discussions | Midterm Exam, Practical Exam, Final Exam, Assignment |

| ECTS / Workload Table | | | |
|---|---|---|---|
| Activities | **Number** | **Duration (Hours)** | **Total Workload** |
| Preparation for lectures | **15** | **1** | **15** |
| Lectures | **15** | **3** | **45** |
| Midterm Exam | **1** | **1** | **1** |
| Preparation for Midterm Exam | **1** | **5** | **5** |
| Final Exam | **1** | **1** | **1** |
| Preparation for Final Exam | **1** | **5** | **5** |
| Presentation(s) | - | - | - |
| Preparation for Presentation(s) | - | - | - |
| Research for Project(s)/Essay(s) | - | - | - |
| Project Writing | - | - | - |
| Group Work | **3** | **5** | **15** |
| In-class Discussion(s) | **15** | **1** | **15** |
| Quiz(es) | - | - | - |
| Preparation for Quiz(es) | - | - | - |
| Laboratory | - | - | - |
| Assignment(s)/Homework/Class Works | - | - | - |
| Micro-Teaching Sessions | - | - | - |
| Lesson Planning | - | - | - |
| Materials Adaptation | - | - | - |
| Material Development | - | - | - |
| Draft Preparation | - | - | - |
| Drawing | - | - | - |
| Essay Writing | - | - | - |
| Tutorial(s) | - | - | - |
| Portfolio Preparation | - | - | - |
| Portfolio Presentation | - | - | - |
| **Total Workload** | | | **102** |
| **ECTS Credit** | | | **3** |

| Evaluation System | | |
|---|---|---|
| **Semester Requirements** | **Number** | **Percentage of Grade** |
| Attendance/Participation | 1 | 5 |
| Laboratory | - | - |
| Application | 3 | 45 |
| Field Work | - | - |
| Special Course Internship (Work Placement) | - | - |
| Assignment(s)/Homework/Class Works | - | - |
| Providing reliability and motivation for the individual's homework completion and Submission | - | - |
| Presentation/Jury | - | - |
| Project | - | - |
| Quiz | - | - |
| Midterms/Oral Exams | 1 | 20 |
| Final/Oral Exams | 1 | 30 |
| Total | **6** | **100** |

| | **Percentage** | **Course Grade** | **Coefficient** |
|---|---|---|---|
| **Grading Policy** | 90-100 | AA | 4.0 |
| | 85-89 | BA | 3.5 |
| | 80-84 | BB | 3.0 |
| | 75-79 | CB | 2.5 |
| | 70-74 | CC | 2.0 |
| | 60-69 | DC | 1.5 |
| | 50-59 | DD | 1.0 |
| | 49 and below | FF | 0.0 |
| | Less than 70% attendance | NA | - |
| **Course Requirements and Policies** | • Alerted attendance at the lectures is essential!<br>• Students are expected to check the instructor's web page frequently for the course announcements.<br>• The University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating. | | |