University of Kyrenia

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Chemistry for Mariners							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
CFM101	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**
				40	40	-	20
Course Venue and Time				Wednesday 14.30-17.20			
Instructor information				**Assist. Prof. Dr. Engin Ata** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 engin.ata@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides an in-depth introduction to the fundamental principles of chemistry as applied to the maritime environment. Topics include atomic structure, chemical bonding, properties of metals and alloys used in ship construction, corrosion chemistry, thermochemistry, acids and bases, water chemistry, marine fuels, lubricants, coatings, and anti-fouling paints. The course emphasizes practical applications onboard ships, including solution preparation, corrosion prevention, fuel and lubricant handling, and water treatment methods. Laboratory sessions reinforce theoretical knowledge with hands-on experiments, ensuring students understand safe handling procedures and marine-specific chemical practices.
Course Aims and Objectives	The course aims to equip students with a solid understanding of fundamental chemical principles and their practical applications in the maritime environment. It emphasizes the knowledge and skills necessary to handle marine fuels, lubricants, coatings, and water systems safely and efficiently while preventing corrosion and ensuring the operational integrity of ships. • Understand and explain the fundamental concepts of chemistry, including atomic structure, chemical bonding, and thermochemistry. • Identify the properties of metals, alloys, and other materials used in ship construction and their chemical behavior. • Apply principles of corrosion chemistry and galvanic reactions to prevent material degradation onboard ships. • Prepare and manage chemical solutions, marine fuels, lubricants, and coatings safely and effectively. • Conduct water quality testing and apply water treatment methods suitable for maritime operations. • Demonstrate safe laboratory practices and proper handling of chemicals in marine applications.
Course Learning Outcomes	**CLO1:** Demonstrate a comprehensive understanding of fundamental chemical principles relevant to maritime operations. **CLO2:** Analyze the chemical properties of metals, alloys, and other materials used in ship construction, with a focus on their corrosion behavior. **CLO3:** Apply corrosion prevention and control techniques, including anodizing, cathodic protection, and galvanic protection, in maritime applications.

	CLO4: Prepare and manage chemical solutions, marine fuels, lubricants, and protective coatings in accordance with maritime standards and procedures. **CLO5:** Conduct water quality assessments and apply appropriate treatment strategies to ensure safe and effective operation of onboard systems. **CLO6:** Interpret thermochemical data, reaction kinetics, and chemical equilibria within the context of shipboard systems and operational requirements. **CLO7:** Practice safe handling, storage, transportation, and disposal of chemicals in both laboratory and shipboard environments. **CLO8:** Evaluate marine coatings, anti-fouling systems, and lubricants in terms of performance, durability, and suitability for different operational conditions. **CLO9:** Integrate chemical knowledge to diagnose and propose solutions for common chemical-related problems encountered in maritime operations. **CLO10:** Communicate chemical findings, assessments, and operational recommendations effectively in written and verbal formats relevant to maritime practice.

Content of the Course

Week	*Subject*
1	Fundamental concepts, units, and maritime-related chemical laws
2	Atomic structure and properties of elements Iron, steel and casting
3	Chemical bonding: ionic, covalent, and metallic bonds Bronze, admiralty brass and galvanic reaction
4	Solutions: preparation, concentration units, and shipboard applications Corrosion chemistry, galvanic corrosion and anodizing
5	Thermochemistry: heat, reaction rates, and equilibrium
6	Acids, bases, and their role in marine systems
7	Water chemistry: testing methods and treatment techniques
8	Midterm Exam
9	Corrosion: causes, types, and prevention methods
10	Marine fuels: properties, storage, and handling
11	Marine lubricants: types, functions, and testing
12	Marine coatings and anti-fouling paints
13	Laboratory experiments review and safety in chemical handling
14	Course review and exam preparation
15	Final Exam

Methods and Techniques used in the Course

Lectures:

- Delivery of fundamental concepts, chemical laws, and theoretical knowledge related to maritime chemistry.

Laboratory Practices:

- Hands-on experiments covering corrosion tests, solution preparation, fuel and lubricant analysis, water testing, and coating evaluations.
- Emphasis on laboratory safety and correct handling of chemicals.

Case Studies and Applications:

- Analysis of real-world maritime scenarios, including corrosion prevention, fuel handling, and water treatment onboard ships.

Group Discussions:

- Collaborative problem-solving sessions to understand chemical processes and their practical implications.

Demonstrations:

- Instructor-led demonstrations of chemical testing, marine coatings, and anti-fouling applications.

Assignments and Reports:

- Written assignments and laboratory reports to reinforce theoretical understanding and practical skills.

Quizzes and Problem Solving:

- Short exercises to evaluate comprehension of chemical principles and their applications in maritime systems.

Sample Questions

- Define the difference between ionic, covalent, and metallic bonds, and give an example of each in marine applications.
- Explain the properties of iron and steel that make them susceptible to corrosion in marine environments.
- How do you prepare a 10% NaCl solution, and what are its common shipboard applications?
- Explain the difference between molarity, molality, and percent concentration.
- Describe the mechanisms of galvanic corrosion and how to prevent it on a ship.
- Explain anodizing and its application in marine engineering.
- What are the main properties of marine diesel oil, and why are they important for engine operation?
- Compare the types of marine lubricants and their functions.
- Describe the types of anti-fouling paints and their mechanism of action.
- What factors affect the durability of marine coatings?
- Explain the relationship between temperature and reaction rate in corrosion processes.
- How does thermochemistry help in understanding fuel combustion on ships?
- List the methods for testing seawater quality on board and their importance.
- How are acidic or alkaline conditions controlled in marine water systems?
- Demonstrate the correct procedure for measuring the pH of seawater.
- How would you test for galvanic corrosion between two dissimilar metals onboard?
- A ship's steel hull shows signs of pitting. Explain the likely causes and preventive measures.
- Design a basic maintenance schedule for monitoring corrosion in engine room piping systems.

Materials Used in the Course

Textbooks & Reference Books

- "Marine Chemistry: An Introduction for Maritime Students" – Author, Year
- "Principles of Chemical Engineering in Marine Applications" – Author, Year
- "Corrosion and Corrosion Control in Marine Environments" – Author, Year
- "Marine Fuels and Lubricants: Properties, Handling, and Testing" – Author, Year
- "Water Chemistry for Ships: Testing and Treatment Methods" – Author, Year

Laboratory Materials & Equipment

- Standard chemical reagents for acids, bases, salts, and solutions
- pH meters and titration equipment
- Corrosion test kits (metal samples, salt solutions, electrodes)
- Thermochemical measurement tools (calorimeters, temperature probes)
- Marine fuel and lubricant testing kits
- Protective equipment: gloves, goggles, lab coats, and ventilation systems

Software & Online Resources

- Simulation software for chemical reactions and thermodynamic calculations
- Online databases for chemical safety data sheets (SDS)
- Interactive e-learning modules for marine corrosion and coatings

Supplementary Materials

- Laboratory manuals and experiment worksheets
- Lecture slides and handouts
- Case studies on real-world marine chemical applications

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 **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 – Fundamental chemical principles	Lecture, Question–Answer	Midterm Exam, Final Exam
CLO2 – Metals, alloys, corrosion properties	Lecture, Case Studies	Midterm Exam, Final Exam
CLO3 – Corrosion prevention techniques	Lecture, Laboratory Practice, Demonstration	Lab Reports, Midterm Exam, Final Exam
CLO4 – Chemical solutions, fuels, lubricants	Lecture, Hands-on Practice, Demonstration	Lab Reports, Midterm Exam, Final Exam
CLO5 – Water quality assessment & treatment	Lecture, Laboratory Practice	Quizzes, Lab Reports, Midterm Exam, Final Exam
CLO6 – Thermochemistry, kinetics, equilibrium	Lecture, Problem-Solving Sessions	Quizzes, Midterm Exam, Final Exam
CLO7 – Chemical safety & disposal	Lecture, Safety Training Session, Demonstration	Quizzes, Midterm Exam, Final Exam
CLO8 – Marine coatings & lubricants evaluation	Lecture, Case Studies, Demonstration	Midterm Exam, Final Exam
CLO9 – Diagnosing maritime chemical problems	Lecture, Case Studies, Hands-on Practice	Assignments, Midterm Exam, Final Exam
CLO10 – Communication of chemical findings	Lecture, Question–Answer, Presentation Practice	Assignments, Final Exam

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)	-	-	-
Research for Project(s)/Essay(s)	-	-	-
Project Writing	**1**	**4**	**4**
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	**15**	**1**	**15**
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	1	10
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Homework/Assignments	2	10
Providing reliability and motivation of the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	1	10
Quiz	-	-
Midterms/Oral Exams	1	30
Final/Oral Exams	1	40
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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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 I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
ENG101	I	Fall	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** Faculty of Maritime Studies Friday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 aydogan.erkan@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	*English I (ENG 101)* 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. 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. • Understand and use everyday expressions and basic phrases related to immediate needs and familiar topics. • Introduce themselves and others, ask and answer questions about personal details, and describe daily routines. • Use appropriate vocabulary and expressions to interact in contexts such as shopping, travel, health, socializing, and work. • Demonstrate the ability to ask for and give directions, make arrangements, and express likes, dislikes, and preferences. • Apply strategies to maintain conversations in English, including making invitations, offers, suggestions, and responding politely. • Develop basic listening comprehension skills for real-life communication scenarios. • Strengthen oral fluency and accuracy through practice in dialogues, role-plays, and discussions. • Gain cultural awareness by comparing customs, traditions, and social practices across cultures.

Course Learning Outcomes	**CLO1:** Communicate effectively in everyday contexts using appropriate vocabulary, expressions, and structures at an A2/B1 CEFR level. **CLO2:** Introduce themselves and others, and exchange personal information accurately in both spoken and written forms. **CLO3:** Describe daily routines, habits, hobbies, and preferences using common verbs, adjectives, and frequently used expressions. **CLO4:** Ask for and give directions, make requests, and express needs in everyday situations such as shopping, travel, and dining. **CLO5:** Demonstrate comprehension of short oral texts, including conversations and dialogues, through listening-based tasks. **CLO6:** Express personal opinions, likes, dislikes, and preferences in social and interpersonal communication. **CLO7:** Participate actively in role-plays and dialogues that simulate real-life communication settings (e.g., health, work, travel, social interactions). **CLO8:** Apply basic grammatical structures—including present, past, and future tenses; prepositions; and question forms—to produce accurate and meaningful sentences. **CLO9:** Use English appropriately for intercultural communication, demonstrating awareness of cultural similarities and differences in daily life and traditions. **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** • Course overview and objectives • Importance of English in daily life • Introduction to basic greetings and self-introduction • Classroom language and expressions
2	**Talking About Yourself and Others** • Describing yourself, family, and friends • Asking and answering personal questions • Common verbs and adjectives for description
3	**Daily Routines and Habits** • Vocabulary for everyday activities • Talking about routines using simple present tense • Time expressions (e.g., always, usually, sometimes)
4	**Places and Directions** • Vocabulary for locations in town and transportation • Asking for and giving directions • Prepositions of place and movement
5	**Food and Drinks** • Vocabulary related to meals, groceries, and restaurants • Ordering food and drinks • Expressing likes, dislikes, and preferences
6	**Hobbies and Free Time** • Vocabulary for hobbies, sports, and leisure activities • Talking about routines and preferences • Using frequency adverbs
7	**Shopping and Money** • Vocabulary for shopping, products, and prices • Asking for information and making purchases • Expressing quantity and cost
8	**Health and Illness** • Vocabulary for body parts, symptoms, and medical situations • Expressing how you feel and giving advice • Making simple requests for help
9	**Work and Professions** • Vocabulary for jobs, workplaces, and daily tasks • Talking about duties and responsibilities • Asking and answering about someone's work
10	**Travel and Transportation** • Vocabulary for travel, tickets, and accommodations • Asking for travel information and making arrangements • Discussing past and future travel plans
11	**Weather and Environment** • Vocabulary for weather conditions, seasons, and nature • Describing the environment and climate

	• Making small talk about the weather
12	**Socializing and Making Plans** • Invitations, offers, and suggestions • Accepting and refusing politely • Talking about future arrangements using “will” and “going to”
13	**Culture and Daily Life** • Vocabulary for festivals, traditions, and cultural activities • Comparing your culture with others • Expressing opinions and preferences
14	**Review of Key Functions and Vocabulary** • Revision of greetings, daily routines, hobbies, and travel • Practice dialogues in simulated real-life situations • Listening and speaking exercises for comprehension
15	**Final Assessment & Speaking Practice** • Oral presentations or dialogues • Listening comprehension assessment • 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 **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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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: Technical Drawing I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC101	I	Fall	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**
				-	-	-	100
Course Venue and Time				Wednesday / 08:30 – 11:20			
Instructor information				**Chf. Eng. Volkan Varışlı** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4095 volkan.varisli@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides a comprehensive introduction to the fundamental concepts, components, and applications of information technologies. Students will gain a solid understanding of computer hardware, software, storage systems, input/output devices, and networking principles, with an emphasis on practical skills for everyday computing and professional use. The course also covers essential software applications, including word processing and spreadsheet programs, enabling students to create, edit, and manage documents and data effectively. Additionally, students will explore the Internet and the World Wide Web, learning how to access, evaluate, and use online resources safely and efficiently. Through a combination of lectures, hands-on exercises, and projects, this course aims to equip students with the foundational IT knowledge and practical competencies necessary for academic, personal, and professional success.
Course Aims and Objectives	The aim of this course is to provide students with a thorough understanding of the principles and applications of information technologies. It seeks to develop both theoretical knowledge and practical skills, enabling students to use computer systems and software effectively in academic, professional, and personal contexts. The course emphasizes problem-solving, digital literacy, and the ability to navigate, evaluate, and utilize technology and online resources responsibly. Identify and explain the main components of computer systems, including hardware, software, input/output devices, and storage systems. • Understand the roles of system software and application software in computing. • Demonstrate practical skills in using word processing and spreadsheet software to create, edit, format, and manage documents and data. • Access and utilize the Internet and World Wide Web efficiently, including evaluating online information and understanding digital communication tools. • Apply basic problem-solving techniques using information technology tools. • Develop awareness of safe, ethical, and responsible use of information technologies. • Integrate IT skills to improve productivity, communication, and information management in various contexts.
	CLO1: Explain the fundamental components of computer systems, including the system unit, input/output devices, and storage systems.

Course Learning Outcomes	**CLO2:** Demonstrate knowledge of system software (e.g., operating systems) and application software (e.g., word processors, spreadsheets) and their practical uses. **CLO3:** Create, edit, format, and manage professional-quality documents using word processing software. **CLO4:** Organize, analyze, and present data effectively using spreadsheet software, including the use of formulas, functions, and charts. **CLO5:** Navigate the Internet and the World Wide Web efficiently, access online information resources, and use email and digital communication tools responsibly. **CLO6:** Incorporate tables, charts, images, and other graphical elements into documents to enhance clarity and visual presentation. **CLO7:** Prepare documents for printing, review, and revision using effective layout and presentation techniques. **CLO8:** Apply basic problem-solving and data management techniques using IT tools to support academic and professional tasks. **CLO9:** Demonstrate ethical, safe, and responsible use of information technologies in personal, academic, and professional contexts. **CLO10:** Integrate multiple IT skills to improve productivity, organize information effectively, and communicate efficiently across different contexts.

Content of the Course

Week	*Subject*
1	**Introduction to Technical Drawing and Tools** • Overview of technical drawing, its importance in engineering and design • Drawing instruments and their use • Lettering standards and conventions • Types of lines, line weights, and dimensioning rules
2	**Introduction to Technical Drawing and Tools** • Overview of technical drawing, its importance in engineering and design • Drawing instruments and their use • Lettering standards and conventions • Types of lines, line weights, and dimensioning rules
3	**Geometric Constructions II** • Construction of regular polygons (pentagons, hexagons, octagons) • Continuation of polygon construction exercises • Practical exercises on precision and accuracy
4	**Circles, Arcs, Curves, and Tangents I** • Drawing circles and arcs using compass and templates • Constructing tangents to circles and arcs • Introduction to curves and spline drawing
5	**Circles, Arcs, Curves, and Tangents I** • Drawing circles and arcs using compass and templates • Constructing tangents to circles and arcs • Introduction to curves and spline drawing
6	**Circles, Arcs, Curves, and Tangents II** • Advanced curve constructions: involutes, ellipses, parabolas • Tangents between two curves or circles • Applications in mechanical and architectural drawings
7	**Equivalent Areas and Scaling** • Concept of equivalent areas • Techniques for reducing and enlarging plane figures • Use of proportional dividers and scale rules
8	**Midterm Exam** • Written and practical assessment on geometric constructions, circles, curves, and scaling • Evaluation of manual drawing skills and accuracy
9	**Introduction to AutoCAD** • Setting up AutoCAD environment and workspace • Custom settings and toolbars • Understanding coordinates, units, and drawing limits
10	**AutoCAD Drawing Basics** • Basic drawing commands: line, circle, arc, rectangle, polygon • Drawing layers and properties • Dimensioning and text annotation
11	**Modifying Commands in AutoCAD** • Editing commands: move, copy, rotate, scale, trim, extend • Object selection methods and shortcuts

	• Layer management and organization
12	**AutoCAD Tutorials & Introduction to 3D** • Introduction to 3D workspace, viewing commands, and navigation • Creating 3D objects from 2D sketches • Extrude, revolve, and sweep commands
13	**Converting Orthographic to Isometric Drawings I** • Understanding orthographic projection principles • Transforming 2D orthographic views into 3D isometric views • Hands-on exercises in AutoCAD
14	**Converting Orthographic to Isometric Drawings II** • Advanced isometric drawing techniques • Creating complex 3D objects from multiple orthographic views • Visualization and spatial reasoning exercises
15	**Final Exam & Project Presentation** • Comprehensive written and practical exam • Submission and presentation of individual AutoCAD projects • Review and feedback on course outcomes

Methods and Techniques used in the Course

Lectures: Conceptual explanations and demonstrations of computer hardware, software, and digital tools.

Hands-on Practice: Guided exercises using word processing, spreadsheet, and presentation software to reinforce learning.

Interactive Demonstrations: Live demonstrations of system operations, software features, and Internet navigation techniques.

Group Activities: Collaborative exercises and projects to encourage teamwork and practical application of IT skills.

Case Studies: Analysis of real-life scenarios requiring the use of information technology tools to solve problems.

Assignments and Exercises: Individual tasks to practice document creation, formatting, data management, and Internet research.

Quizzes and Short Tests: Periodic assessments to evaluate understanding of concepts and practical skills.

Discussion and Q&A Sessions: Encouraging student participation to clarify concepts, solve problems, and share best practices.

Multimedia Learning: Use of videos, tutorials, and software simulations to enhance comprehension and engagement.

Project-Based Learning: Final or cumulative projects that integrate multiple IT skills, reinforcing applied knowledge.

Sample Questions

Multiple Choice Questions (MCQs):

- Which component of the system unit is responsible for executing instructions?
  a) RAM
  b) CPU
  c) Hard Drive
  d) Keyboard
- What is the primary purpose of system software?
  a) Create documents
  b) Manage hardware and run applications
  c) Surf the Internet
  d) Format text

True/False Questions:

- The World Wide Web and the Internet are the same thing. (True/False)
- A spreadsheet program can be used to perform calculations and create charts. (True/False)

Short Answer Questions:

- Explain the difference between input and output devices.
- Describe the function of an operating system.

Practical/Application Questions:

- Create a Word document containing a title, a formatted paragraph, and a table with at least three columns.
- In Excel, calculate the total, average, and maximum of the following dataset: [provide data].

Essay/Discussion Questions:

- Discuss the importance of computer literacy in the modern workplace.
- Explain how cloud computing has changed the way we store and access data.

Problem-Solving Scenario:

- You are asked to prepare a report using Word and include data from Excel charts. Describe the steps you would take to complete this task efficiently.

Matching Questions:

- Match the following software types with their correct description:
  a) Word Processor
  b) Spreadsheet
  c) Database
  d) Web Browser

Materials Used in the Course

Textbooks and Reference Books:

- *Introduction to Information Technology* by IT authors (latest edition)
- *Microsoft Office 2010/2013/2016 Step by Step* (Word, Excel, PowerPoint)
- *Computer Fundamentals and Information Technology* by relevant authors

Software Tools:

- Microsoft Word (2010 or later)
- Microsoft Excel (2010 or later)
- Web browsers (Chrome, Edge, Firefox)
- Optional: PowerPoint for supplementary assignments

Online Resources:

- Official Microsoft Office tutorials
- Online guides and documentation for Word and Excel
- Educational videos and e-learning platforms for IT basics

Hardware and Lab Equipment:

- Desktop or laptop computers with required software installed
- Projector for demonstrations
- Internet connection for online research and exercises

Supplementary Materials:

- Lecture slides prepared by the instructor
- Sample datasets and practice exercises
- Handouts on computer terminology, keyboard shortcuts, and common commands

Assessment Tools:

- Online quizzes and practice tests
- Practical lab exercises for Word and Excel
- Midterm and final exam templates

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 **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 – Understand Computer Systems	Lecture, Demonstration	Midterm Exam, Final Exam
CLO2 – Use System and Application Software	Lecture, Hands-on Practice	Lab Reports, Midterm Exam, Final Exam
CLO3 – Document Creation and Management	Lecture, Practical Exercises	Lab Assignments, Final Exam
CLO4 – Spreadsheet Skills	Lecture, Hands-on Practice	Lab Assignments, Quizzes, Final Exam
CLO5 – Digital Communication	Lecture, Online Practice	Quizzes, Assignments, Final Exam
CLO6 – Graphical and Visual Tools	Lecture, Demonstration, Practice	Lab Assignments, Midterm Exam
CLO7 – Printing and Presentation	Lecture, Practical Exercises	Lab Assignments, Final Exam
CLO8 – Problem-Solving with IT Tools	Lecture, Hands-on Activities	Assignments, Quizzes, Final Exam
CLO9 – Ethical and Safe Use of IT	Lecture, Discussion, Case Studies	Quizzes, Assignments, Final Exam
CLO10 – Integrate IT Skills	Lecture, Hands-on Projects, Group Work	Project, Lab Assignments, 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	15	10
Laboratory	-	-
Application	2	10
Field Work	-	-
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	40
Total	**5**	**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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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 I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MED101	I	Fall	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** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4095 volkan.varisli@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides students with foundational knowledge and practical skills related to safe working practices and maintenance operations onboard ships, focusing on engine room workshop activities and safety culture. The course covers principles of workplace safety, risk assessment, and the implementation of the permit-to-work system in maritime environments. Students are introduced to essential maintenance methods, measurement and alignment tools, and the fundamentals of machinery fitting and surface preparation. Emphasis is placed on safe handling of equipment, technical drawing interpretation, and practical applications involving hand and bench tools. Advanced topics include cutting and drilling techniques, welding theory and its various applications, and safe handling of oxy-acetylene systems for cutting and welding operations. Case studies and practical exercises are integrated throughout the course to strengthen students' abilities in hazard identification, root-cause analysis, and environmentally responsible maintenance operations. The course combines theoretical instruction with hands-on applications to prepare students for safe and efficient technical operations on board ships. Students gain competence in using workshop equipment, performing minor repairs and modifications, and adhering to international safety and environmental standards. By the end of the course, students will have developed the technical and safety awareness necessary for effective participation in shipboard maintenance teams.
Course Aims and Objectives	**Course Aims:** • To provide students with a comprehensive understanding of safe working practices, workplace safety culture, and environmental protection in ship engine room workshops. • To develop technical competencies in the use of measurement tools, machinery fitting, welding, and maintenance operations onboard ships. • To enhance students' ability to identify and assess risks, implement permit-to-work systems, and apply international safety standards and regulations. • To prepare students for real-life shipboard maintenance operations by integrating theoretical knowledge with hands-on applications and case studies. **Course Objectives:** Upon successful completion of the course, students will be able to: • Understand and apply international safety regulations and risk assessment techniques relevant to shipboard maintenance and workshop activities. • Identify and properly use measurement tools, hand tools, bench tools, cutting tools, and welding equipment safely and effectively. • Interpret technical drawings and apply them to practical fitting and maintenance operations. • Demonstrate knowledge of surface preparation methods, machinery alignment, and proper repair and maintenance procedures. • Apply safe work practices in welding and oxy-acetylene operations while adhering to environmental protection measures. • Conduct root-cause analysis and implement corrective actions to prevent safety hazards recurring. • Develop teamwork and problem-solving skills through group projects, applications, and case studies involving realistic shipboard scenarios.

Course Learning Outcomes	**CLO1:** Explain and apply international safety regulations, permit-to-work systems, and risk assessment methods relevant to engine room workshop operations. **CLO2:** Identify and correctly operate measurement and alignment tools (such as calipers, micrometers, and dial gauges) for maintenance and repair tasks. **CLO3:** Interpret and utilize technical drawings, plans, and specifications when planning and executing fitting, cutting, and assembly operations. **CLO4:** Demonstrate practical skills in surface preparation, pipe fitting, hot work, welding, and oxy-acetylene cutting while adhering to strict safety procedures. **CLO5:** Analyze and evaluate the root causes of machinery failures or safety hazards and propose effective corrective and preventive actions. **CLO6:** Apply environmental protection practices and maintain a safe workspace during on-board maintenance and repair operations.

Content of the Course

Week	*Subject*
1	Principle of safety working and workspace safety / engine room workshop
2	Introduction to maintenance and production in the ships, permit to work system, root-cause analysis
3	Measurement tools (vernier caliper, dial gauges, micrometers and other meas. tools), Work planning and design requirements
4	Risk Assessment, safe working regulations in compartments and engine room workshop
5	Machinery element's surface finishing, files and file works / Fittings and Fitting elements, pipe fitting and grinding and surface
6	Applications of learned elements, Working with technical drawings, hand tools and bench tools
7	Surface preparations and fitting models (Bolts-nuts, rivets, soldering or detachable)
8	Mid-Term Exam Application (Case studies)
9	Marking, set screw and mitering, measurement verification, alignment control
10	Cutting tools, punching, drills, bench drill and lathe drill
11	Work-space safety related with Hot-work, permit
12	Welding Theory and Welding Types, Welding equipment, Bonding, Repair and maintenance
13	Welding models & Applications of different modes of operations
14	Safety of Oxy-acetylene systems, cutting and Oxy-acetylene welding
15	Final Exam Application (Workspace and environmental protection)

Methods and Techniques Used in the Course

Lectures and Theoretical Instruction:

Core concepts related to safe working principles, shipboard workshop practices, maintenance and production processes, and welding technologies are delivered through structured lectures with the support of multimedia presentations.

Case Studies and Problem-Solving Sessions:

Real-world marine engineering scenarios are analyzed to strengthen decision-making skills, such as risk assessments, root-cause analysis, and permit-to-work applications.

Laboratory and Workshop Applications:

Hands-on training sessions in the engine room workshop include measurement tool handling (calipers, micrometers, dial gauges), alignment control, cutting, drilling, welding, and fitting practices under safe work protocols.

Demonstrations and Technical Drawings:

Practical demonstrations on using hand tools, bench tools, welding equipment, and oxy-acetylene systems are performed. Students practice interpreting and applying technical drawings for workshop operations.

Collaborative Learning and Group Work:

Group projects are organized for students to collectively design and implement maintenance or repair tasks, emphasizing teamwork, safety, and environmental awareness.

Assignments and Independent Study:

Students complete individual homework on topics such as workspace safety regulations, welding theory, and maintenance planning, requiring literature research and application of learned concepts.

Continuous Assessment and Feedback:

Student performance is evaluated through applications, homework, midterm and final exams, as well as ongoing in-class participation and workshop practices.

Sample Questions

Part A – Short Answer / Definition

- Define the term **"Permit to Work System"** and explain its importance in engine room operations.
- List and briefly explain three **risk factors** that must be assessed before performing maintenance in the engine room.
- What are the main differences between **vernier calipers, micrometers, and dial gauges** in terms of accuracy and use?
- Explain the purpose of **root-cause analysis** in ship maintenance.
- Describe the principles of **welding safety** and why proper ventilation is crucial during welding operations.
- What are the **advantages and disadvantages** of oxy-acetylene welding compared to electric arc welding?
- Define **surface preparation** and explain its importance before welding or fitting works.

Part B – Problem Solving / Practical Questions

- A technician needs to verify the alignment of a pump shaft with a motor. Describe the **measurement tools and steps** required for proper alignment control.
- Analyze the following scenario: A maintenance task requires hot-work (welding) inside a fuel tank. **Identify the safety precautions and permit requirements** that must be completed before work can start.

Part C – Case Study

You are assigned to lead a team preparing for a **critical maintenance operation** on a vessel. Describe a **risk assessment plan** including:

- Identifying hazards
- Implementing safety measures
- Workspace preparation steps

During a PSC (Port State Control) inspection, an officer requests a demonstration of **engine room safety compliance** and **maintenance records**. As the chief engineer:

- What documents and records should you present?
- What preventive measures should be highlighted to demonstrate compliance?
- How would you address any minor non-conformities found?

Applied / Analytical Questions

- A ship requires emergency repair of a cracked pipe in the engine room. Outline the **temporary and permanent repair options** and discuss which is most appropriate under time and safety constraints.
- Explain the **marking and measurement verification steps** required before drilling and fitting a new flange in a pipeline system.
- Discuss how the **permit-to-work system** interacts with **hot-work safety measures** in welding operations.

Materials Used in the Course

Primary Textbooks and References:

- D. A. Taylor, *Introduction to Marine Engineering*, Elsevier.
- S. L. Coles, *Marine Engineering Practice – Workshop and Maintenance Techniques*.
- *Marine Engineering* by Roy L. Harrington (for maintenance and machinery fundamentals).
- ISGOTT (International Safety Guide for Oil Tankers and Terminals) – sections related to hot work and engine room safety.
- IMO Publications:
    - *SOLAS Convention* (safety of life at sea – chapters on safety and fire protection)
    - *ISM Code* (International Safety Management Code – permit-to-work and safety culture).
- *Welding Handbook* (AWS – American Welding Society) for welding principles and safety.

Workshop & Safety Manuals:

- Engine Room Workshop Safety Guidelines (shipboard safety manuals).
- Manufacturer manuals for measurement and cutting tools.
- Safety Data Sheets (SDS) for welding gases and materials.
- Permit-to-Work documentation and sample risk assessment forms.

Equipment & Tools (for applications):

- Vernier calipers, micrometers, dial gauges, depth gauges.
- Cutting and drilling tools (bench drill, lathe drill, hand drills).
- Welding equipment (arc welding, oxy-acetylene welding sets).
- Fitting and surface preparation tools (files, grinders, bolts/nuts sets, soldering kits).
- Safety equipment: PPE (helmets, gloves, goggles), welding screens, fire extinguishers.

Digital and Audio-Visual Materials:

- IMO and IACS online databases (classification and safety documentation).
- Training videos on engine room risk assessment and hot-work safety.
- Interactive modules for welding and alignment practices.

Case Study and Regulatory Documents:

- Real-world PSC inspection reports and analysis.
- Sample maintenance logs and planned maintenance system (PMS) templates.
- Industry best practices from OCIMF, ISGOTT, and classification societies.

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 **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**	**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**	**2**	**30**
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			**118**
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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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 I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MPH101	I	Fall	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** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 engin.ata@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides a foundational understanding of physics principles with direct applications to maritime engineering and navigation. It covers classical mechanics, thermodynamics, fluid mechanics, and wave phenomena, integrating both theoretical knowledge and practical laboratory exercises. Students will develop the ability to analyze and solve problems related to motion, forces, energy, momentum, and rotational systems, while also exploring the behavior of fluids, oscillatory systems, and thermodynamic processes. Emphasis is placed on maritime applications, enabling students to link physics concepts to real-world scenarios encountered on ships and in marine environments. Laboratory sessions reinforce theoretical knowledge through hands-on experiments, enhancing students' analytical and observational skills. By the end of the course, students will have the competence to apply physics principles in the context of ship operations, machinery performance, and marine navigation systems.
Course Aims and Objectives	**Course Aims** The aim of this course is to provide students with a solid understanding of fundamental physics concepts and principles relevant to maritime applications. The course seeks to integrate theoretical knowledge with practical laboratory experiences, enabling students to develop analytical and problem-solving skills necessary for ship operations, marine engineering, and navigation. **Course Objectives** By the end of this course, students will be able to: • Understand and apply fundamental concepts of mechanics, thermodynamics, fluid mechanics, and wave motion. • Analyze motion in one and two dimensions and apply Newton's laws to maritime contexts. • Evaluate energy, momentum, and angular momentum in mechanical systems, including collisions and rotational dynamics. • Investigate the behavior of fluids, including buoyancy, pressure, and flow dynamics relevant to ships. • Apply thermodynamic principles to understand energy transfer, temperature effects, and the laws of thermodynamics in marine systems.

	• Conduct experiments in a laboratory setting, record observations, and interpret data accurately. • Develop problem-solving and critical-thinking skills to address practical maritime engineering and navigation challenges.
Course Learning Outcomes	**CLO1 – Fundamental Understanding:** Demonstrate a thorough understanding of fundamental physics concepts, including motion, force, energy, momentum, and thermodynamics, in the context of maritime applications. **CLO2 – Problem Solving:** Apply Newton's laws, circular motion principles, and conservation laws to solve physics problems related to maritime engineering and ship operations. **CLO3 – Rotational Dynamics:** Analyze rotational motion, torque, and angular momentum as they pertain to marine systems and ship mechanisms. **CLO4 – Fluid Mechanics:** Explain the properties of fluids, buoyancy, pressure, and flow, and relate them to ship design, stability, and navigation. **CLO5 – Wave Motion:** Describe oscillatory motion, wave propagation, superposition, and standing waves in marine environments, with practical implications for ship behavior and operations. **CLO6 – Thermodynamics:** Apply the first and second laws of thermodynamics to energy systems, engines, and other onboard maritime applications. **CLO7 – Laboratory Skills:** Conduct laboratory experiments, operate measurement tools accurately, and interpret experimental results to validate theoretical models. **CLO8 – Analytical Thinking:** Integrate theoretical knowledge and experimental findings to make informed and reliable decisions in maritime engineering and operational scenarios. **CLO9 – Communication:** Present scientific findings, analyses, and solutions effectively using proper scientific terminology, visual aids, and communication techniques. **CLO10 – Application of Knowledge:** Synthesize physics principles and experimental data to solve complex problems in ship design, marine operations, and maritime engineering tasks.

Content of the Course

Week	*Subject*
1	Introduction, measurements; motion in 1-d and 2-d
2	Newton's laws of motion
3	Circular motion
4	Energy of a system and conservation of energy
5	Linear Momentum and collisions
6	Rotations and Angular momentum
7	Midterm Exam
8	Static equilibrium and elasticity
9	Fluid mechanics
10	Oscillatory motion, and wave motion
11	Superposition and standing waves
12	Midterm Exam
13	Temperature
14	1st law of thermodynamics
15	2nd law of thermodynamics
16	Final Exam

Methods and Techniques used in the Course

Lectures:

- Conceptual explanation of physics topics such as motion, forces, energy, momentum, waves, and thermodynamics.
- Use of real-life maritime examples to relate theory to ship operations and navigation.

Laboratory Sessions:

- Hands-on experiments to measure motion, forces, rotational dynamics, fluid properties, and thermal processes.
- Application of measurement tools (rulers, vernier calipers, stopwatches, pressure sensors, thermometers) for data collection and analysis.
- Experiments on oscillatory motion, wave formation, and fluid mechanics phenomena relevant to maritime environments.

Problem-Solving Sessions:

- In-class exercises solving theoretical and numerical problems.
- Case studies related to ship dynamics, stability, and onboard energy systems.

Group Work and Discussions:

- Collaborative exercises for analyzing experimental data and interpreting results.
- Discussion of real-world maritime physics applications, such as ship stability, propulsion efficiency, and fluid flow behavior.

Assignments:

- Problem sets and scenario-based questions to reinforce theoretical concepts.
- Integration of theory with practical maritime operations.

Examinations:

- Midterm and final exams to evaluate understanding of theory and problem-solving skills.
- Lab assessments to test practical measurement and analysis abilities.

Sample Questions

Motion and Kinematics

- A ship accelerates from 5 m/s to 15 m/s over 120 seconds. Calculate its acceleration and the distance traveled.
- Describe the motion of a ship navigating a curved channel and identify the forces acting on it.

Newton's Laws of Motion

- A tugboat applies a force of 5000 N to tow a barge of mass 2500 kg. Calculate the acceleration of the barge.
- Explain how Newton's third law applies to propeller thrust and ship movement.

Circular Motion

- A rotating radar antenna completes one revolution every 10 seconds. Calculate the angular velocity and centripetal acceleration at the tip of the antenna if its radius is 2 m.
- Discuss the effect of circular motion on cargo in a turning ship.

Energy and Momentum

- A ship with mass 10,000 kg moves at 5 m/s. Calculate its kinetic energy.
- Two boats collide elastically: Boat A (mass 5000 kg, velocity 4 m/s) and Boat B (mass 3000 kg, velocity 2 m/s). Determine their velocities after collision.

Rotations and Angular Momentum

- Calculate the angular momentum of a rotating propeller of radius 1.5 m and mass 200 kg spinning at 120 rpm.
- Explain how angular momentum affects the stability of a ship during turning maneuvers.

Fluid Mechanics

- Calculate the pressure at the bottom of a ship's ballast tank filled with water to a depth of 3 m.
- Explain the principle of buoyancy and its application to ship loading and stability.

Oscillatory and Wave Motion

- A lifeboat oscillates with a period of 2 s. Calculate the frequency and angular frequency.
- Describe the formation of standing waves in a harbor basin and their potential effect on moored ships.

Thermodynamics

- A marine boiler operates at 200°C. Calculate the heat energy required to raise 500 kg of water from 25°C to 200°C.
- Explain how the second law of thermodynamics applies to engine room heat management and fuel efficiency.

Materials Used in the Course

Textbooks:

- K. A. Witt, *Physics for Mariners*, 3rd Edition, Maritime Press, 2020.
- J. D. Cutnell & K. W. Johnson, *Physics*, 11th Edition, Wiley, 2018.
- T. Hughes, *Applied Physics for Seafarers*, 2nd Edition, Nautical Institute, 2019.

Supplementary Reading:

- J. S. Walker, *Fundamentals of Physics*, 10th Edition, Pearson, 2019.
- M. D. F. Sheppard, *Marine Engineering and Physics*, Elsevier, 2017.

Laboratory Materials:

- Motion sensors and timers for kinematic experiments
- Masses, spring scales, pulleys, and inclined planes for force and motion studies
- Rotational rigs, angular velocity sensors, and gyroscopes
- Fluid mechanics equipment: manometers, hydrometers, tanks, and flow meters
- Oscillation and wave apparatus: pendulums, slinkies, water wave tanks
- Thermodynamic setups: calorimeters, temperature sensors, heating elements
- Measurement tools: vernier calipers, micrometers, protractors, stopwatches

Software & Digital Tools:

- Logger Pro / PhyPhox for data acquisition and analysis
- MATLAB or Excel for computational modeling, graphs, and calculations
- Simulation software for marine kinematics and wave motion analysis

Other Learning Aids:

- Lecture slides and notes provided by the instructor
- Video demonstrations of marine physics experiments
- Access to online maritime physics journals and articles

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 **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 – Fundamental Understanding	Lecture, Demonstration, Conceptual Discussion	Midterm Exam, Final Exam, Quizzes
CLO2 – Problem Solving	Lecture, Problem-Solving Sessions, Tutorials	Homework, Midterm Exam, Final Exam
CLO3 – Rotational Dynamics	Lecture, Computational Examples, Laboratory Demonstration	Lab Reports, Quizzes, Final Exam
CLO4 – Fluid Mechanics	Lecture, Simulation Exercises, Laboratory Practice	Lab Assignments, Midterm Exam, Final Exam
CLO5 – Wave Motion	Lecture, Multimedia Demonstration, Discussion	Quizzes, Assignments, Final Exam
CLO6 – Thermodynamics	Lecture, Problem-Solving Sessions	Midterm Exam, Final Exam, Lab Reports
CLO7 – Laboratory Skills	Hands-on Laboratory, Demonstration, Guided Experiments	Lab Reports, Practical Exams, Quizzes
CLO8 – Analytical Thinking	Case Studies, Tutorials, Problem-Solving Exercises	Assignments, Lab Reports, Final Exam
CLO9 – Communication	Presentations, Group Discussions, Report Writing	Oral Presentations, Written Reports, Lab Reports
CLO10 – Application of Knowledge	Integrated Projects, Simulations, Applied Problem Solving	Project Reports, Final Exam, Lab 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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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: General Aspects of Marine Engineering							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MRE101	I	Fall	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**
				20	30	30	20
Course Venue and Time				Wednesday 12.30-16.20			
Instructor information				**Chf. Eng. Volkan Varışlı** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4095 volkan.varisli@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides an introductory understanding of marine engineering, focusing on the basic principles, machinery, and systems used on board ships. It familiarizes students with the main and auxiliary engines, propulsion systems, heat exchangers, boilers, pumps, compressors, and other essential shipboard equipment. The course also introduces students to the safe and efficient operation of marine machinery, emphasizing the importance of shipboard safety culture, planned maintenance, and environmental awareness. Students will learn the fundamentals of diesel engine operation, power generation, steam and gas systems, and auxiliary machinery, as well as their roles in the overall performance of a vessel. By combining theoretical knowledge with practical case studies, the course aims to develop a solid foundation in marine engineering principles, preparing students for more advanced studies and professional responsibilities in the maritime industry.
Course Aims and Objectives	**Course Aims:** The aim of this course is to provide students with a solid foundation in marine engineering principles, shipboard machinery, and operational systems, while emphasizing a culture of safety and efficiency. The course seeks to equip students with the knowledge and skills required to understand, operate, maintain, and optimize ship machinery systems, both in routine and critical scenarios. **Course Objectives:** By the end of the course, students will be able to: • Comprehend the fundamental principles of internal combustion engines, diesel engines, and prime movers used in ship propulsion. • Understand the operation of main and auxiliary machinery, including electrical power systems, boilers, heat exchangers, and turbines. • Apply principles of heat transfer, steam, and gas turbine operations in practical shipboard scenarios. • Identify and operate auxiliary machinery and systems, including pumps, compressors, and fuel management equipment. • Implement safe operational procedures and cultivate a safety culture onboard. • Analyze and perform maintenance, repair, and surveying tasks for ship machinery. • Develop problem-solving skills through case studies and alternative operational scenarios. • Optimize shipboard machinery operations considering efficiency, safety, and regulatory compliance, including EEXI considerations. • Integrate theoretical knowledge with practical skills to manage complex engineering systems in real-life maritime contexts.

Course Learning Outcomes	**LO1:** Explain the principles and operational characteristics of internal combustion engines, diesel engines, and other prime movers used in ship propulsion systems, integrating fundamental concepts of steam, gas, and heat transfer. **LO2:** Describe the operation and functional interaction of main and auxiliary shipboard machinery, including electrical power generation systems, heat exchangers, boilers, turbines, pumps, compressors, and fuel management equipment. **LO3:** Apply engineering principles and problem-solving skills to analyze shipboard systems, evaluate operational efficiency, and optimize machinery performance in compliance with industry regulations, including EEXI requirements. **LO4:** Operate and monitor auxiliary machinery and related ship systems safely and effectively, demonstrating adherence to safety procedures and fostering a strong onboard safety culture. **LO5:** Plan, conduct, and document maintenance activities, inspections, troubleshooting processes, and temporary or permanent repairs on ship machinery, ensuring reliability and operational readiness. **LO6:** Evaluate alternative operational scenarios through case studies, integrate theoretical and practical knowledge to manage complex machinery systems, and communicate engineering concepts and technical findings clearly in written and oral formats.

Content of the Course

Week	*Subject*
1	Principle of Marine Engineering and shipboard safety culture
2	Internal Combustion principle and Main and Auxiliary Machineries
3	Diesel Engines & Prime-moving Propulsion, Operating local & remote-control stationaries
4	Diesel Engine Types and stationary power: Electrical energy as main and emergency
5	Principle of heat exchanging Heat machinery, Exchangers, Boilers steam and thermal oil
6	Principles of Steam and Gas theory, Steam and Gas Turbines
7	Auxiliary machinery theory and auxiliary systems of machineries
8	Mid-Term Exam Case studies (Alternative Operations)
9	Liquid transfer and displacement pumps, types with their functions
10	Compressed air/Gas Transfer and Compressors, types with their functions
11	Other ship auxiliaries, ship maneuvering facilities and consumables (Fuels, oils & FW)
12	Fuel types, consumption and efficient ship operations considerations - EEXI
13	Sources of Planned maintenance (PMS) Temporary and permanent repairs with surveying
14	Investigation, reinforcement and different approaches of maintenance
15	Final exam Case studies (Critical thinking)

Methods and Techniques used in the Course

Lectures

- Theoretical presentations of marine engineering principles, machinery systems, and shipboard safety culture.
- Use of diagrams, animations, and real-life ship schematics to illustrate engine operations, heat exchangers, and auxiliary systems.

Practical Applications / Laboratory Sessions

- Hands-on exercises with engine simulators or model systems.
- Demonstration of operating main and auxiliary machinery, propulsion, and control stations.
- Liquid transfer, pumps, compressors, and fuel system handling.

Case Studies and Problem-Solving

- Analysis of real-life scenarios, e.g., engine failure, fuel consumption optimization, maintenance scheduling.
- Group discussion of alternative operations and critical decision-making exercises.

Assignments / Reports

- Written exercises to consolidate understanding of engine types, auxiliary systems, and safety procedures.
- Research on EEXI compliance, fuel efficiency, or maintenance planning.

Group Work / Collaborative Projects

- Team-based exercises to analyze system performance, propose improvements, or simulate operational scenarios.

Exams (Mid-Term and Final)

- Evaluation of both theoretical knowledge and practical understanding.
- Case-based questions to test application of concepts in real marine engineering contexts.

Supplementary Tools

- Technical manuals, simulation software, maritime engineering publications.
- Visual aids such as schematics, charts, and videos for complex machinery systems.

Sample Questions

Theoretical Questions

- Explain the working principle of a two-stroke and a four-stroke diesel engine. Compare their advantages and disadvantages in marine applications.
- Describe the main components and functions of a steam turbine system on board. How does it differ from a gas turbine system?
- Discuss the principles of heat exchange in marine boilers and the importance of maintaining proper thermal efficiency.
- What are the key elements of a shipboard safety culture, and how do they impact daily operations and emergency preparedness?
- Define EEXI (Energy Efficiency Existing Ship Index) and explain its significance in modern ship operations.

Application / Problem-Solving Questions

- Given a scenario where a main engine shows abnormal fuel consumption, outline the steps you would take to investigate, diagnose, and rectify the issue.
- A ship's auxiliary system fails during voyage. Describe the immediate actions and long-term maintenance measures to ensure continued safe operation.
- Calculate the required pump capacity for transferring 500 m^3 of fuel within 4 hours, given the system constraints.

Case Study / Critical Thinking Questions

- Analyze a shipboard incident involving a fuel leak in the machinery space. What procedures should be followed to minimize risk to the crew, environment, and vessel?
- Evaluate two alternative propulsion options for a medium-sized vessel: diesel-electric vs. conventional diesel. Discuss performance, efficiency, and maintenance considerations.

Materials Used in the Course

Textbooks and References

- "Marine Engineering" – D.A. Taylor, Butterworth-Heinemann
- "Principles of Naval Engineering" – United States Naval Institute
- "Marine Auxiliary Machinery" – H.D. McGeorge
- "Shipboard Safety Management and Culture" – I. C. Thomas, Routledge
- "Marine Engineering Knowledge Guide" – L. G. Skipper
- Relevant International Conventions and Codes: SOLAS, MARPOL, ISM Code, STCW

Journals and Articles

- *Journal of Marine Engineering & Technology*
- *International Journal of Maritime Engineering*
- Selected papers on EEXI, fuel efficiency, and safety culture in marine vessels

Software and Tools

- Marine engine simulation software (e.g., MAN Diesel simulation tools, Wärtsilä Engine Simulators)
- Fuel consumption and efficiency calculators
- Shipboard PMS (Planned Maintenance System) software

Practical Materials

- Engine room models or cutaway diagrams of main and auxiliary machinery
- Pumps, compressors, and heat exchanger mock-ups for demonstration
- Safety equipment and emergency drills guides

Additional Resources

- IMO and classification society guidelines for machinery operation and safety
- Case studies and practical examples from shipboard operations

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**	**2**	**30**
Lectures	**15**	**2**	**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	**2**	**3**	**6**
Project Writing	**-**	**-**	**-**
Group Work	**1**	**4**	**4**
In-class Discussion(s)	**-**	**-**	**-**
Quiz(es)	**-**	**-**	**-**
Preparation for Quiz(es)	**-**	**-**	**-**
Laboratory / Practical Applications	**2**	**2**	**4**
Assignment(s)/Homework/Class Works	**4**	**3**	**12**
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**

Program Outcomes /Course Learning Outcomes Matrix **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	2	2	1
PO2	2	3	2	3	3	2
PO3	1	2	2	3	2	2
PO4	2	2	3	2	2	3
PO5	1	2	3	2	2	3
PO6	1	1	2	1	3	3
PO7	1	1	1	2	2	3
PO8	1	1	2	2	2	3
PO9	1	1	2	1	2	2
PO10	1	1	2	2	3	3
PO11	1	2	2	1	3	3
PO12	1	1	2	1	2	3

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1	Lectures, visual presentations, technical demonstrations	Midterm exam, quizzes
CLO2	Lectures, problem-solving sessions, case-based learning	Midterm exam, assignments
CLO3	Lectures, guided practice, technical document analysis	Assignments, quizzes
CLO4	Practical demonstrations, laboratory sessions, simulator-based exercises	Lab performance, practical exam
CLO5	Safety drills, scenario-based training, interactive discussions	Practical exam, participation, reports
CLO6	Workshops, maintenance practice, case studies, group activities	Final exam, project/report, performance assessment

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	-	-
Laboratory	-	-
Application	2	10
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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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 I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MTH101	I	Fall	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** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 engin.ata@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	Calculus I introduces students to fundamental concepts of mathematics that are essential for scientific and engineering applications. The course covers numerical calculations, algebraic operations, matrices and determinants, logarithms, and graphical representations of functions. Students will develop problem-solving skills through the study of limits, differentiation, and basic integration. Emphasis is placed on understanding both the theoretical foundations and practical applications of calculus in real-world scenarios, including rate of change, optimization, and area calculations.
Course Aims and Objectives	The course aims to provide students with a solid foundation in calculus and related mathematical concepts, enabling them to apply these principles effectively in engineering, physical sciences, and other technical fields. Students will gain both computational skills and a conceptual understanding of key mathematical techniques. • To develop proficiency in performing calculations with integers, fractions, decimals, exponents, roots, and logarithms. • To introduce matrix algebra and determinants, including their applications in solving linear systems. • To teach students how to interpret and construct mathematical graphs for various functions. • To understand and apply the concepts of limits, continuity, and differentiability. • To develop skills in differentiation and integration, including practical problem-solving applications. • To enhance analytical thinking and the ability to solve real-world problems using calculus.
Course Learning Outcomes	**CLO1 – Time and Angle Calculations:** Perform accurate calculations involving time, angles, degrees, minutes, and seconds, applying proper conversion and measurement techniques. **CLO2 – Arithmetic Operations:** Apply arithmetic operations to integers, fractions, and decimal numbers, including rounding, estimation, and numerical approximation methods. **CLO3 – Exponents, Roots, and Logarithms:** Solve mathematical problems involving exponents, roots, and logarithmic functions with precision and contextual understanding. **CLO4 – Matrices and Determinants:** Calculate determinants and perform matrix operations, including addition, multiplication, and inversion, in engineering and scientific applications. **CLO5 – Graph Analysis:** Analyze and interpret graphs of functions and relationships, identifying trends, intersections, and key characteristics of functions. **CLO6 – Ratios, Deviations, and Interpolation:** Apply concepts of ratios, deviations, and interpolation to solve practical and real-world problems efficiently.

	CLO7 – Limits of Functions: Understand and compute limits of functions, including one-sided and infinite limits, and interpret their significance in mathematical modeling. **CLO8 – Differentiation:** Apply differentiation techniques to solve problems involving rates of change, slopes, and optimization in applied contexts. **CLO9 – Integration:** Understand and compute basic integrals and their applications, including area under curves and accumulation problems. **CLO10 – Applied Problem Solving:** Integrate mathematical concepts, including algebra, calculus, and analytical methods, to solve complex, real-world problems in engineering, science, and technology.

Content of the Course

Week	*Subject*
1	Time and angle calculations Converting between degrees, minutes, and seconds Basic measurement concepts
2	Operations with integers Operations with proper and improper fractions
3	Operations with integers Operations with proper and improper fractions
4	Operations with powers and roots Exponential rules and simplification techniques
5	Operations with powers and roots Exponential rules and simplification techniques
6	Matrices: definition, types, and basic operations Addition, subtraction, and scalar multiplication
7	Matrix multiplication and applications Inverse matrices and determinants in solving linear equations
8	Logarithms: concepts, properties, and calculation Using logarithmic tables for computation
9	Algebra review and solving equations Linear and quadratic functions
10	Graphs: plotting functions and interpreting graphs Linear, quadratic, and exponential graphs
11	Ratios, deviations, and intermediate value calculations Interpolation techniques
12	Introduction to limits Calculating limits of functions and understanding continuity
13	Derivatives: definition and basic rules Differentiation of polynomials, exponential, and trigonometric functions
14	Applications of derivatives: maxima, minima, and curve analysis
15	Introduction to integrals Basic integration techniques and applications

Methods and Techniques used in the Course

Lectures: Systematic presentation of theoretical concepts in calculus and related mathematical operations.

Problem-Solving Sessions: Guided practice of exercises to reinforce understanding of calculations, limits, derivatives, and integrals.

Worked Examples: Step-by-step demonstrations of solving real-world and applied mathematics problems.

Group Activities: Collaborative exercises to enhance problem-solving, analytical thinking, and peer learning.

Use of Graphing Tools and Software: Visualization of functions, derivatives, and integrals using calculators or computer software.

Quizzes and Homework Assignments: Regular practice to consolidate learning and track student progress.

Tutorials: Small group sessions for addressing individual difficulties and clarifying complex topics.

Interactive Discussions: Encouraging questions, debates, and discussions to develop critical thinking.

Sample Questions

Time and Angle Calculations:

- Convert 3 hours, 45 minutes, and 30 seconds into decimal hours.
- Express 75° 30′ 45″ in decimal degrees.

Operations with Numbers:

- Simplify: $\frac{3}{4} + \frac{7}{8}$.
- Round 12.6789 to three decimal places.

Exponents and Roots:

- Simplify: $(3^2 \cdot 3^3)^{1/2}$.
- Solve for x if $\sqrt{x+5} = 4$.

Matrices and Determinants:

- Compute the determinant of $\begin{bmatrix} 2 & 3 \\ 5 & 7 \end{bmatrix}$.
- Multiply the matrices $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$ and $\begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}$.

Logarithms:

- Solve for x: $\log_2 x = 5$.
- Use logarithm tables to approximate $\log 125$.

Graphs and Functions:

- Sketch the graph of $f(x) = x^2 - 4x + 3$ and identify its vertex.
- Determine the slope of the tangent line to $y = \sin(x)$ at $x = \pi/4$.

Interpolation:

- Estimate $f(2.5)$ using linear interpolation if $f(2) = 4$ and $f(3) = 9$.

Limits and Derivatives:

- Compute $\lim_{x \to 3} \frac{x^2 - 9}{x - 3}$.
- Find $\frac{d}{dx}(3x^3 - 5x^2 + 2)$.

Integrals:

- Evaluate $\int (2x^3 - x)dx$.
- Find the area under $y = x^2$ from $x = 0$ to $x = 2$.

Materials Used in the Course

Textbooks:

- Stewart, *Calculus: Early Transcendentals*
- Larson & Edwards, *Calculus*
- Thomas, *Calculus*

Reference Books:

- Apostol, *Calculus, Vol. 1*
- Spivak, *Calculus*
- Hughes-Hallett et al., *Calculus: Single Variable*

Lecture Materials:

- Instructor-prepared lecture notes and presentations
- Worked examples and problem sheets

Digital & Interactive Tools:

- Graphing calculators or software (e.g., GeoGebra, Desmos)
- Online video tutorials and educational platforms (e.g., Khan Academy, Coursera)

Supplementary Resources:

- Mathematical tables (logarithms, trigonometric values)
- Scientific calculators for complex operations

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 **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 – Time and Angle Calculations	Lecture, Worked Examples, Practice Exercises	Quizzes, Homework, Midterm Exam
CLO2 – Arithmetic Operations	Lecture, Tutorials, Problem-Solving Sessions	Homework, Quizzes, Midterm Exam
CLO3 – Exponents, Roots, and Logarithms	Lecture, Problem-Solving Sessions, Tutorials	Homework, Midterm Exam, Final Exam
CLO4 – Matrices and Determinants	Lecture, Guided Practice, Laboratory/Software Simulations	Lab Reports, Assignments, Final Exam
CLO5 – Graph Analysis	Lecture, Interactive Graphing Tools, Discussion	Assignments, Quizzes, Midterm Exam
CLO6 – Ratios, Deviations, and Interpolation	Lecture, Case Studies, Problem-Solving Exercises	Homework, Quizzes, Final Exam
CLO7 – Limits of Functions	Lecture, Tutorials, Conceptual Demonstrations	Quizzes, Homework, Midterm Exam
CLO8 – Differentiation	Lecture, Problem-Solving Sessions, Guided Exercises	Homework, Midterm Exam, Final Exam
CLO9 – Integration	Lecture, Tutorials, Applied Problems	Homework, Lab/Project Work, Final Exam
CLO10 – Applied Problem Solving	Integrated Projects, Case Studies, Applied Exercises	Project Reports, Final Exam, 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**	**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! • Students are expected to check frequently the instructor's web page for the course announcements. • 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 I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
SAF101	I	Fall	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 08.30 -12.20			
Instructor information				**Cpt. Çağrı Deliceırmak** Faculty of Maritime Studies Friday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 cagri.deliceirmak@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	Maritime Safety I provide students with essential knowledge and practical skills for maintaining safety, security, and environmental protection at sea. The course covers personal safety and social responsibilities, basic first aid, emergency response, accident prevention, and the use of safety equipment in maritime operations. Students will learn to assess risks, manage casualties, handle medical emergencies, and respond effectively to incidents involving fire, flooding, collisions, and piracy. Additionally, the course introduces maritime security principles, the ISPS Code, and procedures to prevent pollution and protect the marine environment. Through a combination of theoretical instruction and practical exercises, students will develop the competencies needed to operate safely and responsibly aboard ships in compliance with international maritime regulations. The course will be conducted in accordance with the IMO Model Courses 1.13, 1.21, 3.26, and 3.27, as well as the national regulation "Egitim Sinav Yonergesi 2025" of the Turkish Republic. Successful students will obtain mandatory STCW certificates of (1); Personal Safety and Social Responsibility, (2); Security Familiarization, (3); Security Awareness, (4) Designated Security Duties, and (5) Elementary First Aid. The contents of the course are; Introduction to Safety and Emergencies.
Course Aims and Objectives	This course aims to train students with the knowledge, skills, and competencies required to ensure safety and security on board ships. It focuses on personal safety, first aid, emergency response, maritime security awareness, accident prevention, and environmental protection in maritime operations. The course emphasizes both theoretical understanding and practical application, preparing students for safe, responsible performance in real-world maritime environments. • Comprehend the concepts of safety, security, and emergency procedures onboard. • Comprehend safe working practices, emergency response procedures, and risk management protocols onboard. • Recognize the importance of effective communication and human relationship skills, including gender issues, minority issues, and shipboard discipline, as well as preventing and responding to violence and harassment. • Understand the importance of managing fatigue and stress on ships. • Comprehend the environmental impact of maritime operations and implement pollution prevention measures onboard. • Learn and practice the use of personal life-saving appliances and protective equipment onboard. • Acquire knowledge and comprehend maritime security protocols, including the ISPS Code, as well as security threat recognition. • Acquire fundamental first aid skills and effectively handle medical emergencies while aboard.
	LO1: Implement safety, security, and emergency protocols aboard. **LO2**: Maintain safe working practices, implement risk assessments, and emergency procedures on board.

Course Learning Outcomes	**LO3**: Maintain effective communication and human relationship skills, including the prevention and response to issues related to gender, minority groups, violence, and harassment. **LO4**: Implement strategies for managing fatigue and stress to improve onboard organization. **LO5**: Recognize environmental pollution risks and implement preventive measures to uphold environmental protection. **LO6**: Identify and correctly utilize personal life-saving appliances and protective equipment aboard. **LO7**: Familiarize with maritime security regulations, including the ISPS Code, and ship security protocols, and implement appropriate onboard security procedures to prevent and address security threats. **LO8**: Demonstrate knowledge of basic first aid procedures and apply them effectively in medical emergencies on board.

Content of the Course

Week	*Subject*
1	**Introduction to Maritime First Aid** Terminology and related maritime English terms Overview of maritime accidents and medical emergencies Assessing personal safety and accident risks Evaluating the human body and vital functions
2	**Emergency Response and Immediate Actions** Terminology and related maritime English terms Accident site management Positioning of the casualty and the unconscious casualties CPR and life-support techniques Controlling bleeding, shock management, and burns
3	**Casualty Handling and First Aid Materials** Terminology and related maritime English terms Electrical and thermal hazard interventions Safe casualty evacuation and transfer Application of bandages and use of emergency kits
4	**Basic First Aid Practical Session** Content and use of the emergency first aid kit CPR and life-support applications Safe casualty evacuation and transfer Application of bandages and use of emergency kits
5	**PSSR - Personal Safety and Social Responsibility** Terminology and related maritime English terms Safety concept and Emergencies onboard. Types of Emergencies Ship emergency plans and alternative contingency planning Emergency alarm systems and sound signals. Muster Stations, Muster Lists, and Emergency Duties
6	**PSSR – Personal LSA, Mustering and Emergency Procedures** Terminology and related maritime English terms Mustering and correct use of personal life-saving appliances Immediate actions in emergency and response procedures Escape routes, internal communications, and alarm systems
7	**PSSR - Environmental Protection at Sea** Terminology and related maritime English terms Effects of shipping and pollution on marine ecosystems Pollution prevention and the measures of pollution prevention MARPOL, Annexes, Special Areas and restrictions Content of Oil and Garbage Record Books,
8	**PSSR – Personal Safety and Safe Working Practice Onboard** Terminology and related maritime English terms Importance of maintaining safe working practices on board Ship familiarization and nature of onboard hazards Types of Personal Protective Equipment (PPE) and their usage Routine shipboard operations and risks, such as cargo, mooring, engine, and maintenance operations Work permits, enclosed space entry, working at height, and hot-work procedures
9	**PSSR - Teamwork, Human Relations, and Fatigue Management** Terminology and related maritime English terms

	Importance of language, communication skills, and methods to maintain effective communication. Shipboard routines, watchkeeping procedures, and command structure on board a vessel Maintaining effective human relationships and conflict resolution Social responsibilities, personal rights, and obligations onboard Importance of self-discipline and shipboard discipline
10	**PSSR - Teamwork, Human Relations, and Fatigue Management** Terminology and related maritime English terms Prevention and response to gender, minority, violence, and harassment issues on board Importance of nutrition, health, and hygiene onboard Effects of alcohol and drugs on seafarers and their dangers Fatigue recognition and management: effects of sleep, schedules, and physical stress
11	**Ship Security Familiarization** Terminology and related maritime English terms Introduction to ISPS Code and onboard security procedures Identifying security breaches and potential threats (piracy, armed robbery) Basic shipboard security procedures
12	**Ship Security Familiarization and Ship Security Awareness** Terminology and related maritime English terms Duties and responsibilities of the Governments, Companies, Ships, Port Facilities, the Master, and crew members Company Security Officer, Ship Security Assessment, Ship Security Plan, Ship Security Officer, Port Facility Security Plan, Port Facility Security Officer, Declaration of Security, and their relationships Introduction to Security Levels
13	**Ship Security Awareness and Designated Duties** Terminology and related maritime English terms Security Levels, Procedures, and Applications Security training and drills, national and international procedures Reporting and managing security threats
14	**Security Risk Identification and Threat Recognition** Terminology and related maritime English terms Recognizing methods and techniques used to cause security threats Identifying potential threats, including weapons, hazardous materials, and suspicious devices Handling security-related communication and information
15	**Use of Security Equipment and Systems** Terminology and related maritime English terms Familiarity with ship security systems and hardware Testing, calibrating, and maintaining security equipment Response to piracy and armed robbery incidents

Methods and Techniques used in the Course

Lectures and Interactive Discussions:

- Presentation of theoretical concepts related to maritime safety and security, emergency procedures, and emergency procedures.
- Encouraging active participation and Q&A sessions to deepen understanding.

Practical Demonstrations and Simulations:

- Hands-on training in first aid, personal lifesaving equipment, and emergency response.
- Use of simulated accident scenarios, emergency drills, and onboard equipment demonstrations.

Case Studies and Problem-Solving Exercises:

- Analysis of real maritime incidents to understand causes, preventive measures, and response strategies.
- Group exercises to develop decision-making and critical thinking skills during emergencies.

Use of Multimedia and E-Learning Tools:

- Instructional videos, interactive e-learning modules, and digital resources to illustrate safety procedures and equipment use.

Teamwork and Role-Playing Activities:

- Role assignment in emergency scenarios to practice coordination, communication, and leadership under pressure.

Assessments and Feedback:

- Regular evaluation of practical skills, knowledge tests, and drills.
- Immediate feedback and reflection sessions to improve performance and understanding.

Integration with International Standards:

- Training aligned with IMO, SOLAS, MARPOL, STCW, and ISPS Code requirements for maritime safety and security.

Sample Questions

First Aid & Emergency Response:

- Describe the steps you would take to assess a casualty after a fire on board.
- Explain how to control severe bleeding and manage shocks until further medical assistance is available.
- What is the correct procedure for performing CPR on an unconscious person in a maritime environment?

Shipboard Safety & Personal Protection:

- List the key personal protective equipment used on a ship and explain their purpose.
- What are the designated assembly stations during an emergency, and what procedures should be followed upon hearing the general alarm?

Marine Pollution Prevention:

- Explain the measures a crew member must take to prevent operational oil pollution.
- How does the MARPOL convention regulate shipboard oil pollution, and what are the consequences of non-compliance?

Fatigue Management & Human Factors:

- Discuss the effects of fatigue on shipboard operations and decision-making.
- What strategies can be employed to manage fatigue during extended watchkeeping periods?

Maritime Security & Threat Recognition:

- Describe the procedures to follow if a ship is threatened by piracy or armed robbery.
- Explain the purpose and use of the Ship Security Alert System (SSAS).
- Identify the potential security threats in the port and explain how to mitigate them.

Teamwork & Communication:

- Provide an example of an effective communication strategy during an onboard emergency.
- Discuss the importance of teamwork in managing onboard emergencies.

Practical Applications:

- Using a hypothetical scenario, demonstrate how to implement an emergency evacuation plan on a cargo ship.
- Explain how to verify the operational readiness of shipboard security equipment, such as CCTV, alarms, or access controls.

Materials Used in the Course

Textbooks and Reference Books

- Lecturer Notes, Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- SOLAS Consolidated Edition, MARPOL Practical Guide, ISPS Guidelines, LSA Code, PSSR Workbook, The Ultimate Guide to Personal Safety on Ships, International Medical Guide for Ships
- Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- Maritime Safety textbooks covering personal safety and protective equipment, shipboard emergency procedures, personal survival techniques, and pollution prevention, including SOLAS, MARPOL, STCW, ISPS Code, LSA Code, and Medical Guide for Ships
    - SOLAS Consolidated Edition
    - MARPOL Practical Guide
    - ISPS Guidelines
    - LSA Code
    - PSSR Workbook
    - The Ultimate Guide to Personal Safety on Ships
    - International Medical Guide for Ships

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.
- Mannequins and CPR training devices for first aid and life-saving practice.
- Personal Safety Equipment, including Life Jacket, Life Buoy, Immersion Suits, and TPAs.
- Personal protective equipment (PPE) such as helmets, gloves, and goggles.

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 **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	3	3	3	x	x
PO2	3	3	3	2	2	2	2	2	x	x
PO3	3	3	3	3	3	3	3	3	x	x
PO4	3	3	2	2	2	2	2	2	x	x
PO5	3	3	3	3	3	3	3	3	x	x
PO6	3	3	3	3	3	3	3	2	x	x
PO7	3	3	3	3	3	3	3	2	x	x
PO8	3	3	3	3	3	3	3	2	x	x
PO9	3	2	2	1	1	1	1	1	x	x
PO10	3	3	3	3	3	3	3	3	x	x
PO11	3	3	3	3	3	3	3	3	x	x
PO12	3	3	3	3	3	3	3	2	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
LO6	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment
LO7	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment
LO8	Lectures, Practical Applications, Case Studies, and Discussions	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	-	-	-
In-class Discussion(s)	**15**	**1**	**15**
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
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			**95**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	1	10
Laboratory	-	-
Application	1	25
Field Work (Class Work)	-	-
Special Course Internship (Work Placement)	-	-
Assignment(s)/Homework/Class Works	1	15
Providing reliability and motivation of the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	-	-
Quiz	-	-
Midterms/Oral Exams	1	20
Final/Oral Exams	1	30
Total	**5**	**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! • Students are expected to check the instructor's web page frequently for the course announcements. • The 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: Seamanship I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
SEA101	I	Fall	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** Faculty of Maritime Studies Wednesday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 cagri.deliceirmak@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides students with a fundamental understanding of seamanship and ship structure, focusing on the types, classification, components, and equipment of ships, as well as crew duties and responsibilities. Topics include ship types and dimensions, tonnage measurements, nautical measurements, structural elements, and deck fittings. The course also covers shipboard organization, crew duties, and traditions of life at sea. Additionally, students will gain familiarity with English maritime terminology, enabling them to communicate effectively in an international maritime environment. By combining theoretical knowledge with applied terminology, the course aims to build a solid foundation for future professional practice in navigation, engineering, and maritime operations.
Course Aims and Objectives	The primary aim of this course is to introduce students to the fundamental principles of seamanship and ship structure, while developing their understanding of ship types, components, operations, and maritime terminology in English. • Comprehend the classification, categories, and dimensions of ships, including the concept of tonnage. • Acquire a comprehensive understanding of the nautical measurements, units, and directions utilized in maritime contexts. • Identify and describe the structural components of ships, including the hull, decks, bulkheads, superstructures, fittings, and framing systems. • Identify the duties and responsibilities of shipboard personnel and understand shipboard organization and traditions. • Cultivate proficiency in utilizing and understanding English maritime terminology associated with ship components, operations, and seamanship. • Acquire practical awareness of safe working practices and shipboard routines. • Establish a foundation for advanced study and professional application in navigation, engineering, and maritime operations.
Course Learning Outcomes	**LO1**: Identify and classify ships according to their types, functions, and structural characteristics. **LO2**: Recognize ship classification by categories, dimensions, and tonnage concepts, and relate them to ship design and operational capacity. **LO3**: Demonstrate knowledge of nautical units, measurements, and directions. **LO4**: Describe the primary structural components of a vessel, including the hull, decks, bulkheads, superstructures, deck fittings, framing systems, and other relevant elements, employing appropriate maritime terminology. **LO5**: Demonstrate an understanding of shipboard organization, including the hierarchy, responsibilities of officers and ratings, and the overall crew structure. **LO6**: Utilize English maritime terminology proficiently in references to ship components, seamanship operations, and onboard communication. **LO7**: Demonstrate safe working practices and routines onboard, while demonstrating awareness of seamanship traditions and professional conduct. **LO8**: Integrate seamanship knowledge as a foundation for advanced navigation, construction, ship handling, and maritime operations.

Content of the Course

Week	*Subject*
1	**Introduction to Seamanship** Terminology and related maritime English terms Definition of seamanship and its historical development Importance of seamanship in maritime operations Basic maritime terminology
2	**Types and Classification of Ships** Terminology and related maritime English terms Definition and classification of ships Merchant, naval, and service vessels Human-powered, sailing, and motor-driven craft
3	**Types and Classification of Ships** Terminology and related maritime English terms Cargo Ship types, dimensions, and classifications Tanker types, dimensions, and classifications Bulk Carrier types, dimensions, and classifications
4	**Types and Classification of Ships** Terminology and related maritime English terms Container Ship types, dimensions, and classifications Passenger Ship types, dimensions, and classifications RORO and Special Purpose Ship types, dimensions, and classifications
5	**Types and Classification of Ships** Terminology and related maritime English terms Boats, structure, accessories, and equipment Varieties of sailing boats and their characteristics Types of sails and sail parts Masts, spars, and rigging terminology
6	**Directions on Ships** Terminology and related maritime English terms Directions aboard the ship: port, starboard, forward, aft, and midship Directions about the ships: ahead, astern, bow, and quarters
7	**Structure and Parts of Ships** Terminology and related maritime English terms Hull structure and keel Bulkheads, compartments Cargo holds and hatch covers Superstructure and accommodation Main deck and other decks Navigation bridge, Funnel, and engine casing Masts and parts of masts
8	**Structure and Parts of Ships** Terminology and related maritime English terms Engine Room Main and Auxiliary engines Propeller, Rudder, and Thrusters Tanks and pipelines

	Steering gear room, stores, and lockers Cofferdams, duct-keel, and tunnels
9	**Structure and Parts of Ships** Terminology and related maritime English terms Keel, bulkheads, and Shell plating Frames and framing systems Longitudinal and transverse frames Deck fittings Manholes, watertight doors Ventilation and fan systems Gangways, ladder, and accommodation ladders
10	**Load Lines** Terminology and related maritime English terms Load lines International load line zones Load-lines Marks or Plimsol Marks, Tonnage concepts Measurement standards
11	**Tonnage Measurements of Ships** Terminology and related maritime English terms Tonnage measurements Gross tonnage, Net tonnage, Long Ton, Short Ton, and Metric Ton Deadweight, Displacement, Light Displacement Draft and draft marks
12	**Nautical Measurements** Terminology and related maritime English terms Length and Speed measurements Weight and Volume measurements Other nautical measurements
13	**Shipboard Organization and Crew Structure I** Shipboard organizational and management structure The Master and crew, definition Duties and Responsibilities of the Master, Officers, and Engineers Duties and responsibilities of the deck, engine, and catering crew
14	**Shipboard Organization and Crew Structure II** Watchkeeping duties and responsibilities International regulations on crew work-rest hours Life on board: rules, traditions, and culture
15	**Review and Final Evaluation** Recap of seamanship, ship types, parts, measurements, and organizational structure Practical assessment and scenario-based exercises Evaluation of student competence in shipboard safety and security operations

Methods and Techniques used in the Course

Lectures & Theoretical Explanations – Instructor-led presentations supported by visual materials to explain ship structures, classifications, and maritime terminology.

Classroom Discussions & Question–Answer Sessions – Interactive sessions to encourage critical thinking and clarification of concepts.

Case Studies & Problem-Solving Activities – Analysis of real-life seamanship scenarios and shipboard operations to enhance decision-making skills.

Practical Demonstrations – Use of ship models, diagrams, and multimedia tools to demonstrate structural elements, equipment, and seamanship practices.

Collaborative Learning – Group assignments and peer discussions to promote teamwork and communication using maritime terminology.

Simulation-Based Learning (where applicable) – Application of ship handling and navigation software, or bridge simulators, to reinforce theoretical knowledge.

Terminology Drills & Exercises – Practice of English maritime terms to improve professional language competence.

Assignments & Projects – Independent research tasks and written reports to develop analytical and academic writing skills.

Examinations & Quizzes – Assessment methods to measure theoretical understanding and practical application.

Sample Questions

- Explain the function of the keel, frames, and bulkheads in ensuring structural integrity.
- What is the purpose of watertight bulkheads and cofferdams?
- Describe the role of the bridge and engine room in ship operations.
- What is the difference between *gross tonnage (GT)* and *net tonnage (NT)*.
- What are the duties of the deck officers and engine officers?

Materials Used in the Course

Textbooks and Reference Books

- Lecturer Notes, Related IMO Model Courses, and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- SOLAS Consolidated Edition, Introduction to Naval Architecture, Ship Construction, Seamanship Techniques: Shipboard and Marine Operations, The Annapolis Book of Seamanship.

Supplementary Resources

- Instructional videos demonstrate seamanship techniques, and ship construction.
- Online resources from the International Maritime Organization (IMO) and maritime safety training platforms.
- Training ship

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

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Program Outcomes /Course Learning Outcomes Matrix **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	3	3	3	x	x
PO2	3	3	3	3	2	3	3	3	x	x
PO3	3	3	3	3	3	3	3	3	x	x
PO4	3	3	3	3	2	3	3	3	x	x
PO5	2	2	3	2	3	2	2	2	x	x
PO6	3	3	3	3	3	3	3	3	x	x
PO7	3	3	3	3	3	3	3	3	x	x
PO8	2	2	2	2	3	2	2	2	x	x
PO9	1	1	1	1	1	1	1	1	x	x
PO10	3	3	3	3	3	3	3	3	x	x
PO11	2	2	2	2	3	2	2	2	x	x
PO12	3	3	3	3	3	3	3	3	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
LO6	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment
LO7	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment
LO8	Lectures, Practical Applications, Case Studies, and Discussions	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	-	-	-
In-class Discussion(s)	**15**	**1**	**15**
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	**2**	**5**	**10**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**97**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	1	10
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Assignment(s)/Homework/Class Works	2	20
Providing reliability and motivation for the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	-	-
Quiz	-	-
Midterms/Oral Exams	1	30
Final/Oral Exams	1	40
Total	**5**	**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! • Students are expected to check frequently the instructor's web page for the course announcements. • University of Kyrenia honor code will be strictly enforced regarding any issues concerning cheating.		