Sveučilište u Rijeci • University of Rijeka
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3.2. Course Description

Generic information		
Head of Course	Iva Tuhtan Grgić, PhD	
Course	Maritime Law	
Study Programme	Marine Engineering	
Level	Undergraduate degree programme	
Type of Course	Core (compulsory course)	
Year of Study	1	
Estimated Student Workload and Methods of Instruction	ECTS Coefficient of Student Workload	3
	Number of Hours (L+E+S)	30 + 0 + 0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Students should become familiar with international and national legal framework regulating the boundaries of national jurisdiction at sea, rights and duties of states at sea, their mutual relations related to exploration and exploitation of marine and submarine resources and their protection, their relations concerning war and neutrality in armed conflicts at sea, as well as safety of navigation and protection of the marine environment, organization of maritime administration, labour relations of seafarers, flag state and port state control, maintenance of order in ports and harbours, and regime of maritime domain. Students should also gain knowledge on international and national legal regulations governing maritime accidents such as general average, collisions of ships, salvage at sea, wreck removal and liability for marine pollution, along with basic concepts of marine insurance.

1.2. Prerequisites for Course Registration

none

1.3. Expected Learning Outcomes

1. To list and compare the international conventions and other sources of the international law of the sea, to describe its basic principles and to explain their influence on the regimes of navigation of ships in various parts of the sea, as well as on the regime of the exploitation of the resources of the sea and the seabed.

2. To explain the regime of entry and navigation of various foreign ships (merchant, government, military, fishing, scientific) and foreign yachts and boats in internal waters, territorial sea and protected ecological and fishery zone of the Republic of Croatia.

3. To enumerate and interpret rules and regulations of international maritime law governing the safety of navigation and the protection of the marine environment.

4. To explain the structure and describe the activities of the International Maritime Organization (IMO) and the European Maritime Safety Agency (EMSA).

5. To list the laws and regulations of the Republic of Croatia in the area of maritime administrative law and explain their application to ships and other maritime crafts, maritime navigation, sea lanes, pilotage and order in seaports.

6. To describe organization of the maritime administration in the Republic of Croatia, explain the role and organization of harbour master's offices, to enumerate their functions, highlight the features of the certificate of registration and other ship documents and books, indicate the principles and procedures of inspection, explain the technical control and list other activities of the Croatian Register of Ships.

7. To explicate the legal regulation of the maritime domain and seaports in the Republic of Croatia, describe the concept of the maritime domain and highlight the features of its concession, interpret the notion and list the types of seaports, and to describe the structure of the port authority and indicate its activities.

8. To compare and describe the specifics of the legal position of master, chief engineer and crewmembers, to analyse and interpret their rights and obligations under international and national maritime labour law.

9. To explain and interpret the basic features of the maritime law concepts of general and particular average, ship collisions, salvage at sea and wreck removal, as well as indicate the principles of shipowner's liability for pollution of the marine environment and to specify the main elements of marine insurance.

1.4. Course Outline

International Law of the Sea: definition and codification: UNCLOS I, II and III - Geneva Conventions (1958) and UN Convention on the Law of the Sea (1982); internal waters, ports, bays, historic bays and historic waters, archipelagic waters, regime of islands, territorial sea, contiguous zone, straits used for international navigation, canals, continental shelf, exclusive economic zone, maritime boundary delimitation, area, high seas, land-locked states, geographically disadvantaged states, enclosed and semi-enclosed seas, marine scientific research, marine pollution, marine and submarine areas of the Republic of Croatia, status of foreign ships in Croatian internal waters and territorial sea; International Law of Armed Conflicts at Sea: neutrality, rights and duties of neutral and belligerent states, war zones at sea, status of neutral ships in convoy, status of military and merchant ships in armed conflicts, naval blockade, contraband of war.
International Maritime Organization (IMO) – structure, goals and functions. International conventions on safety of navigation and protection of the marine environment: SOLAS, COLREG, LOADLINES, TONNAGE, INTERVENTION, LDC, MARPOL, OPRC, AFS and BWC. Principles of ISM and ISPS Code, Paris Memorandum of Understanding on Port State Control, problems of flags of convenience. European Maritime Safety Agency (EMSA) - structure and functions. Master and crew, STCW Convention, Maritime Labour Convention and other Conventions and Resolutions of the International Labour Organization (ILO). Croatian maritime legislation, Maritime Code, harbour master's offices and inspection of safety of navigation, categories of navigation, sea lanes, pilotage, ships – legal regime, ownership, nationality, registration, classification, name and call sign, ship registers, ship's documents, log book. Croatian Register of Ships, technical supervision of ships, jurisdiction – flag state, coastal state and port state jurisdiction. Maritime Domain and Seaports Act: concept of maritime domain, concessions, definitions and characteristics of ports and harbours, concessions for port activities, port fees. Maritime accidents: concept of particular and general average, collision of ships, salvage at sea, wreck removal, marine pollution from ships and liability, marine insurance basics - hull, cargo and liability insurance through P&I Clubs.

1.5. Modes of Instruction		
	☒ Lectures	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☐ Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments	

1.7. Student Obligations

a) Students' main obligations are active course attendance with the preparation and presentation of seminar paper and they are required to pass two mid-term tests.

b) As a prerequisite for the final exam, students must score at least 35 out of a possible 70 points (50%) during the classes.

c) Students must score at least 15 out of a possible 30 points on final exams (50%).

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,0	Class participation		Seminar paper	0,2	Experiment	
Written exam	1,0	Oral exam		Essay		Research	
Project		Continuous Assessment	0,8	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The evaluation procedure consists of continuous examination of knowledge in the form of two tests and a final exam. Examples of evaluating learning outcomes during classes and on the final exam:

1. Compare the concept and legal regime of the contiguous zone according to the Convention on the Territorial Sea and Contiguous Zone (1958) and the UN Convention on the Law of the Sea (1982).
2. Indicate and explain conditions for entry and navigation of ships, yachts and boats of foreign nationality in internal waters of the Republic of Croatia, including their stay in seaports and shipyards.
3. List and discuss international acts regulating the protection of the marine environment from pollution.
4. Describe the structure of the International Maritime Organization (IMO) and highlight the role and functions of each body (Assembly, Council, Secretariat, Committees and Subcommittees).
5. Interpret the term and types of pilotage according to the provisions of the Maritime Code of the Republic of Croatia, specify the rights and duties of the pilot, and explain potential responsibility and liability of the pilot and of the pilot company.
6. Describe the structure of the maritime administration in the Republic of Croatia, highlight the most important powers of harbour master's office, and elaborate the rules of procedure for maritime offenses.
7. Explain the legal concept of maritime domain and indicate which parts of land and sea have this status.
8. Specify the most important legislative acts regulating the rights and obligations of seafarers, describe the organization of watchkeeping in engine and explain the role and duties of the chief engineer.
9. Compare the legal concepts of particular and general average, and explain under what conditions damage of the main engine may be recognized as general average.

1.10. Main Reading

Luttenberger, Axel, Pomorsko upravno pravo, Pomorski fakultet, Rijeka, 2005.
Luttenberger, Axel, Osnove međunarodnog prava mora, Pomorski fakultet, Rijeka, 2006.
Luttenberger, Axel, Pomorsko ratno pravo, Pomorski fakultet, Rijeka, 2008.
Pavić, Drago, Pomorsko pravo, knjiga III – Pomorske nezgode i pomorsko osiguranje, VPŠ, Split, 2000.

1.11. Recommended Reading

Capar, Rudolf, Međunarodno pravo mora, Pomorski fakultet, Rijeka, 1994.
Capar, Rudolf, Međunarodno pomorsko ratno pravo, Školska knjiga, Zagreb, 1989.
Grabovac, Ivo, Pomorsko pravo, Knjiga I: Pomorsko javno i upravno pravo,VPŠ Split, 2001
Grabovac, Ivo – Petrinović, Ranka, Pomorsko javno, upravno i radno pravo, Pomorski fakultet, Split, 2006.
Pavić, Drago, Pomorsko imovinsko pravo, Književni krug, Split, 2006.
Stanković, Predrag, Pomorske havarije, Školska knjiga, Zagreb, 1995.
Ibler, Vladimir, Međunarodno pravo mora i Hrvatska, Barbat, Zagreb, 2001.
Rudolf, Davorin, Međunarodno pravo mora, JAZU, Zagreb, 1985.
Pomorski zakonik, N.N. 181/04. (s kasnijim izmjenama i dopunama)
Zakon o pomorskom dobru i morskim lukama, N.N. 158/03. (s kasnijim izmjenama i dopunama)

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Osnove međunarodnog prava mora	Sufficient (in library and book shop)	148
Pomorsko ratno pravo	Sufficient (in library and book shop)	148
Pomorsko upravno pravo	Sufficient (in library and book shop)	148
Pomorsko pravo, knjiga III – Pomorske nezgode	Sufficient (in library and book shop)	148

1.13. Quality Assurance

Quality assurance of the course performance is continuously monitored according to ISO 9001 system applied at the University of Rijeka Faculty of Maritime Studies. An analysis of results of the final exams and a student survey are conducted and appropriate measures are adopted for each academic year.

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Course description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language I		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Core		
Year of Study	1	Semester	1
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		15+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to develop the students' ability for written and oral communication in English language using the basic terminology related to the types, parts and dimensions of ships, as well as deck machinery and crew members.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

The students are expected to be able to:

1. Describe and identify the types of ships.
2. Describe and identify ship parts and deck machinery.
3. Differ among the duties of individual crew members.
4. Describe everyday activities and retell past events.
5. Paraphrase active sentences into passive.
6. Translate simple sentences from Croatian into English, using a dictionary.

1.4. Course Outline

Types of ships.
Ship's construction, spaces, measurements.
Mathematic symbols and formulae.
Manning, duties and responsibilities.
Employment contract and the necessary documentation.
Sentence structure, tenses, passive voice.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Class attendance, activities, continuous assessment and final exam (written and oral)

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio		Final exam	1				

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % in class, 30 % at the final exam (outcomes 1-6).
1st mid-term exam (30 %) for outcomes 1, 2, 4
2nd mid-term exam (30 %) for outcomes 3,5,6
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final oral exam (30 %) (outcomes 1-6)

Examples of assessment for each outcome in mid-term exams:
1. Recognize the type of ship on the picture and describe her basic characteristics
2. Mark parts of ships on the picture and name the deck machinery shown in the picture
3. Differ among the duties of individual crew members.
4. Describe everyday activities on the ship. Retell a past even in pairs.
5. Rephrase active sentences into passive.
6. Understand and translate simple professional texts from Croatian into English using a dictionary.

Examples of assessment for each outcome in the final exam:
1. Provide an oral description of the ship in the picture.
2. Define what is and where is a superstructure, engine room, chain locker, etc, how the winch works.
3. Describe the duties of certain crew members, say something about the documents and contracts that the seamen sign.
Outcomes 4 and 5 are not assessed directly, but in the framework of other outcomes (eg. understanding and usage of the present tense may be assessed through the task of ship description (outcome 1) whereby the student has to use the appropriate tense).
6. Provide an oral translation of a professional text from Croatian into English using a dictionary.

1.1. Main Reading

1. Spinčić, A.-Pritchard, B.: *An English Textbook for Marine Engineers I,* Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.
2. Luzer, J. Spinčić. A*: Gramatička vježbenica engleskog jezika,* Pomorski fakultet, III izdanje, Rijeka 2003.

1.2. Recommended Reading

MarEng, Web-based Maritime English Learning Tool, EU Leonardo Project
Kluijven, P. van , *International Maritime English Programme*. Alkmaar
moodle.srce.hr

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić, A.-Pritchard, B. *An English Textbook for Marine Engineers* Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.	70	70
Luzer, J. Spinčić. A: *Gramatička vježbenica engleskog jezika*, Pomorski fakultet, III izdanje, Rijeka 2003.	70	70

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Associate professor Biserka Draščić Ban, PhD, Ivan Tudor		
Course	Mathematics 1		
Study Programme	Marine Engineering		
Level	Undergraduate degree programme		
Type of Course	obligatory		
Year of Study	first		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		30+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The main objective of the course is to provide general educational content and education about the mathematical apparatus used in other basic and elective courses during undergraduate studies and to emphasize the importance of accurately expressing and defining all the terms used in the courses during study.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

1. To recognize basic concepts of linear algebra, real functions of one variable and differential calculus of functions of one variable.
2. To state and correctly explain basic results from linear algebra and diffrential calculus of functions of one variable.
3. To interpret basic operations with matrices, vector and determinants, to solve the systems of linear equations, and find the limit values and derivatives of real functions of one variable.
4. To master the application of differential calculus on describing real functions.

1.4. Course Outline

Elements of the set theory. Number sets N,Z Q,R,C. Elements of Combinatorics. Binomial and polynomial formula. Sequences. Determinants. Matrices. Systems of linear algebraic equations. Vecotrs. Mapping, relation, function of one variable. Limits of functions. Derivative. Differential. Theorems of differential calculus. Application of differential calculus on describing real functions.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Taking classes regularly and doing homework assignments.

1.8. Assessment[1] of Learning Outcomes

Course attendance	2	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Assesment of Learning is done through two partial written tests during Classes and through oral final exam.

Example od written test:

1) (outcome 1, 2 I 3) Calculate the following limits: a) $\lim_{n\to\infty}\left(\frac{n^2+1}{n^2-1}\right)^{n^2+2}$ b) $\lim_{x\to 1}\ln x \ln(x-1)$

2) (outcome 1, 2 I 3) Find z: $\frac{\acute{z}+|z|-\sqrt{9}}{2}=3+\frac{9}{2}i^9$

3) (outcome 1, 2 I 3) Find $A^{-1}\cdot B$ if:

$$A=\begin{bmatrix}3 & 0 & -2\\ 0 & 4 & 5\\ -4 & 0 & 6\end{bmatrix} \text{ i } B=2I-A$$

4) (outcome 1, 2 i 3) Find the first derivative od the function

f (x) = $\frac{2x}{x^2-2x-3}+\sqrt{6-x^2}+\ln(x+5)$

5) (outcome 4) Describe and plot the function $f(x)=\frac{1-x^2}{x^2+1}$

PITANJA NA USMENOM (outcome 2):

1) The principle of mathematical induction
2) Gaussian method
3) Continuity of function
4) Extreme values of a function of one variable

1.10. Main Reading

1. R. Dobrosavljević, Ž. Glavan, I. Kitarović, Z. Zenzerović, Matematika I, Pomorski fakultet u Rijeci, 1982., Rijeka
2. B. P. Demidovič, Zadaci i riješeni primjeri iz matematičke analize : za tehničke fakultete, Tehnička knjiga, 2003., Zagreb

1.11. Recommended Reading

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
R. Dobrosavljević, Ž. Glavan, I. Kitarović, Z. Zenzerović, Matematika I, Pomorski fakultet u Rijeci.	8	60
B. P. Demidovič, Zadaci i riješeni primjeri iz matematičke analize : za tehničke fakultete,, Tehnička knjiga, Zagreb.	8	60

1.13. Quality Assurance

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3.2. Course description

Generic information			
Head of Course	Gulić Marko, Ph.D.		
Course	Applied computer science		
Study Programme	Marine Engineering		
Level	Undergraduate degree programme		
Type of Course	Obligatory		
Year of Study	1.		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	5	
	Number of Hours (L+E+S)	30+30+0 (2+2+0)	

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring knowledge about the structure and principle of computer operation, as well as an algorithmic way to solve problems using a computer.

1.2. Prerequisites for Course Registration

No

1.3. Expected Learning Outcomes

After the exam is passed, students will be able to:

1. *Properly justify basic concepts of the structure and principle of operation of the computer*
2. *Describe different types of computer software support*
3. *Use the application program MS word for text processing*
4. *Use the application program MS Excel for spreadsheets*
5. *Write an algorithm in Just Basic programming language as a solution to a given problem*

1.4. Course Outline

Mathematical and logical basics of computer operation. Computer hardware. Input / output units. Computer memory. Central processing unit. Software. System software support. Operating System. Software development. Utilities. Application software. Solving problems with computer. Algorithms and programs. Elements of algorithms. Describing algorithms. Algorithm commands. Control structures of the algorithm.

1.5. Modes of Instruction		
	☒ Lectures	☒ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments

1.7. Student Obligations

The student is obliged to actively attend lectures and exercises and be present in at least 70% of classes. All continuous assessment *affect the grade, and none are satisfied with less than 50%.*

1.8. Assessment[1] of Learning Outcomes

Course attendance	2	Class participation		Seminar paper		Experiment	

Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out in accordance with the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka as follows:

- *During the course of the course, 70% of the learning outcomes obtained are evaluated through three proficiency tests, each of which must be positive (at least 50%).*
  The first proficiency test involves learning the learning outcomes of using the MS Word application program - 3rd learning outcome (25%):
  Examples of checking 3rd learning outcomes:
  – *Using the MS Word application format the given text.*
  The second knowledge test involves learning the learning outcomes of using an MS Excel spreadsheet application - 4th learning outcome (25%).
  Examples of checking 4th learning outcomes:
  – *Using the MS Excel application, draw a graph for the given data.*
  The third check involves checking the 5th learning outcome (20%) on writing algorithms in Just Basic as a solution to a given problem.
  Example of checking 5th learning outcomes:
  – *Write a program that will load 50 numbers and print the smallest number loaded.*

- *In the final part of the exam, 30% of the learning outcomes are evaluated. Student must have minimum of 50% to pass the final exam. The final exam checks the 1st and 2nd and the learning outcomes.*
  Examples of learning outcomes 1 and 2:
  – *Explain the basic characteristics of the processor.*
  – *Describe the different types of application software.*

1.10. Main Reading

– Tudor, M. Primjena elektroničkih računala, University of Rijeka, Faculty for Maritime Studies, Rijeka, 2010.
– Course material available on the eLearning system - Merlin (https://moodle.srce.hr)

1.11. Recommended Reading

– Tudor, M. Osnove primjene računala, University of Rijeka, Faculty for Maritime Studies Rijeka, 2003.
– Grundler, D. Primijenjeno računalstvo, Graphis, Zagreb, 2000.
– Grundler et al, ECDL, Osnovni program, PRO-MIL d.o.o., Varaždin, 2005.

1 **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.12. Number of Main Reading Examples

Title	*Number of*	*Number of students*
Tudor, M. Primjena elektroničkih računala, University of Rijeka, Faculty for Maritime Studies, Rijeka, 2010.	Library 5	90
Course material available on the eLearning system - Merlin (https://moodle.srce.hr)	Publishing Service 150	

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a semester, a student survey is conducted. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	Prof. Goran Vukelić,		
Course	Engineering Mechanics I		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	Compulsory		
Year of Study	1		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		6
	Number of Hours (L+E+S)		3+2

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring theoretical knowledge that is the basis for problem solving in the field of solid mechanics statics.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

1. Understanding the axioms of statics and laws of mechanics.
2. Applying the laws of mechanics to solve the problems of determining the reactions of rigid bodies on friction(less) surfaces.
3. Analyzing the load distribution at beams and trusses.
4. Understanding simple and complex type of loads onto the solid body.
5. Applying the laws of mechanics onto the dimensioning of the solid body.
6. Analyzing stress, strain and stability of beams.

1.4. Course Outline

Colinear, concurrent, parallel and general planar system of forces. Resultant of a forces and equilibrium of a body. Moment of a system of forces. Force couple. Analysis of a system of forces. Friction. Pappus-Guldin theorems. Beams and trusses.
Normal and tangential stress. Stress and strain dependence. Allowed stress. Axial load, shear stress, torsion, bending, buckling. Combined loadings. Dimensioning of beams and shafts. Dynamic loads and strength.

1.5. Modes of Instruction		
	☒ Lectures	☒ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments

1.7. Student Obligations

Attending the lectures and exercises (min. 70%), attending the assessment and exams, submitting results of assignments.

1.8. Assessment[1] of Learning Outcomes

Course attendance	2	Class participation	1	Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

According to the study rulebooks of University of Rijeka and Faculty of Maritime Studies:

- through continuous assessment during the semester (70% of learning outcomes)
  - 1. colloquium - learning outcomes 1-2 (20%),
  - 2. colloquium - learning outcomes 3 (20%),
  - 3. colloquium - learning outcomes 4 (15%),
  - homework assignments - learning outcomes 1-6 (15%),
- through final exam (30% of learning outcomes (5-6)) with passing rate set at min. 50% of final exam points.

Examples of evaluation in correlation to learning outcomes:

1. Determine equilibrium of a body exposed to a system of forces.
2. Determine free body diagram of a rigid body.
3. Determine free body diagram of a beam and determine distribution of forces and moments.
4. Effect of basic and combined loadings onto the solid body.
5. Determining stress, strain and stability of a beam, dimensioning of a beam.

1.10. Main Reading

Brnić, J.: "Statika", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.
Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996.
Nikola Tomac: "Nauka o čvrstoći", Pomorski fakultet, Rijeka, 2013. web edition

1.11. Recommended Reading

Nash, W.: “Strength of Materials”, Schaum’s Outline Series, McGraw-Hill, New York, 1998.
Muftić, O. “Mehanika I, Statika”, Tehnička knjiga, Zagreb, 1989.
Mc Lean, W.G.,Nelson, E.W., Theory and Problems of Engineering Mechanics, Statics and Dynamics,SCHAUM’S OUTLINE SERIES, Mc GRAW-HILL BOOK COMPANY
Tehnička enciklopedija, Leksikografski zavod Hrvatske.
Alfirević, I., «Nauka o čvrstoći I», Tehnička knjiga, Zagreb, 1989.
JACKSON, J.H., WIRTZ, H.G., »STATICS and STRENGTH of MATERIALS», SCHAUM’S OUTLINE SERIES, McGRAW-HILL BOOK COMPANY.
J. Brnić, G. Turkalj: Nauka o čvrstoći I, Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Brnić, J.: "Statika", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.	5	80
Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996.	5	80
Nikola Tomac: "Nauka o čvrstoći", Pomorski fakultet, Rijeka, 2013. Web izdanje	-	80

1.13. Quality Assurance

According to ISO 9001 system set at Faculty of Maritime Studies, Rijeka. Once a year analysis of passing exam rate. Once a semester anonymous students online survey.

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3.2. Course description

Generic information			
Head of Course	Vizentin Goran, Ph.D.		
Course	Material and processing technology		
Study Programme	Marine Engineering		
Level			
Type of Course	compulsory		
Year of Study	1		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		2+2+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of this course is to provide the student with appropriate knowledge of materials and processing technologies and systems prescribed by STCW and IMO Model Courses for the service of Naval Navigation Officer.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

After passing the exam, students will be able to do the following:
1. Describe technical materials, strength tests and technological properties of materials.
2. Explain the basic methods of iron and steel production.
3. Explain the structure of atoms, arrangement of atoms and irregularities in the atomic structure.
4. Explain the motion of atoms in materials and solidification and solidification.
5. Explain the iron carbon alloys.
7. Describe the basic properties and methods of production of iron, steel and non-ferrous metals.
8. Describe the basics of heat treatment.
9. Explain the basics of plastic, ceramic, composite and natural materials.
10. Explain basic welding procedures
12. Know basic practical measurements with manual measuring tools.
13. Have the knowledge necessary to perform basic manual processing; logging, sawing, drilling, etc.
14. Have the knowledge required to perform basic machine operations on a universal lathe, milling machine, drill, grinder and sharpener.
15. Have the knowledge necessary to perform basic welding with a coated electrode and a TIG process.
16. Have the knowledge necessary to perform the measurement of the hardness, toughness of the material and identify the metal structure with a microscope.

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1.4. Course Outline

Introduction to technical materials and strength tests and technological properties of materials, basics of metallography, basic methods of production of iron and steel, basics of heat treatment, fundamentals of plastic, ceramic, composite and natural materials. Fundamentals of particle separation, unconventional processing methods and technological welding processes.
Laboratory program: manual measurements; machining on a lathe, milling machine, drill grinder, sharpener; manual processing; manual welding with electrode coated and TIG process; measurement of static and dynamic strength of material with a trowel and trowel; measurement of hardness; measurement of material toughness; identifying the metal structure with a microscope

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Regular attendance at classes, regular midterm exams, final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	0,9	Essay		Research	
Project		Continuous Assessment	1,6	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Learning outcomes are evaluated through regular class attendance and activity (10%), continuous exams (60%) and final examination (30%). During the class, the student can collect a maximum of 70% of the grade points as follows:
A) Successfully pass 2 oral midterms within the prescribed deadlines. Each passed midterm carries a minimum of 15% and a maximum of 30% of marks and can be taken 3 times. A student who has not achieved all the required learning outcomes cannot take the midterm exam. The next colloquium cannot be accessed unless the previous colloquium is passed. The colloquiums include the following:
1st Colloquium (Learning Outcomes 1-5)
2nd Colloquium (Learning Outcomes 1-5)
B) Active attendance (lectures and exercises). Each class absence accounts for 1% of the grade point. Students who have passed both exams can apply for the oral final exam (learning outcomes 1-5) and earn a minimum of 15% and a maximum of 30% of the marks.

Examples of evaluating learning outcomes in relation to set learning outcomes are:
1. Describe technical materials, strength tests and technological properties of materials.
2. Explain the basic methods of iron and steel production.
3. Explain the structure of atoms, arrangement of atoms and irregularities in the atomic structure.
4. Explain the motion of atoms in materials and solidification and solidification.
5. Explain the iron carbon alloys.
7. Describe the basic properties and methods of production of iron, steel and non-ferrous metals.
8. Describe the basics of heat treatment.
9. Explain the basics of plastic, ceramic, composite and natural materials.
10. Explain basic welding procedures

1.10. Main Reading

Tomac, N. Tehnički materijali, 2012.
Tomac, N.: Tehnologija materijala i obrade, 2008., http://www.pfri.hr/~tomac/TMO/SADRZAJ.htm

1.11. Recommended Reading

Šestan, A.: Tehnologija materijala i obrade. Pomorski fakultet, Rijeka, 1997.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Tomac, N. Tehnički materijali, 2012.		

1.13. Quality Assurance

In accordance with ISO 9001 at the Faculty level.

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3.2. Course description

Generic information		
Head of Course	**Maja Skendžić, mag.cin.**	
Course	**Physical education 1**	
Study Programme	**Marine Engineering**	
Level	**UNDERGRADUATE DEGREE PROGRAMME**	
Type of Course	core	
Year of Study	1st	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	**1**
	Number of Hours (L+E+S)	**0+30+0 (0+2+0)**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Introduce students to the importance of continuing to maintain the health of seafarers through physical exercise, basic, general and specific motor skills:

-climbing rope and ladder ladders, drowning rescue, swimming, sailing rowing.

Adequate kinesiological activities to satisfy the needs of students for movement as an expression of satisfaction of general needs that increase adaptive and creative abilities in contemporary living and study conditions. In addition, the objective of the Physical and Health Culture course is to convey basic health and work-life information to students.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

1. Improve general and specific motor skills, knowledge, skills and habits of seafarers
2. Maintain health, in particular psychological stability, as a prerequisite for the health of seafarers on board
3. Participate in more meaningful use of leisure time
4. Apply motor task resolution in seafarers emergency situations
5. Encourage the humane interpersonal relationships on which the health of the seafarers and the crew of the ship depends
6. Improve knowledge of the factors that condition the injury and illness of seafarers
7. Develop the ability to create with motor expression according to the individual characteristics of gifted seafarers.

1.4. Course Outline

Introducing students to the curriculum, teaching locations and specific equipment. Familiarity with health status and (non) activities of students.Heart rate measurement: starting position lying down, sitting, standing. Jogging. Cyclic running for up to 6 minutes. Running Technique: Matching Breathing, Hand & Leg Work. Stretching exercises. Stretching for a variety of sports.

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Looseness exercises. Relaxation exercises. Climbing up and down the rope. Basic kinesiological transformations on board. Motion coordination. Kinesitherapy exercises for the preservation of the spine of seafarers. Dry swimming exercises. Hand work is waiting. Determination of basic individual swimming motor skills and student knowledge. Basic elements of swimming technique kraul. Dorsal swimming technique. Breathing. Footwork. Hand work. Typical Errors and Correction: Head Lifting, Hip Bends. Back float. Back skating. Back Germania. Swimming loads of students in three diverse groups with breakwater breathing exercises: light, medium, heavy. Static strength of seafarers. . Basics of self-defense. Stretching. Determining the personal student status of a course attending or not attending based on the attendance or non-attendance of classes and activities or inactivity in teaching.

1.5. Modes of Instruction	☐ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments	Teaching classes of Physical and health education takes place in three different media: a gym, at sea and in a swimming pool. The unpredictability of weather conditions at sea will determine the number of hours of sailing. The ability to reconcile college and swimming pool hours will determine the number of swimming hours. Good weather conditions will allow more hours of teaching at sea to be maintained. Seminar paper is written by part-time students.	

1.7. Student Obligations

Active class attendance and activity in at least 70% of classes.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0,5	Class participation	0,5	Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Active class attendance and activity in at least 70% of classes.

1.10. Main Reading

Recommendation: Heimer, S. (2003) Promicanje zdravstveno-preventivne tjelesne aktivnosti u RH. Sport za sve,21 (35),3-4.

1.11. Recommended Reading

1. Redžić A., Redžić M.: Križobolja i tjelesno vježbanje, HSSR Sport za sve. Godina XXXVI, broj 93. 2018.
2. Volčanšek B.: Bit plivanja , Kineziološki fakultet Sveučilišta u Zagrebu, Zagreb, 2002.
3. Conner D., Levitt M.: Naučite jedriti, Gandalf, Zagreb, 2001.
4. Graver D.K.: Scuba diving, Human Kinetics Publisher, Algoritam, Zagreb, 1993.
5. Anderson B.: Stretching, Vježbe istezanja za svakodnevni fitness: trčanje, plivanje, tenis, biciklizam, skijanje, košarka, nogomet i ostale sportove, Gopal, d.o.o., Zagreb, 1997.
6. Anderson B., Burke E., Pearl B.: Fitnes za sve, Gopal, d.o.o., Zagreb, 19997.
7. Janković V. , N. Marelić.: Odbojka, Fakultet za fizičku kulturu Sveučilišta u Zagrebu, Zagreb 1995.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.12. Number of Main Reading (Examples)

Title	*Number of examples*	*Number of students*

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted. Each class is closely monitored for each (none) arrival and activity of the student on a separate sheet Physical and Health Culture, where the results of longitudinal monitoring are in general and specific psychomotor abilities, knowledge and achievements and functional abilities. The course of Physical and Health Education is evaluated for a particular semester by enrolling in the ISVU system as "PASSED".

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3.2. Course description

Generic information		
Head of Course	Jasminka Bonato, Ph.D.	
Course	Marine Electrical Engineering	
Study Programme	Marine Engineering	
Level	undergraduate	
Type of Course	obligatory	
Year of Study	1.	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	5
	Number of Hours (L+E+S)	30+30+0 (2+2+0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

To introduce the basic physical laws in the field of electricity and magnetism, as well as examples of their practical application.

1.2. Prerequisites for Course Registration

No.

1.3. Expected Learning Outcomes

1. Explain the basic concepts of electrostatics and direct currents
2. Recognize the fundamental physical laws of electricity and magnetism in the course of auditory exercises on specific computational examples
3. Say the basic properties of magnetism
4. Show the basic expressions in electromagnetism
5. Explain the basic properties of AC
6. Apply the laws of electricity and magnetism in laboratory exercises
7. Analyze the application of theory through a variety of examples in technical practice

1.4. Course Outline

Electric charge. Electric forces and electric field. Electric field potential and electrical voltage. Capacity. Electric current in conductors. Electrical resistance and electrical conductivity. Direct current sources. DC Circuits. Energy and power. Magnetic forces, magnetic field, magnetic induction and magnetic flux. Magnetic field of conductor flowed by current. Force on conductor under current in magnetic field. Electromagnetic induction. Self-induction and inductance. Inter-induction and inter-inductance. Magnetic characteristics of ferromagnetic materials. Ferromagnetic Circuits. Variable and alternating currents. AC circuits. AC power and energy. Three-phase systems. Measurement of basic electrical quantities.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☒ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Regular attendance at classes, passing exams that qualify students for the final or remedial exam, depending on their achievement in the written parts of the exam. Activity through which they analyze applications in technical practice. Throughout the semester, students also carry out laboratory measurements, where, in addition to the task of the exercise, they learn about basic measuring instruments, devices and methods of their connection.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation	0,5	Seminar paper		Experiment	0,5
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% during class (attendance records + continuous assessment + experiment) and final exam 30%.

1.10. Main Reading

1. Notes from lectures and exercises
2. V. Pinter; Fundamentals of Electrical Engineering, Book One, Technical Book Zagreb, 1989.
3. V. Pinter; Fundamentals of Electrical Engineering, Book Two, Technical Book Zagreb, 1989.

1.11. Recommended Reading

1.A.Kraš, J.Čelić Fundamentals of Marine Electrical Ethics, Faculty of Maritime Studies, Rijeka;, Rijeka, 2016.
2. I. Kuzmanić: Marine Electrical Engineering and Electronics, Faculty of Maritime Studies in Split, Split, 2006.
3 .I. Kuzmanić., I. Vujović: Fundamentals of Electrical Engineering - Collection of Solved Problems, Faculty of Maritime Studies in Split, Split, 2005.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
V. Pinter; Fundamentals of Electrical Engineering, Book One, Technical Book Zagreb, 1989.	8	
V. Pinter; Fundamentals of Electrical Engineering, Book Two, Technical Book Zagreb, 1989.	5	

1.13. Quality Assurance

The quality of study is constantly monitored in accordance with the ISO 9001 system implemented at the Faculty of Maritime Studies in Rijeka. An analysis of the exams is made annually and a student survey is conducted once a semester.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information		
Head of Course	mr.sc. Rikard Miculinić	
Course	Marine engineering elements	
Study Programme	Marine Engineering	
Level	Undergraduate degree programme	
Type of Course	mandatory	
Year of Study	1.	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	6
	Number of Hours (L+E+S)	3+2+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to master basic technical drawing skills. The acquired knowledge in this subject enables the participant to understand the types, function, constructive forms, sizing of machine elements according the stresses in the material, as well as basic knowledge in technical projection, which enable the participant to read technical documentation and make the technical drawing of the machine elements with all the necessary data.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

Students will be able to:

1. To know the ISO standards of engineering graphics and the rules of technical drawing.
2. Sketch the object in orthogonal projection, apply all required labels.
4. Explain and apply tolerances.
5. Read and create new technical drawings of simple machine elements with all the necessary data.
6. Make simple CAD drawings.
7. Explain the structural forms and materials of machine elements.
8. Describe the function of machine elements.
9. Analyze the load and strain of the machine element.
10. Determine the size of the element based on the allowed stresses in the material.

1.4. Course Outline

The course contains the norms and recommendations of ISO and DIN standards for the design of the technical drawing (lines, formats and scales).
Engineering Graphics covers the basic norms in graphic communications (lines, technical letter, formats and scales). Orthogonal projection on two and three planes (points, lengths, planes and bodies). Tolerances and surface roughness. Basic symbols in shipbuilding.
Machine elements include coupling elements (joints, detachable joints and springs), circular motion and power transmission elements (shafts, bearings, couplings, belt drives, chain drives, friction drives and gears)

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1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning ☐ Field work	X Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		
1.7. Student Obligations		
In addition to the required tasks, the student is required to create a complex engineering drawing.		
1.8. Assessment[1] of Learning Outcomes		

Course attendanc		Class participation	1	Seminar paper	2	Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in final exam; according to "Pravilnik o studijima Sveučilišta u Rijeci" and "Pravilnik o studiranju na Pomorskom fakultetu u Rijeci" (the regulations on Studies of the University of Rijeka and the regulations on studies at the Faculty of Maritime Studies in Rijeka).

Examples of evaluation by individual outcome at the midterm and final exam:

1. 20% - two graphical tasks (plane) (learning outcomes 1,2,3)
2. 20% - two graphical tasks (spatial) (learning outcomes 1,2,3)
3. 20% - drawing problems (learning outcomes 1,2,3,4) with mandatory CAD drawing.
4. 10% - exercises. (learning outcomes 1,2,3,4,5,6)
5. 30% - final exam, outcomeses 6,7,8,9,10

Examples of evaluation:
1. The object in spatial projection draw in orthogonal projection according to the picture (outcome 1,2,3).
2. The object is given in orthogonal projection. Draw object in spatial projection (outcome 5).
3. Determine all necessary measurements / deviations of the fittings, type of fittings and draw a tolerance diagram with all the necessary data (outcome 4).
4. Screw joints (deformation diagram)

1.10. Main Reading

Bukša, A., Grafičke komunikacije – Zbirka zadataka, Pomorski fakultet Rijeka, 2001.
Karl-Heinz Deecker, Elementi strojeva, Tehnička knjiga, Zagreb 2006.

1.11. Recommended Reading

1. Opalić M., Kljajin M., Sabastijanović S., Tehničko Crtanje, Sveučilište u Zagrebu, Fakultet strojarstva i brodogradnje, 2003.
2. Bukša A., Programski zadaci iz grafičkih komunikacija, Pomorski fakultet u Rijeci, Rijeka 1998.
3. Bukša A.: Izjednačenje opterećenja kod zupčanih prijenosa s višestrukim zahvatom u brodskim reduktorima i njihova konstruktivna rješenja, Zbornik radova Pomorskog fakulteta u Rijeci, God. 10, Rijeka 1996.
4. Lamit, L. – Kitto, K., Principles of Engineering Drawing, St. Paul, West Publishing Company, 1994.
5. Prebil, Ivan, Tehnična dokumentacija, Ljubljana, Tehniška založba Slovenije, 1995.
6. Parker M.- Dennis L., Engineering drawing fundamentals, Cheltenhan, Stanley Thornes, 1990.
7. Parker M.- Pickup F., Engineering drawing with worked examples 1, Cheltenhan, Stanley Thornes, 1990.
8. Hercigonja, Eduard, Tehnička grafika, Zagreb, Školska knjiga, 1996.
9. Kovač, Branko, Tehničko crtanje, Zagreb, Školska knjiga, 1975.

1. Maruni ć, Gordan a, Elemen ti inženje rske grafike, Rijeka,T ehnički

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Bukša, A., Grafičke komunikacije – Zbirka zadataka, Pomorski fakultet Rijeka, 2001.	12/50	70
Course syllabus is available on the e-learning system - Merlin in electronic format		

1.13. Quality Assurance

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Course description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language II		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Core		
Year of Study	1	Semester	2
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		15+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to develop the students' ability for written and oral communication in English language using the basic terminology related to the properties of technical materials and their application in engineering, as well as the basic principle of operation of marine engines.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

The students are expected to be able to:

1. Describe and classify technical materials and their properties
2. Differ among the different types of marine propulsion and their characteristics
3. Recognize parts of the engine, understand their function and the way they are assembled.
4. Turn reported speech into verbal communication (image-speech/writing).
5. Translate complex sentences from Croatian into English using specialized and general language dictionaries.

1.4. Course Outline

Materials and alloys.
Material testing, mechanical and physical properties. Stress and strain.
Ship's propulsion.
Principles of a diesel engine operation and basic components.
Marine boilers, operation and elements.
Auxiliary machinery, turbines, basic parts and principle of operation.
Tenses, passive voice, modal verbs and articles.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Class attendance, activities, continuous assessment and final exam (written and oral)

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio		Final exam	1				

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % in class, 30 % at the final exam (outcomes 1-5).
1st mid-term exam (30 %) for outcomes 1, 2
2nd mid-term exam (30 %) for outcomes 3 - 5
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final oral exam (30 %) (outcomes 1-5)

Examples of assessment for each outcome in mid-term exams:
1. Describe and classify technical materials and their properties.
2. Single out the advantages and disadvantages of different types of marine propulsion and their specific characteristics
3. Recognize engine parts, understand their function and the way they are assembled.
4. Describe a diagram or a scheme in writing.
5. Translate complex sentences from Croatian into English using specialized and general language dictionaries

Examples of assessment for each outcome in the final exam:
1. Present and classify technical materials and their properties.
2. Single out the advantages and disadvantages of different types of marine propulsion and their specific characteristics
3. Recognize parts of the engine in the picture, describe their purpose.
4. Describe a diagram or a scheme orally.
5. Provide an oral translation of complex sentences from Croatian into English using specialized and general language dictionaries.

1.1. Main Reading

1. Spinčić, A.-Pritchard, B.: *An English Textbook for Marine Engineers I,* Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.

2. Luzer, J. Spinčić. A*: Gramatička vježbenica engleskog jezika,* Pomorski fakultet, III izdanje, Rijeka 2003.

1.2. Recommended Reading

MarEng, Web-based Maritime English Learning Tool, EU Leonardo Project
Moodle.srce.hr

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić, A.-Pritchard, B. *An English Textbook for Marine Engineers* Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.	70	70
Luzer, J. Spinčić. A: *Gramatička vježbenica engleskog jezika*, Pomorski fakultet, III izdanje, Rijeka 2003.	70	70

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Associate professor Biserka Draščić Ban, PhD, Ivan Tudor		
Course	Mathematics 2		
Study Programme	Marine Engineering		
Level	Undergraduate degree programme		
Type of Course	obligatory		
Year of Study	first		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		30+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The primary goal of the course is to provide general education content and instruction on the mathematical framework used in other core and elective courses during undergraduate studies, as well as to highlight the importance of precise expression and accurate definition of all terms used in courses throughout the studies.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

1. Master the application of differential calculus to analyze the behavior of functions.
2. Recognize and correctly interpret the fundamental concepts of integral calculus for functions of a single variable, series, multivariable functions, and differential equations.
3. State and correctly interpret the fundamental results of integral calculus for functions of a single variable, series, multivariable functions, and differential equations.
4. Interpret basic computational operations with indefinite and definite integrals, series, functions of two variables, and methods for solving differential equations.
5. Master the application of definite integrals.

1.4. Course Outline

Application of differential calculus to analyze the behavior of functions. Primitive function, tabulated integrals. Integration methods. Definite integral. Properties of the definite integral. Newton–Leibniz formula. Improper integral. Series. Convergence of series with positive real terms, convergence criteria. Alternating series. Power series. Differential equations, homogeneous, linear, Bernoulli equation. Functions of several real variables. Limit of functions of several real variables. Partial derivatives. Total differential. Schwarz's theorem. Extrema of multivariable functions. Conditional extrema.

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1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		
1.7. Student Obligations		
Taking classes regularly and doing homework assignments.		
1.8. Assessment[1] of Learning Outcomes		

Course attendance	2	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Assesment of Learning is done through two partial written tests during Classes and through oral final exam.

Example od written test:

1) (outcome 1, 2, 3) **Examine the behavior and graph the function.**: $f(x)=\frac{1-x^2}{x^2+1}$

2) (outcome 2, 3, 4) Calculate: a) $\int \frac{4x+2}{x^2+x+1}dx$ b) $\int_0^{\frac{\pi}{4}} (\cos^2 x-\sin^2 x)\,dx$

3) (outcome 5) Calculate the volume of the solid of revolution formed by rotating around the x-axis the region bounded by the curve $y=-x^2+2$ and the line y=x in the first quadrant, around the x-axis. Draw it.

4) (outcome 2, 3, 4) Solve the differential equation $y'(y^3+1)(1+x^2)=xy$

5) (outcome 2, 3, 4) Determine the extrema of the function of two variables

$$f(x,y)=x^2+2y^2+2xy-6x-10y+50$$

PITANJA NA USMENOM (outcome 2):
1) Newton-Leibniz formula
2) Cauchy's convergence criterion for series
3) Extreme values of a function of two variable

1.10. Main Reading

1. R. Dobrosavljević, Ž. Glavan, I. Kitarović, Matematika II, Pomorski fakultet u Rijeci, 1993., Rijeka
2. B. P. Demidovič, Zadaci i riješeni primjeri iz matematičke analize : za tehničke fakultete, Tehnička knjiga, 2003., Zagreb

1.11. Recommended Reading

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
R. Dobrosavljević, Ž. Glavan, I. Kitarović, Matematika II, Pomorski fakultet u Rijeci.	10	60
B. P. Demidovič, Zadaci i riješeni primjeri iz matematičke analize : za tehničke fakultete,, Tehnička knjiga, Zagreb.	5	60

1.13. Quality Assurance

6) The quality of studying is monitored in accordance with the ISO 9001 system and in line with European standards and guidelines for quality assurance, which are implemented at the Faculty of Maritime Studies in Rijeka. The pass rate results are analyzed once a year, and appropriate measures are taken.

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3.2. Course description

Generic information			
Head of Course	Prof. Goran Vukelić		
Course	Engineering Mechanics II		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	Compulsory		
Year of Study	1		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring theoretical knowledge that is the basis for problem solving in the field of kinematics, dynamics and fluid mechanics.

1.2. Prerequisites for Course Registration

Completed “Engineering Mechanics I”.

1.3. Expected Learning Outcomes

1. Applying the laws of mechanics to solve the problems of particle, body and system motion.
2. Analyzing the motion of mechanisms.
3. Applying the laws of mechanics to solve the problems of fluid statics.
4. Applying the laws of mechanics to solve the problems of fluid dynamics.
5. Analyzing the suitability of pipeline and its elements regarding fluid mechanics parameters.

1.4. Course Outline

Coordinate system and position of a body within. Motion. Degrees of freedom. Kinematics of a particle: rectilinear and curvilinear motion. Kinematics of a rigid body: translation, rotation, planar motion. Kinematics of planar mechanisms.
Dynamics of a particle: inertia, inertia force, D’Alembert principle, impulse. Work, energy and power.
Fluid mechanics: general physical values and parameters. Fluid statics. Pressure and change of pressure. Measuring the pressure. Pressure force. Buoyancy. Stability of a floating body. Pascal law. Hydraulic press. Fluid motion. Laws of fluid motion. Euler and Bernoulli equation. Application f Bernoulli equation. Fluid flow. Laminar and turbulent flow. Flow of ideal and real fluid. Flow losses. Fluid circulation. Cavitation.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☒ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Attending the lectures and exercises (min. 70%), attending the assessment and exams, submitting results of assignments.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation	1	Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

According to the study rulebooks of University of Rijeka and Faculty of Maritime Studies:

- through continuous assessment during the semester (70% of learning outcomes)
  - 1. colloquium - learning outcomes 1-2 (25%),
  - 2. colloquium - learning outcomes 3 (25%),
  - homework assignments - learning outcomes 1-6 (20%),
- through final exam (30% of learning outcomes (4-5)) with passing rate set at min. 50% of final exam points.

Examples of evaluation in correlation to learning outcomes:

1. Determine dynamic equilibrium of a body at planar motion.
2. Compare the motion of several interconnected bodies based on the set criterium.
3. Calculate pressure, change of pressure, pressure force, buoyancy.
4. Use Euler and Bernoulli equation to determine motion parameters of the fluid.
5. Determine the losses in a pipeline.

1.10. Main Reading

Žigulić, R, Braut, S.: Kinematika, Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2012.
Krpan, M., Butković, M., Žigulić, R., Braut, S., Franulović, A.: Dinamika, Tehnički fakultet, Rijeka, 2001.
Pečornik, M.: Tehnička mehanika fluida, Školska knjiga, Zagreb, 1985.

1.11. Recommended Reading

Jecić, S.: Tehnička mehanika II - Kinematika i dinamika, Tehnička knjiga, Zagreb, 1995.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Žigulić, R, Braut, S.: Kinematika	5	80
Krpan, M. et al.: Dinamika	5	80
Pečornik, M.: Tehnička mehanika fluida	5	80

1.13. Quality Assurance

According to ISO 9001 system set at Faculty of Maritime Studies, Rijeka. Once a year analysis of passing exam rate. Once a semester anonymous students online survey.

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Course description

Generic information			
Head of Course	Srđan Žuškin, PhD		
Course	Ship design and construction		
Study Programme	Marine Engineering		
Type of Course	Mandatory		
Year of Study	1st year	2nd semester	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		60 + 30 + 0 (4 + 2 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The first objective of the course is to acquaint students with the basic ship's dimensions and measures, transversal and longitudinal constructional elements, the elementary conception of the ship's strength and constructional features of different types of ships together, and International rules for ship construction. The second objective of the course is based on ship stability elaboration, statical and dynamical stability, and ship stability in loading/unloading or shifting mass.

1.2. Prerequisites for Course Registration

No prerequisites

1.3. Expected Learning Outcomes

It is expected that the student will be able to:

1. Parse and apply international rules for the ship's construction and historical development.
2. Parse and analyze the type of ship construction and structural elements of longitudinal and transversal ship's strength.
3. Parse and apply basic ship dimensions and measures with ship drawings.
4. Properly analyze the ship's division toward different constructional characteristics
5. Properly analyse the ship's division toward purpose, type of cargo, navigational water categories, construction material, nature of shipping service, etc.
6. Define and parse technical and technological characteristics for different types of ships.
7. Parse and apply ship stability definition and division
8. Parse and define initial stability with basic elements of transverse statical stability
9. Parse and define the elements of transverse statical stability in mass-shifting
10. Parse and define the elements of transverse statical stability in mass transshipment (loading/unloading)
11. Analyse the influence of Free Surface Correction (FSC) on transverse statical stability
12. Parse and define longitudinal stability with basic elements
13. Parse and define the elements of longitudinal stability in mass shifting and transshipment (loading/unloading)
14. Parse and define the dynamical stability and damage stability regulations

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1.4. Course Outline

International rules for ship construction and historical development. Construction materials, welding, bulkheads, watertight bulkhead, watertight door. Type of ships. Structural elements of longitudinal and transversal ship's strength. Strength and stress of ship structure. Ship compartments, cargo compartments, navigation bridge, and engine room. Ship's cargo handling equipment for different types of ships. Ship's operational equipment. Type of rudders, remarks for different kinds of rudders, propeller execution with main particularities. Geometrical ship's dimensions and measures. Ship drawings and design. The general plan of the ship with different system technology. Wind surface and underwater area. Ship's division toward purpose, type of cargo, navigational water categories, construction material, nature of shipping service, etc. Technical and technological characteristics for General Cargo ships, Container Ships, Ro-Ro vessels, Bulk Carriers, Oil/Oil products and Chemical Tankers, Gas takers, Passenger liners and cruise ships, and offshore vessels with different purposes and services.
Ship stability definition and division. Basic ship hydrostatics. Statical initial transverse metacentric high. Transverse statical stability change in vertical and horizontal mass shifting. Transverse statical stability change in mass transshipment (loading/unloading). Transverse statical stability change in hanging loads. Influence of Free Surface Correction (FSC) on transverse statical stability. Statical transverse stability at large angles of the heel. GZ curve construction with Intact stability regulations analyses. KG calculation in transverse stability. Statical longitudinal stability. Longitudinal stability changes in mass shifting or transshipment (loading/unloading). XG calculation in longitudinal stability. Dynamical stability analyses. Damage stability. Ship's trim and stability book.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☒ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments	The Learning Outcomes in this course are under STCW regulation.	

1.7. Student Obligations

Active attendance of classes over 70 %. Longitudinal and transversal ship drawing – student task.
Passed two written exams. Final oral exams.

1.8. Assessment[1]t of Learning Outcomes

Course attendance	2,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1,5	Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio	0,5						

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % of the course grade is based on 2 written exams in class and 30 % of the course grade is based on the oral final exam according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka. Practical work is based on transversal and longitudinal ship drawing creation tasks. Continuous assessment: Each written exam must have at least 60% score.
1st written exam – Ship design and construction (learning outcomes 1-6)
2nd written exam – Ship stability (learning outcomes 7-14)
The final oral exam (learning outcomes 1- 14) checks the competencies of theoretical knowledge where it is necessary to achieve all learning outcomes.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

1.10. Main Reading

1. Žuškin, S., teaching materials from the course Ship design and construction on the teacher's personal web site (MERLIN) of the Faculty of Maritime Studies in Rijeka (2023)
2. Komadina, P., Brodovi multimodalne prijevozne tehnologije, Pomorski fakultet u Rijeci, Rijeka, 2001.
3. Komadina, P., Ro-Ro brodovi, Pomorski fakultet u Rijeci, Rijeka, 2001.
4. Komadina, P., Tankeri, Pomorski fakultet u Rijeci, Rijeka, 1994.
5. Buljan, I., Stabilnost broda, Priručnik za pomorce, Školska knjiga Zagreb, Zagreb, 1982.

1.11. Recommended Reading

1. Vademecum Maritimus, Podsjetnik pomorcima, Pomorski fakultet u Rijeci, Rijeka, 2002.
2. Uršić, J., Stabilitet broda I. dio, Sveučilište u Zagrebu, Zagreb, 1968.
3. Uršić, J., Stabilitet broda II. dio, Sveučilište u Zagrebu, Zagreb, 1968.
4. Fatur, J., Teorija broda, Uredništvo časopisa Brodogradnja, Zagreb, 1954.
5. Milošević, M., i Š., Osnove teorije broda 1, Sveučilište u Zagrebu, Zagreb, 1981.
6. Milošević, M., i Š., Osnove teorije broda 2, Sveučilište u Zagrebu, Zagreb, 1981.
7. Barrass, B., Derrett, D. R., Ship stability for Masters and Mates, Elsevier, 2008.
8. Eyres, D. J., Ship Construction, Butterworth-Heinemann, London, 2007

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Teaching materials from the course Ship design and construction	MERLIN – online	70
Brodovi multimodalne prijevozne tehnologije	10	
Ro-Ro brodovi	10	
Tankeri	10	

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with the European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, exam passing results are analyzed, and appropriate measures are adopted.

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3.2. Course description

Generic information		
Head of Course	**Maja Skendžić, mag.cin.**	
Course	**Physical education 2**	
Study Programme	**Marine Engineering**	
Level	**UNDERGRADUATE DEGREE PROGRAMME**	
Type of Course	core	
Year of Study	1st	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	**1**
	Number of Hours (L+E+S)	**0+30+0 (0+2+0)**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Introduce students to the importance of continuing to maintain the health of seafarers through physical exercise, basic, general and specific motor skills:

-climbing rope and ladder ladders, drowning rescue, swimming, sailing rowing.

Adequate kinesiological activities to satisfy the needs of students for movement as an expression of satisfaction of general needs that increase adaptive and creative abilities in contemporary living and study conditions. In addition, the objective of the Physical and Health Culture course is to convey basic health and work-life information to students.

1.2. Prerequisites for Course Registration

Prerequisite for enrollment in the course is the passed Physical and Health Education course 1

1.3. Expected Learning Outcomes

Possibility of changing morphological characteristics, motor and functional abilities; training students to exercise independently; the legality of health culture; quality nutrition.

1. Learning new conventional motor skills
2. Improving basic, theoretical and practical kinesiological knowledge
3. Determining the interest of anthropological features and motor awareness
4. Promoting sports culture

1.4. Course Outline

Characteristics of adolescence and maritime adolescence in maintaining health and exercise. Work in basketball motor development groups. Volleyball rules, application in the game. Volleyball elements: lower and upper service, top rebound, hammer, pitching, third ball. Basketball rules, application in the game. Grabbing, adding, running a basketball. Working in combined groups. How to lift weights and other loads while maintaining spine health. Removing and carrying oars. Getting in and out of the lifeboat with a paddle 3.80 m. Proper load of lifeboat: bow, middle, stern, left and right.

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Basic match alignment. Navy rowing technique in life-boat. Basic starting position: the position of the arms, torso and oars. The active and passive phases are astounding. Rowing of bow, middle and stern rowers. Basic sailor paddles. Short, medium, long and strong, powerful paddles. Rowing start, turn, aim. Long jump from place. Semi-structural complex movements: football. New 3-team basketball game. Jump up from place. Adapted limiter with the largest Pilates ball. Elective polystructural complex motions. Determination of the personal student status of a course or class completed based on the arrivals or non-attendance of classes and activities or inactivity in teaching.

1.5. Modes of Instruction	☐ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments	Teaching classes of Physical and health education takes place in three different media: a gym, at sea and in a swimming pool. The unpredictability of weather conditions at sea will determine the number of hours of sailing. The ability to reconcile college and swimming pool hours will determine the number of swimming hours. Good weather conditions will allow more hours of teaching at sea to be maintained. Seminar paper is written by part-time students.	

1.7. Student Obligations

Active class attendance and activity in at least 70% of classes.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0,5	Class participation	0,5	Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Active class attendance and activity in at least 70% of classes.

1.10. Main Reading

Recommendation: Heimer, S. (2003) Promicanje zdravstveno-preventivne tjelesne aktivnosti u RH. Sport za sve,21 (35),3-4.

1.11. Recommended Reading

1. Redžić A., Redžić M.: Dodatak kineziološkim znanjima studenata pomoraca u ponudama on-line tehnologija za poticanje tjelesnog vježbanja pomoraca za vrijeme plovidbe. HKS 27. Ljetna škola Kineziologa RH. Poreč 2018.
2. Volčanšek B.: Bit plivanja , Kineziološki fakultet Sveučilišta u Zagrebu, Zagreb, 2002.
3. Conner D., Levitt M.: Naučite jedriti, Gandalf, Zagreb, 2001.
4. Graver D.K.: Scuba diving, Human Kinetics Publisher, Algoritam, Zagreb, 1993.
5. Anderson B.: Stretching, Vježbe istezanja za svakodnevni fitness: trčanje, plivanje, tenis, biciklizam, skijanje, košarka, nogomet i ostale sportove, Gopal, d.o.o., Zagreb, 1997.
6. Anderson B., Burke E., Pearl B.: Fitnes za sve, Gopal, d.o.o., Zagreb, 19997.
7. Janković V. , N. Marelić.: Odbojka, Fakultet za fizičku kulturu Sveučilišta u Zagrebu, Zagreb 1995.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.12. Number of Main Reading (Examples)

Title	*Number of examples*	*Number of students*

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted. Each class is closely monitored for each (none) arrival and activity of the student on a separate sheet Physical and Health Culture, where the results of longitudinal monitoring are in general and specific psychomotor abilities, knowledge and achievements and functional abilities. The course of Physical and Health Education is evaluated for a particular semester by enrolling in the ISVU system as "PASSED".

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3.2. Course description

Generic information		
Head of Course	Aleksandar Cuculić, Ph.D. Panić Ivan, Ph.D.	
Course	Marine Electric Equipment and Systems	
Study Programme	Marine Engineering	
Level	Undergraduate	
Type of Course	Elective	
Year of Study	III	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of this course is to provide the student with relevant knowledge of marine power systems with a focus on high voltage technologies and electrical propulsion systems, as prescribed by STCW and IMO Model Courses for the service of marine engineers.

1.2. Prerequisites for Course Registration

Completed courses: Marine Electrical Engineering and Marine electrical equipment.

1.3. Expected Learning Outcomes

The student is expected to be able to:

1. Describe, analyze and evaluate the configurations of the ship's power system and know the related technical regulations.
2. Explain the technical and economic aspects of high voltage applications and apply safety measures to work on high voltage systems.
3. Define and explain panels and circuitry.
4. Describe and explain measuring protective instrumentation, automatic guidance and control system and electrical protections.
5. Understand the principle of operation and basic components of the ship's propulsion system and evaluate the parameters of the power quality onboard vessels with electrical propulsion.
6. Apply condition diagnostics and techniques for operating electric devices and systems.

1.4. Course Outline

Technical and economic aspects of high voltage applications. Voltage and frequency systems. Technical regulations. Boards and switchgear. High voltage electrical machines. System configurations. Electrical masuring instrumentation. Guidance and management system. Propulsion electric motors. Propulsion frequency converters. Power quality. Electrical protection. Occupational safety measures. Equipment condition diagnostics. Operating of devices and systems.

1.5. Modes of Instruction

☒ Lectures	☐ Practical work
☐ Seminars and workshops	☐ Multimedia and Network
☒ Exercises	☐ Laboratory
☐ E-learning	☐ Mentorship

	☐ Field work	☐ Other _____
1.6. Comments		

1.7. Student Obligations

Regular follow-up of classes (lectures and exercises), solving of written exams, and passing the oral final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	2	Class participation		Seminar paper		Experiment	
Written exam	1	Oral exam	1	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka as follows:
• 70% of the acquired learning outcomes through the 1st written exam - through learning outcomes 1-3 (23%), 2nd written exam - through learning outcomes 4-6 (24%), 3rd written exam - through learning outcomes 7-9 (23%); the student must have completed at least 50% of points in each midterm.
• 30% of the acquired learning outcomes (1-9) are evaluated in the final part of the exam, with a minimum of 50% credit for passing the final exam.
Examples of evaluating learning outcomes in relation to set learning outcomes are:
1. Explain the diesel generator power capability curves.
2. Describe the procedure for synchronizing the generator to the network.
3. Explain the role of the speed controller in the distribution of active power between generators connected in parallel.
4. List all the steps necessary to safely isolate the high voltage ship's device.
5. Describe the working principle of cycloconverter.

1.10. Main Reading

Teaching materials on the Merlin e-learning system (https://moodle.srce.hr)

1.11. Recommended Reading

Hall, Dennis T. Practical marine electrical knowledge. Witherby Seamanship International,2014.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Teaching materials on the Merlin e-learning system	Available on Web	30
Hall, Dennis T. Practical marine electrical knowledge. Witherby Seamanship International, 2014.	3	30

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	**Fran Torbarina, Ph.D.**		
Course	**Thermodynamics and heat transfer**		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	STCW - obligatory		
Year of Study	2		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		7
	Number of Hours (L+E+S)		60 + 30 + 0 (4 + 2 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to introduce the students in the field of thermodynamics and heat transfer, to be able to use the Laws of Thermodynamics to estimate the potential for thermo-mechanical energy conversion in marine engineering and propulsion systems, to explain and calculate thermal processes and heat transfer.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

It is expected that the students will be able to:

1. Define properties of state, concept of equilibrium and laws of thermodynamic
2. Explain and analyse the energy conservation law, transfer of energy, thermodynamic work and First law of thermodynamic
3. Define and explain the Properties of the substance, Ideal gases, Specific heat and mixing of gases and vapours.
4. Define and analyse the Second and Third law of thermodynamic
5. Explain and analyse thermodynamic cycles, reversible and irreversible processes, Entropy, Enthalpy and loss of work in irreversible processes.
6. Define and explain vaporization and liquefaction, steam and cooling processes and cycles, Carnotization of steam cycles, Exergy and Anergy.
7. Define, explain and analyse heat transfer, dimensionless numbers, thermal insulation and Greenhouse effect.
8. Calculate and demonstrate overall heat transfer and capacity of heat exchanger.

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1.4. Course Outline

- Introduction, properties of state, the concept of equilibrium, Zeroth law of thermodynamics, aggregate states, Molecular-kinetic theory of thermodynamics, gas pressure and volume.
- The first law of thermodynamics, heat transfer, conservation of energy, Joule's experiments, internal energy, the First Law, the Ideal gas law, thermodynamics work, Avogadro's principle, specific heat capacity, ideal gas mixtures, ideal gas state changes.
- The Second law of thermodynamics, thermodynamics cycles, Carnot and Joule's cycles, reversible and irreversible process, Second law equation, Entropy, maximum work, technical work, Enthalpy, loss of work in irreversible process.
- Vaporization and Liquefaction, Phase diagram, Critical point, Triple point, Sublimation, vaporization heat exchange, Clapeyron-Clausius equation, state changes of vapor, steam cycles processes, Carnotization of steam process, the Mollier diagram of Entalpy (h-s chart), Exergy and Anergy, Cooling process
- Heat transfer, thermal Conduction, thermal Convection, Overall heat transfer, Dimensionless Nusselt, Reynolds, Prandtl and Grashof Numbers, thermal Radiation, Greenhouse effect.

1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other
1.6. Comments		

1.7. Student Obligations

Students are required to:
attendance at min. 70 % of lectures,
passing all written exams (min. 50%) – Continuous Assessment
final exam – Oral exam

1.8. Assessment[1] of Learning Outcomes

Course attendance	3	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1,5	Essay		Research	
Project		Continuous Assessment	2,5	Presentation		Practical work	
Portfolio							

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % during classes and 30 % on final exam (learning outcomes 1 – 8) in accordance with University's and Faculty's normative acts.
Continuous assessment:
1. Written exam – theory – learning outcomes 1 – 5
2. Written exam – exercises – outcomes 1 – 5
3. Written exam – exercises – outcomes 6 - 8.

Final exam:
On final oral exam complete field of Thermodynamics and heat transfer is assessed with particular reference to learning outcomes 6 – 8.
Examples of assessment for outcome:
1. Define and analyze at least 6 properties of state with their units. (outcome 1)
2. In well insulated tank is mixing 50 l of water with 500 W mixer. Calculate temperature increase after 2 hours. In how much time will temperature increase for 2 Celsius degrees ? (outcome 2)
3. Explain the appearance of vapor in humid air at 15 degrees Celsius! (outcome 3)
4. The Joule process with hot air takes place between pressures 10 bar and 1 bar, while the highest and lowest temperatures in the process are 673 K and 288 K. Determine the thermal efficiency of the process and draw the process in *p-v* diagram! (outcome 4)
5. Explain the concept of entropy and determine the entropy increase of the air in a room of 295 k. (outcome 5)
6. Explain Rankine's process by which supercharged water vapor enters the turbine. Explain how heat balances are determined and how values that are included in heat balances are obtained! Outcome 6)
7. Explain heat transfer through two vertical walls of different material and thickness. On one side of the walls there is hot gas and on the other side is cold liquid. Draw a flow chart and determine the thermal resistance! (outcome 7)

1.10. Main Reading

F. Bošnjaković; Nauka o toplini I i II; Tehnička knjiga Zagreb
B. Halasz; Nauka o toplini I i II, FSB Zagreb

1.11. Recommended Reading

M. D. Burghardt; *Engineering Thermodynamics with Applications*; U.S. Merchant Marine Academy, Kings Point, NY

N. Petric, I. Vojnović, V. Martinac, *Tehnička termodinamika*, HINUS, Zagreb, 1999.

A. Kostelić; Nauka o toplini; Školska knjiga Zagreb

R. Budin; A. Mihelić-Bogdanić; Osnove tehničke termodinamike; Školska knjiga Zagreb

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
F. Bošnjaković; Nauka o toplini I i II; Tehnička knjiga Zagreb	10	70
B. Halasz; Nauka o toplini I i II, FSB Zagreb	10	70

1.13. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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Generic information			
Head of Course	Robert Baždarić, Ph.D.		
Course	Automation of Ship's Propulsion		
Study Programme	Marine engineering		
Level	Undergraduate degree programme		
Type of Course	Compulsory course		
Year of Study	2 years		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		45+15+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The main objectives of the course are to gain knowledge in the fields of automation, the principles of automatic control and automatic regulation, as well as understanding the manner in which the measuring, actuating and regulating members and their elements operate, and their application to ship machinery and processes.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

After passing the exam, students will be able to do the following:

1. Distinguish between the principles of automatic control and automatic regulation
2. Explain the basic requirements of automation
3. Calculate the transfer function for the regulation control circuit
4. Distinguish between types of automation elements and their basic characteristics
5. Apply standard techniques for adjusting the regulators
6. Calibrate the measuring sensors (temperature, pressure, level)
7. Explain the basic principles of operation of different regulator designs
8. Define and describe the SARs of the ship's process, management and protection of the ship's propulsion systems

1.4. Course Outline

Areas of automation, principles of describing automation objects. Signaling. Energies/media in automation and energy selection factors. Defining the transient and transfer function and principles of calculating the transfer function for various complex structures. Features of automatic regulation, automatic control and automatic process control. Principles and techniques of automatic regulation. The structure of the automatic control system. Basic components of regulation and control systems (measuring members, comparators, control devices, actuators, ...). Calibration of measuring sensors. Regulator performances. Divisions of regulation. Signal transmitters, principles and schemes of pneumatic and hydraulic control. Marine process regulation systems, automatic remote control, control and protection for ship propulsion systems.

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1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☒ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

1st colloquium, 2nd colloquium, design and presentation of a research assignment in an hour of exercises, final exam

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation	0,5	Seminar paper	0,5	Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	0,5
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out in accordance with the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka as follows:

- through continuous assessment of knowledge during class 70% of the acquired learning outcomes are assessed. Those include: 1st semester exam (midterm) - learning outcomes 1-4 (25%), 2nd semester exam (midterm) - learning outcomes 5-8 (25%), presentation of the research assignment (seminars) - learning outcomes 1-8 (20%); the student must score at least 50% of points in each midterm, while the presentation of the research assignment is evaluated on the basis of elaborated evaluation criteria;
- 30% of the obtained learning outcomes (1-8) are evaluated at the final exam, with the student having to complete at least 50% of points for passing the final exam.

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Draw a block diagram of the regulation circuit, mark the regulation members, elements and sizes in the regulation circuit
2. When and how to apply PD controller
3. Calculate the transfer function for the given regulation circuit
4. Principle of operation and properties of electromagnetic setup drives
5. Describe the setting of the regulation action for the PID controller (Zeigler-Nichols method)
6. Calibration of pressure sensors
7. How to adjust the actions pneumatic regulator with a screen-nozzle amplifier
8. Explain the basic structure, mode of operation of the servo system and what is the difference with respect to program regulation
9. How and by which measuring sensors can we gain the information about the angle of inclination of the rudder or azimuth propeller

1.10. Main Reading

1. V. Tomas, I. Šegulja, M. Valčić, Osnove automatizacije, Pomorski fakultet, Sveučilište u Rijeci, 2010.
2. E-course syllabus available on the e-learning system - Merlin

1.11. Recommended Reading

1. T. Šurina, Automatska regulacija, Školska knjiga, Zagreb, 1987.
2. HRB- Pravila za tehnički nadzor pomorskih brodova, dio 13.-Automatizacija, Hrvatski registar brodova, Split 1994.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Tomas, I. Šegulja, M. Valčić, Osnove automatizacije, Pomorski fakultet, Sveučilište u Rijeci, 2010.	60	60
E-course syllabus available on the e-learning system - Merlin	-	60

1.13. Quality Assurance

Quality assurance is based on Faculty ISO 9001 system. Yearly analyze is produced based on quantitative student examination data, and qualitative based on student survey derived at the end of each semester.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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Course description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language III		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Core		
Year of Study	2	Semester	3
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		3
	Number of Hours (L+E+S)		15+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to develop the students' ability for written and oral communication in English language using the basic terminology related to the basic parts of the engine and their functions.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

The students are expected to be able to:

1. Recognize and describe the basic parts of the main engine.
2. Describe the function of the engine parts.
3. Anticipate possible malfunctions and difficulties in the operation of the main engine parts.
4. Interpret the instructions provided in the instruction manuals.
5. Connect simple lexical and syntactic units into complex units.

1.4. Course Outline

Cylinder crankcase.
Crankshaft, main bearings and shaft.
Service instruction.
Connecting rod.
Cylinder liners.
Pistons.
Cylinder head and valves.
Inlet and exhaust valves.
Relative/Adjectival clauses. Result clauses.
Means or agent. Time clauses.
Nominal compounds.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Class attendance, activities, continuous assessment and final exam (written and oral)

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	
Portfolio		Final exam	0,5				

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % in class, 30 % at the final exam (outcomes 1-5).
1st mid-term exam (30 %) for outcomes 1, 2
2nd mid-term exam (30 %) for outcomes 3 - 5
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final oral exam (30 %) (outcomes 1-5)

Examples of assessment for each outcome in mid-term exams:
1. Describe engine parts on the picture.
2. Provide a presentation of engine parts and their functions
3. Anticipate possible malfunctions and difficulties in the operation of main engine parts.
4. Rephrase the instructions from the instruction manuals.
5. Connect simple lexical and syntactic units into complex units

Examples of assessment for each outcome in the final exam:
1. Mark parts of the engine on the picture.
2. Describe and present engine parts and their functions.
3. Anticipate possible malfunctions and difficulties in the operation of main engine parts.

Outcomes 4 and 5 are assessed indirectly through the outcomes 1-3.

1.1. Main Reading

Spinčić, A.-Pritchard, B.: An English Textbook for Marine Engineers II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.

1.2. Recommended Reading

- marinediesels.co.uk (The Learning Resources for Marine Engineers, Warsash Maritime Academy, UK)
moodle.srce.hr

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić, A.-Pritchard, B.: *An English Textbook for Marine Engineers* II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.	30	70

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	**Radoslav Radonja, Ph. D.**		
Course	**Machinery Control and Crew Management**		
Study Programme	**Marine Engineering**		
Level	**Undergraduate**		
Type of Course	**STCW - obligatory**		
Year of Study	**2**		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		**4**
	Number of Hours (L+E+S)		**3 + 0 + 0**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The aim of the course is to acquire knowledge about the principles and laws of machinery control, crew management and Watchkeeping on board, and especially the part related to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) and the International Safety Management Code (ISM Code) pursuant to A-III-1/2 of the STCW Convention.

1.2. Prerequisites for Course Registration

-

1.3. Expected Learning Outcomes

After passing the exam, it is expected that the students will be able to do following:

1. Properly interpret the basic concepts of Engine room management (management, supervision, control, decision-making, decision-making in risk situations, correct prioritization) and shipboard crew management (assignment of crew and duties, assignment of tasks, effective communication, assertiveness, awareness of the situation and respect team experience)
2. Explain the concept of Watchkeeping, organization of Engine Watchkeeping, taking over, holding and handing over of the Engine Watch on board
3. State and explain the actions of the Watchkeeping Engineer in special circumstances and emergencies
4. Properly interpret the requirements of the ISM and ISPS codes and the impact of the human factor on their application
5. State and explain the legislative requirements and documentation on board related to Engine room management and crew management (Engine logbook, technical documentation, checklists, working permits, etc.)
6. Explain the method of calculating risk factors and analyse various events with regard to harm or danger
7. State and explain the basic principles of good management, shipboard organization and crew health care
8. Analyze the work performance of the crew member, the role in the team and their contribution to the overall work in the engine room and on board (maintenance of the plant, participation in exercises, participation in joint operations, etc.)
9. Explain how to prepare and conduct ship meetings and write reports
10. State and explain teaching and training methods and requirements with regard to emergency drills, testing and maintenance of emergency equipment and facilities.

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1.4. Course Outline

Definition of management, decision making and control in management, management in a risk situation, places of Engine control. Watchkeeping: the formation of the Watch, travel planning, taking over, performing and handing over the Watch, keeping the Watch in extraordinary circumstances. ISM code (safe management system on board - SMS), crew health and safety, proper safety and risk assessment, ISPS code, safety cases and elements, human factors, work permit system, safe management elements and hazard identification. Principles of crew management, crew attitudes, group behavior, employment conditions. Crew organization: scheduling, work analysis, distribution of duties, organization in case of safety and emergency, crew duties and communication, management of ship administration, meeting technique. Exercise methods and emergency exercises on board. MLC and ILO conventions.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☐ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Active class attendance, 1st colloquium, 2nd colloquium and final oral exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation	0,5	Seminar paper		Experiment	
Written exam		Oral exam	0,5	Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio							

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes takes place in accordance with University's and Faculty's normative acts as follows:

- through continuous testing of knowledge during classes, 70% of the acquired learning outcomes are evaluated through the 1st colloquium - learning outcomes 1-3 (30%), 2nd colloquium - learning outcomes 4-10 (40%), while the student must realize a minimum of each colloquium 50% points
- at the final part of the exam, 30% of the acquired learning outcomes are evaluated (1-10), and the student must realize a minimum of 50% of points in order to pass the final exam.

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Explain the concept of engine control (regulation)? Explain the difference between the term 'data' and the term 'information' in control terms? What are the types of management control? State and explain the human reaction to control? List and explain at least two difficulties that may arise on board when making decisions in a risk situation? ...
2. What does the term Engineering Watch mean and what factors influence its structure? Who is responsible for setting up a Watch on the ship and in the engine room? In which cases may a Watch engineer/Officer not hand over the Watch to the Engineer/Officer replacing him? ...
3. List and explain the features of performing Engineering Watch in special circumstances and emergencies? In which cases must the Engineer on duty immediately inform the Chief Engineer? List and explain the features of the collaboration between the Engine officer on duty and the staff working on preventive maintenance in the Engine room? ...
4. State and explain the objectives of the ISM Code / (ISPS Code…)? State and explain the influence of the human factor in the implementation of code requirements?
5. Who is in charge of entering data in the Engine Logbook and what data is entered? For which works in the Engine room must a 'Hot Work Permit' be obtained? Who conducts the verification process and signs the 'Entry into Enclosed Space Permit'? What should a person who is in charge of being at the entrance of an enclosed space have to do at least if he notices that the person in the enclosed space has lost consciousness? ...
6. Explain how the risk assessment for certain events is approached and how the risk factor is calculated?
7. List and explain at least three principles of good leadership? What factors can influence crew attitudes and their performance? Explain the concept of 'Safety working practice' and requirements regarding the use of protective work equipment and resources?
8. List and explain at least two elements that include the analysis of the work of the crew on board? Explain why a response such as "I did not receive a report …" or "I did not say because no one asked me …" is considered completely unacceptable in terms of good communication?
9. Explain the basic elements that must be included in the preparation of the meeting? In what ways can a meeting be held? Who should be involved? How is the agenda prepared? How appropriate is the duration of the meeting? How can disagreements be resolved during the meeting? Who keeps the minutes and writes the report of the meeting? How is the conclusion made and what about those points about which it could not be made? What to do in cases where some participants do not agree with the conclusions of the meeting? ...
10. Explain what is the purpose of conducting exercises/drills/trainings on board? What is the name and where should be placed the list of emergency crew responsibilities, what is a 'Personal emergency responsibility card' and where it should be located? How often do exercises have to be conducted on board? Give some examples of exercises on board and explain how they are carried out? What emergency devices do Engine officers check every Saturday? Which devices in the lifeboat are regularly checked by Engine officers? Explain the term 'quick-closing valves' what are they for and where is the place of activation? If a CO2 engine fire extinguishing system is used on board, where it should be located, how can it be activated and what should be done before activating it? …

1.10. Main Reading

1. Teacher lectures - available in electronic form
2. STCW Convention, (2010),
3. SOLAS (ISM Code / ISPS Code)

1.11. Recommended Reading

1. Code of Safe Working Practices for Merchant Seamen, The Stationery Office Publications Center, London, 1998 - available in electronic form

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
1-3 (electronic form)	unlimited	90

1.13. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Davor Lenac, BSTT, lecturer		
Course	Fuels, Lubricants and Water (116506)		
Study Programme	Marine Engineering		
Level	BSc		
Type of Course	Compulsory		
Year of Study	II		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		30 + 0 + 0 (2 + 0 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Understanding fuel, lubricants and water features and their application on board.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

After passing the exam students will be able to:
1. Define the liquid and gas fuels use on board
2. Explain the basic crude oil refining processes.
3. Explain the classification of liquid and gaseous fuels, their composition, structure and properties.
4. Explain and analyses engine faults due to inadequate lubricants and fuels
5. Explain and define the combustion process.
6. Analyse and explain the fuel system on board.
7. Explain the importance of lubrication and methods of lubricants production
8. Explain properties of lubricants.
9. Analyse lubricants on board
10. Explain the use of water on board, the physical and chemical properties of water and problems with water

1.4. Course Outline

Crude oil, the basics of crude oil processing. Liquid fuels and gaseous fuels. Properties and application of Marine diesel, heavy and residual fuels; Marine fuels properties for gas turbines. Fuel oil combustion process. Marine fuel quality and heavy fuel combustion problems. Liquid fuel and lubricating oil treatment and cleaning. Marine fuel quality standards and comparison with other fuels. Using poor quality fuels in diesel engines. Fuel and lubricants additive. Lubricant properties. Lubricant classifications and specifications. Type of lubricant for marine use. System oils and their specificities. Lubrication of marine engine cylinders. Lubrication of thermal turbines, compressors, and other machines; conditions and requirements. Handling lubricants (oils and greases), disposal of waste lubricants. Oil quality control, in-service oil treatment, lubricant oil replacement recommendations. Use of water on board, physical and chemical properties of water. Water treatment and problems related to inadequate water.

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1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☐ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

In addition to the compulsory lectures, the student is obliged to pass the exams and pass the final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Procedure for evaluating acquired learning outcomes:
- The final grade in the subject is the sum of the points that the student has achieved during the course (70% of the grade) and the points earned on the final exam (30% of the grade) according to the Regulations on Studies of the University of Rijeka and the Regulations on Studying at the Faculty of Maritime Studies in Rijeka.
- Continuous assessment:
  two colloquiums - a minimum of 50% of the estimated number of points is required
- Final exam:
  At the final exam (oral exam) the knowledge in the field of Fuels, Lubricants and Water is checked - a minimum of 50% of points is required.

Examples of evaluation by individual outcome at the colloquiums and final exam:
1. Boiler water quality assessment and feed water treatment
2. Comparison properties of Liquefied Natural gas, liquid fuel oil, LPG, methanol
3. Lubricating oil analysis, properties and consequences of poor lubricants quality

1.10. Main Reading

E. Tireli; *Goriva i njihova primjena na brodu*, knjiga, Pomorski fakultet u Rijeci
E. Tireli; *Maziva i njihova primjena na brodu*, knjiga, Pomorski fakultet u Rijeci
E. Tireli; *Voda i njezina primjena na brodu*, skripta, Pomorski fakultet u Rijeci
Lectures and presentations

1.11. Recommended Reading

Voda i brod, Vojtjeh Bačić, VPŠ, 1975

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
E. Tireli; *Goriva i njihova primjena na brodu*, knjiga, Pomorski fakultet u Rijeci	15	60
E. Tireli; *Maziva i njihova primjena na brodu*, knjiga, Pomorski fakultet u Rijeci	15	60

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

E. Tireli; *Voda i njezina primjena na brodu*, skripta, Pomorski fakultet u Rijeci	15	60

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	Dean Bernečić, Ph.D.		
Course	Marine Steam Generators (MSG)		
Study Programme	Marine engineering		
Level	Undergraduate		
Type of Course	Obligatory		
Year of Study	2		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Introducing students to the basic thermodynamic laws of operation of a steam generator, their construction and exploitation onboard the ship. Understanding fault diagnostics and cost-effective exploitation. Understanding the monitoring of the main parameters on a steam system

1.2. Prerequisites for Course Registration

Completed course “Thermodynamics and heat transfer”

1.3. Expected Learning Outcomes

It is expected that students will be able to:
1. Describe the purpose, types and main characteristics of marine steam boilers.
2. Explain the thermodynamic process in the steam generator, heat transfer and changes in the state of the individual parts of the steam generator.
3. Define and explain combustion, combustion products, control of combustion process.
4. Define and explain the steam generator heat balance, heat losses, utilization, fuel consumption.
5. Describe and explain air and exhaust gas circulation, water circulation, steam separation, fuel and feed water supply system.
6. Define materials for making pressure parts.
7. Describe and explain the system of regulation and steam generator safety system and parts.
8. Distinguish and compare the main types of marine steam generators.
9. Start boiler on the simulator and explain steam distribution the basics of maintenance, inspections and conservation .

1.4. Course Outline

Marine Steam Generators development, boilers purpose, boilers types, main features. Heat balance, heat losses, utilization. Air and exhaust gas circulation: natural and forced. feed water circulation: natural and forced. Steam separation. Fuel system. Feed water supply system. Materials for making pressure parts, basic properties, classification regulations. Thermal dilatations and their compensation. Regulation. Equipment and fittings, protection devices. Special designs of marine steam generators. Exhaust gas boilers (utilizers). Boiler automation systems. Operation and maintenance, water analysis and treatment inspections, conservation.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

In addition to the required lectures and exercises, before the final exam, the student takes 2 partial exams and a test on the engine room simulator.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	1.5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class and partial exams, 30% in final exam; according to the University of Rijeka Study Regulations and the Study Regulations at the Faculty of Maritime Studies in Rijeka (Outcomes 1 - 9).
Partial exam 1 (I1 - I6)
Partial exam 2 (I2, I3, I5, I7, I9)
Simulator operation (I3, I4, I7, I9)
Simulation check example: Properly prepare and start steam boiler, be able to read operating parameters (I5, I7, I8, I9).
Simulator valuation: Percentages allocated by checklist with respect to correct or incorrect procedures during operation.
Partial and final exam question example: Explain three-component feed water regulation, identify sensors and explain their role (I7).

1.10. Main Reading

Z. Prelec: Brodski generatori pare, Školska knjiga, Zagreb,1990.
Readings on web page: https://www.pfri.uniri.hr/web/hr/zavod_BS.php?pregled&id_username=10

1.11. Recommended Reading

J.H. Milton, Marine Steam Boilers, Newnes - Butterworths, 1980.
G.T.H. Flanagan, Marine Boilers, Kandy Marine Engineering Series, 1974.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Z. Prelec: Brodski generatori pare, Školska knjiga, Zagreb,1990.	Library – 7 Book store - 0	70

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Dean Bernečić, Ph.D., BME Davor Lenac, BSTT, lecturer		
Course	Marine Heat Turbines (116508)		
Study Programme	Marine Engineering		
Level	BSC		
Type of Course	Compulsory		
Year of Study	II		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		30 + 15 + 0 (2 + 1 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The course aim is to familiar students with the operation principles of steam and gas turbines, their application and operation in the ship's propulsion, importance of proper monitoring parameters in turbine operation.

1.2. Prerequisites for Course Registration

Completed course - Thermodynamics and heat transfer

1.3. Expected Learning Outcomes

After passing the exam istudents will be able to:
1. Explain the purpose, classification and main characteristics of marine heat turbines.
2. Explain the thermal processes of steam turbines
3. Define and analyze types of steam turbines, steam flow in the turbine, operation turbine optimizing.
4. Explain the performances of marine steam turbines.
5. Identify and explain the components of the steam turbine, the heating and degassing system of the water, the lubricating oil system.
6. Analyze and explain the system of regulation and protection of the steam and gas turbine.
7. Explain and analyze thermal processes in gas turbines.
8. Identify and explain the main parts of gas turbine and combined gas and steam turbine plants.
9. Plan and analyze heat turbine preparation, maintenance, inspection and operation of plant in operation.
10. Analyze failures in thermal turbines

1.4. Course Outline

Comparison of propulsion machines: diesel engines, steam turbines, gas turbines. Types of steam turbines, steam flow in the turbine, optimizing turbine operation. Energy losses inside the steam turbine. Marine steam and gas turbine design. Steam turbine plant and control system. Gas turbines; open gas turbine process, two-stage expansion, two-stage compression and expansion. Main parts of gas turbine plant. Combined gas and steam turbine plants. Plant in operation. Turbine and condenser failures.

1.5. Modes of Instruction		
	☒ Lectures	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☐ Laboratory

	☐ E-learning ☐ Field work	☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

In addition to the obligatory lectures and exercises, the student is obliged to pass the examinations and pass the final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Procedure for evaluating acquired learning outcomes:
- The final grade in the subject is the sum of the points that the student has achieved during the course (70% of the grade) and the points earned on the final exam (30% of the grade) according to the Regulations on Studies of the University of Rijeka and the Regulations on Studying at the Faculty of Maritime Studies in Rijeka.
- Continuous assessment:
  two colloquiums - a minimum of 50% of the estimated number of points is required
- Final exam:
  The final exam (oral exam) checks the completeness of knowledge in the field of Marine heat turbines - a minimum of 50% of points is required.

Examples of evaluation by individual outcome at the colloquiums and final exam:
1. In the schematic diagram of the ship's heat turbine, identify the function of each element
2. On the basis of the operating parameters diagnose the fault and perform proper system regulation
3. Critically evaluate the local and remote indication of measured parameters

1.10. Main Reading

E. Tireli, D.Martinović: Brodske toplinske turbine, Pomorski fakultet u Rijeci, 2000.
Presentations from lectures and exercises

1.11. Recommended Reading

S.C. McBirnie, W.J. Fox; Marine Steam Engines and Turbines, Newnes-Butterworths
Woodward; Marine Gas Turbines

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
E. Tireli, D.Martinović: Brodske toplinske turbine, Pomorski fakultet u Rijeci, 2000.	25	60

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	Dean Bernečić, Ph.D.		
Course	Marine ICE (internal combustion engine)		
Study Programme	Marine Engineering		
Level	*Undergraduate degree programme*		
Type of Course	Mandatory		
Year of Study	II		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		7
	Number of Hours (L+E+S)		4+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Introducing students to the basic principles of the engine operation, their use , diagnostics of engine failures and their method of elimination, and economics of operation by proper monitoring of combustion and maintenance of diesel engine plants on board

1.2. Prerequisites for Course Registration

Matematika I, Tehnička mehanika I i II, Termodinamika i prijenos topline .

1.3. Expected Learning Outcomes

Students will be able to:
1. explain the basic principles underlying the work of the ICE
2. Explain the principles of ICE operation
3. Show and explain the main parts of ICE
4. Describe media exchange inside ICE
5. Describe supercharging methods
6. Describe ICE mixture forming
7. define and explain load diagram of ICE
8. Describe and explain major maintenance operations at ICE
9. Describe and compare different types of ICE propulsion plants
10. define and describe alarm levels and describe their effect on the operation of ICE

1.4. Course Outline

Basic terms. Staple mechanism. Thermal processes. Engine power. Mean effective pressure. Usefulness. Movable and stationary engine parts. Kinematics and dynamics of the stack mechanism. Engine charging. Turbochargers. Modifying the work media. External and internal mixture formation. External characteristic curve (load curve) of ICE and screw. Fuels and lubricants. Engine maintenance. Measurements and adjustments.

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1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning ☐ Field work	X Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		
1.7. Student Obligations		
Compulsory attendance (at least 70%).		
1.8. Assessment[1] of Learning Outcomes		

Course attendance	2.5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	4	Presentation		Practical work	
Portfolio		Final exam	0.5				

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in final exam; according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka

1.10. Main Reading

Mikuličić : Motori I, Školska knjiga, Zagreb, 1976; Krpan: Prednabijanje motora,Laki motori I i II, Sveučilišna naklada Liber, Zagreb, 1976; Parat: Brodski motori s unutarnjim izgaranjem, Sveučilište u Zagrebu, 1990.

1.11. Recommended Reading

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Parat: Brodski motori s unutarnjim izgaranjem, Sveučilište u Zagrebu, 1990..	5	

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information		
Head of Course	Vladimir Pelić, Ph.D.	
Course	MARINE AUXILIARIES	
Study Programme	Marine Engineering	
Level	Undergraduate	
Type of Course	STCW - obligatory	
Year of Study	2	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	**6**
	Number of Hours (L+E+S)	**60 + 15 + 0**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to introduce the students in the field of marine auxiliary machinery, the characteristics of their important elements and the exploitation of the systems in a safe and efficient mode, what is necessary for responsible marine engineer officer.

1.2. Prerequisites for Course Registration

-

1.3. Expected Learning Outcomes

Students will be able to:

1. Explain the design, construction and mode of operation of propulsion shaft elements.
2. Define and analyse the main characteristics of marine pumps. Explain the design, construction, operation and regulation of diferent marine pumps design.
3. Analyse the main characterics of marine compresors and blowers. Explain the design,construction, operation and regulation of diferent marine compresors and blowers.
4. Define and analyse the main characteristics and mode of selection of marine separators and filters. Explain design and operation of various types of marine filters and separators.
5. Analyse the type of steering system elements and characteristics of marine deck machinery.
6. Define the main properties and method of calculation and selection of marine heat exchangers.

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1.4. Course Outline

Introduction, stern tube system, intermediate shaft, propeller shaft, thrust bearing, shaft aligned.
Stern tube, bearings, transmissions and clutches, propellers.
Marine pumps, introduction, types of pumps.
Pump drive and regulation, application of pumps on board ship, special requirements.
Energy transmission, pumps head, pumps power and efficiency, suction head, cavitation.
Piston pumps, air pumps
Centrifugal pumps
Rotational volumetric pumps – screw and gear pumps
Compressors and ventilators, introduction
Compressor processes, multistage compressors, compressor parts
Working principles, condensate and oil drain, malfunctions
Separators and filters, separation principles, types of centrifugal separators, working principles.
Lub oil and fuel oil separation, fuel heating
Separator automatization
Filters and bilge water separators
Special equipment, cargo air drier equipment, sewage treatment equipment
Heat exchangers, coolers, heaters and vaporizers.

1.5. Modes of Instruction		
	X Lectures	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	X Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	X Field work	☐ Other

1.6. Comments	

1.7. Student Obligations

Students are required to:
attendance at min. 70 % of lectures,
passing all written exams (min. 50%) – Continuous Assessment
final exam – Oral exam

1.8. Assessment[1] of Learning Outcomes

Course attendance	2,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2,5	Presentation		Practical work	
Portfolio							

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% during classes and 30% on final exam (learning outcomes 1 – 6) in accordance with the University's and Faculty's normative acts.

Continuous assessment: three theoretical partial written exams:
- first on propulsion shaft elements and marine pumps (outcomes 1. and 2.)
- second on marine compressors and blowers (outcome 3.)
- third on marine separators and filters and marine deck machinery (outcomes 4. and 5.)

On oral final exam complete field of marine auxiliaries is assessed. (outcomes 1-6)

Examples of assessment for outcome:

1. Shematically show, mark and explain all parts of modern propulsion shaft on propulsion system with two-stroke low speed reversible diesel engine. (outcome 1)
2. Show and explain parallel and serial connection of two centrifugal pumps of the same characteristics. (outcome 2)
3. Display the starting air supply scheme for main engine, explain the regulation system and comment Ship Register requirements. (outcome 3)
4. In the shown figure, define the main parts of the main engine heavy oil separator and present starting process. (outcome 4)
5. Draw and explain the scheme of the steering gear on the tanker. How the requirement for the Main and Auxiliary steering gear is handled in practise. Hhiglight the requirements of the Registers. (outcome 5)
6. Analyze the ship's heat exchangers and explain how they are calculated and selected. (outcome 6)

1.10. Main Reading

V. Ozretić, *Brodski pomoćni strojevi i uređaji.*
Smith, D.W.: *Marine auxiliary Machinery*, Butterworths, London, 1983.
Martinović- *zapisi sa predavanja, materijali na internetskoj stranici fakulteta i Merlinu*

1.11. Recommended Reading

M. Mikuličić, *Brodski pomoćni uređaji i strojevi*; D. Bošković, *Brodske pomoćne mašine*

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
V. Ozretić, *Brodski pomoćni strojevi i uređaji.*	10	70
Smith, D.W.: *Marine auxiliary Machinery*, Butterworths, London,1983.	5	70

1.13. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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NCourse description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language IV		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Core		
Year of Study	2	Semester	4
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		2
	Number of Hours (L+E+S)		0+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to develop the students' ability for written and oral communication in English language using the basic terminology related to the ship systems and machinery.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

The students are expected to be able to:

1. Recognize and describe the parts of the fuel system, lub oil system, starting air system, cooling system.
2. List possible failures and damages on the systems and suggest possible solutions.
3. Translate specialized texts from instruction manuals and ship engineering books from English into Croatian.
4. Connect simple lexical and syntactic units and sentences into complex.

1.4. Course Outline

Valve operating gear.
Fuel system.
Fuel injection system.
Air and exhaust systems.
Turbochargers.
Lubricating oil system.
Water cooling system.
Starting air system.
Purpose clauses.
Cause-result relationship.

1.5. Modes of Instruction

- ☐ Lectures
- ☐ Seminars and workshops
- ☒ Exercises
- ☐ E-learning
- ☐ Field work
- ☐ Practical work
- ☐ Multimedia and Network
- ☐ Laboratory
- ☐ Mentorship
- ☐ Other _____

1.6. Comments

1.7. Student Obligations

Class attendance, activities, continuous assessment and final exam (written and oral)

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	0,5	Presentation		Practical work	
Portfolio		Final exam	0,5				

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70 % in class, 30 % at the final exam (outcomes 1-4).
1st mid-term exam (30 %) for outcomes 1, 2
2nd mid-term exam (30 %) for outcomes 3, 4
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final oral exam (30 %) (outcomes 1-4)

Examples of assessment for each outcome in mid-term exams:
1. Recognize on the picture and describe in writing the parts on the fuel system, lub oil system, starting air system, cooling system.
2. List possible failures and damages on the systems and suggest a solution using causal, relative and passive clauses.
3. Translate in writing a specialized text from instruction manuals and ship engineering books from English into Croatian.
4. Connect simple lexical and syntactic units and sentences into complex.

Examples of assessment for each outcome in the final exam:
1. Recognize on the picture and describe in writing the parts on the fuel system, lub oil system, starting air system, cooling system.
2. List possible failures and damages on the systems and suggest a solution using causal, relative and passive clauses.
3. Translate orally a specialized text from instruction manuals and ship engineering books from English into Croatian.
Outcomes 4 is assessed indirectly through the outcomes 2 and 3.

1.1. Main Reading

Spinčić, A.-Pritchard, B.: An English Textbook for Marine Engineers II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.

1.2. Recommended Reading

- marinediesels.co.uk (The Learning Resources for Marine Engineers, Warsash Maritime Academy, UK)
- Seagull training package

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić, A.-Pritchard, B.: *An English Textbook for Marine Engineers* II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.	30	70

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	**Radoslav Radonja, Ph. D.**		
Course	**Sea and Marine Environment Protection**		
Study Programme	**Marine Engineering**		
Level	**Undergraduate**		
Type of Course	**STCW - obligatory**		
Year of Study	**2**		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		**3**
	Number of Hours (L+E+S)		**2 + 0 + 0**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The main goal of the course is to acquire knowledge about the principles and laws of environmental protection, and understanding of theoretical, technical and legislative considerations of the relationship between organisms, biotopes and sources of pollution in traffic, and especially the part related to marine environment.

1.2. Prerequisites for Course Registration

-

1.3. Expected Learning Outcomes

After passing the exam, it is expected that students will be able to do the following:
1. Properly interpret the basic concepts of ecology and sustainable development
2. Explain and interpret the harmful impact of pollutants in maritime transport on the biocenosis and biotope
3. List and explain the protocols and annexes of the MARPOL 73/78 Convention
4. Explain the categories of pollutants according to the annexes and their harmful impact
5. State and explain the legislative requirements and documentation on board related to pollution prevention
6. Argue the requirements of the Ballast Water Convention (BWC) and assess their impact on the environment
7. State and explain the harmful effects of underwater anti-fouling paints (AFC)
8. Analyze and compare sources of marine noise pollution
9. List the requirements of the Convention on the Recycling of the Ships and explain prudent disposal procedures
10. Discuss possible scenarios related to sustainable development and climate change.

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1.4. Course Outline

Basic concepts of ecology, sustainable development and sustainable maritime affairs. Pollutants and their harmful effects. Marine ecosystem factors and protection of the marine environment. Ship as a source of pollution. Marpol 73/78 (protocols and annexes). Ballast Water Convention. Convention against anti-fouling paints. Ship Recycling Convention. Sound pollution. Assumed possible scenarios related to sustainable development and climate change.

1.5. Modes of Instruction	☒ **Lectures** ☐ Seminars and workshops ☐ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Active class attendance, 1st colloquium, 2nd colloquium and final oral exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,0	Class participation	0,5	Seminar paper		Experiment	
Written exam		Oral exam	0,5	Essay		Research	
Project		Continuous Assessment	1,0	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes takes place in accordance with University's and Faculty's normative acts as follows:
• through continuous testing of knowledge during classes, 70% of the acquired learning outcomes are evaluated through the 1st colloquium - learning outcomes 1-2 (20%), 2nd colloquium - learning outcomes 3-6 (50%), and the student must realize each colloquium minimum 50% points;
• At the final part of the exam, 30% of the acquired learning outcomes are evaluated (1-10), whereby the student must realize a minimum of 50% of points in order to pass the final exam.

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Explain what studies ecology as a science? What is the difference between abiotic and biotic factors? Why is water said to be the most important abiotic factor? Explain the concept of sustainable development and sustainable maritime affairs?
2. What is meant by the term "oil on board" and what does the spread and movement of the oil spill on the water depend on? List and explain the basic processes of oil decomposition? What are the harmful effects of pollutants from the exhaust gases of marine energy systems on the environment, and what on human health and why? ...
3. What does the Marpol 73/78 Convention consist of and what does Annex 1 (or 2 or 3 or... 6) deal with? To which ships does it apply / does it not apply? What are the exceptions? What are special and what are particularly sensitive marine areas? ...
4. According to Annex 2 of Marpol 73/78 of the Convention, where are unhealthy substances in bulk listed and how are they classified? According to Annex 3 of the Marpol 73/78 Convention, where are dangerous substances listed and how are they classified? ...
5. According to Annex 5 of the Marpol Convention, what documentation must a ship have? According to Annex 3 of Marpol 73/78 of the Convention, what are the conditions of packing and marking of cargo, requirements for accompanying documentation, packing and labeling, and how to handle empty packing? ...
6. What is the potential danger from ballast water to the environment coming from a tanker unloading / loading cargo at the tanker terminal and why? What is the difference between clean and separate ballast on an oil tanker? ...
7. What impact on the ship comes from the accumulation of fouling on the hull? What environmental hazards come from TBT underwater anti-fouling paints? ...
8. How does marine noise pollution affect the environment and people? What are the possible sources of noise and what is the difference between land and sea noise pollution? ...
9. Explain the term so-called. "Green passports" on board? Explain the difference in costs and the impact on people and the environment between ship recycling by stranding and recycling in a recycling shipyard? ...
10. What are the causes that can lead to the opening of the so-called northern sailing routes and what are the possible consequences? How can a further increase in atmospheric temperature affect 'permafrost' and what are the possible consequences? Why is a ship considered the most environmentally friendly means of transport despite being heavily polluted? ...

1.10. Main Reading

1. Teacher lectures - available in electronic form
2. Klepac, R.: Osnove ekologije, JUMENA, Zagreb 1990.
3. IMO, MARPOL 73/78., Consolidated Edition, London 2013.

1.11. Recommended Reading

1. https://www.pfri.hr/web/dokumenti/uploads_nastava/20180227_184357_zec_ZMMO_v.1.5_web.pdf
2. Golubić, J. Promet i okoliš, Fakultet prometnih znanosti u Zagrebu, Zagreb, 1999.
3. Dorčić, I.: Osnove čišćenja uljnih zagađenja, SKTH, Zagreb
4. Botkin, D., Keller, E., Environmental science, J. Wiley & sons, Inc., New York, 1995.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Teacher lectures - available in electronic form	-	60
IMO, MARPOL 73/78., Consolidated Edition, London 2013.	1	60
Klepac, R.: Osnove ekologije, JUMENA, Zagreb 1990.	1	60

1.13. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information		
Head of Course	Damir Zec, Ph.D.	
Course	Safety at Sea	
Study Programme	Marine Engineering	
Level	Undergraduate	
Type of Course	Mandatory	
Year of Study	2	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	45 + 15 + 0 (3 + 1 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to familiarize students with the international navigation safety system, including the most important maritime conventions and to enable them to perform basic maritime safety tasks independently, including search and rescue at sea, emergency communications, survival at sea and firefighting, in accordance with the provisions of the STCW Convention. Through practical work and exercises, students need to acquire skills required in case of different emergencies, especially in case of on-board fire, vessel abandon, survival at sea and communication using the GMDSS equipment.

1.2. Prerequisites for Course Registration

Students who have not completed maritime nautical schools are required to attend and successfully complete the Introductory program (D2 - Special onboard basic safety program).

1.3. Expected Learning Outcomes

Students are expected to be able to:

1. enumerate and interpret the legal sources of the international and national safety system,
2. control the ship safely,
3. perform basic search and rescue operations at sea,
4. use means of communication in case of emergency,
5. prepare to abandon the ship and use safety crafts and means available on board the ships,
6. recommend survival methods after the ship's abandon,
7. explain the functional characteristics, technological conditions and the way of maintaining fire-fighting devices on ships,
8. use fire-fighting means available on merchant ships.

1.4. Course Outline

International and national maritime safety system, search and rescue at sea, maritime accidents, life-saving means, communications while assisting in danger, leaving the ship and surviving at sea, people at sea, fire protection, maintenance and surveillance of all safety systems on board, development and preparing an emergency plan and organizing and conducting exercises on board.

1.5. Modes of Instruction		
	☒ Lectures	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

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1.6. Comments	

1.7. Student Obligations

Active participation and at least 70% of class attendance.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.0	Class participation		Seminar paper		Experiment	
Written exam	1.0	Oral exam	1.0	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	1.0
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

1. 70% in class and 30% in final exam (according to the Regulations on studies of the University of Rijeka and the Regulations on study at the Faculty of Maritime Studies in Rijeka)
2. Practical work - on a training ground (practicum, firefighting field) (outcomes 2,3,4,5,8)
3. Written exam in the field of International Maritime Safety, Search and Rescue at Sea, Maritime Accidents, Life-Saving, Communication during Assistance, Ship's abandon, Survival and Fire Protection (minimum 75% correct answers required, all learning outcomes)
4. Oral exam - the completeness of theoretical knowledge in the field of safety at sea is checked (minimum 50% of the required theoretical knowledge is required)

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Sort out ways to help people at sea by type of threat.
2. List the maritime communication channels and explain the advantages and disadvantages of each frequency band.
3. Explain the ship's abandon procedure.
4. List and explain how the ship's firefighting systems work.
5. Explain and prepare a muster list.

1.10. Main Reading

1. Zec, D., "Sigurnost na moru", izdanje 2001.

1.11. Recommended Reading

1. International Maritime Organization, SOLAS, London, 2009.
2. International Maritime Organization, SAR, London, 2003.
3. International Maritime Organization, IAMSAR, Vol. 1, Vol. 2, Vol. 3, 2006.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Zec, D. Safety at sea	11)	60

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the failure to pass are analysed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Predrag Kralj, Ph.D., MS.ME., BS.ME.		
Course	Marine Auxiliary Systems		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	STCW - obligatory		
Year of Study	3		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		6
	Number of Hours (L+E+S)		60+15+0 (4+1+0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to introduce the students in the field of ship auxiliary systems, their most common types, the characteristics of their important elements and the exploitation of the systems in a safe and efficient mode, what is necessary for responsible marine engineer officer.

1.2. Prerequisites for Course Registration

Passed exams of Technical mechanics I and II and Thermodynamics and heat transfer courses

1.3. Expected Learning Outcomes

It is expected that the students will be able:

1. To recognize, define and give examples of new trends in technology and recent developments in marine engineering, e.g. changes in propulsion systems regarding recent development of marine diesel engines, development of diesel engines' cooling systems through history etc.
2. To know marine engineering terminology, both Croatian and English
3. To demonstrate the skills of simple calculation – how to calculate and dimension system element (segments / parts)
4. To analyse the type of ship piping element and to draw most common elements
5. To explain graphic interpretation of the system and its function
6. To plan maintenance works in the engine room and perform engineer officer duties in a safe manner on both operation and management level
7. To establish the relations among measured parameters, the measuring points in the system and the alarms and their characteristics, the importance of alarms and, to give fault diagnosis, i. e. the cause of the alarms or faults
8. To create functional piping scheme in accordance with the classification society's rules or manufacturer's recommendations

8.1. Course Outline

The piping systems on board ships, the system elements, the materials and the protection methods, the international regulations, namely propulsion systems (fuel oil, lubrication oil, compressed air (7.02:1.2.1.8.), cooling water (7.02:1.2.1.6., 1.2.2.11.-13.), steam and condensate, combustion air, exhaust gas system); general purpose and safety systems (ballast –7.02: 1.3.1.1., bilge – 7.02:1.3.1.2., firefighting –7.02:1.3.1.3., ventilation, drinking and sanitary water, sewage systems, operation and automation air (7.02:1.2.3.5.), air conditioning (7.02:1.1.3.2.) and ventilation, automation, hydraulics, sounding pipes, draining and overflow systems, filling systems, vent systems, exploitation).
Marine refrigerating systems: design and optimization, application on board ships, system elements, automated operation and protection, exploitation, safety operation with refrigerants, maintenance.
The systems related to liquid cargoes (inert gas, gas sampling systems, cargo loading/unloading systems, washing and crude oil washing systems, stripping and draining systems, heating and cooling of cargo).
The exploitation of systems, local and remote operation and surveillance, the sea environment protection (7.02: 1.3.1.4.-5).

8.2. Modes of Instruction		
	☒ Lectures	☒ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☒ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____
8.3. Comments	Upon completion of laboratory exercises students need to create final laboratory reports consisting of tables with measured values, heat diagrams and explanations.	

8.4. Student Obligations

Beside lectures and exercises students have four home works and a set of laboratory exercise reports to deliver.

8.5. Assessment[1] of Learning Outcomes

Course attendance	2,5	Class participation		Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	0,5
Portfolio							

8.6. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% during classes and 30% on final exam (learning outcomes 1 – 8) in accordance with the University's and Faculty's normative acts. Continuous assessment:

- Two theoretical partial exams – first on marine piping systems and second on refrigerating systems (60%) – outcomes 1 – 8
- 4 % students gain for correct solving of four numerical home works (outcomes 3, 4, 6) and another one (1 %) for practical work on fresh water generator simulator (outcomes 5, 6), while another 5% students gain for correct performance on laboratory exercises (outcomes 1 – 7).

On written final exam complete field of marine auxiliary systems is assessed.
Examples of assessment for outcome:

1. On the marine auxiliary system's schematic representation recognize its function and the function of each element (outcomes 1, 2, 3, 5, 7)
2. Read out measured values and diagnose the fault in the system, make basic calculation of the element to be replaced, plan and execute replacement (outcomes 2, 4, 5, 6,7)
3. Evaluate local and remote indication of measured parameters, dependence between manometric and

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

absolute pressure, analog and digital indication (outcomes 1, 2, 7, 8)

8.7. Main Reading

1. Kralj Predrag, Šegulja Ivica, Brodski cjevovodi, Pomorski fakultet, Rijeka, 2018.
2. Martinović Dragan, Brodski strojni sustavi, Pomorski fakultet, 2005.
3. Matković Milan, Protupožarna zaštita na brodovima, Pomorski fakultet, Rijeka, 1995.
4. Martinović Dragan, Brodski rashladni uređaji, Školska knjiga, Zagreb, 1994.
5. Learning materials published on the lecturer's web page and on the e-learning system Merlin

8.8. Recommended Reading

1. Martinović Dragan, Stanković Predrag, *Sustav inertnog plina, Pomorski fakultet, Rijeka, 1995.*
2. Martinović Dragan, *Strojarski priručnik za časnike palube, Graftrade, Rijeka*
3. Martinović Dragan, Stanković Predrag, *Sigurnost na tankerima, Pomorski fakultet, Rijeka, 1995.*
4. Martinović Dragan, Stanković Predrag, *Pranje tankova sirovom naftom, Pomorski fakultet, Rijeka, 1992.*
5. Ozretić Velimir, *Brodski pomoćni strojevi i uređaji, Ship management, Split, 1996.*
6. Marsh, R. W., Olivo, C. T., *Refrigeration, Delmar Publishers, Inc., Bombay, 1966.*
7. Golber, P. F., *Refrigeration Servicing, Delmar Publishers, Inc., Bombay, 1971.*
8. Knak Christen, *Diesel Motor Ships – Engines and Machinery, G-E-C GAD Publishers, Copenhagen, 1979.*

8.9. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Brodski cjevovodi	Bibliothek 7 Faculty Book Store 150	80
Brodski strojni sustavi	Bibliothek 7 Faculty Book Store 0	
Protupožarna zaštita na brodovima	Bibliothek 14 Faculty Book Store 500	
Brodski rashladni uređaji	Bibliothek 5 Faculty Book Store 0	

8.10. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

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3.2. Course description

Generic information			
Head of Course	Davor Lenac, BSTT, lecturer		
Course	Technical supervision and ship classification (116513)		
Study Programme	Marine Engineering		
Level	BSc		
Type of Course	compulsory		
Year of Study	III		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		30 +15 + 0 (2 + 1 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The course aims to enable students to become proficient in Rules for the Technical Supervision of sea-going ships as well as ship classification.

1.2. Prerequisites for Course Registration

None

1.3. Expected Learning Outcomes

After passing the exam in this course students will be able to:
1. Explain and correctly interpret the Registry Rules
2. Define machinery ship class inspections
3. Explain performed inspection report or failure machine device report
4. Explain and identify regular and extraordinary examinations
5. Identify and explain chief engineer survey procedure
6. Explain and recognize differences between classification and statutory certificates
7. Explain and recognize the importance of non-destructive material inspection
8. Explain and recognize the importance of classification review, certification, authorization of the Registry for the issuance of statutory certificates

1.4. Course Outline

Rules prescribing internationally (IACS) accepted technical standards for carrying out technical controls for the seagoing ships. Introduction to the Registry Rules, Ship Class, Classification Documents, Loss of Class, Types of Inspections, Construction Supervision, Type Approval, Sea trial , Chief Engineer survey, Inspections of steam turbine, Gas turbine inspection, Auxiliary machinery, steering gear, pressure vessels, ship screws and shafts, safety systems, special ships, metal materials and inspection in accordance with statutory certificates.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

In addition to the obligatory lectures and exercises, the student is obliged to pass the colloquiums and pass the final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Procedure for evaluating acquired learning outcomes:
- The final grade in the subject is the sum of the points that the student has achieved during the course (70% of the grade) and the points earned on the final exam (30% of the grade) according to the Regulations on Studies of the University of Rijeka and the Regulations on Studying at the Faculty of Maritime Studies in Rijeka.
- Continuous assessment:
  two colloquiums - a minimum of 50% of the estimated number of points is required
- Final exam:
  The final exam (oral exam) checks the knowledge in the field of Technical supervision and Recognized organisation rules - a minimum of 50% of points is required.

Examples of evaluation:
1. Explain visual inspection for class assignment
2. Critically evaluate the measured parameters during the chief engineer survey
3. Recognize the validity of classification and statutory certificates
4. Explain inspection of steam generators, propulsion and auxiliary machinery
5. Explain the ship's device type approval
6. Explain and identify the classification ship machinery automation features

1.10. Main Reading

Rules for technical supervision and ship classification - Croatian Register of Shipping (CRS), Split
Lecturer presentations

1.11. Recommended Reading

Web pages - IACS

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Rules for technical supervision and ship classification - Croatian Register of Shipping (CRS), Split	15	60

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information		
Head of Course	Dean Bernečić, Ph.D.	
Course	Simulator Operation Training 1 (SOT 1)	
Study Programme	Marine engineering	
Level	Undergraduate	
Type of Course	Obligatory	
Year of Study	3	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	1+2

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the course is to acquaint the students with the proper preparation of the propulsion plant and auxiliary plant on the existing simulator with logical reasoning and critical thinking.

1.2. Prerequisites for Course Registration

Marine Engineering Secondary Naval School or completed and passed an additional Course from the basics of ship systems and facilities for 1st year students who have not completed secondary naval school. It is advisable to pass the courses of the profession (Marine Engines, Marine Engine Systems, Marine Steam Generators, Marine Turbines, Refrigeration equipment and Systems, Auxiliary Machinery Systems).

1.3. Expected Learning Outcomes

After passed exam students should be able on Kongsberg KSIM V-5 Simulator: on a VLCC Carrier (MAN B&W MC 90 engine);

1. Prepare and start auxiliaries and main engine and auxiliary steam generator;
2. Prepare and start fuel and oil separators;
3. Prepare and start bilge water separator;
4. Prepare and start fresh water generator;
5. Properly start the exhaust gas boiler (utilizer) and explain the reasons consequences of EGB fire, as well as the methods of protection.
6. Properly start the turbo-generator and the steam turbine-driven centrifugal cargo pumps.
7. Connect and disconnect the diesel generators, shaft gen. and turbo-generator on MSB, as well as properly select load shearing mode during parallel operation of multiple generators.
8. Start and understand the function of all other auxiliary systems of the ship's engine room.
9. Understand the interdependence between individual systems.

1.4. Course Outline

The Kongsberg Simulator is a marine engine room simulator with all associated systems, local and engine control room control panels as well as bridge control panel. Simulator also include main switchboard, steam generator control panel and interactive mimic panel on Big View screens. It simulates the engine room on a crude oil Carrier (VLCC).

1.5. Modes of	☒ Lectures	☐ Practical work

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Instruction	☐ Seminars and workshops ☒ Exercises ☐ E-learning ☒ Field work	☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Required lectures and exercises in min. range of 75% (90% for obtaining special certificates according to STCW 73/78).

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	1.5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class and partial exams (colloquium), 30% in final exam; according to the University of Rijeka Study Regulations and the Study Regulations at the Faculty of Maritime Studies in Rijeka (Outcomes 1 - 9).
Colloquium 1 (I1, I7, I8, I9)
Colloquium 2 (I5, I8, I9)
Colloquium 3 (I1, I2, I3, I4, I5, I6, I7, I8, I9)
Examples of simulator checks: Properly prepare and start diesel generators, connect them to the MSB, know to read parameters (I1, I7, I8, I9).
Exams Questions Example:
Explain the main engine LT and HT cooling water circuits (I1, I9),
Explain the ME lube oil temperature regulation (I1, I2, I8, I9),
Valuation: Percentages according to the checklist with respect to proper and incorrect procedures during operation. The final exam involves checking the understanding of overall work on simulator.

1.10. Main Reading

D. Bernečić, R. Radonja; Praktikumi za vježbe te upute za rad na simulatoru; LITERATURA ZA SPP 1
web page: https://www.pfri.uniri.hr/web/hr/zavod_BS.php?pregled&id_username=10

1.11. Recommended Reading

Instrukcione knjige s brodova,
Koljatić, V., Priručnik za strojarski simulator,

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
		70

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Fran Torbarina, Ph.D.		
Course	Maintenance management		
Study Programme	Marine Engineering		
Level	Undergraduate degree programme		
Type of Course	Mandatory		
Year of Study	III		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Introducing students to the basic laws of failures distribution, and transfer this knowledge to ship systems and the ship as a whole.

1.2. Prerequisites for Course Registration

Brodski motori, Brodski pomoćni uređaji i strojevi, Konstrukcija broda, Brodski strojni sustavi .

1.3. Expected Learning Outcomes

Students will be able to:
1. Explain maintenance costs
2. define and explain the principles of occurrence and types of failures
3. define and explain the reliability of technical systems
4. Define and describe maintenance strategies
5. Describe ways how to maintain the underwater hull section
6. Define and explain the impact of spare parts on maintenance

1.4. Course Outline

Maintenance costs. Damage and failures. Reliability of technical systems. Maintenance technology and organization. Maintenance strategies: preventative maintenance, corrective maintenance, overhaul maintenance, condition maintenance. Maintenance of the underwater part of the hull and the propeller. The impact of automation on maintenance. Spare parts.

1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning ☐ Field work	X Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Compulsory attendance (at least 70%).

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio		Final exam	0.5				

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in final exam; according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka

1.10. Main Reading

Šegulja, Bukša, Tomas: Održavanje brodskih sustava, Pomorski fakultet u Rijeci, 2007;
Lovrić: Osnove brodske terotehmologije, Pomorski fakultet, Dubrovnik, 1989;
Rejec: Terotehnologija, Informator, Zagreb, 1974;
Bonefačić: O preventivno-planskom održavanju brodova u kontekstu terotehnologije, Zbornik radova Fakulteta za pomorstvo i saobraćaj u Rijeci, 1984;

1.11. Recommended Reading

1. I.Berezovski: Reliability Theory and Practise
2. A.Kelly: Maintenance Planning nad Control
3. B.Vučinić: Maintenance Concept Adjustement of Design.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Šegulja, Bukša, Tomas: Održavanje brodskih sustava, Pomorski fakultet u Rijeci, 2007.	20	

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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Course description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language VI		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Elective		
Year of Study	3	Semester	6
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		3
	Number of Hours (L+E+S)		15+30+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to develop the students' writing skills in a specific working environment in English for Specific Purposes.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

The students are expected to be able to:
1. Complete the ship engineering documentation correctly.
2. Compose a CV.
3. Write a cover letter.
4. Compose and write correspondence and electronic mail.
5. Compose and translate notes, specifications and reports.

1.4. Course Outline

Writing letters, e-mail. Memorandums, circular letters and engine manufacturer notes. Examples of correspondence from ship engineering practice. Notes in the engine room log. Notes about the condition of the rings, pistons and grooves. Notes about the condition of the liner. Notes about measuring clearance and the condition of bearings. Notes about bearing and bolts inspection. Dry docking specifications.
Grammar: Language structures in orders, advice and recommendations, instructions, work specifications

1.5. Modes of Instruction

☒ Lectures	☐ Practical work
☐ Seminars and workshops	☐ Multimedia and Network
☒ Exercises	☐ Laboratory
☐ E-learning	☐ Mentorship
☐ Field work	☐ Other _____

1.6. Comments

1.7. Student Obligations

Class attendance, activities, continuous assessment and final exam (written and oral)

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	0,5	Presentation		Practical work	
Portfolio	0,5	Final exam	0,5				

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

60 % in class, 40 % at the final exam (outcomes 1-5).
Mid-term exam - 30 % (outcomes 1, 4).
Independent work (CV) – (10 %) (outcome 2)
Independent work (cover letter) (10 %) (outcome 3)
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final exam (40 %) (outcome 5)

Examples of assessment for each outcome in the mid-term exam

1. Complete the ship engineering documentation correctly.
2. Compose letters or e-mails

Examples of assessment for each outcome in the final exam:

1. Compose and translate notes, specifications and reports (complex notes in technical forms, requirements for spare parts and components acquisition)

1.1. Main Reading

Spinčić-Luzer: *Engleski u brodostrojarskim komunikacijama*, Adamić, III izdanje Rijeka 2007.

1.2. Recommended Reading

Borucinsky, M., Kegalj, J. 2020. Notes on Written Communication in Marine Engineering. Rijeka: Faculty of Maritime Studies.
Original correspondence from everyday communication
moodle.srce.hr

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić-Luzer: Engleski u brodostrojarskim komunikacijama*, Adamić, III izdanje Rijeka 2007*.	15	30

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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Generic information			
Head of Course	Ivan Panić, Ph.D		
Course	Marine Electric Power Systems		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	Compulsory		
Year of Study	3		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		6
	Number of Hours (L+E+S)		3+2+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of this course is to provide students with appropriate knowledge of marine electrical power systems, focusing on high-voltage technologies and electrical propulsion systems as prescribed by STCW and IMO Model Course for the Engine Officer service

1.2. Prerequisites for Course Registration

Completed courses: Marine Electrical Engineering, Marine electrical machines and drives

1.3. Expected Learning Outcomes

After passing the exam, students will be able to do the following:

1. Describe, analyse, and evaluate the marine electrical power system topologies and be familiar with the associated technical regulations.
2. Define and explain switchboards, associated electrical panels and switchgear technology.
3. Describe and explain measurement and protection systems and instrumentation, automatic control and management systems, and electrical protections.
4. Apply relevant diagnostics for system condition and techniques for handling devices and systems.
5. Understand the operating principle and basic components of the marine electrical propulsion system and evaluate the quality parameters of electrical energy on a ship with electrical propulsion.
6. Explain the technical and economic aspects of the use of high-voltage on-board and apply relevant safety measures when working on high-voltage systems.

1.4. Course Outline

Ship electrical power network topologies on ships with conventional and electrical propulsion. Source, distribution, and allocation of electrical energy on board. Grounded and ungrounded ship electrical power systems. Marine switchgear and switching devices. Selectivity of short-circuit protection in ship electrical power networks. Faults in ship electrical power systems (connection to the ship's hull reference voltage point, interruption, short circuit). Fault detection and localization of the fault location. Special safety aspects of ship low-voltage and high-voltage loads. Safety zones. Temperature protection class. Explosion-proof protection. Electrical insulation. Reasons and areas of application of power electronics on board. Semiconductor power valves (uncontrolled, semi-controlled, fully controlled). Single-phase and three-phase diode and thyristor rectifiers. DC-DC converters. LCI converter, Cycloconverter, PWM frequency converter. High voltage on board. Technical aspects of using high voltage. Specifics of electrical protections in high-voltage systems. Hazards of working with high voltage. Safety measures and rules of classification societies and regulations related to the use of high voltage on board and electrical propulsion systems.

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1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Regular follow-up of classes (lectures and exercises), continuous assessment, and passing the oral final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	3,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka as follows:
• 70% of the acquired learning outcomes through the continuous assessment 1st mid-term exam - through learning outcomes 1-4 (35%), 2nd mid-term exam - through learning outcomes 5-6 (35%).
• 30% of the acquired learning outcomes (1-6) are evaluated in the final part of the exam, with a minimum of 50% credit for passing the final exam.

Examples of evaluating learning outcomes in relation to the set learning outcomes are:

1. Sketch and explain the parts of the principal single-line diagram of a radial marine electrical power network.
2. List the parts and explain the difference between the switching devices of a marine low-voltage and high-voltage switchboard.
3. Choose the correct circuit breaker for a given electrical load with respect to the selectivity diagram for short-circuit protection.
4. Sketch the block diagram of the system for detecting the state of connection of the power network to the ship's hull reference point.
5. Draw the electrical schematic of a frequency converter with impressed voltage. Show the waveforms of input and output currents and voltages, considering the state of the intermediate DC circuit.
6. Precisely list the steps of the procedure for isolating a ship's high-voltage device.

1.10. Main Reading

Teaching materials on the Merlin e-learning system (https://moodle.srce.hr)

1.11. Recommended Reading

1. Skalicki B., Grilec J.; Električni strojevi i pogoni, Fakultet strojarstva i brodogradnje, Zagreb, 2005.
2. Rashid H., Muhammad; Power electronics handbook, Oxford : Butterworth-Heinemann, 2018.
3. Patel, M.R.; Shipboard electrical power systems. Crc Press, 2021.
4. Hall, T. Dennis; Practical marine electrical knowledge, Witherby Seamanship International, 2014.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Teaching materials on the Merlin e-learning system	Available on Web	50

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analysed and appropriate measures are adopted.

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3.2. Course description

Generic information		
Head of Course	Robert Baždarić, Ph.D.	
Course	Shipboard Automatic Control	
Study Programme	Marine engineering	
Level	Undergraduate degree programme	
Type of Course	Compulsory course	
Year of Study	3 years	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	30+15+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The main objectives of the course are to gain knowledge of the principles of operation of process computers in control systems used on board.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

After passing the exam, students will be able to do the following:
1. define the features of multiple hierarchical on-board management systems
2. Explain the methods on which the valuation of ship management systems (BSU) is based
3. Explain the procedures for establishing a BSU
4. Explain the technical and economic aspect of ship automation
5. Describe and demonstrate the hardware and software structure of ship's control systems
6. Demonstrate different performances of the process control algorithm for ship systems
7. Explain the structure and programming method of a programmable logic controller (PLC)
8. demonstrate the operating principles of the automation of individual ship systems

1.4. Course Outline

Directions for development of onboard computerized control systems. Hierarchical management systems. Placing hardware and software requirements with respect to management system characteristics. Synchronization of algorithm with process. Impact of restrictions on the management system. Programmable controller and PLC. Examples of systems for monitoring, managing and collecting data. Factors affecting further improvements to onboard computerized control systems.

1.5. Modes of Instruction		
	☒ Lectures	☒ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☒ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments

1.7. Student Obligations

1st colloquium, 2nd colloquium, design and presentation of a research assignment in an hour of exercises, final exam

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1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper	0,5	Experiment	
Written exam	0,5	Oral exam		Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	0,5
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out in accordance with the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka as follows:

- through continuous assessment of knowledge during class 70% of the acquired learning outcomes are assessed. Those include: 1st semester exam (midterm) - learning outcomes 1-4 (25%), 2nd semester exam (midterm) - learning outcomes 5-8 (25%), presentation of the research assignment (seminars) - learning outcomes 1-8 (20%); the student must score at least 50% of points in each midterm, while the presentation of the research assignment is evaluated on the basis of elaborated evaluation criteria;
- 30% of the obtained learning outcomes (1-8) are evaluated at the final exam, with the student having to complete at least 50% of points for passing the final exam.

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Which equipment is used in each stage for control and which for the regulation and properties of each stage of ship automation
2. Draw a block diagram of a multi-hierarchical onboard control system
3. Postulates describing the procedures, relationships and logic of the guidance system
4. Development cycle and specific difficulties in developing a new management system
5. Postulates describing the procedures, relationships and logic of the guidance system
6. Specific tasks, guidance levels and input / output circuits
7. Interaction of the basic processing unit, the process controller and the parent guidance system
8. What is a PLC, its structure, what is a scene cycle, a Leder diagram
9. Level and load handling system (operating principle, features, configurations)

1.10. Main Reading

1. V. Tomas, Ship automatic control, authorized lectures (textbook in preparation),
2. E-course syllabus available on the e-learning system - Merlin

1.11. Recommended Reading

1. Radovan Antonić: Automatizacija broda II, Pomorski fakultet u Splitu, 2003
2. George M. Siouris: Missile Guidance and Control Systems, Springer New York, 2013
3. Konsberg manual-"Integrated ship control-Functional specification-Power menagment system, process control unit, signal acquisation unit"

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
V. Tomas, Ship automatic control, authorized lectures (textbook in preparation)	50	50
E-course syllabus available on the e-learning system - Merlin	-	50

1.13. Quality Assurance

Quality assurance is based on Faculty ISO 9001 system. Yearly analyze is produced based on quantitative student examination data, and qualitative based on student survey derived at the end of each semester.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Fran Torbarina, Ph.D.		
Course	Economics of ship exploitation		
Study Programme	Marine Engineering		
Level	Undergraduate degree programme		
Type of Course	Elective		
Year of Study	III		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The main objective of the course is to acquaint students with the field covered by the economics of ship exploitation, and through exercises to apply this knowledge to specific cases in practice.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

Students will be able to:
1. Explain the cost term
2. define and explain the costs of maritime transport
3. define and explain the calculation of the maritime voyage
4. define and describe types of marine shipping
5. define and explain the performance indicators of the maritime business

1.4. Course Outline

ECONOMICS OF SHIP EXPLOITATION. Definition, subject of research, application of scientific and theoretical knowledge in practice.
THE BASICS OF ECONOMICS. Cost theory: the concept of costs, types, locations and cost carriers, fixed and variable costs.
CALCULATIONS. Measuring business results. Business success and benchmarks, productivity, economy, profitability.
BOAT EXPLOITATION TECHNIQUE. Economic and technological criteria defining different types of shipping. Passenger shipping, freelance, liner, tanker shipping.
FORMATION OF VEHICLES IN MARINE SHIPPING. The concept and types of fares. Characteristics and formation of freight rates in certain types of shipping industry.
MARITIME TRANSPORT COSTS. Definition of cost and cost. Types of costs in marine shipping. Fixed and variable costs. Marginal cost. A model of the total cost of a ship's voyage.
OPTIMIZATION OF SHIPPING COSTS.
PERFORMANCE INDICATORS IN MARITIME SHIPPING. Productivity. efficiency. profitability. Optimal size and speed of the ship in terms of economy and cost-effectiveness.

1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Compulsory attendance (at least 70%).

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio		Final exam	0.5				

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in final exam; according to the Regulations on Studies of the University of Rijeka and the Regulations on Studies at the Faculty of Maritime Studies in Rijeka

1.10. Main Reading

1. B.Bonefačić : Osnovi organizacije I ekonomike za brodske pogonske inžinjere
2. Rubinić, I.: Ekonomika brodarstva, Ekonomski fakultet, Rijeka, 1976.
3. Glavan, B.: Ekonomika morskog brodarstva, Školska knjiga, Zagreb, 1992.
4. Kesić, B., Počuča, M.: Ekonomika Brodarstva, Vježbe, Pomorski fakultet u Rijeci, Rijeka, 2001.

1.11. Recommended Reading

Stopford, M.: Maritime Economics, Routledge, London & New York, 2000.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	Assoc. Prof. Goran Vukelić		
Course	Vibration and Noise		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	Elective		
Year of Study	3		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		2+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring theoretical and practical knowledge of vibration and noise analysis. Understanding the effect of vibrations and noise on constructions, engines and people.

1.2. Prerequisites for Course Registration

Completed “Engineering Mechanics I” and “Engineering Mechanics II”.

1.3. Expected Learning Outcomes

1. Applying the laws of mechanics to solve the problems of vibrations and noise.
2. Understanding the effect of vibrations and noise on constructions, engines and people.
3. Measurement of vibrations and noise.
4. Analyzing the results of calculation and measurement.

1.4. Course Outline

Introduction to vibration and noise. Basics of one-degree and two-degree freedom systems vibrations. Free and force vibrations, damped and undamped vibrations. Source, transmission and isolation of vibrations. Axial, flexural and torsional vibrations. Source and spreading of sound. Noise and noise protection. Legislation and standards concerned with noise and vibration. Measurement of vibration and noise. Vibration and noise on ships. Vibration and noise modelling.

1.5. Modes of Instruction	☒ Lectures ☒ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☒ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments	-	

1.7. Student Obligations

Attending the lectures and exercises (min. 70%), attending the assessment and exams, submitting results of assignments.

1.8. Assessment[1] of Learning Outcomes

Course attendance		Class participation		Seminar paper	1	Experiment	1
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	
Portfolio							

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

According to the study rulebooks of University of Rijeka and Faculty of Maritime Studies, 70% of learning outcomes will be assessed through continuous assessment during the semester (colloquium, seminars, laboratory exercises), 30% of learning outcomes through final exam with passing rate set at min. 50% of final exam points.

Examples of evaluation in correlation to learning outcomes:

1. Determine dynamic equilibrium of oscillating body and systems.
2. Positive and negative effect of vibration and noise.
3. Measure displacement, speed and acceleration of oscillating body.
4. Compare experimental and calculated results.

1.10. Main Reading

Krpan, M., Butković, M., Žigulić, R., Braut, S., Franulović, A.: Dinamika, Tehnički fakultet, Rijeka, 2001.
Senjanović, I.: Vibracija broda I, Sveučilište u Zagrebu, Zagreb, 1974.

1.11. Recommended Reading

Inman, D.J.: Engineering vibration, Prentice Hall, New Jersey, SAD, 2001.
Brüel & Kjaer: Measuring vibrations, Naerum, Danska, 1982.
Brüel & Kjaer: Mesuring sound, Naerum, Danska, 1984.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Krpan, M. et al.: Dinamika	5	45
Senjanović, I.: Vibracija broda I	1	45

1.13. Quality Assurance

According to ISO 9001 system set at Faculty of Maritime Studies, Rijeka. Once a year analysis of passing exam rate. Once a semester anonymous students online survey.

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3.2. Course description

Generic information			
Head of Course	**Pelić Vladimir, Ph. D.**		
Course	**Failure Analysis**		
Study Programme	Marine Engineering		
Level	Undergraduate		
Type of Course	Obligatory		
Year of Study	**3.**		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		**4**
	Number of Hours (L+E+S)		**2 + 1 + 0**

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring knowledge about failures of marine engineering systems and devices, methods of diagnosing failures and economics of operation with proper monitoring of influential parameters in operation and maintenance of facilities on board. By simulating individual failures and faults on ship engine room simulators, and their consequences, students should be able to interpret and analyze individual alarms and learn the correct procedures during troubleshooting.

1.2. Prerequisites for Course Registration

Course taken: Work on the simulator 1

1.3. Expected Learning Outcomes

After passing the exam, it is expected that students will be able to do the following:
1. Describe and explain the basic concepts and methods of failure diagnosis.
2. Explain the occurrence of failures caused by errors in design, manufacture, installation, transport, trial operation, operation, maintenance and surveys
3. Analyze diesel engine faults and failures
4. Analyze faults and failures in the steam generator
5. Analyze faults and failures in steam turbine plants
6. Analyze faults and failures in auxiliary machines and devices
7. Analyze faults and failures in electrical machines and devices

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1.4. Course Outline

Fundamentals and methods of fault diagnosis. Identification, causes and troubleshooting of marine steam generators, steam turbines, diesel engines, separators, pumps, fans, compressors, electrical machines and devices and various marine systems.

1.5. Modes of Instruction		
	☒ **Lectures**	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ **Exercises**	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments	

1.7. Student Obligations

Active attendance at classes and exercises, 1st colloquium (theory and exercises), 2nd colloquium (theory and exercises) and final oral exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation	0,5	Seminar paper		Experiment	
Written exam		Oral exam	0,5	Essay		Research	
Project		Continuous Assessment	1,5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes takes place in accordance with University's and Faculty's normative acts as follows:
• through continuous testing of knowledge during classes, 70% of acquired learning outcomes are evaluated through the 1st colloquium (theory and exercises) - learning outcomes 1-2 (20%), 2nd colloquium (theory and exercises) - learning outcomes 3-7 (50 %), while the student must realize a minimum of 50% of points for each colloquium;
• At the final part of the exam, 30% of the acquired learning outcomes are evaluated (1-7), where the student must realize a minimum of 50% of points to pass the final exam

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Explain the terms fault and failure diagnosis? List and explain the characteristic stages of work in the process of diagnosing a fault? ...
2. List and explain the types of failures that can be classified as run-in failures / accidental failures / time failures? What are the so-called "Built-in influences" on the occurrence of failures and what is their cause? List and explain the methods of technical diagnostics? What methods can be included in the so-called. "Objective methods"? ...
3. List and explain engine protections that stop / slow down the operation of a two-stroke diesel engine? List and explain the causes of black smoke on the engine exhaust? List and explain on the indicator diagram the causes of compression reduction in a diesel engine? ... EXERCISES: simulation of various failures on the engine room simulator.
4. State and explain the protection of the steam generator? List and explain the causes of high water levels in the steam boiler, and how can such a fault be remedied? ... EXERCISES: simulation of various failures on the engine room simulator.
5. State and explain the protection of the steam turbine? List and explain the possible causes of vibration in the steam turbine and the possibility of elimination? List and explain the methods of checking the quality of lubricating oil at the turbine plant? ... EXERCISES: simulation of various failures on the engine room simulator.
6. State and explain the causes of reduced supply in centrifugal pumps? List and explain the possible causes of increased salinity in fresh water at the outlet of the freshwater generator, and the procedure and method of troubleshooting? What are the possible causes of 'jerky motion' in the steering gear? What are the possible causes of water seal loss in a centrifugal oil / fuel separator? ... EXERCISES: simulation of various failures on the engine room simulator.
7. List and explain the protections of the AC electric generator? Explain what can be expected in a fully automated electrical system on board if a network load suddenly occurs while only one generator is turned on? ... EXERCISES: simulation of various failures on the engine room simulator.

1.10. Main Reading

1. Teacher lectures - available in electronic form
2. Exercises on the engine room simulator.

1.11. Recommended Reading

1. Cowley, J., *The Running and Maintenance of Marine Machinery*, The Institute of Marine Engineers, London, UK, 1994.
2. Kuiken, K., *Diesel engines parts I and II*, Target Global Energy Training, Onnen, NL, 2008.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Teacher lectures - available in electronic form	unlimited	50

1.13. Quality Assurance
Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information		
Head of Course	dr. sc. Predrag Kralj, mr.sc. Rikard Miculinić	
Course	Marine Hydraulics and Pneumatics	
Study Programme	Marine Engineering	
Level	Undergraduate degree programme	
Type of Course	mandatory	
Year of Study	3.	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	2+1+0

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objectives		
Introduce students to the types, function and basic characteristics of hydraulic machines, as well as		
1.2. Prerequisites for Course Registration		
Engineering Mechanics 2		
1.3. Expected Learning Outcomes		
Students will be able to: 1. Explain the basics of hydrodynamics and fluid hydrostatics. 2. Explain the requirements that hydraulic drive media must satisfy. 3. Explain the differences in the types, construction and symbol of the hydraulic or pneumatic element. 4. Explain the differences in types, construction and symbol of hydraulic machine (pumps and hydraulic motors). 5. Explain the function of hydraulic or pneumatic systems. 6. Describe hydraulic or pneumatic equipment.		
1.4. Course Outline		
Physical basics (hydrostatics, hydrodynamics). Leakage of liquid through the small holes. Requirements for hydraulic oils. Structure and representation of the hydraulic system. Basic performance and kind of pumps and rotary motors. Slow motion engines. Pressure limiting valves. Hydraulic equipment. Division of hydraulic systems. Pressure ranges, performance and representation of pneumatic systems. Basic control schemes for hydraulic and pneumatic systems.		
1.5. Modes of Instruction	X Lectures ☐ Seminars and workshops X Exercises ☐ E-learning X Field work	X Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

1. Colloquium, 2. Colloquium, exercises performed. Final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendanc	1.5	Class participation	1	Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in final exam; according to "Pravilnik o studijima Sveučilišta u Rijeci" and "Pravilnik o studiranju na Pomorskom fakultetu u Rijeci" (the regulations on Studies of the University of Rijeka and the regulations on studies at the Faculty of Maritime Studies in Rijeka).
Of the possible 70% during the semester, 60% is spent on two written tests, 10% on the completed exercises.
1. At the first colloquium, 30% is spent on learning outcomes 1,2,3
2. At the second colloquium, 30% is spent on learning outcomes 3,5,6
3. 10% is spent on properly made exercises. (learning outcomes 1,2,3,4,5,6)
4. The final exam include task from all outcomes in oral form.

Examples of evaluation by individual outcome:
1. The name of the hydraulic element must be properly entered for the corresponded symbol (outcome 1,2,3).
2. Sketch the symbol and mark the pump, tank, and service connections.
   a) 4/3 hydraulically actuated valve
   b) 3/3 electromagnetically actuated valve, outcome 1,2,3.
3. Sketch and explain the pressure regulator in a closed hydraulic system through the example of installing a pressure limiting valve on the pressure line of the engine power supply pump. (outcome 4).
4. Explain the operation of the system in the shown position of the distribution valve. (describe the role of the three pressure control valves, the order in which the working cylinders are started, outcome 5

1.10. Main Reading

Šestan, A.: Uljna hidraulika i pneumatika. Pomorski fakultet, Rijeka, 2003.

1.11. Recommended Reading

Matković, M., Bukša, A. "Zbirka zadataka iz hidromehanike", Pomorski fakultet, Rijeka, 1998.
Pečornik, M., "Tehnička mehanika fluida", Školska knjiga, Zagreb, 1985

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Šestan, A.: Uljna hidraulika i pneumatika. Pomorski fakultet, Rijeka, 2003.	10	30
Course syllabus is available on the e-learning system - Merlin in electronic format.		30

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	Davor Lenac, BSTT, lecturer		
Course	Simulator operation training 2 (116523)		
Study Programme	Marine Engineering		
Level	BSc		
Type of Course	compulsory		
Year of Study	III		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		15 + 30 + 0 (1+2+0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The course aims enable students to become familiar with the ship's steam propulsion turbine, turbine prime mover for auxiliary devices, various engine room systems . Simulating faults, students should be able to interpret and analyse errors.

1.2. Prerequisites for Course Registration

Completed courses: Marine turbines

1.3. Expected Learning Outcomes

After passing the exam in this course students will be able to:
1. Explain and establish the ship's LNG power system
2. Explain how to prepare LNG ship engine room plant
3. Analyse and explain importance of a steam generator water quality
4. Explain and analyse operation of a steam generator working with liquid or gaseous fuel
5. Identify and explain fuel, sea, condensate, feed water, superheated steam systems
6. Analyse and explain main propulsion turbine regulation and protection systems
7. Explain and analyse the operation of turbogenerators and their preparations for parallel operation
8. Explain and analyse start of the main propulsion turbine
9. Analyse the parameters in the operation of the ship's LNG ship's machinery plant

1.4. Course Outline

Introduction to LNG simulator, familiarisation with pipe diagrams and devices, preparation of diesel and emergency generators, sea system, condensate, power supply, superheated steam systems, preparation and start-up turbo feed pumps and turbogenerators, preparation others auxiliary machinery and equipment, main turbine oil system, preparation and start of fuel and oil separators, preparation of main propulsion steam turbine, monitoring parameters of main propulsion steam turbine and other devices

1.5. Modes of Instruction		
	☒ Lectures	☐ Practical work
	☐ Seminars and workshops	☐ Multimedia and Network
	☒ Exercises	☐ Laboratory
	☐ E-learning	☐ Mentorship
	☐ Field work	☐ Other _____

1.6. Comments	

1.7. Student Obligations

In addition to the obligatory lectures and exercises, the student is obliged to pass the examinations and pass the final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1	Essay		Research	
Project		Continuous Assessment	2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Procedure for evaluating acquired learning outcomes:
- The final grade in the subject is the sum of the points that the student has achieved during the course (70% of the grade) and the points earned on the final exam (30% of the grade) according to the Regulations on Studies of the University of Rijeka and the Regulations on Studying at the Faculty of Maritime Studies in Rijeka.
- Continuous assessment:
Three colloquiums - a minimum of 50% of the estimated number of points is required
- Final exam:
The final exam (oral exam) checks the knowledge in the field of Simulator 2 - LNG ship - a minimum of 50% of points is required.

Examples of evaluation by individual outcome at the colloquium and final exam:
1. In the schematic representation of the LNG ship, identify and explain the function of the system
2. On the basis of the operating parameters diagnose the fault, perform proper system regulation
3.Evaluate local and remote indication of measured parameters, establish power system and prepare propulsion turbine for departure

1.10. Main Reading

User Manual Transas 5000
Presentation and lectures

1.11. Recommended Reading

LNG carrier instruction manuals

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
User Manual Transas 5000	50	50

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information		
Head of Course	Dean Bernečić, Ph.D.	
Course	On-board Training (OBT)	
Study Programme	Marine engineering	
Level	Undergraduate	
Type of Course	Obligatory	
Year of Study	3	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	2
	Number of Hours (L+E+S)	0+2

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of the exercises is to familiarize students with the actual ship systems, devices, life on board and their future duties and tasks as a marine engineering officer.

1.2. Prerequisites for Course Registration

Completed courses Work on simulator 1 and 2 and the right to take those exams (more than 70% attendance on lectures and exercises).

1.3. Expected Learning Outcomes

After the exercises, students will:
1. Understand life on board;
2. Know the duties of individual crew members;
3. To become acquainted with his future duties as apprentice engineer and later as a engine officer;
4. To get acquainted with the actual performances of the most important ship systems and to see their accommodation on board and to critically connect the differences and similarities of the real ship and the ship from the simulator;
5. Learn the watch structure, how to changeover the watch and learn the main parameters that are measured and recorded in the engine log book (when and how the record should be taken);
6. Know the ship's maneuver and the obligations of crew members and officers while performing the same.

1.4. Course Outline

Getting to know life on board,
Familiarity with the duties of individual crew members,
Familiarization with the duties of engine officers,
Familiarization with watch keeping and ship maneuver,
Designing the most important ship schemes, following the pipelines in the engine room (Sea and fresh cooling water system, main and auxiliary engine oil system, ME and AE fuel oil system, steam generation and steam distribution system),
Measurement of the most important parameters of the ship's machinery systems and their entry in the engine logbook,
Engine control room design with special reference to the main switchboard (MSB).

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1.5. Modes of Instruction	☐ Lectures ☐ Seminars and workshops ☐ Exercises ☐ E-learning ☒ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments	The onboard practice is organized by the Faculty depending on the possibilities and availability of individual Jadrolinija ships, JPS, "Viktor Lenac" Shipyard or some other shipping company.	

1.7. Student Obligations

Compulsory adherence to ship's crew members safety requirements and rules. It is obligatory to wear protective footwear and clothing, protective gloves and helmets, and it is advisable to take a flashlight. Obligatory adherence to a predefined schedule for staying in the engine room. Adherence to rules of manner on board. For misbehavior, the student will be removed from the ship in the first port at his (or her) own cost of return to the place of residence and will has no right to enter the grade. Misbehavior is considered to be drunkenness and the use of opiates, disturbance of ship's law and order, ascuffle, etc.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation	0.5	Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	0.5	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Onboard practice is carried out in shifts of 2 or 4 hours 24 hours a day, and in one shift there are two students with continuous monitoring of the professor – onboard practice leader. Assessment and evaluation of students' work will be done on the basis of their efforts on board and evaluation of graphic programs. The development of graphic programs requires the commitment of students and the independent tracking of ship pipelines, the schemes development of default main ship systems and their subsequent presentation to other students. Students work in pairs and have to communicate and exchange knowledge with other students and try to solve individual problems together. The evaluation shall also take into account the application of the material covered in the course "Work on Simulator 1 and 2". The passage constitutes the sum of all the above criteria.
The subject is evaluated with P - Passed or N - Not passed

1.10. Main Reading

D. Bernečić, R. Radonja; Praktikumi za vježbe te upute za rad na simulatoru; LITERATURA ZA SPP 1 (www.pfri.uniri.hr/~bernecic)
Literatura za Rad na simulatoru 2

1.11. Recommended Reading

Ships Instruction Books,
Koljatić, V., Priručnik za strojarski simulator,
Martinović, D., Brodski strojni sustavi.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
		70

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.13. Quality Assurance		
The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.		

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Course description

Generic information		
Head of Course		
Course	B.Sc. thesis	
Study Programme	Marine Engineering	
Level	Undergraduate	
Type of Course	Obligatory	
Year of Study	3	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	11
	Number of Hours (L+E+S)	

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Preparation of the final thesis with continuous consultation with the mentor and successful oral defense of the final thesis aims to prove that the student:
- ability to apply theoretical and practical knowledge acquired during undergraduate studies,
- ability to independently use current foreign and domestic literature in research and written processing of the defined topic of the final paper,
- ability to use relevant other people's knowledge, attitudes and facts published in the used literature,
- ability to properly process illustrations (tables, graphs, photographs, drawings) in accordance with the methodology of research work.

1.2. Prerequisites for Course Registration

The student enrolls in the course Final Thesis by enrolling in the sixth (summer) semester of undergraduate study, and the conditions for enrollment are: all courses taken from the fifth (winter) semester and the absence of a possible ban on taking courses from the fifth (winter) semester.

1.3. Expected Learning Outcomes

1. Explain and apply the theoretical and practical knowledge acquired in the study.
2. Be able to independently process a given (selected) topic.
3. Properly apply the methodology and technology of the final paper.
4. Present conclusions and insights related to the topic and the conducted research within the final work.

1.4. Course Outline

The final work is an independent professional or scientific treatment of an established topic. With the final thesis, the student proves the possession of competencies and learning outcomes in solving problems in professional and scientific areas that are the content of the undergraduate study Marine Engineering and the use of theoretical and practical knowledge acquired during the undergraduate study. In the process of presentation the final thesis, the student must prove knowledge of basic theoretical and practical knowledge in the field of marine engineering. The final thesis at the Faculty is given, written and presented in the Croatian language. Exceptionally, the final paper may be written and presented in a foreign language.

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1.5. Modes of Instruction	☐ Lectures ☐ Seminars and workshops ☐ Exercises ☐ E-learning ☐ Field work	X Practical work X Multimedia and Network ☐ Laboratory X Mentorship X Other
1.6. Comments		

1.7. Student Obligations

The obligations of students relate to: preparation of the final thesis in continuous consultation with the mentor during the summer semester and the successful presentation of the final thesis before the Commission. The manner of applying, preparing, presenting and evaluating the final thesis is prescribed by the Rulebook on the final thesis at the undergraduate university study of the Faculty.

1.8. Assessment[1] of Learning Outcomes

Course attendance		Class participation		Seminar paper		Experiment	
Written exam		Oral exam	2	Essay		Research	4
Project	4	Continuous Assessment		Presentation		Practical work	
Portfolio				Mentoring work	1		

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

In accordance with the Instructions on the application of the information system for checking the authenticity of student work of the University of Rijeka, using the Turnitin service (www.turnitin.com), the mentor checks the authenticity of the final work. Based on the above analysis, he compiles a Report on the conducted authenticity of student work - Appendix C (Form of the University of Rijeka) in which he provides data on student work and gives an opinion and explanation on whether the final work meets the requirements of original work. A positive opinion of the mentor and a positive report on the authenticity of the student work is a prerequisite for the acceptance of the final work and the organization of the presentation. The presentation of the final thesis is held before the Commission, which consists of three members, including a mentor. The members of the Commission examine the candidate and a record is kept of the process of defending the final thesis, which records all information about the student and the final thesis, questions asked by the members of the Commission and the success of the candidate in defending the final thesis.

Examples of evaluating learning outcomes in relation to set learning outcomes are:

1. Present in approx. 10 min. your work and highlight the conclusions! (learning outcomes 1 - 4)
2. Explain the diagram x on the y page of your paper! (learning outcomes 1-4)

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1.10. Main Reading

- obligatory literature from the course from which the final thesis is applied for and written
- other required literature in agreement with the mentor
- questions about the so-called final exam as part of the defense of the final thesis
- Instructions for writing the final paper, editors: dr.sc. I. Kolanović, Ph.D. A. Perić Hadžić, Ph.D. T. Dundović Ph.D. I. Jurdana, Ph.D. I. Rudan, Faculty of Maritime Studies University of Rijeka, Rijeka, 2014
- available at https://www.pfri.uniri.hr/web/hr/studij_pre_BS.php

1.11. Recommended Reading

- supplementary literature from the course from which the final thesis is applied for and written
- other supplementary literature in agreement with the mentor

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of stud.*
Instructions for writing the final paper, editors: dr.sc. I. Kolanović, Ph.D. A. Perić Hadžić, Ph.D. T. Dundović, Ph.D. I. Jurdana, Ph.D. I. Rudan, Faculty of Maritime Studies University of Rijeka, Rijeka, 2014	Available at https://www.pfri.uniri.hr /web/hr/studij_pre_BS.php	

1.13. Quality Assurance

Course quality review carried in accordance with ISO 9001 system and European standards and guidance for quality assurance carried through on Maritime faculty. Student Success is evaluated, and corrective measure implemented yearly.

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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Table 2.

3.2. Course description

Generic information			
Head of Course	Mirjana Borucinsky, PhD		
Course	English Language V		
Study Programme	**Marine Engineering**		
Level	Bachelor		
Type of Course	Elective		
Year of Study	3	Semester	5
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		3
	Number of Hours (L+E+S)		15+30+0

1. GENERAL COURSE DESCRIPTION							
1.1. Course Objectives							
The goal of the course is to develop the students' speaking and presentation skills in English for Specific Purposes.							
1.2. Prerequisites for Course Registration							
None							
1.3. Expected Learning Outcomes							
The students are expected to be able to: 1. Based on the terminology learned on core courses English Language I – IV, provide a critical overview of the advantages and disadvantages of various types of propulsion and machinery. 2. Based on the terminology learned on previous core courses, provide a critical overview of marine auxiliary machinery. 3. Make and hold a presentation independently.							
1.4. Course Outline							
Reversing a four-stroke and a two-stroke marine engine. Governor. Starting an engine. Watchkeeping. UMS. Engine room log. Fire-fighting machinery and equipment. Fire-fighting systems on board. Grammar: sequence of tenses, conditional clauses							
1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work		☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____				
1.6. Comments							
1.7. Student Obligations							
Class attendance, activities, continuous assessment and final exam (written and oral)							
1.8. Assessment of Learning Outcomes							
Course attendance	1,5	Class participation		Seminar paper	1	Experiment	

Written exam		Oral exam	0,5	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio		Final exam					

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

60 % in class, 40 % at the final exam (outcomes 1-3).
Independent work (presentation) (50 %)
Activity in class (doing exercises in the learning platform Merlin) (10 %)
Final oral exam (40 %) (outcomes 1-3)

Example of assessing the independent work (presentation)
Draw conclusions about the researched topic and present results.

Examples of assessment for each outcome in the final exam:

1. Provide a critical overview of advantages and disadvantages of different types of propulsion, describe the process of reversing in a slow-speed two-stroke diesel engine.
2. Describe the auxiliary machinery.

1.1. Main Reading

Spinčić, A.-Pritchard, B.: An English Textbook for Marine Engineers II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.

1.2. Recommended Reading

Lamb: Questions and Answers in Marine Engineering (CD)
moodle.srce.hr

1.3. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Spinčić, A.-Pritchard, B.: *An English Textbook for Marine Engineers* II, Pomorski fakultet IV izmijenjeno i dopunjeno izdanje, Rijeka 2002.	15	30

1.4. Quality Assurance

The quality of the course is monitored in accordance with the ISO 9001 system and the European standards and guidelines for quality assurance, implemented at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the course are analyzed and appropriate measures implemented accordingly.

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3.2. Course description

Generic information			
Head of Course	Goran Vukelić, Ph.D.		
Course	CORROSION AND PROTECTION OF MATERIALS		
Study Programme	Marine Engineering		
Level			
Type of Course	electoral		
Year of Study	1		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		2+1+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The objective of this course is to provide the student with the appropriate corrosion knowledge and protection of materials and systems prescribed by STCW and IMO Model Courses for the service of Naval Navigation Officer.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

After passing the exam, students will be able to do the following:
1. Define corrosion, abrasion, erosion, mechanical fatigue, cavitation.
2. Explain corrosion of metals.
3. Explain the division of corrosion.
4. Explain electrochemical corrosion.
5. Explain chemical corrosion.
7. Describe the forms and mechanisms of corrosion.
8. Describe the Purbaix diagram.
9. Explain the corrosion of individual technical metals.
10. Explain basic corrosion protection procedures.
12. Know the technological preconditions for good protection.
13. Have the knowledge necessary to prepare the surface and apply different methods of protection.
14. Have the knowledge necessary to perform the application of various corrosion tests and test the effectiveness of protection.
15. Have the knowledge necessary to perform corrosion tests and test the effectiveness of protection.
16. Have the knowledge necessary to perform a safety performance test

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1.4. Course Outline

Korozija metala. Podjela korozije. Kemijska korozija i elektrokemijska korozija.
Definicije korozije, abrazije, erozije, mehaničkog zamora i kavitacije.
Oblici i mehanizmi korozije.
Korozija pojedinih tehničkih metala.
Posebni oblici korozije u moru.
Destrukcija anorganskih i organskih materijala.
Zaštita od korozije.
Tehnološki preduvjeti za dobru zaštitu.
Priprema površine.
Metode zaštite.
Katodna zaštita.
Koroziona ispitivanja.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☒ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Regular attendance at classes, regular midterm exams, final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	0,9	Essay		Research	
Project		Continuous Assessment	1,6	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Learning outcomes are evaluated through regular class attendance and activity (10%), continuous exams (60%) and final examination (30%). During the class, the student can collect a maximum of 70% of the grade points as follows:
A) Successfully pass 2 oral midterms within the prescribed deadlines. Each passed midterm carries a minimum of 15% and a maximum of 30% of marks and can be taken 3 times. A student who has not achieved all the required learning outcomes cannot take the midterm exam. The next colloquium cannot be accessed unless the previous colloquium is passed. The colloquiums include the following:
1st Colloquium (Learning Outcomes 1-5)
2nd Colloquium (Learning Outcomes 1-5)
B) Active attendance (lectures and exercises). Each class absence accounts for 1% of the grade point. Students who have passed both exams can apply for the oral final exam (learning outcomes 1-5) and earn a minimum of 15% and a maximum of 30% of the marks.

Examples of evaluating learning outcomes in relation to set learning outcomes are:
1. Explain corrosion of metals.
2. Explain the division of corrosion.
3. Explain chemical and electrochemical corrosion.
4. Explain the corrosion of individual technical metals.
5. Explain the special forms of corrosion in the sea.
6. Explain the basic corrosion protection procedures.
7. Explain basic cathodic protection procedures.
8. Describe the basics of corrosion testing and protection effectiveness testing.
9. Explain methods of testing the effectiveness of protection.

1.10. Main Reading

Tomac, N. Korozija i zaštita materijala, 2012.
Tomac, N. Corrosion and protection of materials, 2019.

1.11. Recommended Reading

Corrosion and Protection (Engineering Materials and Processes)-Einar Bardal
Mechanical Engineers Data Handbook20200130 50502 sjtyzf

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Tomac, N. Corrosion and protection of materials, 2019.		

1.13. Quality Assurance

In accordance with ISO 9001 at the Faculty level.

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3.2. Course description

Generic information			
Head of Course	Mirano Hess, Ph.D.		
Course	Ship navigation		
Study Programme	Marine Engineering		
Level	Undergraduate study		
Type of Course	Optional course		
Year of Study	3		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		3
	Number of Hours (L+E+S)		1 + 2 + 0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

To train students to understand the elements of navigation, the methods of terrestrial navigation and electronic navigation systems, meteorological and oceanological factors on the navigation route, and the application of navigation guidance and positioning procedures..

1.2. Prerequisites for Course Registration

/

1.3. Expected Learning Outcomes

1. Define, explain, calculate, illustrate and differentiate elements of maritime navigation
2. Identify, explain and interpret elements of cartography, charts and publications
3. Describe, explain and compare elements of tides and currents
4. Highlight and point out the similarities and differences between loxodrome and orthodrome navigation
5. List, define and differentiate navigation devices and electronic navigation systems

1.4. Course Outline

1. Elements of navigation, geographical coordinates, ship's course, azimuth, bow angle
2. Sea orientation, course and distance determination, magnetic compass
3. Cartography, types of projections, mercator chart
4. Geometric basics of the ship's position, determination of position line, types of positions, determination of speed and distance traveled
5. Drawing Courses on a chart
6. Tides and tides
7. Loxodrome and orthodrome navigation
8. Electronic navigation systems, satellite navigation, radar, electronic charts, speelog, depth sounder, integrated navigation systems

1.5. *Modes of Instruction*	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☒ pracical work on a nautical chart ☒ exercise on a navigation simulator
1.6. *Comments*		

1.7. *Student Obligations*

Active attendance at classes. Passed a midterm exam and final exam.

1.8. *Assessment[1] of Learning Outcomes*

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam	0.5	Oral exam		Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	
Portfolio							

[1] **NOTE:** Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

1.9. *Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam*

70% in class and 30% in final exam (according to the Regulations on studies of the University of Rijeka and the Regulations on study at the Faculty of Maritime Studies in Rijeka). Continuous assessment: a pre-requisite exam, a minimum of 50% correct answers should be obtained (I1, I2). Final exam: written exam in the course material. A minimum of 50% correct answers should be obtained (I3, I4, I5).
Examples of evaluating learning outcomes:

1. The ship sailed from port A (ϕ = 41 ° 26´N; λ = 117 ° 31´E) at 13:10. At 20:05 the coordinates changed by $\Delta\phi$ = 35.9´ N and $\Delta\lambda$ = 24.3'W. Calculate the position of the ship at 8:05 pm. (I1)
2. Explain which chart (chart projection) and for what reason, is it commonly used as a navigation chart? (I2)
3. Explain the procedure (how it is done in practice) to which we can accurately calculate the depth of the sea at a particular time in a particular port? (I3)
4. What are the similarities and differences of loxodrome and orthodrome navigation? (I4)
5. Explain how the ultrasonic speelog works and measures the speed of the ship? (I5)

1.10. *Main Reading*

1. Hess, M.: Ship navigation, script on web pages of Faculty of Maritime Studies Univerity of Rijeka, 2020

1.11. *Recommended Reading*

1. Simović, A.: Terrestrial navigation, Školska knjiga, Zagreb, 2000.
2. Simović, A.: Electronic navigation, Školska knjiga, Zagreb, 2000.
3. Grupa autora: Vademecum maritimus, Pomorski fakultet, Rijeka 2014.
4. Kos, S., Vranić, D., Zorović, D.: Elements of electronic navigation for deck officers and masters, Faculty of Maritime Studies Rijeka, Rijeka, 2005.
5. Bowditch, N.: American Practical Navigator, National Geospatial-Intelligence Agency, Springfield, 2017.
6. Signs and abbreviations on HR charts, Hrvatski hidrografski institut, Split, 2013.
7. Tide tables – Adriatic sea, Hrvatski hidrografski institut, Split, 2018.

1.12. *Number of Main Reading Examples*

Title	*Number of examples*	*Number of students*
Hess, M.: Ship navigation, script on web pages of Faculty of Maritime Studies Univerity of Rijeka, 2020	unlimited	35

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies University of Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information		
Head of Course	Livia Maglić, Ph.D.	
Course	Cargo handling equipment	
Study Programme	Marine Engineering	
Level	Undergraduate	
Type of Course	Elective	
Year of Study	3rd	
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload	4
	Number of Hours (L+E+S)	30+15+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The goal of the course is to familiarize students with the material handling equipment and their exploitation features depending on the type of cargo and handling techniques.

1.2. Prerequisites for Course Registration

None.

1.3. Expected Learning Outcomes

1. Define the basic terms of transport, transfer, transshipment, material handling equipment.
2. Explain the role and importance of material handling equipment in the transport process.
3. Classify material handling equipment by type of cargo and technological process of transshipment.
4. Explain and determine the factors determining the exploitation characteristics of the material handling equipment.
5. Compare and give an example of the application of types of material handling equipment, depending on the technological process of transshipment.
6. Explain how to evaluate, select and determine the required number of material handling equipment.
7. Comprehend and explain the importance of the safety aspect during operations with particular material handling equipment.
8. Determine the productivity, operating class, stability, and a load of material handling equipment.

1.4. Course Outline

Definition of terms of transport, transfer, and transshipment. Types and basic features of transshipment. The productivity of the material handling equipment. Determination of the operating class, safe working load and working speeds of material handling equipment. Cargo lifting gears for handling loads. Documentation, inspection, and testing of material handling equipment. Safety management of material handling equipment.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☒ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

1. Two colloquiums
2. Design and present a project assignment
3. Final exam

1.8. Assessment[1] of Learning Outcomes

Course attendance	1,5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	1,0	Essay		Research	
Project	0,5	Continuous Assessment	1,0	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

The procedure for evaluating the acquired learning outcomes is carried out according to the Regulations on Studies of the University of Rijeka and the Rulebook on Studies at the Faculty of Maritime Studies in Rijeka as follows:

• 70% of the acquired learning outcomes are evaluated through continuous knowledge assessment during the teaching process: through the 1st colloquium - learning outcomes 1-4 (25%), 2nd colloquium - 5-8 (25%), project assignment - learning outcomes 1-8 (20%);

• 30% of the acquired learning outcomes (1-8) are evaluated at the final part of the exam, with a minimum of 50% of available points necessary for passing the final exam.

Examples of evaluating learning outcomes respecting set learning outcomes are:

1. Define the term transport.
2. Specify the basic sizes in the material flow technology for the requirements of cargo transfer with continuous material handling equipment.
3. Explain and describe the basic criteria for the classification of material handling equipment.
4. Classify and explain the utilization coefficients of the safe working load capacity of the material handling equipment.
5. Explain the relation of routes as one of the indicators of valuation of the operation of material handling equipment.
6. Classify and describe the safety precautions when operating with a crane.
7. Calculate and explain theoretical and exploitative productivity on a given numerical example.
8. Calculate the relevant parameters for determining the operating class of a quay crane for the given example.

1.10. Main Reading

- Course presentations available on the e-learning system Merlin
- Dundović, Č., Prekrcajna sredstva prekidnog transporta, Pomorski fakultet u Rijeci, Rijeka, 2005.

Mavrin, I., Transporteri, Fakultet prometnih znanosti, Zagreb, 1999.

1.11. Recommended Reading

- Maglić, L. Optimizacija raspodjele kontejnera na slagalištu lučkoga kontejnerskog terminala, doctoral thesis 2015.
- Burič, A.M., Zbirka riješenih zadataka iz pretovarne mehanizacije, Univerzitet Crne Gore, Podgorica, 2010.
- Vladić, J., Transportna i pretovarna sredstva i uređaji: neprekidni i automatizovani transport, Fakultet tehničkih nauka, Novi Sad, 2005.
- Vladić, J., Mehanizacija i tehnologija pretovara: neprekidni transport i specifične mašine i uređaji, Fakultet tehničkih nauka, Novi Sad, 2005.
- Bukumirović, M., Zbirka riješenih zadataka iz elemenata transportnih sredstava i uređaja 2, Univerzitet u Beogradu, Saobraćajni fakultet, Beograd, 2003.
- Matić, A., Prekrcajna sredstva u pomorskom transportu 1, Veleučilište u Dubrovniku, Dubrovnik, 2000.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Dundović, Č., Prekrcajna sredstva prekidnog transporta, Pomorski fakultet u Rijeci, Rijeka, 2005.	6	70
Mavrin, I., Transporteri, Fakultet prometnih znanosti, Zagreb, 1999.	6	70

1.13. Quality Assurance

The quality of study is continuously observed under the ISO 9001 system and following European standards and guidelines for quality assurance implemented at the Faculty of Maritime Studies, University of Rijeka. An analysis of the exams is given annually, and a survey among students is conducted by the semester.

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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3.2. Course description

Generic information			
Head of Course	Dean Bernečić, Ph.D.		
Course	Liquid Cargo Transport Technology (LCTT)		
Study Programme	Marine engineering		
Level	Undergraduate		
Type of Course	Elective		
Year of Study	3		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		5
	Number of Hours (L+E+S)		3+1

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The student familiarization with Crude Oil Tanker (VLCC) cargo simulator as well as with real oil tankers, chemical tankers and liquefied gas tankers, cargo properties, hazards, hazard monitoring, safety equipment, pollution prevention, cargo handling equipment and basic cargo operations and precautions.

1.2. Prerequisites for Course Registration

There are no prerequisites. It is advisable to listen to and passed the main exams of the future profession (Marine Engines, Marine Auxillary Systems, Marine Steam Generators, Marine Turbines, Marine auxiliary equipment).

1.3. Expected Learning Outcomes

After passing the exam students will be able;
1. Understand cargo systems on particular types of tankers;
2. Read and properly interpret the operating instructions (instruction books) of the liquid cargo handling system;
3. Distinguish between different types of tanks on LNG and LPG ships and understand the basics of their construction and the type and construction of cargo handling equipment;
4. Understand the design of hulls and equipment, as well as the construction of tanks and cargo equipment on a Type 1 chemical tanker with special reference to the “Framo” Hydraulic System;
5. Understand the construction of hulls and equipment, as well as the construction of tanks and cargo equipment on an Crude oil tanker (VLCC) with special reference to the Inert Gas System (I.G.S.) and the Crude oil Washing (COW) and Sea Water Washing (S.W.W.);
6. Distinguish individual inert gas systems depending on the ship type, as well as know their basic characteristics and specificities;
7. Understand cargo handling procedures for particular types of tankers with special reference to the crude oil tanker and product tankers (simulation of loading, unloading, drying, inerting and cargo tank washing);
8. Understand the dry docking procedures;
9. Understand emergency procedures;
10. Perform engine officer duties at the operating and management levels in a safe and responsible manner.

1.4. Course Outline

Introduction, basic terminology, types of cargo, rules and regulations;
Basic physical and chemical properties of liquid cargo;
Fire hazard, health and environmental hazards, reactivity hazard, corrosion hazard;
Hazard monitoring, cargo safety patterns, ways of controlling the potentially dangerous atmosphere on tankers;
Safety equipment and protection of persons, safety measuring instruments, dedicated fire fighting equipment, breathing apparatus;
Entry procedures for tanks and enclosure spaces, rescue and abandonment equipment, protective equipment and clothing, resuscitation devices, precautions and security measures, cargo spill procedures, SOPEP, ship / terminal connection;
Ship construction and cargo handling equipment for oil tankers, cargo tanks, cargo pipelines, valves for cargo systems, ventilation;
Ship construction and cargo handling equipment for chemical tankers, cargo tanks, cargo pipelines, valves for cargo systems, tank and layer materials, tank clearance, cargo heating systems;
Ship construction and cargo handling equipment on liquefied gas carriers, liquefaction and evaporation control systems, heat exchangers;
Inert gas systems, operations, measuring, indicators and alarms, system performances, system elements, maintenance and checks;
Tank washing systems, system designs, pipelines, tank washing machines, drying system, washing process;
Cargo operations, awareness of the dangers involved in carrying out cargo operations on tankers;
Pumps and piping systems for liquid cargo tankers;
Emergency procedures, emergency measures, organizational structure, alarms, procedures.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☒ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

Required min. 75% of attendance at lectures and exercises, and preferably to visit a tanker(s) in shipyard drydock.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1	Class participation		Seminar paper		Experiment	
Written exam	1	Oral exam		Essay		Research	
Project		Continuous Assessment	3	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

Assessment and evaluation of student work covered through three (3) partial exams during the semester. Each covers a separate type of tankers. Partial exams are evaluated with one ECTS each. The final exam involves checking all material and simulator work, in accordance with STCW 73/78 Convention, and get 1 ECTS. Other evaluation includes continuous work, class attendance, exercise monitoring, and classroom activity (1 ECTS).
Colloquium 1 (I1, I2, I3, I6, I7, I8, I9, I10)
Colloquium 2 (I4, I6, I7, I8, I9, I10)
Colloquium 3 (I5, I6, I7, I8, I9, I10)
Example of simulator evaluation:

[1] NOTE: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

Properly prepare and start steam turbine driven cargo pumps (I5)
Start inert gas system (I5)
Examples of evaluation at partial exams and final exam:
Enumerate the type of tanks and explain the construction on LNG / LPG vessels (I1, I3),
Identify and list the advantages and disadvantages of membrane tanks (I1, I3).

1.10. Main Reading

D. Bernečić, LITERATURA ZA TTTT (https://www.pfri.uniri.hr/web/hr/zavod_BS.php?pregled&id_username=10)

1.11. Recommended Reading

Instructional books from ships;
Regulations relating to the safety of tanker navigation and pollution prevention, Faculty of Maritime Studies Rijeka.
Fire protection on ships, Faculty of Maritime Studies Rijeka.
Tanker Safety, Faculty of Maritime Studies Rijeka.
Transport of liquefied gas by sea, Faculty of Maritime Studies Rijeka.
Chemical Tankers, Faculty of Maritime Studies Rijeka.
Inert Gas System and Crude Oil Washing, Faculty of Maritime Studies Rijeka.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
		70

1.13. Quality Assurance

The quality of study is monitored in accordance with the ISO 9001 system and in accordance with European standards and guidelines for quality assurance carried out at the Faculty of Maritime Studies in Rijeka. Once a year, the results of the transience are analyzed and appropriate measures are adopted.

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3.2. Course description

Generic information			
Head of Course	**Marko Gulić, Ph.D.**		
Course	**Business information systems**		
Study Programme	**Marine Engineering**		
Level	Undergraduate degree programme		
Type of Course	Elective		
Year of Study	3rd		
Estimated Student Workload and Methods of Instruction	ECTS coefficient of Student Workload		4
	Number of Hours (L+E+S)		30+15+0

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

Acquiring knowledge about the ship's information system as part of the shipowner's information system. Familiarization with the inclusion of computers in the ship's various technological processes and their integration into the ship's unique information system.

1.2. Prerequisites for Course Registration

1.3. Expected Learning Outcomes

After passing the exam, students will be able to:

1. Explain the organization of data
2. Properly explain the basic concepts of maritime information systems
3. Describe the method of including the ship's systems in the ship's information system
4. Use the MS Access application program for data management and organization

1.4. Course Outline

Presentation and organization of data. Databases. Computer tasks in the automation of ship technological processes. Ways to include computers in process management. Signals. Basic circuit elements required for computer control. Ship computer network. Application of computers on board. Application in maintenance. The ship's integrated information system. Information system of shippers.

1.5. Modes of Instruction	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Student Obligations

A student who has not attended lectures and exercises for more than 70% of the total number of hours cannot take the exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0.5	Class participation		Seminar paper	Experim ent	
Written exam	1	Oral exam		Essay	Researc	
Project		Continuous Assessment	2	Presentation	Practical	
Portfolio						

1.9. Assessment of Learning Outcomes and Examples of Evaluation during Classes and on the Final Exam

70% in class, 30% in the final exam; according to the Regulations on studies at the University of Rijeka and the Regulations on studies at the Maritime Faculty in Rijeka.

Continuous knowledge check:
- 2 part exams

Final exam:
The final exam (written exam) checks the completeness of theoretical knowledge in the field of maritime information systems - it is necessary to achieve a minimum of 50% of the required theoretical knowledge.

1.10. Main Reading

1. Tudor, M. Nastavni materijali, Web stranica www.pfri.uniri.hr/~tudor
2. Tudor, M. Primjena elektroničkih računala, Sveučilište u Rijeci, Pomorski fakultet u Rijeci, Rijeka, 2010.
3. Smiljanić, G. Računala i procesi, Školska knjiga, Zagreb, 1991.

1.11. Recommended Reading

1. Pavić, M. Razvoj informacijskih sustava, Znak, Zagreb, 1996.
2. Smiljanić, G. Sadašnje stanje upotrebe elektroničkih računala na brodovima, Školska knjiga, Zagreb, 1991.
3. Tudor, M. ; Martinović, D. Primjena računala u održavanju broda, Zbornik radova Pomorskog fakulteta, (Biličić, M. urednik), Sveučilište u Rijeci, Pomorski fakultet u Rijeci, Rijeka, 1997, pp. 49-59.
4. Tudor, M. Promjena računala u dijagnostici kvarova, Zbornik radova Pomorskog fakulteta, (Biličić, M. urednik), Sveučilište u Rijeci, Pomorski fakultet u Rijeci, Rijeka, 1998, pp. 187-195.
5. Tudor, M.; Vlahinić, I.; Martinović, D. Selection of Ship Maintenance Strategy Applying the Computer, Naše More, (Lovrić, J. urednik), god. 45, br. 1-2/98, Dubrovnik, 1998. pp. 26-32.
6. Grundler, D. Primjenjeno računalstvo, Graphis, Zagreb, 2000.
7. Tudor, M. Modeliranje integriranog informacijskog sustava nadzora brodskih procesa s gledišta održavanja, Pomorski fakultet u Rijeci, Sveučilište u Rijeci, doktorska disertacija, Rijeka, 2006.

1.12. Number of Main Reading Examples

Title	*Number of examples*	*Number of students*
Tudor, M. Primjena elektroničkih računala, Sveučilište u Rijeci, Pomorski fakultet u Rijeci, Rijeka, 2010.	10	20

1.13. Quality Assurance

[1] **NOTE**: Name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course. Use empty fields for additional activities.

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The quality of study is continuously observed under the ISO 9001 system and following European standards and guidelines for quality assurance implemented at the Faculty of Maritime Studies, University of Rijeka. An analysis of the exams is given annually, and a survey among students is conducted by the semester.