University of Kyrenia

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Ataturk's Principles and History of Turkish Revolution I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
AIT101	II	Fall	2	2	2	0	0
Course type: Compulsory Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				-	-	-	100
Course Venue and Time				Friday / 13:30 – 15:20			
Instructor information				**Aydoğan Erkan** Faculty of Maritime Studies Friday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 aydogan.erkan@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides an in-depth examination of the political, social, cultural, and economic transformations that took place during the decline and dissolution of the Ottoman Empire and the subsequent foundation of the Republic of Turkey under the leadership of Mustafa Kemal Atatürk. It explores the reform movements in the late Ottoman period, the impact of internal and external crises, the struggle for national independence, and the transition from an empire to a modern nation-state. Special emphasis is placed on the National Struggle, the establishment of the Turkish Grand National Assembly, the War of Independence, and the proclamation of the Republic. The course aims to help students understand the historical foundations of Atatürk's principles and the significance of the Turkish Revolution in shaping modern Turkey.
Course Aims and Objectives	The primary aim of this course is to provide students with a comprehensive understanding of the historical, political, and social processes that led to the dissolution of the Ottoman Empire and the establishment of the Republic of Turkey under the leadership of Mustafa Kemal Atatürk. • To examine the political, economic, and cultural challenges faced by the Ottoman Empire in its final period. • To analyze the reform movements and modernization efforts carried out during the late Ottoman era. • To understand the causes, development, and results of the Turkish National Struggle. • To study the leadership and vision of Mustafa Kemal Atatürk in the process of founding the Republic of Turkey. • To explore the significance of the Turkish Revolution in shaping a modern, secular, and national state. • To encourage students to critically assess the historical events that influenced contemporary Turkish society and governance. • To develop students' ability to connect historical developments with present-day political and social structures in Turkey.
Course Learning Outcomes	**CLO1:** Identify the main political, social, and economic factors that contributed to the decline of the Ottoman Empire. **CLO2:** Explain the impact of Western influence on Ottoman reform movements and modernization efforts. **CLO3:** Analyze the conditions that led to the Turkish National Struggle under Mustafa Kemal Atatürk's leadership. **CLO4:** Evaluate the role of national and international dynamics in the foundation of the Republic of Turkey. **CLO5:** Interpret primary historical sources and documents related to the late Ottoman and early Republican periods. **CLO6:** Discuss the importance of Atatürk's reforms and principles in the establishment of a modern, secular nation-state. **CLO7:** Develop a critical perspective on the transformation from an empire to a republic within the context of world history. **CLO8:** Apply historical knowledge to understand contemporary political and social issues in Turkey.

Content of the Course

Week	*Subject*
1	• Introduction to the Course • Purpose, scope, and methodology of the course • Importance of Atatürk's Principles and History of Turkish Revolution
2	• The concept of revolution and reform • Basic definitions: state, nation, sovereignty, independence • General characteristics of the Ottoman Empire in the 19th century
3	• Internal and external problems of the Ottoman Empire • Political, economic, and cultural decline • First reform attempts (Tanzimat and Islahat Edicts)
4	• Constitutional movements in the Ottoman Empire • The First and Second Constitutional Periods • The role of intellectual movements in shaping modern ideas
5	• Dissolution of the Ottoman Empire in the early 20th century • The Tripoli War and the Balkan Wars • Impact of the wars on Ottoman society and politics
6	• The Ottoman Empire in World War I • Causes, alliances, and outcomes • Fronts where the Ottoman Empire fought
7	• Occupation of Anatolia after World War I • Armistice of Mondros and its consequences • Partition plans of the Allied Powers
8	• National Awakening in Anatolia • The emergence of national resistance organizations • Local congresses and their importance
9	• Mustafa Kemal Pasha's arrival in Samsun (19 May 1919) • The Amasya Circular and its significance • Erzurum and Sivas Congresses
10	• The establishment of the Representative Committee • National Pact (Misak-ı Milli) • Opening of the Turkish Grand National Assembly (23 April 1920)
11	• First period of the Turkish Grand National Assembly • Internal revolts and their suppression • Relations with Soviet Russia and the Treaty of Moscow
12	• War of Independence – First Phase • The Eastern and Southern fronts • Organization of the national army
13	• War of Independence – Western Front • First and Second Battles of İnönü • The Battle of Sakarya and its importance
14	• The Great Offensive and the Battle of Dumlupınar • Mudanya Armistice Agreement • Lausanne Peace Treaty
15	• Proclamation of the Republic of Turkey (29 October 1923) • Evaluation of the Turkish National Struggle • General review and preparation for final assessment

Methods and Techniques used in the Course

Lectures and Presentations: Theoretical background and key historical events are explained with the support of visual materials and timelines.

Class Discussions and Debates: Students are encouraged to critically discuss reform movements, revolutions, and Atatürk's principles to develop analytical thinking.

Document and Text Analysis: Examination of historical documents, speeches, treaties, and memoirs to understand events from primary sources.

Question–Answer Sessions: Active student participation through problem-based and guiding questions.

Audio-Visual Materials: Use of documentaries, maps, and archival records to support historical understanding.

Comparative Analysis: Evaluation of Ottoman reforms and Turkish modernization within the global context.

Research Assignments and Presentations: Students prepare individual or group projects on specific historical issues and present them to the class.

Sample Questions

Multiple Choice Questions (MCQs)

- Which of the following was a major reason for the decline of the Ottoman Empire?
  a) Western cultural influences
  b) Strong central government
  c) Economic self-sufficiency
  d) Industrialization within the Empire
- The leader of the Turkish War of Independence was:
  a) Sultan Mehmed V
  b) Mustafa Kemal Atatürk
  c) Enver Pasha
  d) İsmet İnönü
- The Treaty of Lausanne (1923) is important because:
  a) It marked the beginning of the Ottoman Empire
  b) It recognized the sovereignty of the Republic of Turkey
  c) It established the Caliphate
  d) It ended World War I

True/False Questions

- The Tanzimat Reforms aimed to modernize the Ottoman administration and society. (True/False)
- Mustafa Kemal Atatürk led the national movement after the fall of the Ottoman Empire. (True/False)
- The Republic of Turkey was established in 1920. (True/False)

Short Answer Questions

- Briefly explain the social and economic problems faced by the Ottoman Empire in the 19th century.
- What were the main objectives of the national struggle led by Mustafa Kemal Atatürk?
- Name two key reforms implemented during the early years of the Republic of Turkey and their impact on society.

Essay Questions

- Discuss the transition from the Ottoman Empire to the Republic of Turkey, focusing on the internal and external factors that influenced this change.
- Explain the role of Mustafa Kemal Atatürk in shaping the principles of the Turkish Revolution.
- Analyze the impact of Western influences on the reform movements in the late Ottoman period.

Materials Used in the Course

Textbooks & References

- Mango, Andrew. *Atatürk: The Biography of the Founder of Modern Turkey.* Overlook Press, 2000.
- Zürcher, Erik J. *Turkey: A Modern History.* I.B. Tauris, 2004.
- Karpat, Kemal H. *The Ottoman Empire and Modern Turkey.* University of Wisconsin Press, 2001.
- Turkish Ministry of National Education, *Atatürk's Principles and History of Turkish Revolution Textbook.*

Academic Articles & Papers

- Articles on the late Ottoman reforms (Tanzimat and Meşrutiyet) from journals such as *Middle Eastern Studies* and *Journal of Modern Turkish Studies.*
- Papers analyzing the Turkish War of Independence and establishment of the Republic.

Multimedia & Visual Aids

- Documentaries on Mustafa Kemal Atatürk and the Turkish War of Independence.
- Historical maps showing the partitioning of the Ottoman Empire and military campaigns during the independence struggle.
- Archival photographs of key events, leaders, and reforms.

Online Resources

- Official websites: Republic of Turkey Ministry of Culture and Tourism, Atatürk Research Center.
- Online digital archives and libraries for historical documents and treaties (e.g., Treaty of Lausanne, Sèvres).
- Educational platforms with lecture notes, summaries, and videos related to Turkish history.

Supplementary Materials

- Timelines of Ottoman decline and Turkish War of Independence.
- Handouts summarizing Atatürk's principles (Kemalism) and major reforms.
- Vocabulary lists for key historical terms in English to support comprehension.

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Decline of the Ottoman Empire	Lecture, Historical Analysis Sessions, Multimedia Presentations	Quizzes, Assignments, Midterm Exam
CLO2 – Western Influence & Reform Movements	Lecture, Document Analysis, Class Discussions	Assignments, Quizzes, Written Exams
CLO3 – Turkish National Struggle	Lecture, Case Studies, Primary Source Analysis	Midterm Exam, Assignments, Short Essays
CLO4 – Foundation of the Republic	Lecture, Debates, Comparative Analysis Activities	Assignments, Quizzes, Written Exams
CLO5 – Historical Source Interpretation	Document Study Workshops, Archival Material Analysis, Tutorials	Source Analysis Reports, Assignments, Quizzes
CLO6 – Atatürk's Reforms & Principles	Lecture, Group Discussions, Multimedia Presentations	Quizzes, Assignments, Midterm Exam
CLO7 – Empire–Republic Transformation Analysis	Seminar Sessions, Critical Thinking Activities, Case Studies	Essays, Assignments, Participation
CLO8 – Applying Historical Knowledge to Contemporary Issues	Discussions, Problem-Based Learning, Contemporary Case Evaluations	Assignments, Presentations, Final Exam

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**2**	**30**
Midterm Exam	**1**	**3**	**3**
Preparation for Midterm Exam	**1**	**20**	**20**
Final Exam	**1**	**3**	**3**
Preparation for Final Exam	**1**	**20**	**20**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Research for Project(s)/Essay(s)	-	-	-
Project Writing	-	-	-
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	-	-	-
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**91**
ECTS Credit			**2**

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

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

University of Kyrenia

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Statics							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC203	II	Fall	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 Statics course provides a comprehensive introduction to the fundamental principles governing bodies at rest under the action of forces. It emphasizes the analysis and resolution of forces acting on particles and rigid bodies, enabling students to understand the mechanical equilibrium that forms the foundation of engineering mechanics. Throughout the course, students will develop the ability to model real-world engineering structures using diagrams and mathematical tools, while learning to apply vector algebra and equilibrium equations to various mechanical systems. Key topics include force vectors, equilibrium of particles and rigid bodies, free-body diagrams, internal forces, and support reactions. The course also covers the analysis of trusses using the methods of joints and sections, as well as the examination of frames, machines, centroids, distributed loads, and moments of inertia. Practical engineering applications are integrated throughout to strengthen conceptual understanding and problem-solving skills. By the end of the course, students will have acquired a solid foundation in static equilibrium and force analysis, which are essential for advanced studies in dynamics, strength of materials, and structural engineering.
Course Aims and Objectives	The primary aim of this course is to equip students with a fundamental understanding of the principles of **engineering statics**, focusing on the analysis of forces, moments, and equilibrium conditions acting on particles and rigid bodies. The course seeks to develop the students' analytical and problem-solving abilities required to model and solve real-world engineering problems involving static systems. • Understand and apply the basic concepts of force, moment, and equilibrium to engineering systems. • Analyze different types of force systems acting on particles and rigid bodies using vector algebra. • Construct accurate **free-body diagrams** to represent force interactions and equilibrium conditions. • Determine **support reactions**, **internal forces**, and **resultant forces** for a variety of static structures. • Perform detailed analyses of **trusses, frames, and machines** using appropriate engineering methods. • Calculate **centroids, centers of gravity**, and **moments of inertia** for composite bodies and structural elements. • Integrate theoretical knowledge with practical applications in mechanical, civil, and marine engineering contexts. • Develop critical thinking and problem-solving skills necessary for further studies in **Dynamics**, **Mechanics of Materials**, and **Structural Analysis**.

Course Learning Outcomes	**LO1 – Knowledge and Understanding** Define fundamental concepts related to forces, moments, equilibrium, centroids, centers of gravity, and moments of inertia in static systems. Understand the principles underlying internal forces in trusses, frames, and machines. **LO2 – Application of Knowledge** Apply the principles of equilibrium to determine unknown forces, moments, and reactions in engineering structures. Construct accurate free-body diagrams for particles and rigid bodies under various loading conditions. **LO3 – Analytical and Technical Skills** Represent complex force systems using vector notation and perform vector operations for problem-solving. Analyze the internal forces in trusses, frames, and machines using the joint method and method of sections. Compute centroids, centers of gravity, and moments of inertia for different geometrical shapes and composite areas. **LO4 – Evaluation and Critical Thinking** Evaluate the stability and structural integrity of simple static systems under different loading and support conditions. Integrate theoretical knowledge with engineering practice through the application of statics principles in real-world scenarios. **LO5 – Communication and Interpretation** Interpret and communicate the results of statics analyses using appropriate engineering terminology, notation, and graphical representation. **LO6 – Problem-Solving and Decision-Making** Demonstrate effective problem-solving, critical thinking, and analytical skills in solving statically determined systems. Propose solutions for engineering structures considering practical constraints and safety.

Content of the Course

Week	*Subject*
1	Introduction to Statics and Fundamental Concepts
2	Force Vectors and Vector Operations
3	Equilibrium of a Particle
4	Free-Body Diagrams and Force Systems
5	Equilibrium of Rigid Bodies
6	Internal Forces and Support Reactions
7	Midterm Exam
8	Analysis of Trusses: Method of Joints
9	Analysis of Trusses: Method of Sections
10	Frames and Machines
11	Centroids and Centers of Gravity
12	Distributed Loads and Beams
13	Moments of Inertia of Areas
14	Review and Applications of Statics in Engineering
15	Final Exam

Methods and Techniques Used in the Course

Lectures and Theoretical Explanations:

- Core principles of statics are introduced through structured lectures supported by visual presentations, diagrams, and real-life engineering examples.
- Emphasis is placed on conceptual understanding before problem application.

Problem-Solving Sessions:

- Extensive in-class problem-solving practices to reinforce theoretical concepts.
- Students are encouraged to work individually and collaboratively to develop analytical thinking and engineering reasoning.

Interactive Discussions:

- Classroom discussions and question–answer sessions are used to deepen understanding of complex topics such as force systems, truss analysis, and moments of inertia.

Demonstrations and Simulations:

- Use of graphical and computer-based tools (e.g., vector visualization and structure simulation software) to illustrate force distribution, equilibrium, and support reactions.

Assignments and Case Studies:

- Regular homework assignments and mini projects involving real engineering applications to help students connect theoretical knowledge to practice.

Quizzes and Midterm Evaluation:

- Periodic quizzes to assess comprehension and provide formative feedback.
- Midterm and final exams evaluate the students' mastery of statics principles and problem-solving ability.

Independent Learning and Reading:

- Encouragement of self-study through textbook readings, supplementary materials, and reference problems.

Office Hours and Academic Support:

- Individual or group consultations for additional problem clarification and personalized academic assistance.

Sample Questions

Fundamental Concepts

- Define the term *equilibrium* in the context of statics.
- Explain the difference between a scalar and a vector quantity, providing examples relevant to engineering mechanics.
- Describe the conditions required for a particle to be in static equilibrium.

Force Systems and Free-Body Diagrams

- Draw a complete free-body diagram for a given system of forces acting on a rigid body.
- A 250 N force acts at an angle of 30° to the horizontal. Resolve this force into its horizontal and vertical components.
- Determine the resultant of a system of concurrent forces acting at a point.

Equilibrium of Rigid Bodies

- For a beam supported by a hinge and a roller, derive the equations of equilibrium and calculate the support reactions.
- A uniform beam of 6 m length is subjected to a distributed load of 2 kN/m. Find the reactions at the supports.

Trusses and Frames

- Using the **Method of Joints**, calculate the forces in all members of a simple truss subjected to a given load.
- Explain the **Method of Sections** and apply it to find internal forces in selected members of a truss.
- Identify whether the given truss is statically determinate or indeterminate.

Centroids and Centers of Gravity

- Determine the centroid of a composite area consisting of a rectangle and a semicircle.
- Explain the engineering significance of the centroid in structural design.

Moments of Inertia and Distributed Loads

- Derive the formula for the moment of inertia of a rectangular area about its centroidal axis.
- Calculate the moment of inertia for a circular cross-section of radius *r* about its centroidal axis.
- Explain how the moment of inertia influences beam bending resistance.

Applied and Conceptual Questions

- Discuss how static analysis is applied in ship structures, bridges, or building frameworks.
- Why is it essential to draw accurate free-body diagrams in solving statics problems?
- How does the equilibrium concept contribute to the safety and reliability of marine and mechanical systems?

Comprehensive Problem (Example Final Exam Question)

- A 5-meter beam is supported at both ends and carries a 3 kN point load at the mid-span and a uniformly distributed load of 2 kN/m.
    - (a) Draw the free-body diagram.
    - (b) Calculate the reactions at the supports.
    - (c) Determine the shear force and bending moment at mid-span.

Materials Used in the Course

Primary Textbooks

- Hibbeler, R. C. (2022). *Engineering Mechanics: Statics* (15th Edition). Pearson Education.
- Beer, F. P., Johnston, E. R., Mazurek, D. F., & Eisenberg, E. R. (2020). *Vector Mechanics for Engineers: Statics* (12th Edition). McGraw-Hill Education.

Supplementary References

- Meriam, J. L., & Kraige, L. G. (2018). *Engineering Mechanics: Statics* (9th Edition). Wiley.
- Bedford, A., & Fowler, W. (2008). *Engineering Mechanics: Statics* (5th Edition). Pearson Prentice Hall.
- Pytel, A., & Kiusalaas, J. (2016). *Engineering Mechanics: Statics and Dynamics*. Cengage Learning.

Lecture Notes and Presentations

- Instructor-prepared PowerPoint slides summarizing theoretical concepts and problem-solving techniques.
- Supplementary handouts covering derivations, key formulas, and conceptual summaries.

Digital and Online Resources

- **Learning Management System (LMS)**: Access to weekly lecture notes, quizzes, assignments, and supplementary videos.
- **Simulation and Visualization Tools:**
  - MATLAB and AutoCAD for graphical analysis and static system modeling.
  - Engineering simulation platforms (e.g., ANSYS, SolidWorks Motion) for demonstrating equilibrium and force distribution.
- **Online video resources** such as MIT OpenCourseWare and NPTEL lectures on Engineering Mechanics for additional conceptual support.

Practical Materials

- Laboratory models and demonstration kits for illustrating static equilibrium, force vectors, and moment principles.
- Graph papers, rulers, protractors, and other engineering drawing instruments for manual problem-solving and diagram preparation.

Assessment Materials

- Homework problem sets and in-class exercises based on real-world engineering examples.
- Midterm and final exam question banks prepared in line with course learning outcomes.
- Group assignments and case studies connecting static theory with marine and mechanical engineering applications.

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

Program Outcomes Matrix

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

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

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method (Öğretim Yöntemi)**	**Assessment Method (Değerlendirme Yöntemi)**
CLO1 – Knowledge & Understanding	Lectures, Multimedia Presentations, Conceptual Discussions	Written Exams, Quizzes, Short Answer Questions
CLO2 – Application of Knowledge	Problem-Solving Sessions, Tutorials, Hands-on Exercises	Homework Assignments, Practical Problem Sets, Lab Reports
CLO3 – Analytical & Technical Skills	Case Studies, Vector Analysis Exercises, Computer Simulations	Problem-Solving Exams, Reports, Assignments
CLO4 – Evaluation & Critical Thinking	Scenario-Based Learning, Group Discussions, Real-World Examples	Case Study Reports, Project Work, Oral Presentations
CLO5 – Communication & Interpretation	Technical Drawing Workshops, Graphical Representation, Team Exercises	Project Reports, Presentations, Diagram Interpretation Tasks
CLO6 – Problem-Solving & Decision-Making	Problem-Based Learning, Applied Engineering Tasks, Simulations	Practical Problem Solving, Decision-Making Reports, Capstone/Project Evaluation

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Material Science							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC205	II	Fall	3	4	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 *Material Science* course provides a comprehensive study of the properties, structure, and applications of engineering materials, with a particular focus on marine systems. Students are introduced to fundamental concepts of material science, including the terminology and classifications used in modern engineering. The course covers the structural and phase diagrams of metals and alloys, highlighting the relationship between microstructure and material properties. Emphasis is placed on the production methods, designation, and classification of cast iron, steel, and non-ferrous metals, as well as the analysis and selection of materials for various engineering applications. Students gain knowledge of non-metallic materials and their performance characteristics, along with an understanding of how materials behave under different types of stress. Practical applications are explored through topics such as heat treatment of metals, welding technologies, metal casting principles, and the integration of metallic constructions in marine vessels. The course also examines performance assessment techniques and material selection criteria relevant to marine engineering. Through theoretical study, laboratory exercises, and case studies, students develop the ability to evaluate, select, and apply materials effectively, ensuring their suitability for engineering and marine applications. Mid-term and final examinations are conducted to assess understanding and application of material science principles.
Course Aims and Objectives	The aim of the *Material Science* course is to provide students with a thorough understanding of the fundamental principles, properties, and applications of engineering materials, particularly within the context of marine engineering. The course seeks to develop students' ability to analyze, evaluate, and select materials suitable for diverse engineering and marine applications, considering performance, safety, and environmental factors. • To introduce the fundamental concepts, terminology, and classifications of engineering materials. • To explain the structures, phase diagrams, and behavior of metals and alloys under various conditions. • To familiarize students with production methods, designation systems, and classification criteria for cast iron, steel, and non-ferrous metals. • To provide knowledge of non-metallic materials and their properties in engineering applications. • To develop skills in assessing material performance under stress and understanding their mechanical and thermal behavior. • To examine heat treatment processes, welding technology, and metal casting principles relevant to marine and industrial systems.

	• To enable students to select appropriate materials for engineering applications based on mechanical, thermal, and environmental considerations. • To enhance students' problem-solving skills through case studies, laboratory exercises, and practical analysis of material-related engineering challenges.
Course Learning Outcomes	**LO1 – Knowledge and Understanding** Explain the fundamental principles of material science, including the structure, properties, and classification of metals, alloys, and non-metallic materials. Demonstrate understanding of material production methods such as casting, forging, alloying, and modern metallurgical techniques. **LO2 – Application of Knowledge** Apply knowledge of heat treatment, welding, and metal joining processes to improve material performance. Assess material selection for marine and industrial engineering systems, considering operational requirements, environmental conditions, and safety standards. **LO3 – Analytical and Technical Skills** Analyze phase diagrams, material behavior under thermal and mechanical conditions, and interpret material testing and characterization results. Evaluate materials for engineering applications based on mechanical, thermal, and chemical performance criteria. **LO4 – Evaluation and Critical Thinking** Integrate theoretical knowledge with practical applications to solve problems in design, maintenance, and repair of marine systems. Evaluate the suitability and performance of materials under various operational and environmental conditions. **LO5 – Communication and Interpretation** Communicate technical information effectively, preparing clear reports, documentation, and presentations related to material analysis, assessment, and selection. **LO6 – Problem-Solving and Decision-Making** Demonstrate problem-solving and decision-making skills in selecting, treating, and utilizing materials for specific marine and industrial applications, ensuring compliance with performance and safety standards.

Content of the Course

Week	*Subject*
1	Introduction to material science and terminology
2	Structures and phase diagrams of metals and its alloys.
3	Engineering materials and applications on main and auxiliary technologic systems
4	The methods of production of cast iron, steel and non-ferrous metals
5	Designation and classification of steel, cast iron and non ferrous material
6	Material analysis and technics of metallurgic material choice
7	Mid-Term Examination
8	Non-metallic materials
9	The principles and description of materials under stress
10	Material assessment and performance knowledge on marine concept
11	The heat treatment of metals
12	Welding technology and principles of welding on marine applications
13	The principle of metal casting
14	Metal constructions on different marine vessel systems.
15	Final Exams

Methods and Techniques Used in the Course

Lectures and Interactive Discussions

- Presentation of fundamental concepts of material science, material properties, and phase diagrams.
- Encouraging active student participation through Q&A sessions and problem-solving discussions.

Laboratory Work and Practical Sessions

- Hands-on experiments to study the properties of metals, alloys, and non-metallic materials.
- Practical exercises in material testing, metallographic analysis, and evaluation of mechanical and thermal properties.

Case Studies and Application-Based Learning

- Analysis of material selection and performance in real-world marine engineering applications.
- Study of failures and troubleshooting in metal and alloy components.

Use of Simulation and Modeling Tools

- Computer-based simulations to model phase changes, stress-strain behavior, and heat treatment effects.
- Visualization of microstructures and material responses under different conditions.

Problem-Solving and Critical Thinking Exercises

- Assignments focusing on material selection, stress analysis, and corrosion prevention.
- Group discussions to develop analytical skills and decision-making in engineering contexts.

Technical Reports and Documentation

- Preparation of reports on laboratory results, material testing, and metallurgical analysis.
- Emphasis on professional communication and documentation of scientific observations.

Quizzes, Mid-Term, and Final Exams

- Periodic assessments to evaluate theoretical understanding, practical skills, and application knowledge.
- Combination of multiple-choice, short-answer, and problem-solving questions.

Sample Questions

Multiple Choice Questions (MCQs)

- Which of the following is the main strengthening mechanism in steel alloys?
  a) Grain boundary strengthening
  b) Precipitation hardening
  c) Work hardening
  d) All of the above
- Which property of a material is primarily measured by a tensile test?
  a) Thermal conductivity
  b) Elastic modulus and ultimate tensile strength
  c) Electrical resistivity
  d) Density
- In the phase diagram of a binary alloy, the eutectic point represents:
  a) Maximum solubility at high temperature
  b) Complete miscibility of the two metals
  c) The temperature and composition where liquid transforms into two solid phases
  d) A metastable state
- Which of the following non-metallic materials is commonly used for marine insulation due to its corrosion resistance?
  a) Epoxy resin
  b) Aluminum
  c) Cast iron
  d) Copper

Short Answer Questions

- Explain the difference between cast iron and steel in terms of composition and mechanical properties.
- Describe the effect of heat treatment on the microstructure and mechanical properties of steel.

- What is the purpose of using welding technology in marine applications, and what are the key factors affecting weld quality?

Problem-Solving / Applied Questions

- A marine component made of aluminum alloy is subjected to tensile stress. Determine the appropriate aluminum alloy selection considering corrosion resistance, strength, and machinability.
- Analyze a hypothetical scenario where a steel shaft on a ship fails prematurely. Identify possible metallurgical causes and suggest preventive measures.
- Using a given phase diagram, determine the solidification path and phase composition for a copper-nickel alloy at 800°C.

Essay / Discussion Questions

- Discuss the advantages and limitations of using non-ferrous metals versus ferrous metals in marine engineering.
- Explain how material science principles are applied in the design of heat exchangers, pumps, and hull components on ships.
- Evaluate the role of modern metallurgical techniques (such as HCCI engines or alternative heat treatments) in improving the efficiency and longevity of marine machinery.

Materials Used in the Course

Textbooks and Reference Books

- Callister, W. D., & Rethwisch, D. G. (Latest Edition). *Materials Science and Engineering: An Introduction*.
- Smith, W. F., & Hashemi, J. (Latest Edition). *Foundations of Materials Science and Engineering*.
- Ashby, M. F., & Jones, D. R. H. (Latest Edition). *Engineering Materials 1 & 2*.
- Totten, G. E. (Ed.). *Steel Heat Treatment Handbook*.
- ASTM Standards and Codes related to metals, alloys, and marine applications.

Laboratory Equipment and Tools

- Metallographic microscopes and imaging systems
- Tensile and compression testing machines
- Hardness testers (Rockwell, Brinell, Vickers)
- Universal testing machines for mechanical property evaluation
- Thermocouples and furnaces for heat treatment experiments
- Welding equipment for demonstration of marine welding processes

Software and Simulation Tools

- Material property databases (MatWeb, CES EduPack)
- CAD software with material property analysis (SolidWorks, AutoCAD)
- Finite Element Analysis software for stress and deformation studies

Supplementary Learning Materials

- Lecture slides and notes provided by the instructor
- Research articles and case studies on marine material applications
- Videos and tutorials demonstrating casting, welding, and heat treatment processes
- Laboratory manuals for practical sessions

Safety and Protective Materials

- Safety goggles, gloves, and aprons for metallurgical labs
- Ventilation and fume extraction equipment for welding and casting exercises

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

Program Outcomes Matrix

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

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

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Knowledge & Understanding	Lectures, Multimedia Presentations, Conceptual Discussions	Written Exams, Quizzes, Short Answer Questions
CLO2 – Application of Knowledge	Tutorials, Laboratory Sessions, Case Studies, Hands-on Exercises	Homework Assignments, Lab Reports, Practical Problem Sets
CLO3 – Analytical & Technical Skills	Material Testing Labs, Simulations, Case Analysis	Lab Reports, Analytical Assignments, Problem-Solving Exams
CLO4 – Evaluation & Critical Thinking	Scenario-Based Learning, Design Projects, Group Discussions	Project Reports, Case Study Analysis, Oral Presentations
CLO5 – Communication & Interpretation	Technical Writing Workshops, Team Exercises, Report Preparation	Project Reports, Presentations, Documentation Assessment
CLO6 – Problem-Solving & Decision-Making	Problem-Based Learning, Applied Engineering Tasks, Case Studies	Practical Problem-Solving Exercises, Decision-Making Reports, Capstone/Project Evaluation

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**	**5**	**10**
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory / Practical Applications	-	-	-
Assignment(s)/Homework/Class Works	**4**	**5**	**20**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**131**
ECTS Credit			**4**

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Thermodynamics I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC207	II	Fall	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**
				-	50	30	20
Course Venue and Time				Wednesday 09.30-12.20			
Instructor information				**Prof. Dr. Şenol Başkaya** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4060 senol.baskaya@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	The course is designed for third semester engineering students. The objective of the course is to teach basic principles of classical thermodynamics, to train students to identify, formulate and solve engineering problems in thermodynamics, and to teach the application of second law analysis methods for thermodynamic systems.
Course Aims and Objectives	Properties of substances, thermodynamic equilibrium, ideal gas equation of state, energy. Transfer of energy between system and its surrounding, thermodynamic processes, reversible and irreversible processes, simple system, enthalpy, constant-volume and constant-pressure specific heats, pure substance thermodynamic surfaces. The first law of thermodynamics for a control volume. The second law of thermodynamics, entropy, numerical value of entropy. The second law of thermodynamics for a control volume, efficiency. Exergy and thermodynamic analysis of processes.
Course Learning Outcomes	LO1: Gain the ability to find thermodynamic properties. LO2: Gain the ability to apply the first law of Thermodynamics on closed systems. LO3: Gain the ability to apply the first law of Thermodynamics on open systems. LO4: Gain the ability to apply the second law of thermodynamics. LO5: Gain the ability to understand and apply the exergy analysis on closed and open systems.

Content of the Course

Week	*Subject*
1	Introduction
2	Basic Concepts and Definitions
3	Energy and Energy Transfer
4	General Energy Analysis
5	Properties of Pure substances
6	First law of Thermodynamics: Closed Systems
7	Closed System Analysis
8	First law of Thermodynamics: Open Systems
9	Open System Analysis
10	The second law of Thermodynamics
11	Introduction to Entropy
12	Entropy Analysis
13	Introduction to Exergy
14	Exergy Analysis
15	Irreversibility and Availability

Methods and Techniques Used in the Course

Lectures – Structured presentations covering fundamental concepts, laws, and theoretical frameworks of thermodynamics.

Problem-Solving Sessions – Step-by-step analysis of quantitative problems, including energy balances, entropy calculations, and exergy analysis.

Case Studies – Application of thermodynamic principles to real-world engineering systems, including marine propulsion, HVAC, and energy conversion systems.

Computer-Assisted Simulations – Use of simulation tools to model thermodynamic processes, analyze cycles, and visualize energy transformations.

Group Discussions – Interactive sessions to promote critical thinking and collaborative learning in solving complex thermodynamic scenarios.

Homework Assignments – Reinforcement of theoretical knowledge through structured exercises and applied calculations.

Quizzes and Concept Checks – Regular short assessments to monitor understanding and identify areas requiring additional focus.

Analytical and Conceptual Exercises – Encouraging the development of reasoning skills to assess system efficiency, irreversibility, and energy utilization.

Sample Questions

Conceptual Questions

- Define energy, work, and heat, and explain the differences between them.
- Explain the physical meaning of entropy and its relevance to the second law of thermodynamics.
- Discuss the concept of exergy and how it relates to energy efficiency in engineering systems.

Analytical / Calculation Problems

- A closed system undergoes a cyclic process. Given the heat interactions and work done, calculate the net change in internal energy.
- Analyze a steady-flow open system and determine the energy transfer using the first law of thermodynamics.
- Calculate the entropy change of a substance undergoing a reversible isothermal expansion.

Applied / Case Study Problems

- A marine engine operates between two temperature reservoirs. Determine its maximum theoretical efficiency and compare it with actual engine performance.
- Given a refrigeration cycle, calculate the exergy destruction in each component and suggest ways to improve system efficiency.
- Evaluate the effect of irreversibility on the availability of energy in a thermal power plant.

Short Answer / Reasoning Questions

- Explain why no real process can be completely reversible.
- Describe the differences between closed and open system analyses in thermodynamic applications.
- Discuss the role of thermodynamic properties in the design of energy systems, such as turbines or heat exchangers.

Materials Used in the Course

Textbooks and Reference Books

- Çengel, Y.A., Boles, M.A., Kanoğlu, M., Thermodynamics: An Engineering Approach, 9th Ed., McGraw-Hill, 2020.
- Sonntag, R. E., Borgnakke, C., & Van Wylen, G. J., *Fundamentals of Thermodynamics*, 9th Edition, Wiley.
- Moran, M.J., Shapiro, H.N., Boettner, D.D., Bailey, M.B., Fundamentals of Engineering Thermodynamics, 7th Ed., John Wiley & Sons, 2011.
- Van Wylen, G. J., & Sonntag, R. E., *Classical Thermodynamics*, 3rd Edition, Wiley.

Lecture Notes and Course Materials

- Weekly lecture slides and annotated notes prepared by the instructor.
- Supplementary problem sets and solution manuals for practice.
- Case studies and example calculations relevant to marine engineering systems.

Software and Simulation Tools

- MATLAB or Python for thermodynamic calculations and plotting property diagrams.
- EES (Engineering Equation Solver) for energy, entropy, and exergy analyses.
- Thermodynamic property software/databases (e.g., NIST REFPROP).

Online Resources

- Educational videos and tutorials on thermodynamic cycles and principles.
- Interactive online platforms for thermodynamic simulations and exercises.

Laboratory Materials (if applicable for demonstration purposes)

- Demonstration setups for heat transfer, work, and energy experiments.
- Measurement instruments: pressure gauges, thermocouples, flow meters.
- Steam tables, Mollier diagrams, and psychrometric charts for practical exercises.

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

Program Outcomes	
PO1	Ability to demonstrate strong technical competence in mechanical system design, solid mechanics, thermodynamics, fluid mechanics, heat transfer, and control systems.
PO2	Ability to apply mathematics, physics, and engineering principles to identify, formulate, and solve complex mechanical engineering problems.
PO3	Ability to use modern engineering tools, CAD software, simulation environments (FEA/CFD), and manufacturing-related software effectively.
PO4	Ability to design mechanical components, processes, and systems that meet performance, safety, and sustainability requirements.
PO5	Ability to communicate effectively and apply teamwork, leadership, and project management skills in multidisciplinary engineering environments.
PO6	Ability to utilize knowledge of materials science, advanced manufacturing processes, machine design, and maintenance technologies.
PO7	Ability to perform experimental work, collect and interpret data, and use laboratory and measurement techniques effectively.
PO8	Ability to adopt engineering practices aligned with relevant standards, regulations, and industrial quality/safety requirements.
PO9	Ability to internalize ethical engineering behavior, professional responsibility, and awareness of societal and environmental impacts of engineering solutions.
PO10	Ability to recognize the need for lifelong learning and follow international technological, industrial, and academic advancements.
PO11	Ability to integrate Industry 4.0 concepts, automation systems, digital manufacturing, and AI-based tools into mechanical engineering applications.

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Knowledge & Understanding	Theoretical lecture	Midterm examinations and final exam
CLO2 – Application of Knowledge	Theoretical lecture	Midterm examinations and final exam
CLO3 – Analytical & Technical Skills	Theoretical lecture	Midterm examinations and final exam
CLO4 – Evaluation & Critical Thinking	Theoretical lecture	Midterm examinations and final exam
CLO5 – Communication & Interpretation	Theoretical lecture	Midterm examinations and final exam

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**4**	**60**
Lectures	**15**	**3**	**45**
Midterm Exam	**2**	**1,5**	**3**
Preparation for Midterm Exam	**2**	**12**	**24**
Final Exam	**1**	**2**	**2**
Preparation for Final Exam	**1**	**15**	**15**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Case Studies / Critical Thinking	-	-	-
Project Writing	-	-	-
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory / Practical Applications	-	-	-
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			**149**
ECTS Credit			**5**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	-	-
Laboratory	-	-
Application	-	-
Field Work	-	-
Special Course Internship (Work Placement)	-	-
Homework/Assignments	-	-
Providing reliability and motivation of the individual homework completion and Submission	-	-
Presentation/Jury	-	-
Project	-	-
Quiz	-	-
Midterms/Oral Exams	2	60
Final/Oral Exams	1	40
Total	**3**	**100**

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

University of Kyrenia

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Strenght of Materials							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEC209	II	Fall	3	3	2	2	0
Course type: Compulsory Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				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 Strength of Materials course provides an in-depth exploration of the fundamental principles of material mechanics, with a particular focus on understanding how materials behave under various types of loading. The course begins with a review of statics and introduces the concept of deformable bodies, internal forces, and three-dimensional stress distribution. Students will learn to analyze axial, shear, and bending forces in structural elements such as beams, columns, and frames, utilizing both analytical and graphical methods. The course emphasizes the calculation of normal, shear, and bearing stresses, as well as the mechanical properties of materials, including stress-strain behavior, yield points, ultimate stress, and failure criteria. Advanced topics include the elastic deformation of axially loaded members, torsion of circular shafts, states of stress, and analysis of stresses in beams, including composite and combined stresses. Methods for determining deflection of beams, including multiple integration, superposition, and energy methods, are also covered. Throughout the course, theoretical concepts are integrated with practical examples, problem-solving techniques, and design principles according to allowable stress design (ASD) standards. By the end of the course, students will have developed a comprehensive understanding of material behavior under load, enabling them to analyze, design, and evaluate structural components in engineering applications.
Course Aims and Objectives	The aim of the *Strength of Materials* course is to provide students with a solid foundation in understanding the behavior of materials and structural elements under various types of mechanical loads. The course is designed to develop students' analytical, problem-solving, and design skills, enabling them to predict stresses, strains, and deformations in engineering components accurately. It also aims to connect theoretical principles with practical applications in mechanical, civil, and marine engineering contexts. • Comprehend the fundamental concepts of stress, strain, and mechanical properties of materials. • Analyze internal forces in structural elements and draw axial, shear, and bending moment diagrams. • Calculate normal, shear, and bearing stresses in beams, columns, shafts, and other engineering components. • Understand and apply elastic deformation theory for axially loaded members and torsional members. • Evaluate combined stresses, flexural stresses, and composite beam behavior. • Determine beam deflections using multiple methods, including integration, superposition, and energy principles. • Apply engineering design principles according to allowable stress design (ASD) standards.

	• Solve practical engineering problems involving the selection of materials and design of structural elements.
Course Learning Outcomes	**LO1 – Knowledge and Understanding** Understand the mechanical behavior of materials under different types of loading, including axial, torsional, bending, and combined loads. Explain concepts of stress, strain, elastic deformation, and structural performance under various conditions. **LO2 – Application of Knowledge** Apply theoretical principles to analyze and calculate normal, shear, and bearing stresses, strains, axial deformations, torsional deformations, and deflections in beams, shafts, and other structural elements. **LO3 – Analytical and Technical Skills** Draw axial force, shear force, and bending moment diagrams for beams, columns, and frames using analytical and graphical methods. Apply beam theory, flexure formulas, shear stress equations, and energy methods to determine deflections and internal forces. **LO4 – Evaluation and Critical Thinking** Evaluate structural performance under different loading conditions. Analyze design choices and recommend solutions to optimize material usage, safety, and performance in mechanical, civil, and marine engineering structures. **LO5 – Communication and Interpretation** Interpret and communicate results of stress, strain, and deflection analyses using appropriate engineering terminology, notation, and graphical representations in reports and presentations. **LO6 – Problem-Solving and Decision-Making** Demonstrate problem-solving skills by applying mechanics of materials principles to practical engineering problems. Design beam and shaft cross-sections according to allowable stress design (ASD) criteria, considering material properties, operational conditions, and safety standards.

Content of the Course

Week	*Subject*
1	Introduction to strength of materials Course objectives, course description, review of statics and definitions of deformable bodies, internal loading in 3D bodies.
2	Introduction to strength of materials Course objectives, course description, review of statics and definitions of deformable bodies, internal loading in 3D bodies.
3	Axial force, Shear force and bending moment diagrams Drawing the AFD, SFD, and BMD for beams, columns, and frames by using the method of sections and the graphical method. Differential relationships between load and shear and bending moment.
4	Axial force, Shear force and bending moment diagrams Drawing the AFD, SFD, and BMD for beams, columns, and frames by using the method of sections and the graphical method. Differential relationships between load and shear and bending moment.
5	Normal, shear and bearing stress Normal and shear stress at a point, concept of deformation and strain, examples of average normal, shear stress and bearing stress.
6	Mechanical properties of materials Stress and strain diagrams for ductile and brittle materials, yield point, ultimate stress and failure points.
7	Midterm Exam
8	Elastic deformation of axially loaded members Force deformation relationships, statically indeterminate case; force method.
9	Elastic deformation of axially loaded members Force deformation relationships, statically indeterminate case; force method.
10	Torsion of circular shafts Shear stress due to torsion.
11	States of stress States of stress with emphasis on two dimensional problems, Moher's circle for plane stress.
12	Stresses in Beams Pure bending and shear stress in beams, flexure formula, composite beams, Combined Stresses, Design beam cross section according to ASD.
13	Stresses in Beams Pure bending and shear stress in beams, flexure formula, composite beams, Combined Stresses, Design beam cross section according to ASD.
14	Deflection of beams Multiple integration method, method of superposition, and Energy method.
15	Final Exam

Methods and Techniques Used in the Course

Lectures and Conceptual Discussions:

- Presentation of fundamental theories and principles of strength of materials.
- Explanation of stress-strain relationships, material properties, and structural behavior.
- Use of real-life examples from mechanical, civil, and marine engineering applications.

Problem-Solving Sessions:

- Step-by-step derivation of formulas and equations.
- Practice exercises on axial, torsional, and bending loads.
- Development of analytical skills for drawing axial force, shear force, and bending moment diagrams.

Graphical and Analytical Techniques:

- Use of graphical methods for internal force analysis.
- Construction of diagrams using both manual and software-assisted techniques.
- Application of energy methods and superposition for deflection calculations.

Laboratory and Simulation Work (if applicable):

- Hands-on experiments to measure stress, strain, and deformation in material samples.
- Use of strain gauges and torsion testing equipment for practical understanding.
- Simulations of beam deflections, torsion, and combined stresses using engineering software.

Case Studies and Applied Examples:

- Analysis of real-world engineering structures to connect theory with practice.
- Design exercises for beams, shafts, and structural elements considering allowable stress design (ASD).

Interactive Discussions and Peer Learning:

- Group discussions to interpret results, verify calculations, and explore alternative solutions.
- Q&A sessions to reinforce understanding of complex topics.

Assessment-Based Learning:

- Regular quizzes, assignments, and in-class problem-solving to track progress.
- Midterm and final exams with theoretical and applied problem-solving components.

Sample Questions

Axial Loading and Stress Analysis
a) A steel rod of circular cross-section 25 mm in diameter is subjected to a tensile force of 50 kN. Calculate the normal stress in the rod.
b) A composite bar is made of steel and aluminum connected in series, subjected to an axial load. Determine the load carried by each material if the total elongation is limited to a specified value.

Shear Force and Bending Moment Diagrams
a) Draw the shear force and bending moment diagrams for a simply supported beam of length 6 m carrying a uniformly distributed load of 5 kN/m.
b) A cantilever beam of length 4 m carries a point load of 10 kN at its free end. Determine the maximum bending moment and its location.

Torsion and Circular Shafts
a) A solid circular shaft of diameter 50 mm is subjected to a torque of 2 kN·m. Determine the maximum shear stress in the shaft.
b) Explain the difference between torsion in solid and hollow shafts, and discuss which design is more efficient for transmitting power.

Combined Stresses
a) A structural member is subjected to axial load and bending moment simultaneously. Determine the maximum normal stress using the flexure formula.
b) Explain the concept of principal stresses and sketch Mohr's circle for a given two-dimensional stress element.

Beam Deflection
a) Determine the deflection at the midpoint of a simply supported beam with length Lsubjected to a central point load P, using the double integration method.
b) Explain the use of the method of superposition in calculating beam deflections for combined loading.

Material Properties and Stress-Strain Relationships
a) Compare the stress-strain curves of ductile and brittle materials.
b) A steel specimen has a yield strength of 250 MPa and an ultimate strength of 400 MPa. Determine the factor of safety if it is subjected to a working tensile stress of 150 MPa.

Practical/Design-Based Problem
A simply supported beam of length 5 m carries a triangular distributed load with a maximum intensity of 6 kN/m at the midspan. Determine:

- Shear force at supports
- Maximum bending moment and its location
- Maximum bending stress for a rectangular beam section with a width of 100 mm and depth of 200 mm

Materials Used in the Course

Textbooks

- Beer, F.P., Johnston, E.R., DeWolf, J.T., & Mazurek, D.F. *Mechanics of Materials*, 8th Edition, McGraw-Hill.
- Hibbeler, R.C. *Mechanics of Materials*, 11th Edition, Pearson.
- Gere, J.M., & Goodno, B.J. *Mechanics of Materials*, 9th Edition, Cengage Learning.

Lecture Notes and Presentations

- Instructor-prepared lecture slides covering theory, derivations, and worked examples.
- Supplementary notes on beam deflections, torsion, combined stresses, and energy methods.

Reference Books and Academic Papers

- Ugural, A.C., & Fenster, S.K. *Advanced Strength and Applied Elasticity*, 5th Edition.
- Timoshenko, S., & Goodier, J.N. *Theory of Elasticity*, 3rd Edition.
- Selected peer-reviewed journal articles on material performance, composite beams, and torsional analysis in marine and mechanical applications.

Problem-Solving Workbooks

- Engineering problem sets for AFD, SFD, BMD, and stress analysis exercises.
- Practical application examples, including marine and structural engineering case studies.

Software Tools

- MATLAB / MathCAD: For solving statically indeterminate problems and plotting diagrams.
- SolidWorks Simulation / ANSYS Mechanical: For virtual stress analysis and validation of theoretical calculations.

Online Resources

- Educational platforms with supplementary tutorials and animations for visualizing deformation, bending, and torsion.
- Open-source repositories for example problems and solutions in engineering mechanics.

Laboratory and Workshop Materials (if applicable)

- Physical models of beams, shafts, and columns for experimental measurement of stress and deflection.
- Strain gauges and data acquisition systems for observing real-time deformations.

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

Program Outcomes Matrix

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

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

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1 – Knowledge & Understanding	Lectures, Multimedia Presentations, Conceptual Discussions	Written Exams, Quizzes, Short Answer Questions
CLO2 – Application of Knowledge	Tutorials, Problem-Solving Sessions, Laboratory Exercises	Homework Assignments, Practical Problem Sets, Lab Reports
CLO3 – Analytical & Technical Skills	Analytical Exercises, Diagram Drawing Workshops, Simulations	Problem-Solving Exams, Assignments, Graphical/Analytical Reports
CLO4 – Evaluation & Critical Thinking	Scenario-Based Learning, Case Studies, Group Discussions	Case Study Reports, Project Work, Oral Presentations
CLO5 – Communication & Interpretation	Technical Writing Workshops, Diagram & Report Preparation, Team Exercises	Project Reports, Presentations, Documentation Assessment
CLO6 – Problem-Solving & Decision-Making	Problem-Based Learning, Applied Engineering Tasks, Design Exercises	Practical Problem-Solving Exercises, Design Reports, Capstone/Project Evaluation

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**3**	**45**
Midterm Exam	**1**	**3**	**3**
Preparation for Midterm Exam	**1**	**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**	**5**	**10**
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory / Practical Applications	-	-	-
Assignment(s)/Homework/Class Works	**4**	**5**	**20**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**116**
ECTS Credit			**3**

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Operations and Maintenance of Main and Auxiliary Machinery I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MED201	II	Fall	3	3	2	2	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				20	30	30	20
Course Venue and Time				Wednesday 09.30-12.20			
Instructor information				**Chf. Eng. Volkan Varışlı** Faculty of Maritime Studies Wednesday / 09:00 - 12:00 +90 (392) 650 26 00 / 4095 volkan.varisli@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course provides an in-depth study of the operation, maintenance, and safety of main and auxiliary machinery onboard ships. Students will gain comprehensive knowledge of shipboard maintenance practices, the operational principles of large-bore diesel engines, and their auxiliary systems. The course emphasizes both theoretical and practical aspects of marine engineering, including combustion engine operations, propulsive system mechanics, and machinery performance evaluation. The course also covers key aspects of shipboard safety, maintenance planning, and documentation. Students will learn the principles of preventive and corrective maintenance, including fault analysis, troubleshooting, and the use of electronic Planned Maintenance Systems (PMS). Practical applications include operation and maintenance of fuel, lubrication, cooling, and compressed air systems, as well as boiler operation and auxiliary machinery handling. Hands-on training and case studies provide students with experience in monitoring engine parameters, maintaining operational logs, evaluating system performance, and implementing safety procedures during engine room watch-keeping. Additionally, the course addresses emergency procedures, decision-making in critical situations, and the effective management of maintenance activities to ensure the reliability and safety of ship machinery. The course structure includes theoretical lectures, laboratory applications, group projects, assignments, mid-term and final examinations to equip students with both academic knowledge and practical skills essential for a career in marine engineering.
Course Aims and Objectives	**Course Aims** The course aims to provide students with comprehensive knowledge and practical skills required for the safe and efficient operation and maintenance of main and auxiliary machinery onboard ships. It focuses on developing students' technical understanding of marine diesel engines, propulsive systems, auxiliary machinery, and associated operational and safety procedures. **Course Objectives** By the end of this course, students will be able to: • Understand the principles of shipboard maintenance, machinery operations, and engine room safety culture. • Demonstrate operational knowledge of main engines, auxiliary systems, and propulsive machinery. • Apply preventive and corrective maintenance techniques to ensure reliability and performance of ship machinery. • Analyze machinery faults, evaluate potential risks, and implement appropriate corrective actions. • Utilize documentation and record-keeping systems for maintenance planning and performance monitoring. • Develop decision-making and problem-solving skills in engine room operations, including emergency situations. • Integrate theoretical knowledge with practical applications through laboratory exercises, case studies, and group projects.

Course Learning Outcomes	**CLO1:** Apply technical knowledge of marine diesel engines and auxiliary machinery to shipboard operational procedures. **CLO2:** Demonstrate safe operational practices in engine rooms and machinery spaces in accordance with international safety standards and regulations. **CLO3:** Perform routine and preventive maintenance on main engines, auxiliary systems, and propulsion equipment following established procedures. **CLO4:** Identify, diagnose, and rectify machinery faults, evaluating their potential impact on overall ship operations. **CLO5:** Utilize Planned Maintenance Systems (PMS) and related record-keeping tools to plan, document, and manage maintenance activities effectively. **CLO6:** Analyze operational performance data and engine parameters to support decision-making and optimize machinery performance.

Content of the Course

Week	*Subject*
1	Shipboard Maintenance and ship safety, approach of marine engineering methods
2	Internal Combustion Engine maintenance and repair activities. Understanding of Large-bored engines & engines auxiliary systems
3	Combustion engine operations and measurement culture with records of investigational facts
4	Propulsive requirements, propeller types, shaft, mid-bearings, reduction gears, stern-tube and shaft sealing systems
5	Operation and maintenance of propulsive systems, major failures, possible results of faults
6	Diesel engine operations and maintenance and records of quantitative elements
7	Diesel engines fuel system, fuel pumps, Injectors and cyl.head part's, drive mechanism maintenance
8	Mid-Term Exam Application (Case Study - Failure analysis and act of avoidance)
9	Engine Auxiliary system operations and maintenance: Separators, pumps and heat exchangers, in relation with Lub oil, fresh water and seawater systems with their treatment methods.
10	Compressed air system Operation of pressurized air systems and distribution. Air compressor operation and maintenance.
11	Boilers safety and brief operational activities of boiler, maintenance of boilers and boiler water.
12	Planned maintenance concept: Literature root of maintenance, control of electronic planned maintenance systems (PMS) and reporting in these systems.
13	Performance control and evaluations. Watch-keeping in engine room rules and duties, emergency acts and decision-making theory Engine logbook and engine temperature, pressure & all values reporting and control evaluations.
14	Maneuverings faults, testing systems, main and emerg. marine eng. applications
15	Final exam Application (Case-study - Maintenance perspective and requirements)

Methods and Techniques Used in the Course

Lectures and Theoretical Instruction

- Presentation of fundamental concepts of marine engines, auxiliary systems, and propulsive equipment.
- Explanation of operational procedures, safety regulations, and maintenance principles.

Laboratory and Workshop Applications

- Hands-on practice with diesel engines, auxiliary machinery, pumps, boilers, and compressed air systems.
- Measurement and monitoring of operational parameters (temperature, pressure, flow rates).
- Exercises in fault identification, troubleshooting, and minor repairs.

Case Studies and Practical Scenarios

- Analysis of real-world machinery failures and preventive maintenance approaches.
- Critical thinking exercises for decision-making in emergency operations.
- Application of maintenance strategies and corrective actions.

Group Work and Collaborative Projects

- Team-based assignments to simulate engine room operations, maintenance planning, and monitoring.
- Cooperative problem-solving and discussion of operational best practices.

Assignments and Technical Reports

- Individual and group assignments to reinforce theoretical knowledge.
- Documentation and reporting of maintenance activities, engine logbooks, and operational data.

Simulation and Engine Room Monitoring

- Use of engine room simulators (if available) to practice watchkeeping, system monitoring, and fault response.
- Visualization of real-time operational and auxiliary system behaviors.

Mid-term and Final Evaluations

- Assessments through written exams, practical evaluations, and project presentations.
- Application of knowledge to both theoretical and operational problem-solving.

Sample Questions

Theoretical Questions:

- Explain the main differences between trunk piston engines and crosshead diesel engines.
- Describe the principles of internal combustion and the function of pre-combustion and combustion chambers in marine diesel engines.
- What are the main types of propellers used on ships, and how do they influence engine operation and efficiency?
- Explain the purpose and operational principles of the ship's compressed air system.
- Discuss the key elements of engine room watchkeeping and the decision-making process during machinery emergencies.
- Outline the procedure for performing a planned maintenance inspection on a marine diesel engine.
- Describe the function and maintenance requirements of heat exchangers, separators, and pumps in auxiliary systems.

Practical / Application Questions:

- Given a scenario of abnormal temperature rise in a main engine cylinder, outline the steps to diagnose and rectify the issue.
- Demonstrate, with a diagram, the flow of lubricating oil through a diesel engine and identify potential points of failure.
- Analyze a case study where a fuel injector failure led to partial engine shutdown. Suggest preventive measures for future operations.
- Perform a risk assessment for hot-work operations in the engine room, highlighting key safety precautions.
- Given engine logbook data, calculate the engine efficiency and propose corrective actions if deviations are observed.

Materials Used in the Course

Textbooks and Reference Books:

- **"Marine Engineering"** – Roy L. Harrington, McGraw-Hill
- **"Shipboard Machinery"** – A. H. S. Twigg, Butterworth-Heinemann
- **"Marine Auxiliary Machinery"** – H.D. McGeorge, Elsevier
- **"Marine Diesel Engines: Maintenance, Troubleshooting and Repair"** – Nigel Calder
- **"Ship Knowledge: Marine Engineering"** – Jon J. Van der Walt

Standards and Regulations:

- **IMO Conventions and Annexes** (SOLAS, MARPOL, STCW)
- **Classification Society Rules** (Lloyd's Register, DNV, ABS, Bureau Veritas)
- **ISM Code – International Safety Management Code**

Course Materials & Supplementary Resources:

- Engine manuals from major marine diesel engine manufacturers (MAN, Wärtsilä, Caterpillar)
- Engine room workshop guidelines and safety manuals
- Marine engineering simulation software (e.g., Wärtsilä Engine Simulator, MAN Diesel Simulator)
- Engine logbooks, PMS documentation, and operational checklists
- Case study materials for maintenance, troubleshooting, and failure analysis

Laboratory / Workshop Equipment:

- Diesel engine models (cutaway or small-scale demonstrators)
- Auxiliary machinery (pumps, compressors, heat exchangers)
- Measurement instruments: Vernier calipers, micrometers, pressure and temperature gauges
- Tools for maintenance practice: wrenches, torque tools, alignment devices
- Safety equipment for engine room and workshop training

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	-	-	-
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			**108**
ECTS Credit			**3**

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Introduction to Marine Electronics							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MEL201	II	Fall	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	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	This course provides students with the fundamental principles of marine electronics and their practical applications in shipboard systems. It introduces the basic electronic components, circuit theory, and analytical methods required to understand and maintain marine electronic equipment. Key subjects include the characteristics and functions of electronic circuit components, Ohm's law, and the analysis of simple and complex circuits. The course further covers semiconductor theory, diodes, transistors, feedback, amplification, and oscillation principles essential for marine automation and communication systems. Students will learn about modulation techniques, electromagnetic wave propagation, noise reduction, and the integration of electronic circuits with high-voltage marine equipment. Emphasis is placed on safety standards, inspection methods, measurement tools, and troubleshooting procedures. In addition, the course explores shipboard electronics such as radar systems, Doppler logs, antennas, communication equipment, alarm systems, detection systems, and automation technologies. The course combines theoretical knowledge with hands-on practice through laboratory exercises, group projects, and simulations aimed at developing diagnostic and maintenance skills for marine electronic systems. By the end of the course, students will have a foundational understanding of marine electronics and be prepared for advanced studies in maritime automation and navigation technologies.
Course Aims and Objectives	**Course Aims:** • To provide students with a fundamental understanding of electronic theory and components used in marine applications. • To introduce the principles of electronic circuit analysis and their application to shipboard systems. • To develop students' knowledge of safety standards, troubleshooting methods, and maintenance practices for marine electronic equipment. • To prepare students for further studies and professional applications involving marine automation, communication, and navigation electronics. **Course Objectives:** By the end of the course, students are expected to: • Understand the basic electrical and electronic concepts including Ohm's law, circuit analysis, and the function of common electronic components. • Explain the principles of semiconductors, diodes, transistors, amplification, feedback, and oscillation in electronic systems. • Analyze and interpret circuit diagrams and recognize components and their literature symbols. • Gain knowledge of electromagnetic waves, modulation principles, and signal noise reduction techniques relevant to marine environments. • Understand safety regulations, inspection and maintenance requirements, and diagnostic tools used in marine electronics. • Describe the working principles and operational requirements of shipboard electronic systems such as radars, antennas, alarm and detection systems. • Develop hands-on skills through applications, simulations, and case studies for troubleshooting and maintaining marine electronic devices.

Course Learning Outcomes	**LO1 – Understand Electrical & Electronic Fundamentals** Explain the basic principles of electricity and electronics, including Ohm's law, basic circuit analysis, and the operational principles of key electronic components such as resistors, capacitors, diodes, transistors, and amplifiers. **LO2 – Interpret and Analyze Electronic Circuits** Analyze, draw, and interpret marine electronic circuit diagrams using correct symbols and standards, and apply semiconductor theory, feedback, oscillation, modulation, and signal transmission concepts. **LO3 – Evaluate Electromagnetic & Signal Integrity Issues** Assess electromagnetic interference (EMI) problems in marine electronic systems and propose suitable noise reduction and signal integrity solutions. **LO4 – Apply Safety, Maintenance & Troubleshooting Procedures** Apply marine electronic safety regulations, conduct inspections, perform maintenance, and diagnose faults in shipboard electronic systems using standard troubleshooting techniques. **LO5 – Understand Shipboard Electronic Equipment Operation** Explain and evaluate the operation of essential marine electronic equipment, including radar, antennas, communication systems, alarms, sensors, and detection systems. **LO6 – Demonstrate Practical & Team-Based Problem-Solving Skills** Perform hands-on troubleshooting and diagnostics on simulated or real marine electronic systems, and collaborate effectively in teams to solve practical marine electronics case studies.

Content of the Course

Week	*Subject*
1	General aspects of Electronical Characteristics of Circuit board Components
2	Reminder tutorial of Ohm law and simple circuits analysis
3	Circuit line systems and circuit diagrams, understanding of the components with their symbols and literature denominations
4	Semi-conductor theory, diots, types and diot circuit
5	Transistors & amplification, amplificators and functions in the circuit
6	Feed-back theory and amplified feed-back components
7	Ossilation theory and ossilators,
8	Mid-term Application (Theoretical fault-finding)
9	Modulation and integrity with automational control elements
10	Electromagnetic waves and spread, noise and reduction in signalization
11	Integration of electronical circuit components with high voltage equipment
12	Fundamental safety regulations, electronical safety requirements, mechanisms and maintenance. Electronical inspection system, measurements and determination tools
13	Shipboard Electronics I: Radars, doppler logs, antennas and communication equipment
14	Shipboard Electronics: Alarm systems, detection systems and automation
15	Final Exam Application (Acting for troubleshooting)

Methods and Techniques Used in the Course

Lectures and Interactive Discussions:

Theoretical knowledge is delivered through interactive lectures supported by multimedia presentations, encouraging student participation and critical thinking.

Laboratory / Practical Applications:

Hands-on practice with electronic components, circuit building, and troubleshooting exercises are carried out in lab or simulator environments.

Minimum 4 application sessions are conducted throughout the semester.

Case Studies and Problem-Solving Sessions:

Analysis of real-world marine electronics failures and fault scenarios; students develop solutions and present findings.

Group Work and Collaborative Projects:

Students work in teams (*minimum 2 group assignments*) to analyze, design, and troubleshoot circuit diagrams and shipboard electronic systems.

Homework and Research Assignments:

Students complete *at least 2 individual homework assignments* on topics such as circuit analysis, safety procedures, and shipboard electronics.

Mid-term and Final Examinations:

Exams include both theoretical and application-based questions, testing understanding of electronics principles, shipboard equipment, and troubleshooting methods.

Use of Demonstration Tools and Simulations:

Electronic simulation software, circuit boards, and shipboard equipment models are used to reinforce theoretical knowledge with practical demonstrations.

Self-Evaluation and Feedback Sessions:

Briefing and debriefing activities to improve self-assessment and peer learning.

Sample Questions

Mid-term Exam Sample Questions

- **Explain Ohm's Law** and calculate the current passing through a 24 V circuit with a 12 Ω resistor.
- **Draw and label** the main components of a simple DC circuit and explain their functions.
- **Identify and describe** three types of diodes and their typical applications in marine electronics.
- A transistor circuit has a given input and output. **Explain how amplification is achieved** and sketch a simple transistor amplifier circuit.
- **Describe the concept of feedback in electronic circuits.** Provide one example of positive feedback and its effect on the system.

Application / Practical Sample Questions

- **Fault-finding:** Given a faulty circuit diagram, identify potential failure points and suggest troubleshooting steps.
- Using provided circuit symbols, **construct and label** a schematic for a power supply including a diode rectifier and an amplifier stage.
- **Explain and demonstrate** how oscillators generate signals, including the role of feedback components.
- **Case Study:** The radar antenna shows intermittent signal loss. Suggest probable causes related to electronic components and propose inspection methods.

Final Exam Sample Questions

- **Explain modulation** and how it integrates with automation control systems onboard.
- **Discuss electromagnetic interference (EMI):** What are its sources in marine environments and how can it be minimized?
- **Describe the safety measures** required when working with high-voltage shipboard electronic systems.
- **Differentiate** between analog and digital signals and their relevance to marine communication equipment.
- **Describe the working principles** of one shipboard electronic system (e.g., radar or Doppler log) and its integration into navigation operations.

Materials Used in the Course

Textbooks and References

- K. R. Fowler, *Marine Electronics Handbook*, latest edition.
- A. P. Anderson, *Basic Electronics for Engineers and Technicians*.
- Manufacturer manuals and technical documentation for marine electronic devices (e.g., radar, Doppler log, automation systems).
- IMO and SOLAS regulations related to electronic and automation systems on ships.

Lecture Materials

- Instructor-prepared lecture notes and multimedia presentations.
- Circuit diagrams and schematic libraries (digital and printed).
- Safety procedure manuals and guidelines for handling electronic equipment.

Laboratory / Practical Tools

- Breadboards, resistors, capacitors, diodes, and transistors for hands-on circuit design.
- Oscilloscopes, multimeters, and signal generators for testing and diagnostics.
- Marine electronics training kits for radar and communication systems simulations.
- Fault simulation boards for troubleshooting exercises.

Software and Simulation Tools

- Electronic circuit design and analysis software (e.g., Multisim, Proteus, or equivalent).
- Marine electronics simulator software for radar, alarms, and automation system demonstrations.
- Digital libraries and virtual labs for remote practice.

Supplementary Materials

- Safety manuals for electrical and electronic maintenance operations.
- IMO conventions: MARPOL, SOLAS, and ISM Code excerpts related to electronic equipment and safety.
- Case studies and example logs from real shipboard electronics incidents.

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1	Lectures, interactive presentations, guided problem-solving	Midterm exam, quizzes
CLO2	Lectures, component demonstrations, circuit modeling sessions	Midterm exam, quizzes, homework
CLO3	Board work, circuit-drawing exercises, laboratory simulations	Quizzes, lab reports, midterm
CLO4	Lectures, multimedia demonstrations, case-based discussions	Midterm exam, final exam
CLO5	Problem-solving sessions, lab simulations, group analysis	Quizzes, lab reports, final exam
CLO6	Practical lab work, group activities, case studies	Lab reports, project work, final exam

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	-	-	-
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	**4**	**4**	**16**
Assignment(s)/Homework/Class Works	**2**	**4**	**8**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**108**
ECTS Credit			**3**

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Linear Algebra							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
MTH112	II	Fall	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	This course provides a comprehensive introduction to **Linear Algebra**, focusing on the fundamental structures, operations, and applications of vector spaces and matrices in engineering, science, and applied mathematics. The course begins with the study of **systems of linear equations** and the **Gaussian elimination method**, developing students' understanding of how linear systems can be represented and solved using **matrix theory**. It explores the concepts of **matrix operations, invertibility, and special matrices** such as diagonal, triangular, and symmetric matrices, which form the foundation for computational and theoretical applications. Students will learn about **determinants**, their computation through row reduction, and their properties, along with practical applications such as **Cramer's Rule** for solving linear systems. The course continues with an in-depth study of **vector spaces**, **subspaces**, **linear independence**, **basis**, **dimension**, and the **rank-nullity theorem**, emphasizing their geometric interpretations and relevance in modeling real-world phenomena. Further topics include **linear transformations** and their properties, as well as the structure of **Euclidean n-space** and its applications in representing linear mappings between spaces. The course also covers **inner product spaces**, orthogonality, and the **Gram-Schmidt orthogonalization process**, providing the mathematical foundation necessary for optimization and projection methods. In the final part of the course, students are introduced to **eigenvalues and eigenvectors**, **diagonalization**, and their applications in systems of differential equations, stability analysis, and modern computational techniques. Through theoretical discussion, analytical problem-solving, and practical examples, students will gain the ability to apply linear algebraic methods to complex engineering, physics, computer science, and data analysis problems.
Course Aims and Objectives	The primary aim of this course is to provide students with a strong conceptual and practical foundation in **linear algebraic structures**, **methods**, and **applications** relevant to science, engineering, and data analysis. The course is designed to enhance both the **theoretical understanding** and **computational proficiency** required for analyzing and solving linear systems and transformations that arise in various scientific and technological contexts. • **To introduce the fundamental principles of linear systems** and enable students to analyze and solve them using algebraic and geometric methods, particularly through **Gaussian elimination** and **matrix representation** techniques. • **To develop proficiency in matrix operations and transformations**, including the computation of **inverses**, the application of **elementary matrices**, and the understanding of **matrix properties** such as symmetry, diagonality, and triangularity. • **To explore the concept and properties of determinants**, their computation using row operations, and their application in evaluating system solvability and transformations. • **To establish a deep understanding of vector spaces and subspaces**, emphasizing the notions of **linear independence, span, basis, and dimension**, and their importance in modeling multi-dimensional systems. • **To examine linear transformations and mappings** between Euclidean spaces, focusing on their matrix representations and geometric interpretations. • **To introduce and apply the principles of inner product spaces**, orthogonality, and orthonormality, including the **Gram–Schmidt process**, with applications in optimization and least squares problems. • **To develop knowledge of eigenvalues and eigenvectors** and their significance in system analysis, stability studies, and diagonalization of matrices for simplifying linear operations. • **To foster analytical thinking and problem-solving abilities**, enabling students to apply linear algebraic concepts in diverse scientific and engineering applications

	such as control systems, data modeling, computer graphics, and quantum mechanics. • **To promote computational literacy**, encouraging students to utilize mathematical software (e.g., MATLAB, Python, or similar tools) for solving and visualizing linear algebra problems.
Course Learning Outcomes	**LO1 – Knowledge and Understanding** Define and explain the fundamental concepts of linear algebra, including systems of linear equations, matrices, determinants, vector spaces, linear transformations, eigenvalues, and eigenvectors. Understand the geometric significance of linear transformations, orthogonality, orthonormality, and advanced topics such as diagonalization and spectral decomposition. **LO2 – Application of Knowledge** Apply Gaussian elimination, matrix operations, determinant computation, Gram–Schmidt orthogonalization, and eigenvalue/eigenvector analysis to solve linear systems, construct orthonormal bases, and perform transformations. Utilize mathematical software tools (MATLAB, Octave, Python) to perform matrix computations, visualize transformations, and verify analytical results. **LO3 – Analytical and Technical Skills** Perform and analyze matrix operations, assess invertibility and solvability of systems, determine rank and nullity, and evaluate properties of linear transformations such as injectivity, surjectivity, and linearity. Apply linear algebraic methods to real-world problems in engineering, data analysis, signal processing, control systems, and computer graphics. **LO4 – Evaluation and Critical Thinking** Evaluate and interpret the geometric and algebraic properties of linear transformations and systems, including stability analysis, least-squares approximations, and diagonalization. Integrate theoretical knowledge with practical applications to assess solutions' validity and relevance in science and engineering contexts. **LO5 – Communication and Interpretation** Communicate mathematical reasoning effectively using appropriate terminology, symbolic notation, and graphical representations. Interpret and present results of linear algebra analyses in written reports, presentations, and discussions. **LO6 – Problem-Solving and Decision-Making** Demonstrate critical thinking and problem-solving skills in formulating, analyzing, and solving complex linear algebra problems. Make informed decisions when choosing solution methods, approximations, or computational tools for applied problems involving matrices, vector spaces, and transformations.

Content of the Course

Week	*Subject*
1	Introduction to Systems of Linear Equations Gaussian Elimination Matrices and Matrix Operations
2	Introduction to Systems of Linear Equations Gaussian Elimination Matrices and Matrix Operations
3	Inverses; Rules of Matrix Arithmetic Elementary Matrices and a Method for Finding A^{-1}
4	Further Results on Systems of Equations and Invertibility Diagonal, Triangular and Symmetric Matrices
5	The Determinant Function Evaluating Determinants by Row Reduction
6	Midterm Exam
7	Properties of the Determinant Function Cofactor Expansion; Cramer's Rule
8	Euclidean n-Space Linear Transformations from R^n to R^m Properties of Linear Transformations from R^n to R^m
9	Real Vector Spaces Subspaces Linear Independence
10	Basis and Dimension Row Space, Column Space and Nullspace Rank and Nullity
11	Inner Products Angle and Orthogonality in Inner Product Spaces
12	Orthonormal Bases; Gram-Schmidt Process
13	Eigenvalues, Eigenvectors
14	Diagonalization
15	Final Exam

Methods and Techniques Used in the Course

Lectures and Theoretical Explanations

- Core principles of linear algebra, such as systems of equations, vector spaces, and linear transformations, are introduced through structured lectures supported by visual aids and mathematical proofs.
- Conceptual emphasis is placed on connecting algebraic structures to geometric interpretations.

Interactive Problem-Solving Sessions

- Regular in-class problem-solving sessions encourage analytical thinking and the application of techniques learned to various engineering and scientific contexts.
- Students work individually and collaboratively to solve examples that integrate both computational and theoretical aspects.

Tutorials and Guided Exercises

- Step-by-step tutorials are conducted to reinforce understanding of complex topics, such as matrix inversion, determinant evaluation, and eigenvalue problems.
- Example-based learning helps students develop systematic problem-solving strategies.

Use of Computational Tools and Software Applications

- Modern mathematical software such as **MATLAB**, **Octave**, or **Python (NumPy/Matplotlib)** is utilized to perform matrix operations, visualize vector transformations, and verify analytical results.
- Students gain experience in interpreting computational outputs and integrating them with theoretical frameworks.

Group Discussions and Peer Learning

- Group activities are organized to discuss challenging topics such as orthogonality, diagonalization, and spectral decomposition, fostering cooperative learning and critical discussion.
- Peer collaboration enhances understanding through knowledge sharing and practical engagement.

Homework Assignments and Analytical Reports

- Periodic homework assignments emphasize mathematical rigor, accuracy, and logical reasoning.
- Selected assignments require written explanations of solutions to strengthen students' communication of mathematical concepts.

Quizzes and Continuous Assessment

- Short quizzes and in-class exercises are administered to assess ongoing comprehension and provide immediate feedback.
- These formative assessments help identify and address learning gaps early in the semester.

Case Studies and Applied Examples

- Practical examples drawn from engineering, physics, computer science, and data analysis are discussed to demonstrate real-world applications of linear algebra concepts.
- Case studies include areas such as optimization, electrical circuit analysis, and 3D modeling.

Midterm and Final Examinations

- Summative assessments evaluate students' cumulative understanding, analytical reasoning, and ability to synthesize concepts across different topics.

Consultation and Office Hours

- Individual and group consultations provide opportunities for personalized academic support, clarification of complex topics, and guidance on advanced problem-solving techniques.

Sample Questions

1. **Systems of Linear Equations and Gaussian Elimination**
   - Solve the following system of linear equations using Gaussian elimination:

$$\begin{cases} 2x + 3y - z = 5 \\ 4x + y + 2z = 6 \\ -2x + 5y + 3z = 1 \end{cases}$$

   - Determine if the following system is consistent or inconsistent and justify your answer:

$$\begin{cases} x + y + z = 3 \\ 2x + 2y + 2z = 6 \\ x - y + z = 2 \end{cases}$$

2. **Matrix Operations and Inverses**
   - Compute the inverse of the matrix:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 1 & 4 \\ 5 & 6 & 0 \end{bmatrix}$$

   - Verify that $A \cdot A^{-1} = I$ and interpret the result geometrically.
3. **Determinants**
   - Calculate the determinant of the following 3x3 matrix using cofactor expansion:

$$B = \begin{bmatrix} 2 & -1 & 3 \\ 0 & 4 & 5 \\ 1 & 2 & 0 \end{bmatrix}$$

   - Prove that if a matrix has two identical rows, its determinant is zero.
4. **Vector Spaces and Subspaces**
   - Determine whether the set $S = \{(x, y, z) \in \mathbb{R}^3 \mid x + 2y - z = 0\}$ is a subspace of $\mathbb{R}^3$.
   - Find a basis and the dimension of the subspace spanned by the vectors:

$$v_1 = (1, 2, 3),\ v_2 = (2, 4, 6),\ v_3 = (1, 0, 1)$$

5. **Linear Transformations**
   - Let $T : \mathbb{R}^2 \to \mathbb{R}^2$ be defined by $T(x, y) = (2x - y, x + 3y)$. Find the matrix representation of T with respect to the standard basis.
   - Determine whether T is invertible. If so, find T^{-1}.
6. **Eigenvalues and Eigenvectors**
   - Find the eigenvalues and eigenvectors of the matrix:

$$C = \begin{bmatrix} 4 & 1 \\ 2 & 3 \end{bmatrix}$$

   - Determine if C is diagonalizable.
7. **Orthogonality and Gram-Schmidt Process**
   - Apply the Gram-Schmidt process to orthonormalize the vectors:

$$u_1 = (1, 1, 0),\ u_2 = (1, 0, 1),\ u_3 = (0, 1, 1)$$

   - Verify the orthogonality of the resulting vectors.
8. **Application-Based Problems**
   - Solve a real-world problem involving forces or circuits using systems of linear equations.
   - Use matrix operations to model a small network or economic system and compute relevant solutions.

Materials Used in the Course

1. Core Textbooks:

- **"Linear Algebra and Its Applications"** – David C. Lay, Steven R. Lay, Judi J. McDonald
- **"Introduction to Linear Algebra"** – Gilbert Strang
- **"Elementary Linear Algebra"** – Howard Anton, Chris Rorres

2. Supplementary Reference Books:

- **"Linear Algebra Done Right"** – Sheldon Axler
- **"Applied Linear Algebra"** – Peter J. Olver, Chehrzad Shakiban
- **"Matrix Analysis and Applied Linear Algebra"** – Carl D. Meyer

3. Digital and Online Resources:

- MIT OpenCourseWare – *Linear Algebra* lectures and video tutorials by Prof. Gilbert Strang
- Khan Academy – Linear Algebra video lessons and exercises
- Wolfram Alpha / MATLAB – for matrix computations and visualizations
- Online academic journals for applied linear algebra problems in engineering and economics

4. Software Tools:

- **MATLAB / Octave** – for computational exercises, solving systems of equations, eigenvalue problems, and matrix operations
- **Maple / Mathematica** – for symbolic calculations and demonstrations of linear algebra concepts
- **Python (NumPy & SciPy libraries)** – for practical implementations of linear algebra in programming

5. Classroom & Practical Materials:

- Lecture slides and notes provided by the instructor
- Problem sets and worksheets for hands-on exercises
- Visual aids such as charts, diagrams, and geometric interpretations of vector spaces and transformations
- Case studies and examples illustrating applications in engineering, physics, and computer science

6. Assessment & Practice Materials:

- Midterm and final exam practice problems
- Sample questions covering theory, computations, and applications
- Online quizzes and interactive exercises

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

Program Outcomes Matrix

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

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

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method (Öğretim Yöntemi)**	**Assessment Method (Değerlendirme Yöntemi)**
CLO1 – Knowledge & Understanding	Lectures, Conceptual Discussions, Multimedia Presentations	Written Exams, Quizzes, Short Answer Questions
CLO2 – Application of Knowledge	Tutorials, Problem-Solving Sessions, Software-Based Exercises (MATLAB, Python)	Homework Assignments, Practical Problem Sets, Lab Reports
CLO3 – Analytical & Technical Skills	Case Studies, Matrix Computation Exercises, Simulations	Problem-Solving Exams, Assignments, Analytical Reports
CLO4 – Evaluation & Critical Thinking	Scenario-Based Learning, Group Discussions, Applied Problems	Case Study Reports, Projects, Oral Presentations
CLO5 – Communication & Interpretation	Technical Writing Workshops, Graphical Representation, Team Exercises	Project Reports, Presentations, Diagram/Matrix Interpretation Tasks
CLO6 – Problem-Solving & Decision-Making	Problem-Based Learning, Applied Engineering Tasks, Software Simulations	Practical Problem Solving, Decision-Making Reports, Capstone/Project Evaluation

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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Ship Construction I							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
NRC201	II	Fall	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

***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	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

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Maritime Safety III							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
SAF201	II	Fall	3	3	2	2	0
Course type: Compulsory				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				30	-	-	70
Course Venue and Time				Wednesday 14.30-17.20			
Instructor information				**Cpt. Çağrı Deliceırmak** Faculty of Maritime Studies Wednesday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 cagri.deliceirmak@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	This course offers comprehensive training in shipboard security, emergency management, and fire prevention for maritime professionals. It focuses on the role and responsibilities of the Ship Security Officer (SSO) and the Ship Security Plan (SSP) under international regulations, including the SOLAS, STCW, and ISPS Code. Students will gain knowledge of maritime security policies, risk assessment techniques, threat identification, vulnerability management, and firefighting organization and management. Additionally, this course provides comprehensive training in firefighting organization on ships, as well as search and rescue procedures for assisting vessels and people in distress. The course will be conducted in accordance with the IMO Model Courses 2.03, and 3.19, as well as the national regulation "Egitim Sinav Yonergesi 2025" of the Turkish Republic. Successful students will obtain mandatory STCW certificates of (1); Advanced Firefighting, (2); Ship Security Officer. Emphasis is placed on practical applications, including drills, simulations, and coordinated emergency procedures to ensure safe and effective shipboard operations. By integrating theoretical knowledge with practical exercises, the course prepares students to enhance firefighting and ship security organization, implement safety and security measures, respond effectively to onboard emergencies, and assist the vessels in distress in compliance with international maritime standards.
Course Aims and Objectives	The course aims to equip students with the knowledge, skills, and competencies necessary to ensure shipboard safety and security, advanced firefighting, and search-and-rescue capabilities. It emphasizes understanding maritime security policies, recognizing threats, managing risks, and effectively responding to emergencies, including fire and search-and-rescue operations. Students will also learn to operate and maintain onboard safety and security systems in accordance with international regulations. This combination of theoretical and practical training prepares students for real-world maritime safety and security challenges. • Understand the concept of maritime security. • Understand the duties and responsibilities of the Master, SSO, CSO, PFSO, as well as the content of the SSP and SSA. • Comprehend and identify potential security threats, vulnerabilities, and risks onboard a vessel, and implement suitable security measures to ensure effective security management. • Acquire and apply advanced competencies in firefighting and fire emergency management organizations. • Acquire knowledge and engage in the practice of operating, testing, and maintaining onboard firefighting and security equipment and systems. • Comprehend the significance of shipboard drills and simulations in preparing for emergencies.

	• Enhance overall situational awareness, communication, and coordination skills during maritime emergencies. • Comprehend and proficiently execute search and rescue protocols at sea.
Course Learning Outcomes	**LO1**: Demonstrate a comprehensive understanding of maritime security policies, regulations, and conventions (SOLAS, STCW, ISPS). **LO2**: Identify, evaluate, and mitigate security risks, threats, and vulnerabilities on board vessels. **LO3**: Implement and effectively monitor ship security plans and related procedures. **LO4**: Demonstrate advanced knowledge and skills in firefighting operations and organizations on board. **LO5**: Operate, test, and maintain shipboard fire and security equipment. **LO6**: Plan and execute training sessions, drills, and simulations to ensure ongoing compliance with safety and security protocols and prepare detailed reports and evaluations of safety and security incidents for regulatory and operational purposes. **LO7**: Demonstrate advanced skills in situational awareness, communication, coordination, and decision-making during complex maritime emergencies. **LO8**: Effectively respond to the distress alerts of other ships and conduct search and rescue operations for the survivors at sea.

Content of the Course

Week	*Subject*
1	**Introduction to Maritime Security and Safety Policies** Terminology and related maritime English terms History of maritime criminal activities Current threats: piracy, armed robbery, terrorism, smuggling Ship and port operations overview Key definitions, terminology, and responsibilities of states under SOLAS Security organization: company, ship, and port facility responsibilities International regulations on maritime security
2	**Security Responsibilities** Terminology and related maritime English terms Purpose and structure of Ship Security Plans (SSP) Procedures for implementing SSP and reporting security incidents Maritime security levels and critical ship/port security measures Confidentiality and communication of security information Internal audits, inspections, and monitoring procedures
3	**Ship Security Plan Implementation and Oversight** Terminology and related maritime English terms Legal framework for Ship Security Officer (SSO) actions Role of the Master, SSO, Company Security Officer, Port Facility Security Officer Other personnel involved in maritime security
4	**Security Risk, Threat, and Vulnerability Assessment** Terminology and related maritime English terms Risk assessment methods and tools Security documentation and reporting Identification of potential threats, weapons, and hazardous materials Crowd management and coordination Handling sensitive information and security communications
5	**Onboard Security Inspections** Terminology and related maritime English terms Restricted area monitoring and control of access Monitoring of the deck and ship perimeter Security procedures for cargo handling and personnel movement Security measures and coordination in port and ship-to-ship operations
6	**Operation, Testing, and Calibration of Security Equipment** Terminology and related maritime English terms Security equipment types and operational limitations Alarm systems and onboard communication protocols Testing, calibration, and maintenance of security systems Security exercises, drills, training per IMO guidelines, and their evaluations Methods to improve security awareness and onboard readiness
7	**Advanced Fire-Fighting – Principles** Terminology and related maritime English terms

	Fire chemistry and classes of fire Fire prevention and firefighting equipment Organizational and tactical considerations in port and at sea Fire impact on vessel stability and corrective measures
8	**Advanced Fire-Fighting – Systems and Operations** Terminology and related maritime English terms Firefighting team organization and roles Fire detection, fixed and portable extinguishing systems Coordination, communication, and ventilation control
9	**Advanced Fire-Fighting – Systems and Operations** Terminology and related maritime English terms Firefighting team organization and roles Contingency Plans and Team Management Coordination, communication, and ventilation control
10	**Advanced Fire-Fighting – Systems and Operations** Terminology and related maritime English terms Firefighting involving fuel, chemical, and electrical systems Handling hazardous materials and storage safety Control of fuel and electrical systems Dangers caused by fire.
11	**Fire Incident Investigation and Reporting** Terminology and related maritime English terms Legal and classification society reporting requirements Fire event cause analysis Documentation and lessons learned
12	**Search and Rescue Operations** Terminology and related maritime English terms Assisting to a distressed ship, preparations, procedures, and legal aspects Surviving people from a distressed ship Emergency in port
13	**Search and Rescue Operations** Terminology and related maritime English terms IAMSAR Search and Rescue methods and techniques Coordination and communication in search and rescue operations
14	**Search and Rescue Operations** Terminology and related maritime English terms IAMSAR Search and Rescue methods and techniques Coordination and communication in search and rescue operations
15	**Review and Final Evaluation** Recap of maritime safety policies, risk assessment, and emergency procedures Practical assessment and scenario-based exercises Evaluation of student competence in shipboard safety and security operations

Methods and Techniques used in the Course

Lectures and Interactive Discussions – Covering maritime security policies, safety regulations, and risk management principles.

Case Studies – Analysis of real-world maritime security incidents, accidents, and emergencies.

Practical Drills and Simulations – Hands-on training for firefighting, emergency response, collision, grounding, and man-overboard scenarios.

Workshops – Focused sessions on the operation, calibration, and maintenance of safety and security equipment.

Role-Playing Exercises – Simulating shipboard emergencies to develop communication, teamwork, and leadership skills.

Shipboard Security and Safety Plan Exercises – Developing, implementing, and auditing security plans in simulated environments.

Multimedia Resources – Use of instructional videos, manuals, and interactive modules to reinforce theoretical knowledge.

Group Projects – Collaborative exercises on risk assessment, emergency planning, and safety audits.

Quizzes and Written Assignments – Assessing comprehension of regulations, safety procedures, and maritime security practices.

Assessment of Competency in Equipment Use – Practical evaluation of students' abilities to operate firefighting and safety systems effectively.

Sample Questions

- Define the role and responsibilities of a Ship Security Officer (SSO) under international regulations.
- Explain the procedures for implementing and monitoring a Ship Security Plan (SSP).
- Describe methods to identify and assess potential security threats, including piracy and armed robbery.
- Outline the steps for fire detection, alarm, and firefighting on board, and the coordination required among crew members.
- Discuss the correct use and maintenance of shipboard security equipment and systems.
- Describe how to conduct regular security inspections and audits to ensure compliance with ISPS Code.
- Describe the organization and training requirements of firefighting teams on board a vessel.
- Explain the search and rescue methods and techniques in a distress alert.

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, ISPS Code, LSA Code, FSS Code, The Fire Fighting System Guidance, Fire Prevention and Fire Fighting, IAMSAR Manual
- Related IMO Model Courses and STCW (Standards of Training, Certification, and Watchkeeping) manuals.
- Maritime Safety textbooks covering ISPS and ship security, fire prevention and firefighting, shipboard emergency procedures, including SOLAS, STCW, ISPS Code, LSA Code, and FSS Code
    - SOLAS Consolidated Edition
    - ISPS Code Guidelines
    - LSA Code
    - FSS Code
    - The Fire Fighting System Guidance
    - Fire Prevention and Fire Fighting
    - IAMSAR Manual

Supplementary Resources

- Instructional videos demonstrate emergency response techniques, personal safety, and the use of protective equipment.
- Interactive simulations of onboard emergency scenarios, including collision, flooding, fire, and piracy attacks.
- CCTV, Hand-held VHF, detectors, sensors, and locking systems.
- Firefighting equipment, CO2 system, Fireman's Outfit and BA Sets, Hoses, Nozzles, Detection Systems and Alarms
- Shipboard training manuals and emergency plans.
- Practical drill checklists for emergency response.
- Evaluation sheets for ship security and firefighting operations.
- Risk assessment templates for security threats and onboard hazards.

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	**2**	**5**	**10**
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**97**
ECTS Credit			**3**

Evaluation System		
Semester Requirements	**Number**	**Percentage of Grade**
Attendance/Participation	1	10
Laboratory	-	-
Application	1	20
Field Work (Class Work)	-	-
Special Course Internship (Work Placement)	-	-
Assignment(s)/Homework/Class Works	2	20
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	**6**	**100**

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

University of Kyrenia

Faculty of Maritime Studies

Marine Engineering

Syllabus

Course name: Turkish I: Written Expression							
Code	**Year**	**Semester**	**Credit**	**ECTS**	**Course application, Hour/Week**		
					Theoretical	**Application**	**Laboratory**
TUR101	II	Fall	2	2	2	0	0
Course type: Compulsory Elective				**Prerequisite: x**		**Language:** English	
% Contribution to the Professional Fundamental Component				**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
				-	-	-	100
Course Venue and Time				Friday / 13:30 – 15:20			
Instructor information				**Aydoğan Erkan** Faculty of Maritime Studies Friday / 09:00 – 12:00 +90 (392) 650 26 00 / 4060 aydogan.erkan@kyrenia.edu.tr www.kyrenia.edu.tr			

Course Description	*Turkish I: Written Expression* is designed to provide students with a comprehensive understanding of the fundamental aspects of written Turkish. The course focuses on the phonetic features of the language, word stress, word types, phrase and sentence structures, and the use of suffixes. Additionally, students will learn the purposes and rules of punctuation marks, as well as the spelling conventions of Turkish. Through practical examples and exercises, the course aims to develop students' ability to construct grammatically correct sentences and coherent texts, enhancing both their writing accuracy and clarity. This foundation prepares students for effective written communication in academic and everyday contexts.
Course Aims and Objectives	To develop students' understanding of the fundamental grammatical structure of the Turkish language. To enhance students' ability to write correctly using proper spelling, punctuation, and sentence structures. To provide students with a comprehensive understanding of Turkish phonetics, word formation, and morphological rules. To improve students' written communication skills in various contexts, emphasizing clarity and accuracy. • Recognize and apply the phonetic features of Turkish in written form. • Correctly use word stress patterns to convey meaning in writing. • Identify and appropriately use different word types (nouns, verbs, adjectives, adverbs, conjunctions, etc.) in sentences. • Construct phrases and sentences following the rules of Turkish syntax. • Apply suffixes correctly in nouns, verbs, and derivational forms. • Utilize punctuation marks effectively to structure written texts clearly. • Apply Turkish spelling rules consistently in written communication. • Analyze and correct common grammatical and orthographic errors in writing. • Compose coherent paragraphs that reflect proper grammar, vocabulary, and sentence structure.
Course Learning Outcomes	**CLO1 – Phonetics** Demonstrate understanding of Turkish phonetic features and apply them correctly in writing. **CLO2 – Word Stress** Identify and apply proper word stress patterns in written texts. **CLO3 – Word Types** Distinguish between different word types and use them accurately in sentences.

	CLO4 – Syntax Construct grammatically correct phrases and sentences following Turkish syntax rules. **CLO5 – Morphology** Apply nouns, verbs, and derivational suffixes appropriately in written communication. **CLO6 – Punctuation** Use punctuation marks effectively to enhance clarity and coherence in writing. **CLO7 – Spelling** Apply Turkish spelling rules accurately in all written exercises. **CLO8 – Error Correction** Recognize and correct common grammatical and orthographic errors in written Turkish. **CLO9 – Paragraph Composition** Compose clear and coherent paragraphs that reflect proper grammar, vocabulary, and sentence structure. **CLO10 – Integrated Writing Skills** Integrate phonetics, morphology, syntax, spelling, punctuation, and vocabulary to produce well-structured written texts.

Content of the Course

Week	*Subject*
1	**Introduction & Course Orientation** • Overview of the course objectives • Importance of written expression in Turkish • Introduction to basic phonetic features
2	**Phonetics and Pronunciation** • Turkish vowel and consonant sounds • Word stress patterns in Turkish • Common pronunciation rules
3	**Word Types in Turkish I** • Nouns, pronouns, adjectives, verbs, adverbs • Examples of usage in sentences • Basic exercises
4	**Word Types in Turkish II** • Conjunctions, prepositions, interjections, numerals • Role of each word type in sentence structure
5	**Phrase Structures I** • Definition of phrases in Turkish • Noun phrases and verb phrases • Examples and exercises
6	**Phrase Structures II** • Adjective phrases, adverbial phrases • Combining phrases for meaning • Practice exercises
7	**Sentence Types I** • Simple sentences • Compound sentences • Examples and sentence formation
8	**Sentence Types II** • Complex sentences • Subordinate clauses • Practice with sentence combination
9	**Suffixes I** • Noun suffixes: plural, possessive, case suffixes • Usage and examples
10	**Suffixes II** • Verb suffixes: tense, aspect, mood, person markers • Derivational suffixes • Exercises for application
11	**Punctuation Marks I** • Period, comma, colon, semicolon, question and exclamation marks • Rules and correct usage in sentences
12	**Punctuation Marks II** • Quotation marks, parentheses, hyphen, ellipsis, dash • Practical exercises in writing

13	**Spelling Rules I** • Common spelling rules in Turkish • Vowel harmony and consonant changes • Exercises with examples
14	**Spelling Rules II & Review** • Advanced spelling rules and exceptions • Review of phonetics, word types, suffixes, sentence and phrase structures • Writing practice
15	**Final Assessment & Writing Practice** • Composing short texts using learned rules • Peer review and instructor feedback • Final written assessment

Methods and Techniques used in the Course

Lectures and Explanations – Presenting grammatical rules, word structures, suffixes, and spelling conventions in Turkish with examples in English.

Text Analysis – Analyzing sample sentences and paragraphs to illustrate correct usage of words, suffixes, and punctuation.

Writing Exercises – Guided practice in composing sentences, paragraphs, and short texts using the learned grammar and spelling rules.

Drills and Repetition – Exercises focusing on phonetics, word stress, and suffix application to reinforce learning.

Error Correction and Feedback – Reviewing student writing, identifying errors, and providing corrective feedback.

Group Work and Peer Review – Collaborative exercises where students check each other's writing for grammar, spelling, and clarity.

Use of Visual Aids – Charts, tables, and diagrams to illustrate sentence structures, suffix usage, and punctuation rules.

Quizzes and Mini-Assessments – Regular short assessments to evaluate understanding of grammar, word formation, and writing skills.

Homework Assignments – Written tasks to reinforce classroom learning and develop independent writing skills.

Practical Application – Exercises in writing letters, notes, or short essays to simulate real-life written communication.

Sample Questions

Phonetics and Word Stress

- Identify the stressed syllable in the following words: *kitap, öğrenci, mutluluk.*
- Explain the phonetic difference between the letters “c” and “ç” in Turkish with examples.

Word Types (Parts of Speech)

- Classify the underlined words in the sentence: “Ali hızlı koşuyor ve mutlu görünüyor.” (Noun, verb, adjective, etc.)
- Provide an example of a Turkish pronoun and use it in a sentence.

Suffixes

- Add the appropriate possessive suffix to the noun “ev” (house) to indicate “my house” and “our house.”
- Transform the verb “gitmek” (to go) into its past tense using the correct suffix.

Phrase and Sentence Structures

- Identify the subject and predicate in the sentence: “Öğrenciler derse erken geldi.”
- Rewrite the following sentence in negative form: “Ali kitabı okudu.”

Sentence Types

- Convert the following declarative sentence into an interrogative sentence: “Sen bugün okula gidiyorsun.”
- Provide an example of an imperative sentence in Turkish.

Punctuation and Spelling Rules

- Correct the punctuation in the following sentence: “Ali geldi ve Ayşe de geldi mi?”
- Identify the spelling mistake in the sentence: “Okulda öğrenciler çalışıyorlar.”

Writing Skills / Short Composition

- Write 3–5 sentences introducing yourself, mentioning your family and hobbies.
- Write a short paragraph describing your favorite day of the week and why you like it.

Practical Application

- Fill in the blanks with the correct suffixes: “Kitap___ masada duruyor.” (indicating possession)
- Rewrite the following informal text message in proper written Turkish, paying attention to spelling and punctuation.

Materials Used in the Course

Textbooks and Reference Books

- *Turkish Grammar for Foreigners* – A comprehensive guide to Turkish phonetics, grammar, and sentence structure.
- *Elementary Turkish: A Grammar and Workbook* – Provides examples and exercises for practice in word types, suffixes, and sentence formation.
- *Turkish: A Comprehensive Grammar* – Advanced reference for punctuation rules, spelling conventions, and written expression.

Workbooks and Exercises

- Course-specific exercise booklets focusing on phonetics, suffix usage, and sentence construction.
- Short composition and writing practice exercises designed for weekly assignments.

Digital Resources

- Online Turkish language platforms for interactive exercises in grammar, vocabulary, and punctuation.
- Audio recordings of native speakers for practicing pronunciation and stress patterns.

Supplementary Materials

- Handouts and notes provided by the instructor, covering key topics such as suffixes, sentence types, and punctuation rules.
- Visual aids for explaining phrase structures and word stress patterns.
- Sample texts for reading and writing practice, including letters, emails, and short essays.

Assessment Tools

- Quizzes, in-class exercises, and writing assignments to reinforce learning.
- Peer-review exercises for written compositions to encourage collaborative learning and feedback.

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

Program Outcomes Matrix

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

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

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

Course Learning Outcomes/ Evaluation Method		
CLO	**Teaching Method**	**Assessment Method**
CLO1	Lecture, Pronunciation Drills, Guided Writing Exercises	Quizzes, Written Exercises, Oral Assessments
CLO2	Lecture, Stress Pattern Exercises, Listening and Writing Practice	Quizzes, Written Exercises, Oral Presentations
CLO3	Lecture, Vocabulary and Grammar Exercises, Sentence Construction Activities	Assignments, Quizzes, Written Exams
CLO4	Lecture, Sentence Building Exercises, Syntax Workshops	Written Assignments, Exams, Peer Reviews
CLO5	Lecture, Morphology Exercises, Guided Writing	Homework, Quizzes, Written Exercises
CLO6	Lecture, Punctuation Practice, Editing Exercises	Quizzes, Writing Assignments, Peer Feedback
CLO7	Lecture, Spelling Drills, Dictation Exercises	Quizzes, Written Assignments, Exams
CLO8	Lecture, Error Identification and Correction Exercises	Assignments, Quizzes, Written Exercises
CLO9	Lecture, Paragraph Construction Workshops, Peer Review	Written Paragraph Assignments, Rubric-Based Assessment
CLO10	Lecture, Integrated Writing Practice, Project-Based Exercises	Writing Projects, Portfolios, Exams

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Preparation for lectures	**15**	**1**	**15**
Lectures	**15**	**2**	**30**
Midterm Exam	**1**	**3**	**3**
Preparation for Midterm Exam	**1**	**20**	**20**
Final Exam	**1**	**3**	**3**
Preparation for Final Exam	**1**	**20**	**20**
Presentation(s)	-	-	-
Preparation for Presentation(s)	-	-	-
Research for Project(s)/Essay(s)	-	-	-
Project Writing	-	-	-
Group Work	-	-	-
In-class Discussion(s)	-	-	-
Quiz(es)	-	-	-
Preparation for Quiz(es)	-	-	-
Laboratory	-	-	-
Assignment(s)/Homework/Class Works	-	-	-
Micro-Teaching Sessions	-	-	-
Lesson Planning	-	-	-
Materials Adaptation	-	-	-
Material Development	-	-	-
Draft Preparation	-	-	-
Drawing	-	-	-
Essay Writing	-	-	-
Tutorial(s)	-	-	-
Portfolio Preparation	-	-	-
Portfolio Presentation	-	-	-
Total Workload			**91**
ECTS Credit			**2**

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

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