University of Kyrenia

Maritime Vocational School

Ship Machinery

Syllabus

Course name: First Aid and Medical Care							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
FMC202	II	Spring	3	3	2	2	0
Course type: Compulsory Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				30	-	-	70
Course Venue and Time				Tuesday / 08:30 – 12:20			
Instructor information				**Uz.Dr. Kasım Bozgeyik** Faculty of Maritime Studies Wednesday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 kasim.bozgeyik@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides comprehensive knowledge and practical skills in maritime first aid and medical care. It covers the fundamentals of human anatomy, common illnesses, and the use of medicines in a maritime context, with a focus on effective communication in medical emergencies. Students will learn to apply first aid techniques in cases of injury, illness, poisoning, burns, fractures, and environmental effects, as well as to provide extended medical care on board until professional assistance becomes available. The course also introduces international medical references such as the International Medical Guide for Ships (IMGS), the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), and the medical pages of the International Code of Signals. Emphasis is placed on the prevention of diseases, maintaining hygiene on board, record-keeping, and compliance with international maritime medical regulations. Practical skills, including patient examination, wound treatment, suturing, bandaging, pharmacology, sterilization, and radio-medical communication, are developed to prepare students for real-life medical emergencies at sea. The course will be conducted in accordance with the IMO Model Courses 1.14, and 1.15, as well as the national regulation “Egitim Sinav Yonergesi 2025” of the Turkish Republic. Successful students will obtain mandatory STCW certificates of (1); Medical First Aid, (2); Medical Care.
Course Aims and Objectives	The primary aim of this course is to equip students with the essential knowledge, skills, and competencies necessary to deliver effective first aid and medical care on board ships, in accordance with international maritime standards and guidelines. The course prepares students to respond appropriately to medical emergencies, manage injuries and illnesses, and apply preventive healthcare measures in maritime environments. • Comprehend the fundamental framework and roles of the human body concerning first aid and medical treatment. • Communicate effectively in English during medical emergencies, utilizing international codes, guides, and telemedical support. • Identify and respond to common injuries, such as fractures, burns, wounds, and spinal trauma, with proper first aid techniques. • Ensure the application of appropriate procedures during life-threatening emergencies, including cardiopulmonary resuscitation (CPR), drowning incidents, and asphyxia cases. • Utilize the Medical First Aid Guide (MFAG) and other international medical references for handling hazardous materials and poisoning cases. • Provide medical care for both acute and chronic medical conditions, including infectious and tropical diseases. • Deliver specialized care for patients with gynecological, obstetric, dental, and mental health conditions on board. • Implement preventive health measures, including hygiene, vaccination, disinfection, and environmental control on ships. • Maintain precise medical records in accordance with international and national maritime regulations.

	• Cooperate effectively with external medical services, including radio medical advice, medical evacuation, and port health authorities.
Course Learning Outcomes	**LO1**: Describe the structure and functions of the human body that are important for first aid and medical care. **LO2**: Demonstrate effective communication in English during medical emergencies by employing standard medical terminology, adhering to the International Code of Signals, and utilizing telemedical procedures. **LO3**: Identify and assess symptoms associated with common injuries and illnesses, such as burns, fractures, spinal injuries, bleeding, and shock. **LO4**: Carry out fundamental first aid procedures, such as cardiopulmonary resuscitation (CPR), wound management through dressing and bandaging, immobilization of fractures, and patient transportation methodologies. **LO5**: Implement suitable medical interventions in instances of poisoning, hazardous material exposure, and other onboard health hazards in accordance with the Medical First Aid Guide (MFAG). **LO6**: Oversee patient care onboard for both acute and chronic medical conditions, including tropical, infectious, and sexually transmitted diseases. **LO7**: Provide emergency medical assistance for exceptional cases, including pregnancy, childbirth, dental emergencies, and psychological conditions. **LO8**: Implement preventive health and hygiene measures, including vaccination, disinfection, pest control, and environmental monitoring on board. **LO9**: Maintain accurate medical records and documentation in compliance with international and national maritime medical regulations. **LO10**: Collaborate with external medical services for radio medical advice, medical evacuation, and coordination with port health authorities.

Content of the Course

Week	*Subject*
1	**Introduction to Maritime First Aid and Medical Communication** Terminology and related maritime English terms Overview of medical communication in English Anatomy of the human body and basic terminology
2	**Diseases, Medicines, and Medical Communication at Sea** Terminology and related maritime English terms Common illnesses and medications Communication procedures in medical emergencies
3	**International Medical Documentation and Guides** Terminology and related maritime English terms International Code of Signals (Medical Pages) International Medical Guide for Ships (IMGS) and related publications
4	**Fundamentals of First Aid on Board** Terminology and related maritime English terms Immediate first aid in case of accident or illness Shipboard first aid kit: content and usage
5	**Anatomy, Physiology, and Toxic Hazards** Terminology and related maritime English terms Structure and functions of the human body Use of MFAG (Medical First Aid Guide for Accidents Involving Dangerous Goods) Toxic hazards on board
6	**Patient Examination and Emergency Scenarios** Terminology and related maritime English terms Examination of casualties Spinal injuries, burns, scalds, effects of heat and cold
7	**Musculoskeletal and Respiratory Emergencies** Terminology and related maritime English terms Fractures, dislocations, muscle injuries Heart attack, drowning, asphyxia
8	**Pharmacology and Sterilization in Shipboard Medical Care** Terminology and related maritime English terms Principles of pharmacology Sterilization and infection control
9	**Medical Care on Board – Trauma and Injuries** Terminology and related maritime English terms Head and spinal injuries ENT and eye injuries External and internal bleeding Wound management and infection prevention
10	**Medical Care on Board – Trauma and Injuries** Terminology and related maritime English terms Head and spinal injuries ENT and eye injuries External and internal bleeding Wound management and infection prevention
11	**Medical Care on Board – Clinical Cases**

	Terminology and related maritime English terms Burns, cold injuries, fractures, and acute abdominal diseases Pain management, suturing, and bandaging techniques Minor surgical treatments
12	**Hygiene, Sanitation, and Preventive Medicine** Terminology and related maritime English terms Hygiene practices on board Disinfection, fumigation, rat control Vaccination and disease prevention
13	**Records, Regulations, and External Assistance** Terminology and related maritime English terms Medical record-keeping International and national maritime medical regulations External medical assistance and coordination Radio medical advice and its application
14	**Records, Regulations, and External Assistance** Terminology and related maritime English terms Medical record-keeping International and national maritime medical regulations External medical assistance and coordination Emergency evacuation and transportation of the patient with helicopters or any other vehicles
15	**Review, Case Studies, and Final Assessment** Integrated medical scenarios Case study discussions (injuries, diseases, evacuations) Course wrap-up and final evaluation

Methods and Techniques used in the Course

Lectures & Multimedia Presentations – Theoretical concepts related to anatomy, medical conditions, and first aid procedures are taught with visual aids, slides, and videos.

Classroom Discussions & Case Studies – Students analyze real-life maritime medical incidents to enhance problem-solving and decision-making skills.

Demonstrations & Practical Exercises – First aid techniques such as CPR, bandaging, fracture immobilization, and patient transport are demonstrated and practiced in a controlled environment.

Simulation-Based Training – Use of medical manikins, emergency kits, and shipboard scenarios to simulate accidents, hazardous material exposure, and medical emergencies at sea.

Role-Playing & Communication Drills – Students practice radio medical advice, use of International Code of Signals, and medical communication in English.

Group Work & Peer Learning – Collaborative activities to foster teamwork in providing first aid and patient care on board.

Use of Training Manuals & Guidelines – Application of the *Medical First Aid Guide (MFAG)*, *International Medical Guide for Ships (IMGS)*, and national maritime health publications.

Laboratory & Hands-on Training – Practice of sterilization, suturing, wound dressing, and use of medical equipment.

Assessment-Oriented Activities – Quizzes, oral questioning, and scenario-based evaluations to reinforce learning outcomes.

Sample Questions

Multiple Choice Questions (MCQs)

- Which of the following is the primary purpose of the *Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG)*?

  a) To provide guidelines for patient nutrition at sea

  b) To assist in treating illnesses caused by poor hygiene

  c) To provide first aid instructions in cases of hazardous material exposure

  d) To guide the communication protocol with port authorities

- Which of the following is NOT a recommended step when treating a spinal injury on board?

  a) Keep the patient still and immobilize the spine

  b) Move the patient quickly to avoid further injury

  c) Use a rigid stretcher if available

  d) Avoid unnecessary movement of the head and neck

- What is the main purpose of sterilization in medical care on ships?

  a) Pain reduction

  b) Prevention of infection

  c) Faster wound healing

  d) Relief of stress for the patient

Short-Answer Questions

- List three essential items that should be found in a ship's first aid kit.
- Explain the difference between *first aid* and *medical care* on board.
- Identify two common tropical diseases that seafarers should be aware of and describe one method of prevention for each.

Materials Used in the Course

Textbooks and Official Guides

- Lecturer Notes, Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- International Medical Guide for Ships (IMGS), the Medical First Aid Guide for Use in Accidents Involving Dangerous Goods (MFAG), and the medical pages of the International Code of Signals.

Supplementary Resources

- Instructional videos
- Interactive simulations
- Standard shipboard first aid kits and medical chests.
- Mannequins for CPR and first aid practice.
- Splints, stretchers, bandages, dressings, sterilization, and immobilization devices.
- Simulation equipment for burns, fractures, and trauma care.

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	1	1	1	1	1	1	1	1	1	1
PO2	1	1	1	1	1	1	1	1	1	1
PO3	3	3	3	3	3	3	3	3	3	3
PO4	0	0	0	0	0	0	0	0	0	0
PO5	2	2	2	2	2	2	2	2	2	2
PO6	2	2	2	2	2	2	2	2	2	2
PO7	1	1	1	1	1	1	1	1	1	1
PO8	1	1	1	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1
PO10	3	3	3	3	3	3	3	3	3	3
PO11	2	2	2	2	2	2	2	2	2	2
PO12	2	2	2	2	2	2	2	2	2	2

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	Midterm Exam, Practical Exam, Final Exam, Assignment
LO9	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment
LO10	Lectures, Practical Applications, Case Studies, and Discussions	Midterm Exam, Practical Exam, Final Exam, Assignment

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**2**	**30**
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	**15**	**1**	**15**
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			**87**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	1	10
Laboratory	-	-
Application	1	40
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Assignment(s)/Homework/Class Works	-	-
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	**4**	**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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Maritime Law and Conventions							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
LAW202	II	Spring	4	4	4	0	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Fundamental Legal Knowledge (Core)**	**Legal Method & Reasoning**	**Legal Skills (Research & Writing)**	**General Education**
				60%	20%	10%	10%
Course Venue and Time				E-6016 (14.30 - 17.20)			
Instructor information				**Lect. Halil Emre Gürler** Faculty of Law halilemre.gurler@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides a comprehensive introduction to maritime law, international conventions, and regulations governing the safety, operation, and management of ships at sea. It covers fundamental legal principles, the structure of national and international maritime legislation, and the legal responsibilities of shipowners, captains, and crew members. Students will gain knowledge of essential maritime conventions, including SOLAS, MARPOL, STCW, COLREG, UNCLOS, and related IMO codes, as well as conventions governing liability, compensation, search and rescue, and the transport of passengers and cargo. The course also emphasizes practical applications of maritime law, English terminology for ship documentation, and compliance with national and international regulations, providing students with the legal framework necessary for safe and effective maritime operations.
Course Aims and Objectives	The course aims to provide students with a thorough understanding of the legal framework governing maritime activities, including national and international maritime law, conventions, and regulations. It seeks to equip students with the knowledge and skills necessary to interpret, apply, and comply with maritime legal requirements, ensuring safe, lawful, and efficient ship operations. • Explain the fundamental principles, sources, and types of law, including international and national legal systems. • Define and classify maritime law, including its scope, purpose, and key components. • Understand the legal responsibilities and authorities of shipowners, captains, crew, and port authorities. • Identify and interpret essential international maritime conventions and regulations (e.g., SOLAS, MARPOL, STCW, COLREG, UNCLOS). • Apply maritime legal knowledge to practical situations, including ship documentation, safety compliance, and cargo operations. • Understand maritime English terminology for legal documents, vessel operations, and cargo management.

	• Recognize legal procedures related to maritime accidents, salvage, liability, and environmental protection. • Demonstrate awareness of national and international regulatory organizations, their roles, and enforcement mechanisms.
Course Learning Outcomes	**CLO1:** Define and explain the fundamental principles, sources, and types of law relevant to maritime operations. **CLO2:** Describe the scope and classification of maritime law, including national and international regulations. **CLO3:** Identify the legal responsibilities, authorities, and obligations of shipowners, captains, crew members, and port authorities. **CLO4:** Interpret and apply major international maritime conventions and protocols, such as SOLAS, MARPOL, STCW, COLREG, UNCLOS, and ILO Maritime Labour Convention. **CLO5:** Demonstrate the ability to read, understand, and use maritime English terminology in legal, operational, and cargo documentation. **CLO6:** Analyze maritime incidents, including collisions, salvage operations, and pollution events, and determine the legal implications and applicable conventions. **CLO7:** Evaluate compliance requirements for ship certification, documentation, and inspection processes under national and international law. **CLO8:** Apply knowledge of maritime law to practical scenarios, including cargo handling, vessel operations, and environmental protection measures. **CLO9:** Communicate effectively with stakeholders using internationally recognized maritime legal terminology.

Content of the Course

Week	*Subject*
1	**Introduction to Law** • Definition, sources, and types of law • Fundamental principles of law • Basic legal terminology • International law vs. national law: applications and sanctions
2	**Introduction to Maritime Law** • Definition and classification of maritime law • Key principles of international maritime law • Structure and sources of national maritime legislation
3	**Maritime Safety and Legal Requirements** • Laws on the protection of life and property at sea • Seafarers' employment rights and obligations (Maritime Labour Law) • Role, authority, and responsibilities of the ship captain
4	**Ship Documentation and Records** • Definition and types of ships and seaworthiness requirements • Mandatory onboard documents and records • Maritime accidents, collisions, and general average
5	**Maritime Administration and English Terminology** • National maritime organizations and regulations • International maritime organizations and conventions • Ship inspection and certification procedures • Insurance terminology and claims
6	**English for Ship and Cargo Documentation** • Deck documents and port documents • Cargo-related documentation in English
7	**Introduction to International Maritime Organization (IMO)** • IMO structure, committees, and functions • General Assembly, Council, Committees, and Secretariat
8	**SOLAS and Related Codes** • SOLAS 1974 and Protocols (1978, 1988) overview • Related codes: IBC, IMSBC, LSA, FSS, ISM, ISPS, IMDG, FTP, HSC, IGC, INF, BCH • IAMSAR Volume III and International Code of Signals
9	**MARPOL and Pollution Prevention Conventions** • MARPOL 1973 and Protocol 1997 • Annexes and record books: Oil Record, Garbage Record, Sulphur Content Monitoring, Ballast Water • Introduction to environmental protection at sea

10	**Key International Conventions** • UNCLOS 1982 (United Nations Convention on the Law of the Sea) • STCW 1978 and its amendments • COLREG 1972 (Collision Regulations) • Load Line Conventions (LL 1966, LL Protocol 1988) • Tonnage Measurement 1969
11	**Maritime Labour and Safety Codes** • ILO Maritime Labour Convention 2006 • IMO Codes of Safe Practice: CSS, BLU, TDC, OSV • FAL 1965: ship and port declarations, crew and passenger lists, dangerous goods
12	**Maritime Labour and Safety Codes** • ILO Maritime Labour Convention 2006 • IMO Codes of Safe Practice: CSS, BLU, TDC, OSV • FAL 1965: ship and port declarations, crew and passenger lists, dangerous goods
13	**Liability and Compensation Conventions** • CLC 1969 and CLC Protocol 1992 • FUND 1971 and FUND Protocol 2003 • HNS 1996 (Hazardous and Noxious Substances) • OPRC-HNS 2000 Protocol
14	**Liability and Compensation Conventions** • CLC 1969 and CLC Protocol 1992 • FUND 1971 and FUND Protocol 2003 • HNS 1996 (Hazardous and Noxious Substances) • OPRC-HNS 2000 Protocol
15	**Suppression of Unlawful Acts and Final Review** • SUA 1988 and Protocol 2005 (Suppression of Unlawful Acts Against Maritime Navigation) • Summary and integration of maritime conventions • Case studies and discussion of practical implications

Methods and Techniques used in the Course

Lectures and Presentations: Instructor-led theoretical sessions supported with visual materials and case examples.

Classroom Discussions: Interactive discussions to encourage critical thinking and deeper understanding of maritime legal issues.

Case Study Analysis: Examination of real-life maritime incidents, accidents, and disputes to apply relevant conventions and legal principles.

Document and Convention Review: Practical exercises on reading, interpreting, and analyzing international conventions, ship documents, and legal texts.

Problem-Solving Exercises: Scenario-based activities requiring application of maritime law to operational and legal problems.

Group Work and Presentations: Collaborative tasks where students prepare and present analyses of selected maritime law topics.

Simulation and Role-Play: Mock legal or operational exercises (e.g., collision responsibility, salvage agreement, or port authority inspection) to practice real-world applications.

Use of Maritime English Terminology: Emphasis on practicing and applying specialized English vocabulary in written and oral form.

Independent Study and Research: Assignments and projects requiring students to explore maritime legal resources, conventions, and academic literature.

Sample Questions

Short Answer / Definition Questions:

- Define the term *avarya (general average)* and explain its significance in maritime law.
- What are the main sources of maritime law at both national and international levels?
- Briefly describe the duties and responsibilities of a shipmaster under international maritime law.
- What is the primary purpose of the *International Convention on Load Lines (1966)*?
- List the essential ship certificates required to be carried on board under SOLAS.

Essay / Long Answer Questions:

- Discuss the role and structure of the **International Maritime Organization (IMO)** and explain how its conventions influence national maritime legislation.
- Explain the legal consequences of a collision at sea under the **COLREG 1972** Convention, including the allocation of liability.
- Analyze the scope and application of **MARPOL 73/78** with specific reference to oil pollution prevention measures.
- Evaluate the impact of the **STCW 1978 Convention** on the training and certification of seafarers.
- Compare and contrast the concepts of *salvage* and *towage* in maritime law.

Problem-Solving / Case Study Questions:

- A cargo ship suffers a fire at sea and jettisons part of its cargo to save the vessel. Discuss the legal implications for the shipowner and cargo owners under the principle of general average.
- A tanker collides with another vessel in international waters, causing oil pollution. Apply the relevant conventions (COLREG, CLC, MARPOL) to determine liability and possible compensation mechanisms.
- During a port inspection, authorities discover that a vessel's *Garbage Record Book* has not been properly maintained. Identify the applicable convention and discuss potential consequences for the ship and the master.
- A seafarer claims his employment contract has been violated under the Maritime Labour Convention (MLC 2006). Discuss the rights and remedies available to the seafarer.
- A ship is detained at a foreign port due to deficiencies in its safety equipment. Explain which international conventions and codes may apply to this case.

Materials Used in the Course

Primary References:

- International Maritime Organization (IMO) Conventions and Protocols:
  - SOLAS 1974 (International Convention for the Safety of Life at Sea)
  - MARPOL 73/78 (International Convention for the Prevention of Pollution from Ships)
  - COLREG 1972 (Convention on the International Regulations for Preventing Collisions at Sea)
  - STCW 1978 (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers)
  - UNCLOS 1982 (United Nations Convention on the Law of the Sea)
  - LL 1966 (Load Line Convention) and 1988 Protocol
  - ILO Maritime Labour Convention, 2006 (MLC 2006)
  - Other relevant IMO codes (ISM, ISPS, IMDG, LSA, FSS, CSS, BLU, TDC, OSV Codes, etc.)

Secondary References:

- Özdemir, H. (Latest Edition). *Maritime Law: National and International Perspectives.*
- Berlingieri, F. *International Maritime Conventions.*
- Mukherjee, P.K., & Brownrigg, M. *Farthing on International Shipping.*
- Churchill, R.R., & Lowe, A.V. *The Law of the Sea.*
- Tetley, W. *Marine Cargo Claims.*

IMO Publications:

- International Code of Signals (INTERCO)
- IAMSAR Manual (Vol. III)
- Oil Record Book, Garbage Record Book, Ballast Water Record Book
- IMO Safety and Environmental Circulars

Legislation and Regulations:

- National Maritime Legislation (relevant laws, regulations, and decrees)
- Port State Control guidelines and procedures
- Case law and judicial precedents in maritime law

Supplementary Materials:

- Lecture slides and course notes prepared by the instructor
- Case studies and practical scenarios from real maritime incidents
- Legal documents such as bills of lading, charter parties, crew contracts, insurance policies
- Access to IMO's online databases and digital libraries

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**	
PO1	2	2	1	1	2	1	3	3	1	
PO2	2	2	1	2	2	1	2	2	2	
PO3	2	3	2	1	2	1	1	3	3	
PO4	2	2	3	3	3	2	2	2	2	
PO5	1	2	2	2	3	3	2	2	1	
PO6	3	3	3	3	3	2	3	3	2	
PO7	2	2	2	2	1	2	3	3	2	
PO8	1	2	2	2	2	1	1	3	3	
PO9	2	2	2	3	2	2	2	3	3	
PO10	3	3	3	3	3	3	3	3	3	
PO11	2	2	2	2	3	3	3	2	2	
PO12	2	3	3	3	3	3	3	2	2	

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Fundamental Principles of Maritime Law	Lecture, Multimedia Presentation, Case Studies	Quizzes, Assignments, Participation
CLO2 – Scope & Classification of Maritime Law	Lecture, Group Discussions, Tutorials	Quizzes, Written Assignments, Midterm Exam
CLO3 – Legal Responsibilities of Stakeholders	Case Studies, Role-Playing, Problem-Based Learning	Assignments, Observation, Practical Exercises
CLO4 – International Maritime Conventions	Lecture, Workshops, Simulation Exercises	Assignments, Midterm Exam, Practical Case Analysis
CLO5 – Maritime English Terminology in Legal Contexts	Lecture, Guided Practice, Document Analysis	Written Exercises, Quizzes, Assignments
CLO6 – Analysis of Maritime Incidents	Case Studies, Scenario-Based Learning, Group Work	Practical Case Reports, Assignments, Participation
CLO7 – Compliance & Certification Requirements	Lecture, Tutorials, Simulation	Assignments, Quizzes, Practical Exercises
CLO8 – Application of Maritime Law in Operations	Problem-Based Learning, Simulation, Workshops	Case Study Reports, Practical Exams, Assignments
CLO9 – Communication Using Maritime Legal Terminology	Role-Playing, Group Exercises, Presentations	Oral Presentations, Assignments, Observation

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**4**	**60**
Midterm Exam	**1**	**2**	**2**
Preparation for Midterm Exam	**1**	**15**	**15**
Final Exam	**1**	**2**	**2**
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)	**15**	**1**	**15**
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	**1**	**10**	**10**
Individual Reading / Research	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**139**
ECTS Credit			**4**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	15	10
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Homework/Assignments	1	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	50
Total	**4**	**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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Manufacturing Technology							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC202	II	Spring	3	3	2	2	0
Department: Marine Engineering							
Course type: Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	30	30	20
Course Venue and Time				Wednesday 09.30-12.20			
Instructor information				**Chf. Eng. Volkan Varışlı** 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	The *Manufacturing Technology* course provides a comprehensive introduction to the fundamental principles, processes, and technologies used in modern manufacturing. The course begins with an overview of the role of manufacturing in engineering and industrial production, emphasizing the classification of manufacturing processes and the mechanical behavior of materials under different conditions. Students explore traditional and modern manufacturing techniques, including casting, welding, metal forming, machining, and additive manufacturing. Throughout the course, special attention is given to the scientific principles underlying each process—such as material flow, heat transfer, and stress–strain relationships—as well as process design considerations like quality control and defect prevention. Advanced topics include rolling, forging, extrusion, sheet metal forming, and joining technologies, along with a discussion of process selection in modern production systems. By the end of the course, students will have a solid foundation in the theory and practical aspects of manufacturing processes, preparing them for further study and professional application in materials engineering, production, and mechanical design.
Course Aims and Objectives	The primary aim of this course is to provide students with a fundamental understanding of the principles, processes, and technologies involved in manufacturing engineering. The course focuses on developing the ability to analyze, evaluate, and select appropriate manufacturing methods for various materials and engineering applications. • Introduce the basic concepts and classifications of manufacturing processes and their role in modern engineering systems. • Explain the mechanical and physical behavior of materials during different manufacturing operations. • Examine the fundamental principles, equipment, and parameters of key manufacturing processes such as casting, welding, forming, and machining. • Develop students' analytical skills to assess process efficiency, accuracy, and quality control in manufacturing.

	• Familiarize students with the emerging trends and innovations in manufacturing technologies, including additive manufacturing and automation. • Encourage an integrated understanding of design, materials, and production to optimize manufacturing systems. • Prepare students for advanced coursework and professional practice in manufacturing, mechanical design, and industrial engineering.
Course Learning Outcomes	**CLO1 – Understand Fundamental Manufacturing Concepts** Define the fundamental concepts and classifications of manufacturing processes and explain their role in engineering applications. Describe the mechanical behavior of materials under various manufacturing conditions, including deformation, heat transfer, and phase transformations. **CLO2 – Explain Manufacturing Processes and Techniques** Explain the principles, tools, and techniques used in major manufacturing processes such as casting, welding, forming, machining, and additive manufacturing. Demonstrate awareness of modern developments in sustainable and digital manufacturing technologies. **CLO3 – Analyze Process Parameters and Material Behavior** Analyze the effects of process parameters on product quality, material properties, and manufacturing efficiency. Compare and evaluate different manufacturing methods based on material type, design requirements, and economic considerations. **CLO4 – Interpret Data and Solve Manufacturing Problems** Interpret process-related data and apply problem-solving approaches to identify and mitigate defects in manufacturing operations. **CLO5 – Apply Knowledge in Case Studies and Practical Situations** Apply theoretical knowledge to practical examples and case studies related to production systems and process selection. **CLO6 – Integrate Design, Material, and Process Knowledge** Integrate design, material, and process knowledge to make informed decisions in manufacturing planning and product realization.

Content of the Course

Week	*Subject*
1	Introduction to Manufacturing and its Role in Engineering
2	Classification of Manufacturing Processes
3	Overview of Material Behavior in Manufacturing
4	Casting Processes: Fundamentals and Techniques
5	Casting Processes: Molding, Solidification, and Defects
6	Welding and Joining Processes: Principles and Type
7	Midterm Exam
8	Metal Forming: Fundamentals and Stress–Strain Relationships
9	Metal Forming: Rolling and Forging
10	Metal Forming: Extrusion, Drawing, and Sheet Metal Forming
11	Machining and Cutting Mechanics
12	Additive Manufacturing: Concepts and Techniques
13	Other Manufacturing Processes
14	Modern Manufacturing Systems and Process Selection
15	Final Exam

Methods and Techniques Used in the Course

Lectures and Multimedia Presentations:

Core theoretical concepts are delivered through structured lectures supported by visual aids, videos, and digital animations to illustrate complex manufacturing processes such as casting, welding, and metal forming.

Interactive Discussions and Problem-Solving Sessions:

Students are encouraged to participate in classroom discussions and engage in analytical problem-solving activities to enhance conceptual understanding and critical thinking.

Case Studies and Industrial Examples:

Real-world case studies and examples from contemporary manufacturing industries are examined to bridge the gap between theory and practice.

Laboratory Demonstrations and Simulations:

Demonstrations of manufacturing processes and the use of computer-based simulations provide practical insights into process mechanics, parameter control, and defect analysis.

Assignments and Technical Reports:

Students prepare written assignments and technical reports focused on specific manufacturing processes, enabling them to develop technical writing and analytical skills.

Midterm and Final Examinations:

These assessments evaluate students' comprehension of theoretical principles, analytical capabilities, and ability to apply knowledge to solve engineering problems.

Supplementary Readings and Research Reviews:

Selected academic papers and reference materials are assigned to promote independent learning and awareness of emerging manufacturing technologies.

Sample Questions

Theoretical Questions

- Define manufacturing and explain its role in modern engineering design and production systems.
- Describe the major categories of manufacturing processes and provide examples of each.
- Explain the solidification process in metal casting and discuss the factors affecting casting defects.
- Compare and contrast the different types of welding and joining processes used in the manufacturing industry.
- Explain the stress–strain relationship in metal forming and how it affects process selection.

Analytical / Problem-Solving Questions

- A steel casting has a volume of 0.02 m^3 and a density of 7800 kg/m^3. Calculate the total solidification time if the mold constant $C_m = 4.0 \times 10^{-4} s/mm^2$ and the ratio $(V/A)^2 = 1200 mm^2$.
- Determine the rolling load for a 2-high rolling mill with known material properties, roll diameter, and reduction percentage.
- A sheet metal part undergoes drawing and extrusion. Discuss the major stresses acting during each process and methods to minimize defects.
- In a given welding process, analyze the heat input and predict how it influences the microstructure and mechanical properties of the welded joint.

Conceptual / Application Questions

- Discuss the advantages and limitations of additive manufacturing compared to conventional machining.
- Explain how modern manufacturing systems integrate computer-aided design (CAD) and computer-aided manufacturing (CAM) technologies.
- Identify common causes of defects in casting and welding operations and propose preventive measures.
- Evaluate the environmental and economic implications of process selection in manufacturing systems.

Case Study / Discussion Questions

- Analyze a real-world example of process failure in a casting or welding operation. What corrective actions could have been taken?
- Discuss the future of sustainable and automated manufacturing technologies in the context of Industry 4.0.

Materials Used in the Course

Main Textbooks

- Kalpakjian, S., Schmid, S. R. (2020). *Manufacturing Engineering and Technology* (8th Edition). Pearson Education.
- Groover, M. P. (2021). *Fundamentals of Modern Manufacturing: Materials, Processes, and Systems* (8th Edition). Wiley.

Supplementary References

- Degarmo, E. P., Black, J. T., & Kohser, R. A. (2019). *Materials and Processes in Manufacturing* (12th Edition). Wiley.
- Rao, P. N. (2013). *Manufacturing Technology: Foundry, Forming and Welding* (Vol. 1). McGraw-Hill Education.
- Schey, J. A. (2000). *Introduction to Manufacturing Processes.* McGraw-Hill.
- Budinski, K. G., & Budinski, M. K. (2010). *Engineering Materials: Properties and Selection.* Prentice Hall.

Lecture and Course Materials

- Instructor-prepared lecture notes and digital slides.
- Technical drawings and process diagrams for various manufacturing techniques.
- Case studies and research papers on current manufacturing technologies.
- Process videos and simulations for metal forming, casting, and additive manufacturing.

Laboratory and Practical Resources

- Sample materials for machining, casting, and welding demonstrations.
- Access to manufacturing laboratories equipped with machine tools, 3D printers, and metrology instruments.
- Software tools for computer-aided design (CAD) and computer-aided manufacturing (CAM).

Online and Digital Resources

- Supplementary multimedia resources and animations from textbook publishers.
- Relevant academic databases (ScienceDirect, IEEE Xplore, ASME Digital Library) for research on modern manufacturing trends.
- Online tutorials and technical documentation related to manufacturing processes and materials.

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						
	CLO1	**CLO2**	**CLO3**	**CLO4**	**CLO5**	**CLO6**
PO1	3	3	3	3	2	3
PO2	1	3	2	3	3	3
PO3	2	3	3	3	3	3
PO4	1	3	1	3	3	2
PO5	1	2	3	3	3	3
PO6	1	2	3	3	2	3
PO7	1	1	1	2	2	3
PO8	1	1	2	2	2	3
PO9	1	1	2	3	2	3
PO10	-	-	-	-	-	-
PO11	-	-	-	-	-	-
PO12	-	-	-	-	-	-

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1	Lecture, Multimedia Presentation	Midterm Exam, Final Exam
CLO2	Lecture, Demonstration, Case Studies	Midterm Exam, Final Exam
CLO3	Lecture, Demonstration, Laboratory Activities	Midterm Exam, Lab Report, Final Exam
CLO4	Lecture, Problem-Solving Sessions	Midterm Exam, Assignments, Final Exam
CLO5	Lecture, Case Studies, Group Discussion	Assignment, Midterm Exam, Final Exam
CLO6	Lecture, Case Studies, Project-Based Learning	Project / Assignment, 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)	-	-	-
Case Studies / Critical Thinking	-	-	-
Project Writing	**1**	**4**	**4**
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**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**117**
ECTS Credit			**3**

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

	Percentage	**Course Grade**	**Coefficient**
Grading Policy	90-100	AA	4.0
	85-89	BA	3.5
	80-84	BB	3.0
	75-79	CB	2.5
	70-74	CC	2.0
	60-69	DC	1.5
	50-59	DD	1.0
	49 and below	FF	0.0
	Less than 70% attendance	NA	-
Course Requirements and Policies	• Alerted attendance at the lectures is essential! • 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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Dynamics							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC204	II	Spring	3	5	3	0	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	20	20	40
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	The **Dynamics** course provides an in-depth study of the motion of particles and rigid bodies under the influence of forces, emphasizing the fundamental principles of classical mechanics. Building upon the foundations of statics, this course explores kinematics and kinetics of motion in both linear and rotational systems. Students will examine velocity, acceleration, and force relationships through Newton's Laws of Motion, applying these to various physical systems. Key topics include linear and circular motion, work and energy principles, conservation of energy, impulse and momentum, and the analysis of collisions. Through theoretical lectures, graphical methods, and problem-solving exercises, students will develop the ability to model and analyze real-world dynamic systems. Practical examples from marine and mechanical engineering applications are integrated throughout the course to enhance comprehension and technical application. By the end of the course, students will possess the analytical and computational skills necessary to evaluate and predict the dynamic behavior of mechanical systems, preparing them for more advanced studies in mechanical, marine, and structural engineering.
Course Aims and Objectives	The primary aim of this course is to provide students with a comprehensive understanding of the fundamental laws governing the motion of particles and rigid bodies, enabling them to analyze and solve dynamic problems encountered in engineering systems. The course seeks to strengthen students' ability to connect theoretical mechanics with practical applications, particularly within marine and mechanical engineering contexts. **Objectives:** • To introduce the fundamental concepts of kinematics and kinetics of particles and rigid bodies. • To develop the ability to apply **Newton's Laws of Motion** to solve real-world engineering problems involving motion. • To analyze linear and rotational motion using mathematical and graphical approaches. • To explain and apply the **work-energy** and **impulse-momentum** principles in solving dynamic problems. • To investigate the concepts of **power**, **efficiency**, and **energy conservation** in moving systems. • To understand and analyze **collisions** and their effects on mechanical systems. • To provide the analytical framework necessary for the design and evaluation of dynamic components in marine, automotive, and mechanical systems.

	• To cultivate problem-solving skills and critical thinking through theoretical derivations, simulations, and practical case studies.
Course Learning Outcomes	**CLO1 – Fundamental Principles of Dynamics** Define and explain the fundamental concepts of dynamics, including kinematics and kinetics of particles and rigid bodies, and differentiate among linear, curvilinear, and rotational motion. **CLO2 – Kinematics of Motion** Describe and analyze the relationships among displacement, velocity, and acceleration; construct and interpret motion graphs for particles and rigid bodies in various types of motion. **CLO3 – Newton's Laws and Force–Motion Analysis** Apply Newton's Laws of Motion to solve engineering problems involving forces and motion in one, two, and three dimensions, using mathematical models for dynamic system behavior. **CLO4 – Work, Energy, and Power** Analyze and solve problems involving work, energy, and power, applying the principle of conservation of energy to practical mechanical and marine engineering systems. **CLO5 – Impulse, Momentum, and Impact** Evaluate impulse and momentum for particle and rigid body systems, and apply these principles to collision, impact, and transient dynamic scenarios. **CLO6 – Applied Dynamic Analysis & Professional Skills** Integrate theoretical, computational, and graphical methods to perform dynamic analyses; work effectively in teams to conduct simulations, interpret real-world dynamic phenomena, and communicate technical solutions in written and oral form.

Content of the Course

Week	*Subject*
1	Introduction, course overview
2	Velocity and acceleration, graphs
3	Linear motion
4	Linear motion
5	Circular motion
6	Second law of Newton's
7	Second law of Newton's
8	Mid-term Exam
9	Dynamics of a body
10	Work and Energy, Conservation of energy
11	Work and Energy, Conservation of energy
12	Impulse and Momentum
13	Impulse and Momentum
14	Collusion
15	Final Exams

Methods and Techniques Used in the Course

Lectures and Interactive Discussions:

Fundamental principles of dynamics are introduced through structured lectures supported by visual aids, derivations, and real-world examples. Interactive discussions encourage student participation and conceptual clarity.

Problem-Based Learning (PBL):

Students engage with complex, open-ended problems that require the application of Newton's laws, energy methods, and momentum principles to realistic engineering and marine systems.

Analytical and Computational Exercises:

Regular exercises emphasize the formulation and solution of dynamic equations using both analytical and numerical methods. MATLAB or equivalent computational tools may be utilized for simulation and analysis.

Graphical Analysis Workshops:

Students learn to interpret and construct velocity, acceleration, and motion graphs for linear and rotational systems, reinforcing their understanding of kinematics and kinetics relationships.

Case Studies and Engineering Applications:

Selected case studies from marine, mechanical, and aerospace engineering are analyzed to demonstrate the application of dynamic principles in real-world contexts such as ship motion, propulsion systems, and machinery vibration.

Laboratory Demonstrations and Virtual Simulations:

Where applicable, physical demonstrations and computer-based simulations are used to visualize dynamic responses and validate theoretical models.

Collaborative Learning and Group Projects:

Students work in teams to solve dynamic analysis problems, prepare reports, and present findings—enhancing communication, teamwork, and critical evaluation skills.

Continuous Assessment and Feedback:

Quizzes, midterm exams, and homework assignments are used to reinforce learning outcomes, while formative feedback helps students identify areas for improvement.

Sample Questions

Linear and Circular Motion

- A particle moves along a straight line with an acceleration given by $a = 6t - 2\text{m/s}^2$.
  (a) Determine its velocity and displacement as functions of time.
  (b) Find the total distance traveled between $t = 0\text{s}$ and $t = 4\text{s}$.

- A body moves in a circular path of radius 2 m with a constant angular acceleration of 4 rad/s².
  Determine the tangential and normal components of acceleration at the instant when the angular velocity reaches 6 rad/s.

Newton's Laws of Motion

- A block of mass 20 kg is pulled on a horizontal surface with a force of 100 N at an angle of 30° above the horizontal. If the coefficient of friction is 0.25, determine the acceleration of the block and the normal reaction force.

- A 50-kg mass is suspended by two cables making angles of 40° and 60° with the horizontal. Determine the tension in each cable using the equilibrium conditions.

Work and Energy Methods

- A 500-kg marine hatch cover is lifted vertically by a winch. If the winch applies a constant power of 5 kW, determine the velocity of the hatch after it has been raised 3 meters, assuming it started from rest.

- A 2000-kg ship model slides down an inclined plane of 20° with a coefficient of friction of 0.1. Determine the velocity of the model after sliding 5 meters using the work-energy theorem.

Impulse and Momentum

- A 3-kg projectile moving at 100 m/s strikes a stationary target and embeds itself in it. The combined mass after impact is 10 kg. Determine the final velocity immediately after impact and the percentage loss of kinetic energy.

- A 50,000-ton vessel is moving at 10 knots when its engines are suddenly reversed, producing a constant opposing thrust. Using the principle of impulse and momentum, estimate the time required to bring the ship to rest if the thrust force is known.

Collision and Impact

- Two smooth spheres, A (3 kg) and B (2 kg), collide head-on. Before impact, A moves with a velocity of 8 m/s and B with 4 m/s in the opposite direction. If the coefficient of restitution is 0.75, determine the velocities of both spheres after collision.

- A marine piston (mass = 5 kg) strikes a stationary cylinder head with an initial velocity of 2 m/s. If 60% of the kinetic energy is lost during the impact, calculate the rebound velocity of the piston.

Comprehensive Problem (Integration of Concepts)

- A flywheel of moment of inertia 40 kg\cdotpm^2 accelerates uniformly from rest to 300 rpm in 10 seconds.
  (a) Determine the angular acceleration.
  (b) Calculate the torque required to produce this motion.
  (c) Determine the total work done on the flywheel during acceleration.

Materials Used in the Course

Primary Textbooks and References

- Hibbeler, R. C. (2021). *Engineering Mechanics: Dynamics*, 15th Edition. Pearson Education.
- Meriam, J. L., Kraige, L. G., & Bolton, J. N. (2020). *Engineering Mechanics: Dynamics*, 9th Edition. Wiley.
- Beer, F. P., Johnston, E. R., & Cornwell, P. J. (2018). *Vector Mechanics for Engineers: Dynamics*, 12th Edition. McGraw-Hill Education.
- Bedford, A., & Fowler, W. (2015). *Engineering Mechanics: Dynamics*. Pearson.

These texts provide the theoretical background, mathematical formulations, and engineering examples necessary to develop a deep understanding of dynamics principles and their real-world applications in mechanical and marine systems.

Supplementary References

- Tongue, B. H. (2016). *Principles of Engineering Mechanics: Dynamics—The Analysis of Motion*. Springer.
- Kane, T. R., & Levinson, D. A. (1985). *Dynamics: Theory and Applications*. McGraw-Hill.
- Gere, J. M., & Goodno, B. J. (2013). *Mechanics of Materials and Dynamics Applications in Engineering*. Cengage Learning.
- Class notes, instructor-prepared summaries, and selected academic papers on marine and mechanical motion dynamics.

Laboratory and Simulation Resources

- **Computer-Aided Tools:**
  - MATLAB / Simulink for solving motion equations and simulating dynamic systems.
  - ANSYS Mechanical or SolidWorks Motion for dynamic modeling and stress visualization.
  - Tracker Video Analysis for motion analysis and experimental verification.
- **Laboratory Equipment (where applicable):**
  - Linear and rotational motion apparatus
  - Flywheel energy measurement setup
  - Pendulum motion devices
  - Force and acceleration sensors

Online and Digital Resources

- Access to digital learning platforms such as *Pearson Mastering Engineering*, *WileyPLUS*, or *McGraw-Hill Connect*.
- Multimedia materials including dynamic system simulations, recorded lectures, and interactive animations illustrating Newton's laws, energy transformations, and impact phenomena.
- Research databases (ScienceDirect, SpringerLink, IEEE Xplore) for current academic publications related to applied dynamics and marine engineering.

Additional Study Materials

- Lecture notes and weekly problem sets provided by the instructor.
- Sample quizzes and exam preparation booklets focusing on problem-solving strategies.
- Case studies on dynamic behavior in marine propulsion systems and mechanical linkages.

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	1	2	2	2	3	2
PO2	2	3	3	3	3	3
PO3	1	2	2	2	2	2
PO4	1	2	2	2	2	2
PO5	3	1	1	1	1	2
PO6	1	1	1	1	1	2
PO7	1	1	1	1	1	2
PO8	1	1	1	1	1	2
PO9	1	1	1	1	1	1
PO10	0	2	2	2	2	3
PO11	2	1	1	1	1	2
PO12	3	1	1	1	1	2

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Understand fundamental principles of dynamics, including kinematics and kinetics.	Lectures, Interactive Discussion, Concept Demonstrations	Quizzes, Midterm Exam
CLO2 – Analyze displacement, velocity, acceleration, and interpret motion graphs.	Lectures, Problem-Solving Sessions, Graphing Exercises	Assignments, Quizzes, Midterm Exam
CLO3 – Apply Newton's Laws to force–motion problems in 1D, 2D, and 3D.	Lectures, Worked Examples, Computational Tutorials	Midterm Exam, Final Exam
CLO4 – Solve work, energy, and power problems using energy principles.	Lectures, Workshops, Case Studies	Assignments, Midterm Exam, Final Exam
CLO5 – Evaluate impulse, momentum, collision, and impact scenarios.	Lectures, Simulation Exercises, Problem-Solving Workshops	Quizzes, Assignments, Final Exam
CLO6 – Perform applied dynamic analyses and present results effectively.	Group Projects, Presentations, Simulation-Based Learning	Project Report, Presentation, Final Exam

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**2**	**30**
Lectures	**15**	**3**	**45**
Midterm Exam	**1**	**3**	**3**
Preparation for Midterm Exam	**1**	**10**	**10**
Final Exam	**1**	**3**	**3**
Preparation for Final Exam	**1**	**10**	**10**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Case Studies / Critical Thinking	-	-	-
Project Writing	**2**	**10**	**20**
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory / Practical Applications	-	-	-
Assignment(s)/Homework/Class Works	**4**	**10**	**40**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**161**
ECTS Credit			**5**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	-	-
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Homework/Assignments	4	20
Providing reliability and motivation of the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	2	10
Quiz	-	-
Midterms/Oral Exams	1	30
Final/Oral Exams	1	40
Total	**10**	**100**

	Percentage	**Course Grade**	**Coefficient**
Grading Policy	90-100	AA	4.0
	85-89	BA	3.5
	80-84	BB	3.0
	75-79	CB	2.5
	70-74	CC	2.0
	60-69	DC	1.5
	50-59	DD	1.0
	49 and below	FF	0.0
	Less than 70% attendance	NA	-
Course Requirements and Policies	• Alerted attendance at the lectures is essential! • 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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Marine Auxiliary Machinery II							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MED202	II	Spring	3	3	2	2	0
Course type: Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	30	30	20
Course Venue and Time				Wednesday 09.30-12.20			
Instructor information				**Chf. Eng. Volkan Varışlı** 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	*Marine Auxiliary Machinery II* provides students with an advanced understanding of the principles, design, operation, maintenance, and repair of shipboard auxiliary machinery systems. The course emphasizes pumping theory, liquid and gas circuit lines, and piping system design with flow and capacity considerations. Students will analyze the design and performance aspects of pumps, compressors, and associated transfer equipment, including parallel operations and integrated systems. Practical focus is placed on the physical survey of machinery, measurement, performance evaluation, reporting, and repair methods for pumps, compressors, and piping systems. Maintenance planning, spare parts management, and troubleshooting strategies form an essential component of the course. Case studies on ship piping, heating and cooling systems, lubrication, separation, and retrofitting highlight real-world applications. By integrating theory with hands-on practices, students will gain the technical competence required to evaluate, maintain, repair, and improve marine auxiliary machinery systems, ensuring their efficiency, safety, and sustainability in maritime operations.
Course Aims and Objectives	The course aims to equip students with advanced knowledge and practical skills in the operation, maintenance, repair, and performance evaluation of marine auxiliary machinery. It focuses on fostering the ability to integrate theoretical principles with practical applications for efficient, safe, and sustainable shipboard auxiliary systems management. • Understand advanced principles of pumping theory, liquid and gas circuit systems, and piping design. • Analyze the design, operation, and performance of pumps, compressors, and associated auxiliary machinery. • Conduct physical surveys, measurements, and evaluations of running machinery systems. • Plan and perform maintenance and repair operations for pumps, compressors, and piping lines. • Identify critical components, manage spare parts, and apply troubleshooting strategies effectively.

	• Evaluate system performance, identify deficiencies, and propose improvements. • Apply knowledge gained to case studies simulating real shipboard auxiliary machinery operations.
Course Learning Outcomes	**CLO1 – Understand and apply pumping and piping principles** Explain liquid and gas circuit systems, flow theory, pump/compressor fundamentals, and perform basic capacity and performance calculations used in marine auxiliary systems. **CLO2 – Analyze auxiliary machinery performance** Evaluate the operational efficiency, reliability, and safety of pumps, compressors, and associated piping systems using engineering calculations and performance indicators. **CLO3 – Perform maintenance and repair operations** Plan, execute, and document maintenance, repair, and overhaul activities on pumps, compressors, valves, fittings, and piping components according to marine engineering standards. **CLO4 – Inspect and measure auxiliary machinery components** Conduct machinery surveys, perform precise measurements, assess component conditions, and interpret inspection results for operational suitability. **CLO5 – Troubleshoot operational problems and propose solutions** Identify failures in auxiliary systems, apply diagnostic techniques, select appropriate corrective actions, and recommend preventive maintenance strategies. **CLO6 – Integrate theory with practical applications and technical reporting** Apply engineering principles to case studies and real-life scenarios, propose system improvements for reliability and sustainability, and prepare clear technical reports and documentation.

Content of the Course

Week	*Subject*
1	Fundamentals of pumping theory, liquid/gas circuit lines
2	Principles of piping system design, flow theory and capacity calculations
3	Design aspects of transfer equipment: Pumps and compressor development, improvements in existing systems, parallel operations and connected system
4	Physical survey of the running parts of transfer equipment, measurement and reporting
5	Maintenance aspects of transfer machinery, spare part requirements, critical parts
6	Repair methods of lines, pumps, pump elements and alternative methods
7	Repair methods of lines, compressors and alternative methods
8	Mid-term Application (Maintenance& repair principles of auxiliaries)
9	Performance evaluation of marine auxiliaries' machinery systems and reporting
10	Case study 1 Ship main & auxiliary piping systems performance
11	Case Study 2 Heating and cooling system performance evaluation
12	Case study 3 Fuel and oil system, lubrication and separation performance
13	Case study 4 Retrofitting and renewal of system, comparison & adaptation
14	Principles of improvement of marine auxiliary machinery fitness
15	Final Exam Application (Understanding of performance-based troubleshooting)

Methods and Techniques Used in the Course

Lectures and Interactive Discussions – Detailed theoretical sessions covering principles of pumping, piping systems, flow theory, and auxiliary machinery operations, reinforced with interactive Q&A and discussions.

Laboratory/Workshop Applications – Hands-on exercises on pumps, compressors, piping systems, and auxiliary machinery to reinforce practical understanding.

Case Studies – Real-world scenarios and performance analysis exercises to simulate shipboard auxiliary system troubleshooting and maintenance challenges.

Assignments and Homework – Problem-solving tasks, research, and calculations to strengthen theoretical knowledge and applied skills.

Group Projects – Collaborative projects for designing, evaluating, and proposing improvements for auxiliary machinery systems.

Simulation Exercises – Use of software or simulation tools to model fluid and gas transfer, auxiliary machinery performance, and retrofitting strategies.

Mid-Term and Final Evaluations – Assessment of both theoretical knowledge and practical application through written exams and applied exercises.

Demonstrations and Technical Measurements – Training in the use of measurement devices, inspection tools, and reporting methods for system performance and machinery condition.

Sample Questions

Theoretical Questions

- Explain the basic principles of pumping theory and describe the main types of pumps used in marine auxiliary systems.
- Describe the considerations in designing a marine piping system, including flow theory, pressure drop, and capacity calculations.
- What are the critical maintenance aspects of compressors on board a ship, and how do they differ from liquid pumps?
- Explain the principles of parallel operation for pumps and compressors and discuss the advantages and potential risks.
- Discuss the importance of safety procedures and proper documentation in auxiliary machinery maintenance.

Practical / Application Questions

- Given a performance chart of a shipboard pump, calculate the flow rate, head, and efficiency under specific operating conditions.
- Identify and describe the steps required to perform a physical survey of a pump or compressor running part.
- Propose a maintenance plan for a marine auxiliary system, including periodic inspections, replacement of critical parts, and emergency procedures.
- Analyze a hypothetical failure in a lubrication or cooling system and recommend corrective actions based on standard maintenance procedures.

Case Study / Problem-Solving

- A ship's fuel transfer pump is showing reduced efficiency and abnormal vibration. Outline the steps you would take to diagnose, document, and correct the issue.
- Evaluate a heating and cooling system in an auxiliary machinery setup and propose improvements to increase efficiency and reliability.
- Compare the retrofitting of an existing auxiliary system versus full replacement. Discuss technical, safety, and cost considerations.

Materials Used in the Course

Textbooks and Reference Books

- "Marine Auxiliary Machinery" – D.A. Taylor
- "Marine Engineering" – R. G. Lamb
- IMO and SOLAS guidelines on ship auxiliary systems

Technical Manuals and Manufacturer Guides

- Pump, compressor, and piping system manuals
- Auxiliary machinery operation and maintenance guides

Simulation and Digital Resources

- Marine engineering simulation software for auxiliary machinery (if available)
- Digital charts, schematics, and diagrams for piping and machinery systems
- Online platforms for performance calculations and system monitoring

Laboratory Tools and Equipment

- Pumps, compressors, valves, and fittings for hands-on practice
- Measurement tools: flow meters, pressure gauges, thermometers, and manometers
- Tools for inspection and repair, including spanners, wrenches, and assembly tools

Documentation and Reporting Materials

- Logbooks and maintenance record templates
- Checklists for inspections, planned maintenance (PMS), and repair procedures
- Case study handouts and worksheets

Standards and Regulations

- SOLAS, MARPOL, and classification society requirements relevant to auxiliary machinery
- National and international safety and maintenance regulations

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	2	2	2	3	2
PO2	2	3	3	3	3	3
PO3	2	3	3	3	2	2
PO4	2	2	3	3	2	2
PO5	1	2	3	3	3	2
PO6	1	1	3	3	3	2
PO7	1	1	2	3	3	2
PO8	1	1	2	3	3	2
PO9	1	1	2	3	3	2
PO10	2	2	3	2	2	3
PO11	2	2	3	2	2	3
PO12	2	2	3	2	2	3

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1	Lecture, conceptual explanation, board work, demonstrations	Midterm exam, quizzes, short written assessments
CLO2	Problem-solving sessions, guided examples, structured exercises	Midterm exam, homework assignments, quizzes
CLO3	Laboratory demonstrations, hands-on practice with pump/compressor systems	Practical exam, lab reports
CLO4	Workshops on measurement techniques, tool-use demonstrations	Practical assessment, skill-based evaluation
CLO5	Case-based learning, troubleshooting simulations, failure analysis tasks	Case study reports, troubleshooting exam
CLO6	Integrated practice sessions, scenario-based learning	Final exam, performance evaluation, technical report

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**4**	**60**
Midterm Exam	**1**	**1**	**1**
Preparation for Midterm Exam	**1**	**4**	**4**
Final Exam	**1**	**1**	**1**
Preparation for Final Exam	**1**	**4**	**4**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Case Studies / Critical Thinking	-	-	-
Project Writing	**1**	**4**	**4**
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**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**117**
ECTS Credit			**3**

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

	Percentage	**Course Grade**	**Coefficient**
Grading Policy	90-100	AA	4.0
	85-89	BA	3.5
	80-84	BB	3.0
	75-79	CB	2.5
	70-74	CC	2.0
	60-69	DC	1.5
	50-59	DD	1.0
	49 and below	FF	0.0
	Less than 70% attendance	NA	-
Course Requirements and Policies	• Alerted attendance at the lectures is essential! • 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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Operations and Maintenance of Main and Auxiliary Machinery II							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MED206	II	Spring	3	4	2	2	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	-	30	50
Course Venue and Time				Wednesday 09.30-13.20			
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 advanced theoretical and practical knowledge on the operation, maintenance, and safe management of main and auxiliary machinery onboard ships. Emphasis is placed on shipboard repair planning, drydock operations, and the principles of safe machinery handling in marine environments. Students will gain in-depth understanding of propulsion and steering systems, their operational safety mechanisms, and maintenance requirements. The course covers the operation, maintenance, and management of deck machinery, including winches, cranes, davits, gangways, and other essential shipboard equipment. Students will develop skills in inspection techniques, record-keeping, analysis, and reporting according to both internal shipboard procedures and external survey requirements. Integration with ISM-Code, port and flag state inspections, and practical application of safety protocols are key components of the course. Through laboratory sessions, case studies, and simulator exercises, students will apply their knowledge in planning, executing, and supervising maintenance operations. They will also practice risk assessment, repair planning, and coordination of shipboard systems to ensure safe, efficient, and compliant operations. The course combines theoretical lectures with hands-on applications, preparing students for professional responsibilities in marine engineering, including troubleshooting, emergency response, and effective machinery management.
Course Aims and Objectives	**Course Aims** The course aims to provide students with advanced knowledge and practical skills in the operation, maintenance, and management of main and auxiliary machinery onboard ships. It emphasizes safe shipboard practices, effective machinery monitoring, and adherence to regulatory requirements, preparing students to handle complex marine engineering tasks in both routine and emergency situations. **Course Objectives** By the end of this course, students will be able to: • Apply principles of safe maintenance and repair planning in shipboard, drydock, and shipyard environments. • Understand and operate propulsion and steering systems, including safety mechanisms, alignment, and control procedures. • Plan, execute, and evaluate maintenance operations of deck machinery and auxiliary systems efficiently. • Integrate ISM-Code compliance into maintenance, inspection, and repair operations. • Conduct thorough inspections, surveys, and record-keeping for both machinery and hull components. • Analyze operational risks, troubleshoot machinery issues, and implement corrective measures. • Collaborate effectively in team settings to manage machinery operations and emergency procedures.

Course Learning Outcomes	**CLO1:** Demonstrate advanced understanding of shipboard main and auxiliary machinery, including propulsion and steering systems. **CLO2:** Apply safe maintenance and repair practices in shipboard, drydock, and shipyard environments. **CLO3:** Operate and monitor propulsion, steering, and deck machinery systems while ensuring compliance with safety and regulatory standards. **CLO4:** Plan, execute, and evaluate maintenance and repair activities using ISM-Code guidelines. **CLO5:** Conduct systematic inspections and surveys of machinery and hull components, recording and analyzing results accurately. **CLO6:** Identify machinery failures, perform root-cause analysis, and implement corrective actions effectively.

Content of the Course

Week	*Subject*
1	Shipboard safe repair planning and methods of marine engineering in marine environment, in the shipyard and drydock
2	Propulsion mechanism removal and installations, alignment and controls
3	Operational safety system of propulsion equipment
4	Principles of maneuvering steering gear, types, rudder, rudder boss, out and inboard sealing systems,
5	Operational safety system of steering equipment, auxiliaries and tunnel thrusters, e-powered propulsion
6	Maintenance requirements of propulsion and steering systems
7	Ballasting, de-ballasting, anti-healing systems: Operation, maintenance and watch-keeping
8	Mid-term Application (Repair, Planning and management)
9	Deck machinery: Anchor mooring winches, cranes, davids, gangways, cleaning equipment
10	Safe working practices of inspections, record keeping, analysis and reporting
11	Safe working practices of external surveys, record keeping, analysis and certification
12	Methods of Inspection and surveys (Machinery parts)
13	Methods of Inspection and surveys (Hull parts)
14	Maintenance and repair integration with ISM-Code
15	Final Exam Application (Management of maintenance control)

Methods and Techniques Used in the Course

Lectures and Interactive Discussions: Theoretical explanations supported by real-life case studies to enhance conceptual understanding.

Laboratory and Simulator Applications: Hands-on exercises and at least 2 practical sessions on maintenance planning, machinery inspection, and operational simulations.

Assignments and Homework: Minimum of 4 individual assignments to deepen knowledge on maintenance strategies, ISM-Code integration, and safety practices.

Group Projects: At least 2 collaborative studies focusing on shipboard maintenance planning, survey practices, and reporting.

Midterm and Final Examinations: Assessing theoretical knowledge and problem-solving skills related to machinery operation and maintenance.

Case Studies and Failure Analysis: Practical evaluation of real or simulated incidents, encouraging root-cause analysis and troubleshooting.

Classroom Presentations: Student-led discussions and reports on inspection methods, survey requirements, and safety management.

Use of Visual and Technical Aids: Technical drawings, maintenance manuals, ISM documentation, and videos demonstrating best practices.

Sample Questions

Midterm & Final Exam Examples:

- Explain the safety precautions and planning steps required before performing shipboard repairs in drydock.
- Describe the procedure for removing and reinstalling a ship's propulsion shaft. What alignment and control checks are necessary?
- Discuss the operational safety systems associated with steering gear and tunnel thrusters.
- What are the differences between inboard and outboard rudder sealing systems, and how are they maintained?
- Explain the purpose and operation of ballast and anti-heeling systems. How are they monitored and maintained?
- Define the ISM Code requirements for integrating maintenance and repair activities. Provide examples.
- What records and reports are required during deck machinery inspections? Explain their importance for certification.
- How are external surveys of hull and machinery systems carried out safely and efficiently?
- A vessel experiences a malfunction in its ballasting system during a voyage. Outline the troubleshooting steps and emergency measures to restore operation.
- Discuss how proper maintenance planning contributes to safe ship operations and compliance with international maritime regulations.

Application/Practical Case Study Questions:

- Prepare a maintenance schedule for a vessel's steering gear system, including inspection intervals and safety checks.
- Analyze a case where a failure occurred due to improper propulsion alignment. Suggest corrective and preventive measures.
- Draft a report format for inspection of anchor handling equipment and explain how findings should be recorded and submitted for survey purposes.

Materials Used in the Course

Textbooks and Reference Books:

- Marine Engineering Practice Manuals and Class Society Guidelines (e.g., Lloyd's Register, DNV-GL)
- "Marine Auxiliary Machinery" by H.D. McGeorge
- "Marine Engineering" by Roy L. Harrington
- "Propulsion and Steering Systems for Marine Engineers" (class-approved references)
- International Safety Management (ISM) Code and SOLAS regulations documentation

Technical Manuals and Publications:

- Manufacturer manuals for propulsion, steering gear, and deck machinery systems
- Drydock and shipyard repair procedures and safety manuals
- Class survey and inspection guidelines for hull and machinery

Multimedia and Simulation Tools:

- Video demonstrations and animations of propulsion and steering system operations
- Simulation software for maintenance planning and ISM integration
- Case study presentations on propulsion failures and repair planning

Shipboard Documentation Samples:

- Engine logbooks, maintenance reports, and inspection checklists
- Class survey forms, hull and machinery inspection records
- Ballast water management records and ISM maintenance reporting forms

Practical Equipment (for application sessions):

- Training models and cut sections of propulsion shafts, rudders, and sealing systems
- Hydraulic and mechanical steering gear training rigs
- Deck machinery components (e.g., winch brakes, davits) for inspection practice

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	1	2	2	2	3	2
PO2	2	3	3	3	3	3
PO3	1	2	2	2	2	2
PO4	1	2	2	2	2	2
PO5	3	1	1	1	1	2
PO6	1	1	1	1	1	2
PO7	1	1	1	1	1	2
PO8	1	1	1	1	1	2
PO9	1	1	1	1	1	1
PO10	0	2	2	2	2	3
PO11	2	1	1	1	1	2
PO12	3	1	1	1	1	2

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

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**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	**2**	**4**	**8**
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory / Practical Applications	**2**	**4**	**8**
Assignment(s)/Homework/Class Works	**4**	**4**	**16**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**123**
ECTS Credit			**4**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	-	-
Laboratory	-	-
Application	2	10
Field Work	2	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	**10**	**100**

	Percentage	**Course Grade**	**Coefficient**
Grading Policy	90-100	AA	4.0
	85-89	BA	3.5
	80-84	BB	3.0
	75-79	CB	2.5
	70-74	CC	2.0
	60-69	DC	1.5
	50-59	DD	1.0
	49 and below	FF	0.0
	Less than 70% attendance	NA	-
Course Requirements and Policies	• Alerted attendance at the lectures is essential! • 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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Ship Construction							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
NRC202	II	Spring	3	3	3	0	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	40	40	-
Course Venue and Time				Friday / 09:30 – 11:20			
Instructor information				**Prof. Dr. Deniz Ünsalan** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 deniz.unsalan@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides students with fundamental knowledge of ship construction, stability, and heat transfer principles essential for marine engineering. The first part of the course focuses on ship geometry, hull structures, propulsion systems, and the fundamentals of transverse, longitudinal, dynamic, and damaged stability. Students will learn to analyze hydrostatic properties, stability curves, and the effects of loading conditions on vessel performance. The second part of the course introduces the concepts of heat transfer, including conduction, convection, and radiation. Special emphasis is placed on practical applications such as boundary layers, boiling and condensation processes, and heat exchange between surfaces. Through theoretical instruction, problem-solving, and applied case studies, the course aims to equip students with the technical background required for ship design, safe operation, and marine engineering problem-solving.
Course Aims and Objectives	The aim of this course is to provide students with a comprehensive understanding of ship construction, stability, and heat transfer principles that are fundamental to marine engineering. The course is designed to develop both theoretical knowledge and practical problem-solving skills necessary for ship design, safe operation, and engineering analysis. • Understand the fundamentals of ship geometry, hull form, and structural components. • Identify and explain propulsion systems, rudders, and related hydrodynamic effects. • Analyze ship stability in transverse, longitudinal, dynamic, and damaged conditions. • Interpret hydrostatic data, stability curves, and the effects of loading conditions on ship performance. • Gain knowledge of the principles of heat transfer, including conduction, convection, and radiation. • Apply analytical methods to solve steady-state and transient heat transfer problems in marine systems. • Relate theoretical knowledge to practical applications in shipbuilding, operation, and safety. • Develop critical thinking and problem-solving skills through case studies and applied exercises.

Course Learning Outcomes	**CLO1:** Analyze and describe ship geometry, hull forms, and structural components, including midship sections, deck camber, and form coefficients. **CLO2:** Explain the principles of ship propulsion systems, propeller types, cavitation, rudders, and their effects on ship maneuverability. **CLO3:** Calculate and evaluate transverse, longitudinal, and dynamic stability of ships under various loading conditions. **CLO4:** Assess damaged ship stability, including methods for determining drafts, trim, and weight distribution after flooding or structural damage. **CLO5:** Interpret hydrostatic curves, inclining experiment results, and stability criteria according to IMO regulations. **CLO6:** Apply principles of heat transfer—conduction, convection, and radiation—in marine engineering contexts. **CLO7:** Solve one-dimensional, radial, and multi-dimensional heat conduction problems, including transient and steady-state scenarios. **CLO8:** Evaluate hydraulic and thermal boundary layers and flow regimes using Reynolds number analysis. **CLO9:** Analyze heat transfer during condensation and boiling, and between opposing surfaces in marine systems. **CLO10:** Integrate theoretical knowledge with practical applications through problem-solving, case studies, and design exercises relevant to ship construction and marine engineering.

Content of the Course

Week	*Subject*
1	**Introduction to Ship Geometry** Dimensions, forms, and coefficient of forms
2	**Ship Lines and Plans** Body plan, sheer plan, half-breadth plan, midship section
3	**Tonnages** Gross, net, deadweight, and special tonnages; bow and stern forms
4	**Hull Structures and Structural Elements** Keel, bottom structures, and floors
5	**Framing System** Frames, beams, longitudinals, bulkheads, and pillars
6	**Structural Fittings** Shell plating, watertight bulkheads, tanks, sea chests, bilges, manholes, air pipes
7	**Propulsion Systems I** Propeller types, definitions, and cavitation phenomena
8	**Propulsion Systems II** Slip ratio, rudders and rudder types, twin-screw arrangements
9	**Transverse Stability** Displacement, draft, buoyancy, load lines, hydrostatic curves, and GM calculations
10	**Transverse Stability II** Initial stability, equilibrium conditions, inclining experiments, righting levers, Simpson's rule
11	**Dynamic Stability** IMO weather criteria, static and dynamic stability curves, free surface effects
12	**Trim and Longitudinal Stability** Effect of density changes, transfer problems, small and large loading/unloading operations
13	**Damaged Ship Stability** Loss of buoyancy, added weight and permeability methods, effects on stability and trim
14	**Ship Trim, Stability, and Stress Calculations** Displacement, draft survey, trim, GM, and longitudinal stress calculations
15	**Propeller and Rudder Effects** Fixed and controllable pitch propellers, single vs. twin-screw ships, rudder effects on maneuvering

Methods and Techniques used in the Course

Lectures:

- Theoretical presentations of ship construction principles, structural design, stability, and hull geometry.
- Use of diagrams, ship plans, and hydrostatic tables to illustrate key concepts.

Practical Exercises:

- Solving ship stability and hydrostatics problems.
- Calculation of displacement, trim, and stability parameters.
- Analysis of damaged ship stability scenarios.

Case Studies and Examples:

- Analysis of real ship construction cases to apply theoretical knowledge.
- Discussions on various hull forms, structural layouts, and stability challenges.

Group Work and Problem-Solving Sessions:

- Collaborative exercises to enhance analytical and decision-making skills.
- Application of IMO stability criteria in practical scenarios.

Simulation/Software Tools:

- Use of ship design and stability software for hydrostatics calculations and stability assessments.

In-class Discussions:

- Interactive discussions on best practices in ship construction and safety considerations.

Assignments/Homework:

- Individual tasks to reinforce theoretical knowledge and analytical skills.
- Preparation of reports and solutions for given ship stability or structural problems.

Quizzes and Assessments:

- Regular evaluation of students' understanding of key concepts.

Sample Questions

Hull Geometry and Form:

- Explain the difference between block coefficient (Cb), midship coefficient (Cm), and prismatic coefficient (Cp). How do these coefficients affect a ship's performance and stability?

Structural Components:

- Describe the function of bulkheads, frames, decks, and pontoons in a ship's hull. How do they contribute to the overall strength and watertight integrity of the vessel?

Hydrostatics and Stability:

- A ship has a displacement of 10,000 tons and a center of gravity at 6 m above the keel. Calculate the metacentric height (GM) if the transverse moment of inertia is 80,000 m^4 and the waterplane area is 1,500 m^2. Discuss the implications of the GM value for transverse stability.

Trim and Longitudinal Stability:

- A vessel undergoes partial loading: 200 tons are loaded at the bow and 150 tons at the stern. Calculate the resulting change in trim and draft if the ship's longitudinal center of flotation is at 50 m from the bow and the longitudinal moment to change trim 1 cm is 10 ton·m/cm.

Damaged Ship Stability:

- Explain the procedures to assess the stability of a damaged ship according to IMO criteria. How do added weights, flooding, or compartment damage affect draft, trim, and overall stability?

Materials Used in the Course

Textbooks and Reference Books:

- "Ship Construction" – David J. Eyres & George J. Bruce (Latest Edition)
- "Principles of Naval Architecture" – Volume II: Stability, Strength, and Design (SNAME)
- "Ship Hydrostatics and Stability" – Adrian Biran
- "Ship Design and Construction" – American Bureau of Shipping (ABS) Guide

Supplementary Reading:

- Research papers on ship hull optimization and stability
- IMO guidelines on damaged ship stability and safety regulations
- Case studies of recent shipbuilding projects

Software / Simulation Tools:

- Hydrostatic and stability calculation software (e.g., Maxsurf, NAPA)
- Structural analysis programs for ships (e.g., ANSYS, RhinoShip)
- Spreadsheet tools for hydrostatic and weight calculations

Other Materials:

- Ship lines plans, cross-sections, and midship plans
- Drafting and design templates
- Laboratory models or scaled ship sections for demonstration

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	2	2	2	2	3
PO2	2	2	2	2	2	3	3	2	2	3
PO3	2	2	3	3	3	2	3	2	2	3
PO4	1	1	2	2	2	3	2	2	2	2
PO5	3	3	3	2	3	3	3	3	3	3
PO6	2	2	2	2	2	2	2	2	2	2
PO7	1	1	1	1	1	1	1	1	1	1
PO8	1	1	1	1	1	1	1	1	1	1
PO9	1	1	1	1	1	1	1	1	1	1
PO10	1	1	2	2	2	2	2	2	2	2
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, Multimedia Presentation, Case Studies	Quizzes, Assignments, Midterm Exam
CLO2	Lecture, Demonstration, Problem-Solving Sessions	Quizzes, Assignments, Practical Exercises
CLO3	Lecture, Simulation Exercises, Case Studies	Assignments, Midterm Exam, Practical Exercises
CLO4	Lecture, Tutorials, Group Exercises	Lab Reports, Quizzes, Assignments
CLO5	Lecture, Bridge/Shipboard Simulations, Practical Exercises	Practical Exams, Lab Reports, Assignments
CLO6	Lecture, Tutorials, Problem-Based Learning	Quizzes, Assignments, Practical Exercises
CLO7	Role-Playing, Group Work, Simulation	Observation, Assignments, Practical Exams
CLO8	Problem-Based Learning, Case Studies, Simulation Exercises	Assignments, Midterm Exam, Practical Exercises
CLO9	Lecture, Discussions, Case Studies	Quizzes, Assignments, Participation
CLO10	Scenario-Based Exercises, Simulation, Group Projects	Project Reports, Practical Exams, Assignments

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**2**	**30**
Midterm Exam	**1**	**2**	**2**
Preparation for Midterm Exam	**1**	**4**	**4**
Final Exam	**1**	**2**	**2**
Preparation for Final Exam	**1**	**4**	**4**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Research for Project(s)/Essay(s)	-	-	-
Project Writing	**1**	**5**	**5**
Group Work	-	-	-
In-class Discussion(s)	**15**	**1**	**15**
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	**2**	**5**	**10**
Individual Reading / Research	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**87**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	-	-
Laboratory	-	-
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	50
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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Maritime Safety IV							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
SAF202	II	Spring	3	3	2	2	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				30	-	-	70
Course Venue and Time				Wednesday 14.30-17.20			
Instructor information				**Cpt. Çağrı Deliceırmak** 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	Maritime Safety IV provides advanced training in shipboard safety, emergency response, and crisis management for both crew and passengers. The course focuses on protective measures on passenger ships during maritime emergencies, fast rescue boat (FRB) operations, passenger and cargo safety, vessel stability, and effective use of safety equipment. Additionally, this course provides comprehensive training in collision, grounding, and evacuation procedures. Students will gain practical and theoretical knowledge to respond efficiently to emergencies on passenger ships, manage passengers in critical situations, operate lifesaving appliances, and uphold international maritime safety standards. The course will be conducted in accordance with the IMO Model Courses 1.24, 1.28, and 1.29, as well as the national regulation "Egitim Sinav Yonergesi 2025" of the Turkish Republic. Successful students will obtain mandatory STCW certificates of (1); Proficiency in Fast Rescue Boats, (2); Crowd Management, Passenger Safety, and Safety Training for Personnel Providing Direct Services to Passengers In Passenger Spaces, (3); Proficiency in Crisis Management and Human Behaviour Training, Including Passenger Safety, Cargo Safety, and Hull Integrity Training. The course emphasizes leadership, communication, and human behaviour management to ensure preparedness and safety in diverse maritime scenarios.
Course Aims and Objectives	The course aims to equip students with the advanced knowledge and practical skills necessary to ensure the safety of passengers, crew, and vessels in emergencies. It focuses on enhancing maritime safety awareness, improving emergency response capabilities, and fostering effective management of life-saving operations and safety equipment on board. • Comprehend and execute protocols for safeguarding passengers and crew members during maritime emergencies. • Acquire proficiency in the operation, launching, recovery, and management of fast rescue boats (FRBs) across diverse sea and weather conditions. • Oversee passenger evacuation procedures, manage crowd control, and ensure safety in accordance with international regulations. • Develop skills for effective communication, leadership, and human behavior management during crises.

	• Ensure proper handling and securing of cargo, maintenance of vessel stability, and management of hazardous materials. • Comprehend and implement protocols during emergencies, including collisions, groundings, beaching, and emergency evacuations. • Conduct safety drills, risk assessments, and inspections to uphold shipboard safety and readiness.
Course Learning Outcomes	**LO1**: Demonstrate knowledge of maritime emergency response procedures for the protection of passengers and crew. **LO2**: Ensure the safe operation, launching, and recovery of Fast Rescue Boats (FRBs) across diverse sea and weather conditions. **LO3**: Implement crowd management, evacuation protocols, and passenger safety procedures, including aiding individuals with special needs. **LO4**: Utilize effective situational awareness, communication, and leadership skills to manage human behavior during onboard emergencies. **LO5**: Implement safe cargo handling, securing, stowage, and transfer techniques to maintain the stability of a passenger ship. **LO6**: Identify and mitigate risks associated with hazardous materials, dangerous goods, and other safety threats on passenger ships.

Content of the Course

Week	*Subject*
1	**Passenger Ship Safety – Crowd Management** Terminology and related maritime English terms Muster stations, assembly lists, and emergency instructions Role allocation and muster procedures Control in corridors, stairways, and escape routes Evacuation of disabled or special-needs passengers
2	**Passenger Ship Safety – Crowd Management** Terminology and related maritime English terms Instructions and management of passengers Panic prevention strategies Organizing evacuation, checks, and counting of evacuated people Safety checks on life jackets and passenger readiness
3	**Passenger Safety Training – Direct Service Personnel** Terminology and related maritime English terms Effective communication with passengers, the importance of English, and a common language Multilingual and non-verbal communication during emergencies Importance of multilingual emergency instructions Instructing and training passengers on the use of personal life-saving appliances Embarkation and disembarkation of disabled or special-needs passengers
4	**Crisis Management and Human Behaviour** Terminology and related maritime English terms Ship design, safety rules, and emergency plans Emergency organization, resource management, and leadership Behavioural responses in emergencies Controlling and managing stress and panic in emergencies Common passenger behaviour and responses in emergencies
5	**Passenger and Cargo Safety, Vessel Integrity** Terminology and related maritime English terms Loading, unloading, lifting, shifting, and securing cargo Handling of hazardous materials on Ro-Ro vessels Applying proper lashing methods to the vehicles Use of lashing equipment and compliance with safety regulations
6	**Passenger and Cargo Safety, Vessel Integrity** Terminology and related maritime English terms Stability, trim, and stress calculations on passenger and RORO ships Effects of ballast and fuel transfers Opening, closing, and securing vessel hatches, ramps, and doors Ventilation and monitoring the atmosphere in RORO vehicle decks Safe operations on RORO vessels during loading, unloading, and emergencies
7	**Fast Rescue Boats (FRBs)** Terminology and related maritime English terms

	Construction and types of FRBs Specifications and accessories of the FRBs Launching Appliances for the FRBs
8	**Fast Rescue Boats (FRBs)** Terminology and related maritime English terms Preparation and launching of the FRBs Safety measures and precautions during the launching and recovery of the FRBs Launching and operating the FRB in heavy seas
9	**Fast Rescue Boats (FRBs)** Terminology and related maritime English terms Navigational and operational characteristics of the FRBs Up-righting of a capsized FRB, self-righting FRBs Navigation and operation of the FRB in heavy seas
10	**Fast Rescue Boats (FRBs)** Terminology and related maritime English terms Equipment and accessories of the FRB Engine of the FRBs, starting and operating methods Search and rescue methods with the FRBs, and natural limitations
11	**Collision, Grounding, and Emergency Evacuation** Terminology and related maritime English terms Definitions and differences between grounding, stranding, and beaching Preparations for beaching Measures to be taken after grounding, stranding, and beaching
12	**Collision, Grounding, and Emergency Evacuation** Terminology and related maritime English terms Collision and collision management Measures to be taken after a collision Measures to be taken after a fire or explosion
13	**Collision, Grounding, and Emergency Evacuation** Terminology and related maritime English terms Damage control and ship rescue operations Steering failures and emergency steering Towing operations
14	**Collision, Grounding, and Emergency Evacuation** Terminology and related maritime English terms Emergency evacuation, abandoning ship Evacuation methods and techniques
15	**Course Review and Practical Exercises** FRB drills and emergency scenarios Passenger evacuation simulations Integration of shipboard safety, cargo security, and crisis management

Methods and Techniques used in the Course

Lectures and Presentations: Delivery of theoretical knowledge on maritime safety regulations, emergency response, and passenger/cargo safety.

Case Studies and Scenario Analysis: Examination of real-life maritime incidents to develop problem-solving and decision-making skills.

Practical Training and Simulations: Hands-on practice with Fast Rescue Boats (FRBs), lifesaving appliances, and safety equipment under controlled conditions.

Drills and Exercises: Organization of crowd management, evacuation, and firefighting drills to reinforce emergency preparedness.

Group Discussions and Role-Playing: Collaborative activities to enhance communication, leadership, and crisis management abilities.

Workshops and Demonstrations: Guided practice on cargo securing, ship stability calculations, and use of emergency equipment.

Multimedia Tools: Use of videos, simulation software, and visual aids to illustrate complex safety operations.

Assessment and Feedback Sessions: Continuous evaluation through quizzes, practical performance tests, and instructor feedback.

Sample Questions

- Explain the main responsibilities of crew members during a passenger ship emergency evacuation.
- What are the critical differences between crowd management and crisis management on board passenger ships?
- List the essential steps to be followed when operating a Fast Rescue Boat (FRB) in heavy weather conditions.
- A Ro-Ro passenger ship is preparing to load dangerous cargo. What kind of safety measures and precautions must be implemented before, during, and after loading a dangerous cargo onto a RORO vessel?
- What is the correct method of launching and recovering a Fast Rescue Boat using appropriate equipment?
- Name and explain the function of at least five of the safety and emergency equipment used on passenger ships.

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, LSA Code, FSS Code, The Fire Fighting System Guidance, Fire Prevention and Fire Fighting, Master Guide for Fire and Safety on Ferries, Safety of RORO Passenger and Cruise Ships, Guidelines for Contingency Plans on Passenger Ships, Emergency Procedures and Check Lists at Sea
- Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- Maritime Safety textbooks covering Passenger Ship Safety, Safety on RORO vessels, Fast Rescue Boats and Emergency Procedures, including SOLAS, STCW, ISPS Code, LSA Code, and FSS Code
    - SOLAS Consolidated Edition
    - LSA Code
    - FSS Code
    - The Fire Fighting System Guidance
    - Fire Prevention and Fire Fighting
    - Master Guide for Fire and Safety on Ferries
    - Safety of RORO Passenger and Cruise Ships
    - Guidelines for Contingency Plans on Passenger Ships
    - Emergency Procedures and Check Lists at Sea

Supplementary Resources

- Instructional videos
- Interactive simulations
- Real-life accident investigation reports for analysis and discussion
- Safety posters, diagrams, and procedural flowcharts
- Fast Rescue Boat (FRB) and associated launching/recovery equipment
- Personal Life-Saving Appliances (lifejackets, immersion suits, lifebuoys, etc.)
- Firefighting equipment (extinguishers, breathing apparatus, hoses, fixed systems)
- Passenger evacuation plans, crowd management drill scenarios, and muster lists
- Communication tools (radios, public address systems, emergency alarms)

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	3	3	3	3	3	x	x
PO3	3	3	3	3	3	3	3	3	x	x
PO4	2	2	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	3	x	x
PO7	3	3	3	3	3	3	3	3	x	x
PO8	2	2	2	2	2	2	2	2	x	x
PO9	2	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	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	Midterm Exam, Practical Exam, Final Exam, Assignment

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**3**	**45**
Midterm Exam	**1**	**1**	**1**
Preparation for Midterm Exam	**1**	**5**	**5**
Final Exam	**1**	**1**	**1**
Preparation for Final Exam	**1**	**5**	**5**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Research for Project(s)/Essay(s)	-	-	-
Project Writing	-	-	-
Group Work	-	-	-
In-class Discussion(s)	**15**	**1**	**15**
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	**1**	**5**	**5**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**92**
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	10
Providing reliability and motivation for the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	-	-
Quiz	-	-
Midterms/Oral Exams	1	20
Final/Oral Exams	1	35
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

Maritime Vocational School

Ship Machinery

Syllabus

Course name: Technical Ship Management							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
TSM202	II	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**
				-	-	-	100
Course Venue and Time				Tuesday / 10:30 – 13:20			
Instructor information				**Cpt. Caner Özbilgiç** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 mehmetemin.debes@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides an in-depth exploration of the fundamental principles and practices of maritime commercial and technical ship management. It covers the operational, legal, and financial aspects of maritime trade, including liner and tramp markets, chartering practices, freight markets, and key shipping documentation. Students will learn the technical management requirements of ships, including maintenance, classification, surveys, compliance with international regulations, and safety audits. The course also emphasizes safety, environmental protection, and quality management systems in accordance with international conventions such as the ISM Code and MARPOL. In addition, students will develop leadership, decision-making, and teamwork skills essential for effective crew and resource management. A significant focus is placed on maritime English terminology used in commercial and technical documentation, enhancing students' ability to operate in an international maritime environment. Through theoretical lectures, case studies, and practical applications, students gain a comprehensive understanding of how modern shipping companies manage vessels efficiently while meeting safety, environmental, and commercial obligations.
Course Aims and Objectives	**Aim:** The primary aim of this course is to equip students with the theoretical knowledge and practical skills required to effectively manage commercial and technical aspects of maritime operations while ensuring compliance with international safety, environmental, and quality standards. **Objectives:** By the end of the course, students will be able to: 1. **Understand and analyze** the structure and dynamics of maritime markets, including liner and tramp shipping, chartering practices, and freight contracts. 2. **Interpret and apply** international maritime laws, conventions, and regulations related to ship operations, safety management, and environmental protection. 3. **Develop and implement** safety and quality management systems (SMS & QMS) in compliance with ISM Code and other relevant standards. 4. **Manage technical operations** of ships, including maintenance planning, classification surveys, and regulatory inspections. 5. **Apply leadership and decision-making skills** for effective crew management, workload planning, and resource allocation onboard and ashore. 6. **Use professional maritime English terminology** accurately in commercial, technical, and regulatory documentation, including INCOTERMS, charter parties, statements of facts, and time sheets. 7. **Evaluate and improve operational performance** of shipping companies while balancing safety, environmental, and commercial considerations.

Course Learning Outcomes	**CLO1: Explain** the fundamental principles of maritime commercial operations, including liner and tramp shipping, chartering types, and freight markets. *(Knowledge/Understanding)* **CLO2: Interpret and apply** international maritime conventions, safety and environmental regulations, and quality management standards (e.g., ISM Code, classification society requirements). *(Application)* **CLO3: Analyze** various types of charter parties and shipping documentation (e.g., bills of lading, statements of facts, time sheets) and their legal and commercial implications. *(Analysis)* **CLO4: Develop** maintenance, inspection, and technical operation plans for ships in accordance with regulatory requirements and industry best practices. *(Synthesis/Design)* **CLO5: Assess and manage** risks related to maritime safety, environmental protection, and cargo operations, including pollution prevention measures. *(Evaluation)* **CLO6: Communicate effectively** in professional maritime English using correct terminology for technical, operational, and commercial contexts (e.g., INCOTERMS, ship management reports). *(Communication)* **CLO7: Demonstrate** leadership, teamwork, and decision-making skills in managing shipboard personnel, workload planning, and emergency situations. *(Professional/Soft Skills)* **CLO8: Evaluate and propose improvements** to safety, quality, and technical management systems to enhance overall operational efficiency and compliance. *(Evaluation/Problem-Solving)*

Content of the Course

Week	*Subject*
1	**Introduction to Technical Ship Management** • Overview of ship technical management • Tracking regulations and compliance requirements • Ship documentation and inspection procedures
2	**Maintenance and Record Keeping** • Maintenance management and record-keeping systems • Correspondence and reporting in technical management • Planning for repairs and preventive maintenance
3	**Personnel and Training Management** • Crew management principles • Training programs and competency tracking • Safety and supply management related to personnel
4	**Material and Inventory Management** • Materials tracking and record keeping • Planning for equipment and supply needs • Stock management and logistic coordination
5	**Concepts of Safety, Environment, and Quality** • Introduction to safety management • Environmental protection principles • Quality concepts in maritime operations
6	**Marine Environmental Protection and Pollution Prevention** • Measures to prevent marine pollution • Pollution prevention procedures and equipment • Importance of proactive environmental protection
7	**Legal and Commercial Requirements for Safety and Quality Management** • ISM Code overview • International and national quality standards • Regulatory compliance for safety and environmental protection
8	**Safety and Quality Management Systems (Preparation and Implementation)** • Establishing a Safety Management System (SMS) • Implementing a Quality Management System (QMS) • Internal and external audits: techniques and application
9	**Leadership and Teamwork in Maritime Operations** • Crew management and education strategies • Effective team communication and coordination • Motivational and leadership skills development
10	**Maritime Legislation and Regulations** • International conventions and national maritime legislation

	• Compliance and enforcement mechanisms • Legal obligations related to ship operations
11	**Task and Workload Management** • Planning and task allocation • Prioritization under time and resource constraints • Delegation and monitoring of tasks onboard
12	**Resource Management in Maritime Operations** • Allocation and prioritization of resources • Effective ship-to-shore communication • Lessons from team experience and decision-making reflection
13	**Decision-Making Techniques I** • Situation and risk assessment • Evaluating alternatives and selecting actions • Decision-making frameworks and approaches
14	**Decision-Making Techniques II** • Implementing decisions in real operational scenarios • Monitoring and adjusting actions • Evaluating effectiveness of decisions
15	**Integration and Practical Application** • Case studies of technical ship management • Simulation of safety, quality, and operational decision-making • Review and consolidation of leadership, management, and technical skills

Methods and Techniques used in the Course

- **Interactive Lectures** – Instructor-led sessions to explain core concepts of technical management, safety, quality, and environmental regulations.
- **Case Studies** – Analysis of real-world scenarios to illustrate challenges in ship management, maintenance, and compliance.
- **Group Discussions** – Collaborative discussions to develop problem-solving skills and exchange ideas on operational and safety topics.
- **Problem-Solving Exercises** – Practical exercises focusing on planning, decision-making, and prioritization in ship operations.
- **Document Analysis and Simulation** – Reviewing ship documents, audits, and reports to practice regulatory compliance and management procedures.
- **Role-Playing and Scenario-Based Learning** – Simulating onboard situations such as emergencies, resource allocation, and crew management to develop leadership and decision-making skills.

Sample Questions

- Explain the key principles of technical ship management and their importance for safe and efficient vessel operation.
- Describe the main components of a Safety Management System (SMS) according to the ISM Code.
- How would you plan preventive maintenance for a ship's machinery and equipment?
- Discuss the steps involved in preparing a ship for dry-docking.
- Explain how crew training and resource management contribute to the effective operation of a ship.
- What are the legal and regulatory requirements for environmental protection on ships?
- Describe the process of conducting internal and external audits for technical management and quality systems.
- How can decision-making and prioritization techniques be applied in case of multiple technical issues on board?
- Identify the main challenges in technical ship management and propose solutions to mitigate them.
- Discuss the role of documentation and record-keeping in ensuring compliance with international maritime standards.

Materials Used in the Course

Textbooks & Reference Books

- IMO **International Safety Management (ISM) Code** documentation
- Manuals on **ship maintenance and machinery operation**
- Books on **maritime technical management and leadership**
- Industry standards on **environmental protection and quality management**

International and National Regulations

- SOLAS (Safety of Life at Sea)
- MARPOL (Marine Pollution)
- Flag state regulations
- Port state control guidelines

Guidelines & Reports

- Shipboard **Safety Management System (SMS)** manuals
- Technical and operational checklists
- Dry-docking and survey reports

Online Resources & Industry Databases

- IMO and ILO websites for updates on maritime regulations
- Industry publications and case studies on **ship management best practices**

Practical Materials

- Sample **maintenance logs, inspection checklists, and vessel records**
- Crew management and training materials
- Templates for **risk assessment, decision-making, and reporting**

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	2	3	3	2	2	2	0	0
PO2	2	3	2	3	2	3	2	2	0	0
PO3	3	2	3	2	3	2	3	2	0	0
PO4	2	3	2	3	2	3	2	2	0	0
PO5	3	2	3	2	3	2	3	2	0	0
PO6	2	2	2	3	2	2	2	3	0	0
PO7	2	2	2	2	2	2	2	2	0	0
PO8	1	1	1	2	2	1	1	2	0	0
PO9	1	1	1	1	2	1	1	2	0	0
PO10	1	1	2	1	2	2	2	2	0	0
PO11	1	1	1	2	1	1	2	1	0	0
PO12	1	1	1	2	1	1	2	1	0	0

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Maritime Commercial Principles	Lecture, Case Studies, Group Discussion	Quizzes, Written Assignments, Midterm Exam
CLO2 – International Regulations & Standards	Lecture, Tutorials, Problem-Solving Sessions	Assignments, Case Study Reports, Midterm Exam
CLO3 – Charter Parties & Documentation Analysis	Lecture, Practical Exercises, Document Review	Assignments, Written Case Studies, Project Work
CLO4 – Maintenance & Technical Operations Planning	Workshops, Simulations, Group Projects	Project Reports, Practical Exercises, Presentations
CLO5 – Risk Assessment & Management	Case Studies, Problem-Based Learning, Simulations	Risk Assessment Reports, Quizzes, Practical Exercises
CLO6 – Professional Maritime English	Role-Playing, Communication Exercises, Presentations	Oral Presentations, Written Assignments, Participation
CLO7 – Leadership & Teamwork	Group Exercises, Simulations, Scenario-Based Learning	Peer Evaluation, Practical Exercises, Observation
CLO8 – Safety, Quality & Technical Management Evaluation	Case Studies, Workshops, Problem-Solving Exercises	Project Reports, Assignments, Presentations

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**4**	**60**
Midterm Exam	**1**	**2**	**2**
Preparation for Midterm Exam	**1**	**10**	**10**
Final Exam	**1**	**2**	**2**
Preparation for Final Exam	**1**	**10**	**10**
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	**1**	**20**	**20**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**134**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	15	10
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Homework/Assignments	1	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	50
Total	**4**	**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.		