Sveučilište u Rijeci, University of Rijeka
Trg braće Mažuranića 10, 51 000 Rijeka, Croatia
T: (051) 406-500, F: (051) 216-671; 216-091
https://uniri.hr/
Email: ured@uniri.hr

I. DESCRIPTION FORM FOR LIFELONG LEARNING PROGRAM

Note: Specific fields in the form are marked with footnote [a, b, c]. The specified fields are not mandatory for the following program. Furthermore, all fields that are not specifically marked are mandatory to fill in.

General Information	
Course	**Lifelong learning program (special education program) for acquiring certificate of competence for second engineer officer on a ship powered by the main propulsion machinery of 3000 kw propulsion power or more**
Program holder	**University of Rijeka, Faculty of Maritime Studies**
Program execution	**University of Rijeka, Faculty of Maritime Studies**
Type of program	a) Distinctive education in the process of obtaining an academic title. b) Acquiring credit points in an accredited study program. **c) Further training after the acquired academic title.** d) Education for various social and work activities or personal development.

1. INTRODUCTION

1.1. Reasons for starting the program

The Minister of the Sea, Transport and Infrastructure, on the basis of Article 1021 of the Maritime Code (Official Gazette No. 181/04, 76/07, 146/08), enact December 10, 2010. "Rule on amendments and additions to the rulebook on qualifications and certificates of seafarers" (Official Gazette 142/2010). The Ordinance makes it possible to take the exam for obtaining the highest naval titles, subject to the conditions defined by the Maritime Code and the completion of the special education program from Annex I-2 of the said Ordinance, which is conducted at maritime colleges.

1.2. Evaluation of expediency with regards to the needs of the labor market in the public and private sectors [a, b, c]

In the global maritime industry, there is a great demand for Croatian seafarers that holds highest officer ranks, which they obtained by studying at the maritime institutions of higher education's in the Republic of Croatia. By amending and supplementing the Rulebook on titles, which was adopted precisely at the request of companies participating in the maritime labor market in the public and private sector, it is possible for seafarers with long-term maritime experience (prescribed by the Rulebook) to take the exam for the highest maritime ranks upon completion of the Special Program. The special program will be accessed by seafarers who are employed and will be able to advance in their profession after completing the program, as well as seafarers who will become more competitive on the world maritime market by acquiring the highest maritime ranks and thus find a suitable high-ranking job more easily.

1.2.1. Connection with the local community (economy, entrepreneurship, civil society) [a, b, c]

The maritime economy and all matters related to the maritime economy are at the top of the strategic interests of both our local community and the Republic of Croatia. Seafarers have always contributed to our community in a special way, especially in times of crisis.

1.2.2. Compliance with the requirements of professional associations (recommendations) [a, b, c]

All maritime professional associations as well as the maritime trade union have greatly contributed or even played a decisive role in bringing of the mentioned regulation.

1.2.3. List possible partners outside the higher education system who have expressed interest in the program

Possible partners in the implementation of the Special educational program are officers with the highest seafaring certificates who can participate in the implementation of the part of the classes from the courses listed in the Rulebook, as well as leading people of maritime companies who have the appropriate knowledge, authorization, and competence.

1.3. Compliance with the lifelong learning program of the University of Rijeka

The program is conformed with the Rulebook of lifelong education and with the basic draft document for lifelong learning of the University of Rijeka

1.4. Institutional strategy for the development of lifelong learning programs (compliance with the institution's mission and strategic goals)

The program is conformed with the mission and education strategy of the Faculty of Maritime Studies in Rijeka and is aimed at increasing the number quality jobs for its citizens and the creation of experts for successful participation in the world labor market.

1.5. Other important information - according to the proponent opinion

2. GENERAL INFO

2.1. Name of the lifelong learning program

Special education program for acquiring certificate of competence for second engineer officer on a ship powered by the main propulsion machinery of 3000 kw propulsion power or more

2.1.1. Type of program

a) Distinctive education in the process of obtaining an academic title.
b) Acquiring credit points in an accredited study program.
c) Further training after the acquired academic title.
d) Education for various social and work activities or personal development.

2.1.2. Study program level [a, b, c]

2.1.3. Field of the program (scientific/artistic) - specify the name [a, b, c]

Technical sciences - field of traffic and transport technology

2.2. Program holder

University of Rijeka, Faculty of Maritime Studies

2.3. Program execution

University of Rijeka, Faculty of Maritime Studies

2.4. Duration of the program

6 months

2.4.1. ECTS credits – the minimum number of credits required for the student to complete the program [a, b, c]

15 ECTS

2.5. Conditions for enrolling in the program

The conditions are prescribed by the Ordinance on Amendments to the Ordinance on Titles and Certificates of Qualification for Seafarers (Official Gazette 142/2010), Articles 5 and 6.
- Completed high school education in marine engineering or another appropriate course lasting at least 4 years, which includes at least the contents in accordance with the program from Part A-III/1 of the STCW Ordinance or the adapted program from Part A-III/2 of the STCW Ordinance
- has at least 36 months of sea service as an engine officer responsible for the watch in the engine room with a propulsion machinery of 750 kW propulsion power or more
- has at least 24 months of navigation service as an engine officer responsible for the watch in an engine room with a propulsion machinery of 750 kW propulsion power or more and at least 12 months of sea service as a second engine officer on a ship with propulsion machinery of 3000 kW propulsion power or more

2.6. Learning outcomes of the program (competencies that the participant acquires by the end of the program)

Upon completion of the Program, the participant acquires the conditions and competencies for taking the exam to obtain the Certificate of Competence for second engineer officer on a ship powered by the main propulsion machinery of 3000 kw propulsion power or more (STCW III/2) and a certificate of competence for chief engineer on a ship with a propulsion machinery of 3000 kW or more (STCW III/2)

2.7. When enrolling for the program, state the study programs of the proposer or other institutions in the Republic of Croatia from which enrollment is possible into proposed program [a, b, c]

3. COURSE DESCRIPTION

3.1. The structure of the program, schedule of attendance and participants obligations

The program consists of 6 modules, each of which is composed of several complementary courses whose ECTS sum does not exceed 15 ECTS points. The program lasts a total of 6 months, depending on the possibilities of the participants and the faculty organization. It is held in rounds of 2 x 3 months. The program consists of lectures and exercises in classrooms, laboratories and specially equipped classrooms with maritime simulators at the Faculty of Maritime Studies in Rijeka.
Through the program, the applicant fulfills the obligations provided by the program in accordance with ECTS credits. The program is carried out through direct teaching and independent work on the execution of practical tasks with individual consultations with subject teachers. Classes will be held in the afternoon with a maximum load of 6 hours per classes. The morning hours are intended for individual work and study with the possibility of using the faculty library and classroom. Classes are organized by modules and during class the knowledge tests (colloquiums) are organized. Final exam is taken after the course has been completed and all obligations have been met.

3.2. List of courses and/or modules (if they exist) with the number of hours of active teaching required for their implementation (and number of ECTS - points for program types a, b, or c) (attachment: Table 1)

Modules:

1. General marine engineering module, 170 h active teaching hours, 14 ECTS
2. Mechanics and construction of the ship, 125 h active teaching hours, 13 ECTS
3. Thermal machines, 150 h active teaching hours, 15 ECTS
4. Marine engineering at management level, 105 h active teaching hours, 15 ECTS
5. Electrical engineering and electronics at management level, 110 h active teaching hours, 12 ECTS
6. Maintenance and management of the ship at man. level, 135 h active teaching hours, 10 ECTS

3.3. Description of each subject (if any) (attachment: Table 2)

In attachment

3.3.1. Enrollment conditions for the next semester or trimester (subject name) [a, b, c]

3.4. List of subjects and/or modules that can be taught in a foreign language (specify which language)

3.5. Multidisciplinary of the program

The program is multidisciplinary and covers the fields of mechanical engineering, marine engineering, nautical and marine traffic technology, logistics and management.

3.8 Method of completing the program

Participants are obliged to fulfill all obligations according to the established program. After fulfilling all obligations established by the program, the participant takes the final exam in a particular subject. After completing the entire program, they receive a certificate of completion.

Table 1.

3.1. List of courses and/or modules (if they exist) with the number of hours of active teaching required for their implementation with ECTS credits

List of Courses/Modules							
Module	Course	Course holder	L	E	S	ECTS [a, b, c]	
General marine engineering module	Mathematics	Biserka Draščić Ban, PhD Ivan Tudor, mag. educ.	20	10		2	14
	English language	Mirjana Borucinsky, PhD	30	20		4	
	Information technologies	Marko Gulić, PhD	20	10		2	
	Fuel, Lubricants and water	Dean Bernečić, PhD Davor Lenac, univ. mag. ing.	30			2	
	Technology of Materials and Machining	Goran Vizentin, PhD	30			4	
Mechanics and Ship Construction	Engineering Mechanics	Goran Vukelić, PhD	30	10		5	13
	Strength of Materials	Goran Vukelić, PhD	30	10		4	
	Ships Construction	Srđan Žuškin, PhD	45			4	
Thermal machines	Thermodynamics and heat transfer	Predrag Kralj, PhD Goran Vizentin, PhD	45	15		6	15
	Marine engines	Dean Bernečić, PhD	60			6	
	Marine steam generators and heat turbines	Dean Bernečić, PhD Davor Lenac, univ. mag. ing.	30			3	
Marine engineering at management level	Marine auxiliary engines and equipment's	Vladimir Pelić, PhD	30	10		5	15
	Automation of Ship's Propulsion	Robert Baždarić, PhD	35			5	
	Ship auxiliary systems	Predrag Kralj, PhD	30			5	
Electrical engineering and electronics at management level	Marine electrical engineering	Vladimir Pelić, PhD Nikola Lopac, PhD	30			5	12
	Marine electrical devices	Aleksandar Cuculić, PhD	40			3	
	Marine electrical systems	Ivan Panić, PhD	40			4	

Maintenance and management of the ship at management level	Work organization and leadership	Radoslav Radonja, PhD	30			2	10
	Machinery Control	Radoslav Radonja, PhD	30			3	
	Ship design and stability	Srđan Žuškin, PhD	45			3	
	Maritime Law	Igor Vio, PhD	30			2	

Table 2.

3.2. Course description

Generic information		
Head of Course	**Biserka Draščić Ban, PhD** **Ivan Tudor, univ. mag. educ. math. et inf.**	
Course	**Mathematics**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	2
	Number of Hours (L+E+S)	30 (20 + 10 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objective

The main objective of the course is to present general educational content and teach mathematics applied in other core and elective courses as well as to point to the importance of precise expression and definition of mathematical concepts.

1.2. Prerequisites for Course Registration [a]

None

1.3. Expected Learning Outcomes

Upon completion of the course the students will be able to:
1. Recognize the main concepts of linear algebra, one variable functions and differential calculus of a function with one variable.
2. Express and correctly interpret basic results in linear algebra, and the differential calculus of a function with one variable.
3. Interpret basic operations with matrices, vectors, determinants, determine solutions of random linear systems, as well as boundary values and derivations of functions with one variable.
4. Apply the differential calculus.

1.4. Course Outline

Sets of numbers. Complex numbers. Properties of limits of a sequence. Tabular limits of a sequence. Elementary functions. Function with one real variable. Boundary value of a function. Determinants. Matrices. Derivation, properties of derivatives. Vectors. Trigonometry. Primitive function, tabular integration. Methods of integrals.

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. Participant Obligations

Active class attendance according to Regulation directive.
Passed written exam. Home Task delivered.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

Written exam - must have at least 50% score.

1.10. Main Reading

1. Group of authors: Matematika I, Faculty of Maritime Studies in Rijeka
2. Group of authors: Matematika II, Faculty of Maritime Studies in Rijeka
3. Group of authors: Workbook, Faculty of Maritime Studies in Rijeka

1.11. Recommended Reading

B. P. Demidovič, Problems in mathematical analysis

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Group of authors: Matematika I, Faculty of Maritime Studies in Rijeka	8	20
Group of authors: Matematika II, Faculty of Maritime Studies in Rijeka	8	20
Group of authors: Workbook, Faculty of Maritime Studies in Rijeka	8	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Predrag Kralj, PhD** **Goran Vizentin, PhD**	
Course	**Thermodynamics and heat transfer**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	**6**
	Number of Hours (L+E+S)	**60 (45 + 15 + 0)**

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objectives		
The course objectives are to acquaint participants with: heat engines and heat transfer principles, ship power complex heat balances, energy processes optimization and theoretical knowledge necessary for management level decision making.		
1.2. Prerequisites for Course Registration [a]		
None		
1.3. Expected Learning Outcomes		
1. Application of knowledge about basic thermodynamic principles 2. Capability to analyze physical values affecting heat balance 3. Application of methods to gain maximum of power and energy transformation processes optimization 4. Understanding properties of moist air affecting the operation of marine engines and equipment 5. Management of heat transfer equipment and its optimization 6. Recognize the difference between energy and exergy and the possibilities to transform energy to mechanical work 7. Acquire necessary knowledge about thermodynamically based factors for management level decision making		
1.4. Course Outline		
Introduction; definitions and units; mass and energy conservation laws; properties of substances; ideal gas and specific heat; gasses and vapors mixtures; basic thermodynamic laws; cyclic processes and equation of state; entropy and irreversibility; thermodynamic relations; maximal work; technical work; exergy; vapor processes; refrigerating processes; basics of combustion processes; gas compression processes; internal combustion engine processes; gas turbine processes; gas, vapor and liquid flow processes; moist air processes; heat transfer.		
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	Besides theoretical knowledge some numerical examples are also explained.	

1.7. Participant Obligations

Participants are obligated to attend lectures not less than 95%, and to pass partial and final exams.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

The outcomes are assessed through partial exams where participants could receive up to 70% of total score, while the rest (30%) is given in accordance with their results on the final written-oral exam.

1.10. Main Reading

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

1.11. Recommended Reading

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

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
1.10 – 1.	5	10 - 20
1.10 – 2.	4	

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.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Goran Vukelić, PhD**	
Course	**Engineering Mechanics**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	5
	Number of Hours (L+E+S)	40 (30 + 10 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
Acquiring theoretical knowledge that is the basis for problem solving in the field of solid mechanics and fluids statics and dynamics.
1.2. Prerequisites for Course Registration [a]
None.
1.3. Expected Learning Outcomes
1. Understanding simple and complex type of loads onto the solid body. 2. Applying the laws of mechanics onto the dimensioning of the solid body. 3. Analyzing stress, strain and stability of beams. 4. Applying the laws of mechanics to solve the problems of particle, body and system motion. 5. Analyzing the motion of mechanisms. 6. Applying the laws of mechanics to solve the problems of fluid statics. 7. Applying the laws of mechanics to solve the problems of fluid dynamics. 8. Analyzing the suitability of pipeline and its elements regarding fluid mechanics parameters.
1.4. Course Outline
Introduction with basic mathematics for problem solving in mechanics. 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. 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. Participant Obligations

Attending the lectures, attending the assessment and exams.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

Through final exam (100% of learning outcomes) with passing rate set at min. 50% of final exam points.
Examples of evaluation in correlation to learning outcomes:

1. Effect of basic and combined loadings onto the solid body.
2. Determining stress, strain and stability of a beam, dimensioning of a beam.
3. Determining maximum allowable stress and strain.
4. Determine dynamic equilibrium of a body at planar motion.
5. Compare the motion of several interconnected bodies based on the set criterium.
6. Calculate pressure, change of pressure, pressure force, buoyancy.
7. Use Euler and Bernoulli equation to determine motion parameters of the fluid.
8. Determine the losses in a pipeline.

1.10. Main Reading

Brnić, J., “Mehanika i elementi konstrukcija”, Školska knjiga, Zagreb, 1993.
Jecić, S., “Mehanika II, Kinematika i dinamika”, Tehnička knjiga, Zagreb, 1989.
Pečornik, M., “Tehnička mehanika fluida”, Školska knjiga, Zagreb,1985.
Matković, M., Bukša, A. “Zbirka zadataka iz hidromehanike”, Pomorski fakultet, Rijeka,1998.

1.11. Recommended 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.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Brnić, J., “Mehanika i elementi konstrukcija”	10	20
Jecić, S., “Mehanika II, Kinematika i dinamika”	5	20

Pečornik, M., “Tehnička mehanika fluida”	5	20
Matković, M., Bukša, A. “Zbirka zadataka iz hidromehanike”	15	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Dean Bernečić, PhD** **Davor Lenac, univ. mag. ing.**	
Course	**Fuels, Lubricants and Water**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	2
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
Understanding fuel, lubricants and water features and their application on board.
1.2. Prerequisites for Course Registration [a]
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.

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. Participant Obligations

A student with less than 75% of time in class attendance cannot access the exam.

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		Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

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

1.11. Recommended Reading

Voda i brod, Vojtjeh Bačić, VPŠ

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
E. Tireli; Goriva i njihova primjena na brodu, knjiga, Pomorski fakultet u Rijeci	5	20
E. Tireli; Maziva i njihova primjena na brodu, knjiga, Pomorski fakultet u Rijeci	5	20
E. Tireli; Voda i njezina primjena na brodu, skripta, Pomorski fakultet u Rijeci	5	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Dr. sc. Goran Vizentin**	
Course	**Technology of materials and machining**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	4
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objectives
The aim of the class is for the participants to become familiar with the basic properties of the materials from which the elements of ship's machinery are made and with the basic technological procedures of welding and processing by removing particles that are applied on board.
1.2. Prerequisites for Course Registration [a]
N/A
1.3. Expected Learning Outcome
1. Familiarizing with the structure and properties of materials and technological processing procedures. 2. Providing knowledge of prescribed STCW and IMO Model Courses for the service of machine manager in the field of Materials Technology. 3. Understanding of the basic methods of iron and steel production. 4. Understanding of the structure of atoms, arrangement of atoms and irregularities in the atomic structure. 5. Ability to describe the basic properties and methods of production of iron, steel and non-ferrous metals. 6. Ability to describe the basics of heat treatment. 7. Understanding the basics of plastic, ceramic, composite and natural materials. 8. Understanding the basic welding procedures 9. Have the knowledge necessary to perform basic manual processing; logging, sawing, drilling, etc. 10. Have the knowledge necessary to perform the measurement of the hardness, toughness of the material and identify the metal structure with a microscope.
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. Machining program: familiarization of 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; 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. Participant Obligations

Active class attendance according to Regulation directive. Passed written exam. Final oral exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0.5	Class participation	0.5	Seminar paper		Experiment	
Written exam	1.0	Oral exam		Essay		Research	
Project		Continuous Assessment	2.0	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes

Written exam - must have at least 50% score.
Final oral exam - checks the competences of theoretical knowledge where it is necessary to achieve a minimum of 50 % of the required theoretical knowledge.

1.10. Main Reading

1. Katavić, I: Uvod u materijale, 2008.

1.11. Recommended Reading

1. Šestan, A.: Tehnologija materijala i obrade. Pomorski fakultet, Rijeka, 1997.
2. Calister, W.D.: Materials Science and Engineering: An introduction, John Wiley & Sons, Inc., 2006.
3. Smith, W: Foundations of Materials Science and Engineering-McGraw-Hill Higher Education, 2022.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Katavić, I: Uvod u materijale, 2008.	10	20

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.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Goran Vukelić, PhD**	
Course	**Strength of Materials**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	4
	Number of Hours (L+E+S)	40 (30 + 10 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objective		
Acquiring theoretical knowledge that is the basis for problem solving in the field of the strength of materials.		
1.2. Prerequisites for Course Registration [a]		
None.		
1.3. Expected Learning Outcomes		
1. Understanding simple and complex type of loads onto the solid body. 2. Applying the laws of mechanics onto the dimensioning of the solid body. 3. Analyzing stress, strain and stability of beams.		
1.4. Course Outline		
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 ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Participant Obligations

Attending the lectures, attending the assessment and exams.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment 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 free body diagram of a beam and determine distribution of forces and moments.
2. Effect of basic and combined loadings onto the solid body.
3. Determining stress, strain and stability of a beam, dimensioning of a beam.

1.10. Main Reading

J. Brnić, G. Turkalj: Nauka o čvrstoći I, Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.

1.11. Recommended Reading

Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
J. Brnić, G. Turkalj: Nauka o čvrstoći I	10	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Srđan Žuškin, PhD**	
Course	**Ship construction**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	4
	Number of Hours (L+E+S)	45 (45 + 0 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objectives		
The course objective is to acquaint participants with the ship development, basic ship's dimensions and measures, transversal and longitudinal constructional elements, elementary conception of ship's strength and constructional features of different type of ships.		
1.2. Prerequisites for Course Registration [a]		
No prerequisites		
1.3. Expected Learning Outcomes		
1. Apply International rules for ship's construction and historical development. 2. Analyse type of ship construction, structural elements of longitudinal and transversal ship's strength. 3. Parse and define cargo system, ship's equipment and ship's cargo handling equipment for different type of ships. 4. Apply basic ship's dimensions and measures. 5. Properly apply the knowledge gained from the structural elements of longitudinal and transversal ship's strength in ship drawings and design. 6. Properly analyse ship's division toward purpose, type of cargo, navigational water categories, construction material, nature of shipping service, etc. 7. Apply and parse technical and technological characteristics for different types of ships.		
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 type of ships. Ship's operational equipment. Type of rudders, remarks for different kind of rudders, propeller execution with main particularities. Geometrical ship's dimensions and measures. Ship drawings and design. General plan of ship with different system technology. Wind surface and under water 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 liner and cruise ships and offshore vessels with different purpose and service.		
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. Participant Obligations

Active class attendance according to Regulation directive.
Passed written exam. Home Task delivered. Final oral 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

Written exam - must have at least 60% score.
Final oral exam - checks the competences of theoretical knowledge where it is necessary to achieve a minimum of 50 % of the required theoretical knowledge.

1.10. Main Reading

1. Žuškin, S., teaching materials from the course Ship construction on the teacher's personal web site (MERLIN) of the Faculty of Maritime Studies in Rijeka, 2020.
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.

1.11. Recommended Reading

1. Milošević, M., i Š., Osnove teorije broda 1, Sveučilište u Zagrebu, Zagreb, 1981.
2. Milošević, M., i Š., Osnove teorije broda 2, Sveučilište u Zagrebu, Zagreb, 1981.
3. Barrass, B., Derrett, D. R., Ship stability for Masters and Mates, Elsevier, 2008.
4. Eyres, D. J., Ship Construction, Butterworth-Heinemann, London, 2007

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Žuškin, S., teaching materials from the course Ship construction on the teacher's personal web site (MERLIN) of the Faculty of Maritime Studies in Rijeka, 2020.	Online	20
Komadina, P., Brodovi multimodalne prijevozne tehnologije, Pomorski fakultet u Rijeci, Rijeka, 2001.	10	20
Komadina, P., Ro-Ro brodovi, Pomorski fakultet u Rijeci, Rijeka, 2001.	10	20
Komadina, P., Tankeri, Pomorski fakultet u Rijeci, Rijeka, 1994.	10	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Dean Bernečić, PhD**	
Course	**Marine engines**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	6
	Number of Hours (L+E+S)	60 (60 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
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 [a]
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.

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. Participant Obligations

Active class attendance according to Regulation directive. Passed written exam. Home Task delivered.
Final oral exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	2.0	Class participation		Seminar paper		Experiment	
Written exam	2.0	Oral exam	2.0	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

Written exam - must have at least 60% score.
Final oral exam - checks the competences of theoretical knowledge where it is necessary to achieve a minimum of 50 % of the required theoretical knowledge.

1.10. Main Reading

1.11. Recommended Reading

Parat: Brodski motori s unutamjim izgaranjem, Sveuciliste u Zagrebu, 2005
Mikulich : Motori I, Skolska knjiga, Zagreb, 1976;
Krpan: Prednabijanje motora,Laki motori Ii II, Sveucilisna naklada Uber, Zagreb, 1976;
Sretner: Brodski motori s unutamjim izgaranjem, Sveuciliste u Zagrebu, 1970.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Parat: Brodski motori s unutarnjim izgaranjem, Sveuciliste u Zagrebu, 1990.	5	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Dean Bernečić, PhD** **Davor Lenac, univ. mag. ing.**	
Course	**Marine steam generators and heat turbines**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	3
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
Acquaintance of participants with the basic thermodynamic laws of operation of steam generators and heat turbines, their implementation and application on board.
1.2. Prerequisites for Course Registration [a]
None
1.3. Expected Learning Outcomes
It is expected that students will be able to: 1. Describe the purpose, division and main characteristics of ship's steam generators 2. Explain the thermodynamic process in a steam generator, heat transfer and state changes in individual parts of MSG 3. Define and explain the heat balance of the steam generator, heat losses, utilization, fuel consumption 4. Describe and explain the circulation of air, exhaust gases and water, steam separation, fuel system and feed water system 5. Describe and explain the automatic control and regulation of steam generator and safety eguipment 6. Distinguish and compare the main types of marine steam generators 7. Explain steam generator preparation, maintenance, inspections and conservation 8. Describe the purpose, division and main characteristics of marine gas and steam turbines 9. Explain thermal processes in steam turbines and analyze the influence of parameters on efficiency 10. Define and analyze types of marine steam turbines, steam flow in the turbine, efficiency optimization 11. Describe and explain the marine steam turbines types 12. Describe and explain marine steam turbine parts, lubrication oil system and feed water heating and deaerating system 13. Describe and explain the steam turbine automatic regulation system and turbine protection system 14. Explain and analyze thermal processes in gas turbines
1.4. Course Outline
Introduction, development of marine steam generators, purpose, division, main characteristics. Thermal process, heat losses, utilization. Air and exhaust gas circulation: natural, forced. Water circulation: natural, forced. Steam separation. Fuel system. Water supply system. Materials for making pressure parts, basic properties, classification regulations. Thermal expansions and their compensation. Regulation. Equipment and fittings, protection and safety

equipment. Special constructions of ship's steam generators. Exhaust gas steam generators. Operation and maintenance, inspections, damage of pressure parts, conservation.

Introduction. Comparison of propulsion machinery: internal combustion engines, gas turbines, steam turbines. The thermal process of heat turbines, the influence of parameters on the efficiency. Types of steam turbines, steam flow in the turbine, efficiency optimization. Energy losses inside the steam turbine. Performances of marine steam turbines. Parts of the steam turbine plant. Steam turbine automation system. Gas turbines; open gas turbine process, air heating after compression, two-stage expansion, two-stage compression and expansion. The main parts of the gas turbine plant.

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. Participant Obligations

A student with less than 75% of time in class attendance can not access the exam.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

1.10. Main Reading

E. Tireli, D. Martinović: Brodske toplinske turbine; knjiga Pomorski fakultet u Rijeci
Z. Prelec: Brodski generatori pare, Školska knjiga, Zagreb

1.11. Recommended Reading

J.H. Milton, Marine Steam Boilers, Newnes - Butterworths, 1980.
G.T.H. Flanagan, Marine Boilers, Kandy Marine Engineering Series, 1974.
A. Charchalis, Propulsion System of Naval Vessels with Marine Turbine Engines, Wyd Simp Gdansk, 1988

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
E. Tireli, D. Martinović: Brodske toplinske turbine; knjiga Pomorski fakultet u Rijeci	5	20
Z. Prelec: Brodski generatori pare, Školska knjiga, Zagreb	5	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Igor Vio, PhD**	
Course	**Maritime Law**	
Semester	First part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	2
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objective

Participants 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 [a]

No prerequisites.

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 exclusive economic 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 Shipping.

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

1.7. Participant Obligations

Participants' main obligations are active course attendance and passing of two mid-term exams and final exam. Participants must score at least 50% out of possible points on final exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0.1	Class participation	0.2	Seminar paper	0.3	Experiment	
Written exam	0.5	Oral exam	0.5	Essay	0.2	Research	
Project		Continuous Assessment	0.2	Presentation		Practical work	
Portfolio							

1.9. Assessment of Learning Outcomes

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

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.
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)

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Osnove međunarodnog prava mora	Sufficient (in library and book shop)	20
Pomorsko ratno pravo	Sufficient (in library and book shop)	20
Pomorsko upravno pravo	Sufficient (in library and book shop)	20
Pomorsko pravo, knjiga III – Pomorske nezgode	Sufficient (in library and book shop)	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Mirjana Borucinsky, PhD**	
Course	**English language**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	4
	Number of Hours (L+E+S)	50 (30 + 20 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
The main objective of the course is to improve language skills, in particular of Maritime English as the lingua franca of the maritime industry, and Technical English.
1.2. Prerequisites for Course Registration [a]
N/A
1.3. Expected Learning Outcomes
Upon completion of the course, course participants will be able to: 1. Demonstrate the four language skills in English: reading, writing, listening, speaking at level B2 (independent user) according to the Common European Framework of Reference for Languages (CEFR). 2. Discuss technical topics in English. 3. Turn non-verbal communication into verbal communication (figure-speech/writing). 4. Connect simple lexical and syntactic units into more complex ones. 5. Translate technical texts from instruction manuals and other relevant resources from English into Croatian. 6. Translate complex sentences from Croatian into English using general and specialized dictionaries. 7. Write letters and e-mails. 8. Write and translate remarks, specifications and reports.
1.4. Course Outline
Technical terminology covering the following topics: Ship propulsion, Main running and structural parts of an engine: design, materials, types, connection, stresses, troubleshooting and damage. Bedplate, main bearing, crankshafts and its alignment, piston rod, connecting rod, cylinder head, cylinder liner, piston. Valves, valve operating mechanism, turbochargers, fuel injectors. Fuel oil system, Lube oil system, Cooling system, Starting Air System. Relevant grammatical structures: Tenses, passive voice, nominal compounds, prepositions, word formation, modal verbs, polysemy of the verbs ‘carry’ and ‘provide’, language structures in marine engineering communication.

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. Participant Obligations

Attendance and active participation in class. 2 mid-term exams, final exam (oral)

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		Class participation		Seminar			

1.9. Assessment of Learning Outcomes

Continuous assessment (60 % of credits):
Mid-term exam 1 (30 % of credits) – minimum score is 60 %.
Mid-term exam 2 (30 % of credits) - minimum score is 60 %.
Course attendance and participation (10 % of credits)
Final exam (30 % of credits) - minimum score is 50 %.

Examples of assessment for each outcome:

1. Based on the text that you have read, answer the following question: Which factors affect the choice of a propulsion unit onboard ship? (O 1,2)
2. Describe the picture/figure/diagram using the correct tense and technical terminology. (O3)
3. Using modal verbs give instructions and orders. (O4)
4. Translate the following sentences from Croatian into English and vice versa, thereby using a dictionary (O 5,6).
5. Based on the notes provided, compose an e-mail as Chief Engineer in which you are informing the technical department about the malfunction of an engine part and propose possible solutions to the problem (O7).
6. Translate the following remarks, specifications and reports (O8).

1.10. Main Reading

Borucinsky, M., Kegalj, J. (2002). Notes on Written Communication in Marine Engineering. Rijeka: Sveučilište u Rijeci, Pomorski fakultet.

Spinčić, A., Luzer, J.. (2007). Engleski u brodostrojarskim komunikacijama. Rijeka: Adamić.

Spinčić, A. (2002). English Textbook for Marine Engineers I. Rijeka; Pomorski fakultet.

Spinčić, A., Pritchard, B. (2001). A Textbook for Marine Engineers II. Rijeka: Pomorski fakultet.

Luzer, J., Spinčić, A. (2001). Gramatička vježbenica za pomorce. Rijeka: Pomorski fakultet.

1.11. Recommended Reading

Course materials available via the *moodle* platform.
MarEng, Web-based Maritime English Learning Tool, EU Leonardo Project
Kluijven, P. van, International Maritime English Programme. Alk & Heijnen, Alkmaar
marinediesels.co.uk (The Learning Resources for Marine Engineers, Warsah Maritime Academy, UK)

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Borucinsky, M., Kegalj, J. (2002). Notes on written communication in Marine Engineering. Rijeka: Sveučilište u Rijeci, Pomorski	10	20
Spinčić, A., Luzer, J.. (2007). Engleski u brodostrojarskim komunikacijama. Rijeka: Adamić.	10	20
Spinčić, A. (2002). English Texbook for Marine Engineers I. Rijeka; Pomorski fakultet.	10	20
Spinčić, A., Pritchard, B. (2001). A Texbook for Marine Engineers II. Rijeka: Pomorski fakultet.	10	20
Luzer, J., Spinčić, A. (2001). Gramatička vježbenica za pomorce. Rijeka:Pomorski fakultet.	10	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Marko Gulić, PhD**	
Course	**Information technologies**	
Semester	second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	2
	Number of Hours (L+E+S)	30 (20 + 10 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objective		
To provide participants with basic knowledge about the structure and principle of computer operation, as well as knowledge about the use of computers in word processing and spreadsheets.		
1.2. Prerequisites for Course Registration [a]		
No		
1.3. Expected Learning Outcomes		
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		
1.4. Course Outline		
Mathematical and logical basics of computer operation. Computer hardware. Input/output units. Computer memory. Working (RAM, ROM) memory. External memory (HD, FDD disks, CD, DVD, BD, optical disks, optical disks, MO disks, SSD disks). Processor. The principle of computer operation. Computer program support (software). System software support. Operation system. Programs for the development of software support. Auxiliary programs. Application software support. Operating system: MS Windows. Word processing program: MS Word. Program for working with spreadsheets: MS Excel. Automatic computer monitoring, data recording and alarm systems.		
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. Participant Obligations

Students' obligations are regular attendance and two knowledge tests.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

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, the learning outcomes achieved are assessed through continuous checking of knowledge in exercises and two tests, each of which must be positive (at least 50%).
The first test includes checking the part of first learning (25%)
Continuous checking of knowledge in exercises includes checking the third and fourth learning outcome (25%):
The second knowledge test includes checking second part of the first learning outcomes (50%) and checking the second learing outcome.

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.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Tudor, M. Primjena elektroničkih računala, University of Rijeka, Faculty for Maritime Studies, Rijeka, 2010.	Library 10, e-edition on Merlin (eLearning system)	20
Course material available on the eLearning system - Merlin (https://moodle.srce.hr)	Merlin	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Vladimir Pelić, PhD**	
Course	**Marine auxiliary engines and equipments**	
Semester	second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	5
	Number of Hours (L+E+S)	40 (30 + 10 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
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 [a]
No
1.3. Expected Learning Outcomes
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 different marine pumps design. 3. Analyse the main characteristics of marine compressors and blowers. Explain the design, construction, operation and regulation of different marine compressors and blowers. 4. Define and analyse the main characteristics and mode of selection of marine separators and filters. 5. Explain design and operation of various types of marine filters and separators. 6. Analyse the type of steering system elements and characteristics of marine deck machinery. 7. Define the main properties and method of calculation and selection of marine heat exchangers
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	☒ Lectures ☐ Seminars and workshops ☒ Exercises ☐ E-learning ☐ Field work	☐ Practical work ☐ Multimedia and Network ☐ Laboratory ☐ Mentorship ☐ Other _____
1.6. Comments		

1.7. Participant 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	1	Class participation		Seminar paper	1	Experiment	
Written exam	1	Oral exam	1	Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

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

1.10. Main Reading

- V. Ozretić, Brodski pomoćni strojevi i uređaji.
- Smith, D.W.: Marine auxiliary Machinery, Butterworths, London, 1983.

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 titles*	*Number of participants*
- V. Ozretić, Brodski pomoćni strojevi i uređaji.	10	20
Smith, D.W.: Marine auxiliary Machinery, Butterworths, London, 1983.	5	20
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 analysed and appropriate measures are adopted.		

Table 2.

3.2. Course description

Generic information		
Head of Course	**Predrag Kralj, PhD**	
Course	**Ship auxiliary systems**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	5
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION

1.1. Course Objectives

The course objectives are to acquaint participants with: ship piping (main engine auxiliary piping, general purpose piping and special piping) on working and management level; technical regulation for ship piping design and methods for piping main characteristic determination; typical piping materials and methods of corrosion protection; piping elements and symbols used in a graphical interpretation of piping; marine engineer tasks in regard of piping; exploitation of piping in a safe way, taking into account energy and man operating hours savings.

1.2. Prerequisites for Course Registration [a]

None

1.3. Expected Learning Outcomes

1. Ability to read and create classification piping schemes
2. Description of the purpose of an unknown ship piping and the instruments that are a functional part of it
3. Recognition of different ship piping and their purposes
4. Understanding the piping importance and critically respond to the alarms
5. Understanding the dependence of parameters measured in a different piping and dependence between different alarms
6. Responsibility of working space preparation before engine or equipment maintenance to secure safe environment
7. Recognition of the importance of irregularities in power plant operation and prompt action
8. Piping maintenance plan creation to minimize shut-down hours and costs
9. Acquire necessary knowledge on ship piping to perform marine engineer tasks on working and management level in a safe manner

1.4. Course Outline

Ship piping (systems); system elements, materials and protection, national and international technical rules regarding ship piping; propulsion engine auxiliary systems (fuel oil, lubrication oil, *compressed air (Model course 7.02:1.2.1.8.)*, *cooling water (7.02:1.2.1.6., 1.2.2.11.-13.)*, steam and condensate, exhaust gasses and scavenge air); general purpose systems (*ballast –7.02: 1.3.1.1.*, *bilge – 7.02:1.3.1.2.*, *fire extinguishing –7.02:1.3.1.3.*, ventilation, *service and working air (7.02:1.2.3.5.)*, main engine maneuvering air, hydraulic oil, air ducting, spill oil, sounding etc.); special piping (inert gas, cargo loading/unloading, crude oil washing, heating and cooling of cargo, etc.); system exploitation, local and remote surveillance, system operation to insure power, maximum efficiency and environment protection - *7.02: 1.3.1.4.-5.*

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	Upon completion of a major theme participants have a written partial exam. There are also practical numerical home works.

1.7. Participant Obligations

95% attendance in required. Four home works gain additional 10 points.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0.5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam		Essay		Research	
Project		Continuous Assessment	4.0	Presentation		Practical work	0.5
Portfolio							

1.9. Assessment of Learning Outcomes

The outcomes are assessed through four partial exams where participants could receive up to 80% of total score. Each home work gains additional 2,5%. Attendance gains another 10%.

1.10. Main Reading

1. Kralj, P. – Šegulja, I., *Brodski cjevovodi*, Sveučilište u Rijeci, Rijeka, 2020.
2. Kralj Predrag, *autorizirana predavanja objavljena na mrežnoj stranici Pomorskog fakulteta*

1.11. Recommended Reading

1. Martinović Dragan*, Brodski strojni sustavi,* Sveučilište u Rijeci, Rijeka, 2005.
2. Matković Milan, *Protupožarna zaštita na brodovima*, Pomorski fakultet, Rijeka, 1995.
3. Martinović Dragan – Stanković Predrag*, Sustav inertnog plina,* Pomorski fakultet, Rijeka, 1995.
4. Martinović Dragan*, Strojarski priručnik za časnike palube,* Graftrade, Rijeka
5. Martinović Dragan – Stanković Predrag*, Sigurnost na tankerima,* Pomorski fakultet, Rijeka, 1995.
6. Martinović Dragan – Stanković Predrag*, Pranje tankova sirovom naftom,* Pomorski fakultet, Rijeka, 1992.
7. Ozretić Velimir*, Brodski pomoćni strojevi I uređaji,* Ship management, Split, 1996.
8. Pažanin Ante, *Brodski motori*, Školska knjiga, Zagreb, 1993.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
1.10 – 1.	7	10 – 20
1.10 – 2.	On-line	

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.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Robert Baždarić, PhD**	
Course	Automation of Ship's Propulsion	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	5
	Number of Hours (L+E+S)	35 (35 + 0 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objective		
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 [a]		
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.		
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. Participant Obligations							
Class attendance at least 95%, 1st colloquium, 2nd colloquium, final exam							
1.8. Assessment[1] of Learning Outcomes							
Course attendance	1.5	Class participation	0.5	Seminar paper		Experiment	
Written exam	1	Oral exam	1	Essay		Research	
Project		Continuous Assessment	1	Presentation		Practical work	
Portfolio		Class participation		Seminar			

1.9. Assessment of Learning Outcomes

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

1.10. Main Reading

1. V.Tomas, I.Šegulja, M.Valčić: Osnove automatizacije, Pomorski fakultet u Rijeci, Rijeka 2010.
2. HRB- Pravila za tehnički nadzor pomorskih brodova,dio 13.-Automatizacija, Hrvatski registar brodova, Split

1.11. Recommended Reading

1.Norcontrol manual-Integrated ship control-Functional specification-Power management system, process control unit, signal acquisition unit

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
1. V. Tomas, I. Šegulja, M. Valčić, Osnove automatizacije, Pomorski fakultet, Sveučilište u Rijeci, 2010.	60	20
2. HRB- Pravila za tehnički nadzor pomorskih brodova,dio 13.- Automatizacija, Hrvatski registar brodova, Split 1994. - internet	On-line	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Vladimir Pelić, PhD** **Nikola Lopac, PhD**	
Course	**Marine electrical engineering**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	5
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
Learn and interpret the basic physical characteristics of electricity and magnetism and the basic physical principles on which the operation of electrical devices is based.
1.2. Prerequisites for Course Registration [a]
Knowledge of elementary mathematics and the basics of higher mathematics.
1.3. Expected Learning Outcomes
1. explain the basic concepts of electrostatics and direct currents 2. state the basic physical laws of electricity and magnetism 3. distinguish and write basic expressions in electromagnetism 4. explain the basic properties of alternating current 5. analyze the application of theory through various examples in technical practice
1.4. Course Outline
Concept and types of electric charge. Forces between electric charges at rest. Conductors and insulators. Concept of electric field. Electric field of two parallel plate oppositely charged conductors. Concept of electric potential and electric voltage. Voltage between two parallel plate oppositely charged conductors. Concept of electrical capacity. Electric capacitors. Capacitance of plate capacitor. Capacitance of capacitor connections. The concept of electric current in conductors. The strength of the electric current. Electrical conductivity and electrical resistance. Electric resistors. Electrical resistance of resistor connections. Concept and basic elements of direct current circuits. Direct current sources. Durable consumables. Basic laws of direct current circuits. Direct current power and energy. Magnetic forces and magnetic field. Magnetic induction and magnetic flux. The magnetic field of a current-carrying conductor. Inductive coil. Force on a current-carrying conductor in a magnetic field. Electromagnetic induction. Self-induction and inductance. Intermediate induction and intermediate inductance. Ferromagnetism. The concept of alternating current. Characteristic magnitudes of alternating currents. Concept and basic elements of direct current circuits. Impedance. Basic laws of direct current circuits. Alternating current power and energy. Three-phase systems. Principles of measuring 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. Participant Obligations

Active attendance at classes in accordance with the Ordinance on Special Education Program.
Passed colloquium, if necessary, final oral 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	3	Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

Written examination through 2 colloquia, where at least 50% correct answers are required. If necessary, participants answer orally, where at least 50% of correct answers are also required.

1.10. Main Reading

1. Lecture notes (supplement: script prepared by the author J.Bonato)
2. A.Kraš, J.Ćelić;: Fundamentals of marine electrical engineering, Maritime Faculty in Rijeka, Rijeka, 2016.
3. V. Pinter: Fundamentals of electrical engineering, Book one, Technical book Zagreb, 1989.
4. V. Pinter: Fundamentals of electrical engineering, Book two, Technical book Zagreb, 1989

1.11. Recommended Reading

1.Kuzmanić: Marine electrical engineering and electronics, Maritime Faculty in Split, Split, 2006.
2. I. Kuzmanić., I. Vujović: Fundamentals of electrical engineering - Collection of solved problems, Maritime Faculty in Split, Split, 2005.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
A.Kraš, J.Ćelić;: Fundamentals of marine electrical engineering, Maritime Faculty in Rijeka, Rijeka, 2016.	5	20
V. Pinter: Fundamentals of electrical engineering, Book one, Technical book Zagreb, 1989.	8	20
V. Pinter: Fundamentals of electrical engineering, Book two, Technical book Zagreb, 1989	5	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Aleksandar Cuculić, PhD**	
Course	**Marine electrical devices**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	3
	Number of Hours (L+E+S)	40 (40 + 0 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objective		
The objective of this course is to provide knowledge of marine electrical devices and systems prescribed by STCW and IMO Model Course - Chief Engineer Officer and Second Engineer Officer		
1.2. Prerequisites for Course Registration [a]		
Passed Courses: Marine Electrical Engineering		
1.3. Expected Learning Outcomes		
After passing the exam, students will be able to do the following: 1. Explain the operating principles of marine electrical machines. 2. Describe the operating characteristics of marine electrical machines. 3. Carry out testing of marine electrical machines 4. List and explain the maintenance of marine electrical machinery 5. Explain the relay schematics of induction motor starters 6. Explain the principles and characteristics of power electronic devices.		
1.4. Course Outline		
Fundamentals of Electrical Machines. Transformers. Induction motors. DC machines. Synchronous machines. Starters. Electric motor drives. Power Electronics.		
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. Participant Obligations

Active class attendance. Passed exam.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

Course attendance (10%) Oral exam (90%)

1.10. Main Reading

D. Vučetić, Brodski električni uređaji, autorizirana predavanja
A. Cuculić, Brodski električni uređaji, autorizirana predavanja

1.11. Recommended Reading

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
D. Vučetić, Brodski električni uređaji, autorizirana predavanja	Online	20
A. Cuculić, Brodski električni uređaji, autorizirana predavanja	Online	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Ivan Panić, PhD**	
Course	**Marine electrical systems**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	4
	Number of Hours (L+E+S)	40 (40 + 0 + 0)

1. GENERAL COURSE DESCRIPTION		
1.1. Course Objective		
The objective of this course is to provide knowledge of marine electrical devices and systems prescribed by STCW and IMO Model Course - Chief Engineer Officer and Second Engineer Officer		
1.2. Prerequisites for Course Registration [a]		
Passed Courses: Marine Electrical Engineering		
1.3. Expected Learning Outcomes		
After passing the exam, students will be able to do the following: 1. Explain the influence of the environment on marine electrical system 2. Explain the electric power generation and distribution on board. 3. Explain electrical protections 4. Describe electrical lighting 5. Explain the characteristics of marine electric motor drives. 6. Describe the maintenance of electrical equipment on board 7. Explain electrical safety precautions on board.		
1.4. Course Outline		
Influence of the environment conditions, marine electric power systems, electric power generation and distribution, lighting, electrical protections, marine electric motor drives, maintenance, safety		
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. Participant Obligations

Active class attendance. Passed exam.

1.8. Assessment[1] of Learning Outcomes

Course attendance	1.5	Class participation		Seminar paper		Experiment	
Written exam		Oral exam	2.5	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

Course attendance (10%) Oral exam (90%)

1.10. Main Reading

D. Vučetić, Brodski električni sustavi, autorizirana predavanja
I. Panić, Brodski električni sustavi, autorizirana predavanja

1.11. Recommended Reading

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
D. Vučetić, Brodski električni sustavi, autorizirana predavanja	Online	20
I. Panić, Brodski električni sustavi, autorizirana predavanja	Online	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Radoslav Radonja, PhD**	
Course	**Work organization and leadership**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	2
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
The aim of the course is to introduce students to the Engine Resource Management on board, the principles of leadership, organization, communication, administrative duties on board and the conduct of training and exercises on board.
1.2. Prerequisites for Course Registration [a]
No.
1.3. Expected Learning Outcomes
Participants are expected to acquire knowledge in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) and the International Safety Management Code (ISM) and Protection of the Marine Environment for the management level according to the A-III -1/2 STCW Convention. Upon passing the examination in this course, students are expected to be able to 1.Correctly interpret and explain the basic principles of work organization and shipboard leadership; 2.State and explain the basic principles of good leadership, crew organization on board and crew health protection; 3. Analyze the performance of crew members, their role in the team, their assertiveness and their contribution to the overall work in the engine room and on board (watchkeeping, equipment maintenance, participation in exercises, participation in joint operations, ...); 4. Explain how to prepare and conduct shipboard meetings and write reports; 5. Specify and explain teaching and training methods and requirements related to emergency drills, testing and maintenance of emergency equipment and devices.
1.4. Course Outline
Introduction to organization and leadership - management of crew on board; principles of leadership - control of crew in engine room; crew attitudes and conditions of employment; crew behavior; supervision of subordinates and maintenance of good relations among crew members; organization of engine crew according to type of ship and special characteristics of the ship; assignment of duties and analysis of work; communication on board; assertiveness, methods of conducting meetings; organization of maintenance, the necessary management skills, care of crew, crew fatigue, protective measures and checklists; organization of crew in emergencies and their

duties; ship administration, records and documents; drills on board; emergency drills; Muster list; Fire control and safety plan; relevant international conventions and national legislation; International Safety Management Code (ISM) and protection of the marine environment; Designated Person Ashore (DPA); International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention).		
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. Participant Obligations

Attendance and active participation in classes.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

Attendance and active participation in classes (min ≥ 70 %)
Oral exam (min ≥ 50 %).

1.10. Main Reading

1. Lectures
2. STCW Convention, IMO, London, 2010
3. SOLAS Convention, IMO, London, 2004

1.11. Recommended Reading

1. Danton G., (1996), The Theory and Practice of Seamanship, 11th ed., Routledge, London (ISBN 0-415-15372-7)
2. Holder L.A., (1997), Training and Assessment on Board, 2nd ed., Witherby & Co. Ltd., London (ISBN 1-85609-

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Lectures (pdf)	On-line	20
STCW Convention (pdf)	On-line	20
SOLAS Convention (pdf)	On-line	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Radoslav Radonja, PhD**	
Course	**Machinery Control**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	3
	Number of Hours (L+E+S)	30 (30 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
The aim of the course is to familiarize students with the principles and rules of management, preparing engine room watch and watchkeeping, especially the part related to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention), the International Safety Management Code (ISM), the International Ship and Port Facility Security Code (ISPS), the protection of the marine environment and the application of safe working practices. Therefore, the subject includes material on the theoretical, technical and legal considerations of safe management, leadership, engine room control and watchkeeping in accordance with A- III -1/2 of the STCW Convention.
1.2. Prerequisites for Course Registration [a]
No.
1.3. Expected Learning Outcomes
Upon passing the examination in this course, students are expected to be able to: 1.Correctly interpret and explain the underlying principles of management and control; 2. Establish and maintain a watch in the engine room of a ship in accordance with the requirements of the STCW Convention and in exceptional circumstances; 3. Compile Engine log book and keep engine room documentation up to date; 4. Develop and define a checklist in accordance with the ISM Code; 5. Apply safe working practices on board; 6. Analyze various events in consideration of risk or hazard and assessing risk factor; 7. Compare specific information in relation to specific data in the engine room.
1.4. Course Outline
Definition of management, management decision making and machinery control on board, management risk assessment, control stands on board. Watchkeeping on board, organization of watch, voyage planning, setting, leading and transferring of engine room watch, keeping watch under exceptional circumstances. International Safety Management Code, International Code for the Security of Ships and Port Facilities, Protection of the Marine Environment, Safety Management System on board, Crew Health and Safety, safe working practice, Proper Assessment of Safety Cases and Safety Elements, Human Factors, Permit to Work System, Elements of Safety Management and Hazard Identification.

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. Participant Obligations

Attendance and active participation in classes.

1.8. Assessment[1] of Learning Outcomes

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

1.9. Assessment of Learning Outcomes

Attendance and active participation in classes (min ≥ 70 %)
Oral exam (min ≥ 50 %).

1.10. Main Reading

1. Lectures
2. STCW Convention, IMO, London, 2010
3. SOLAS Convention, IMO, London, 2004

1.11. Recommended Reading

1. Holder, L. A. Training and Assessment on Board, Witherby and Co Ltd, London 1997.
2. Code of Safe Working Practices for Merchant Seamen, The Stationery Office Publications Centre, London, 1998.

1.12. Number of Main Reading Examples

Title	*Number of titles*	*Number of participants*
Lectures (pdf)	On-line	20
STCW Convention (pdf)	On-line	20
SOLAS (pdf)	On-line	20

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 analysed and appropriate measures are adopted.

Table 2.

3.2. Course description

Generic information		
Head of Course	**Srđan Žuškin, PhD**	
Course	**Ship design and stability**	
Semester	Second part	
Estimated Workload and Methods of Instruction	ECTS Workload coefficient	3
	Number of Hours (L+E+S)	45 (45 + 0 + 0)

1. GENERAL COURSE DESCRIPTION
1.1. Course Objective
The main objective of the course is based on the ship stability elaboration, statical and dynamical stability and ship stability in loading/unloading or shifting mass
1.2. Prerequisites for Course Registration [a]
1.3. Expected Learning Outcomes
1. Parse and apply ship stability definition and division. 2. Parse and define initial stability with basic elements of transverse statical stability. 3. Parse and define the elements of transverse statical stability in mass shifting. 4. Parse and define the elements of transverse statical stability in mass transshipment (loading/unloading). 5. Analyse the influence of Free Surface Correction (FSC) on transverse statical stability. 6. Parse and define longitudinal stability with basic elements. 7. Parse and define the elements of longitudinal stability in mass shifting and transshipment (loading/unloading) 8. Parse and define the dynamical stability and damage stability regulations
1.4. Course Outline
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 heel. *GZ* curve construction with Intact stability regulations analyses. *KG* calculation in transverse stability. Statical longitudinal stability. Longitudinal stability changes in mass shifting or mass 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		

1.7. Participant Obligations

Attendance and active participation in classes.

1.8. Assessment[1] of Learning Outcomes

Course attendance	0.5	Class participation		Seminar paper		Experiment	
Written exam	2.0	Oral exam	0.5	Essay		Research	
Project		Continuous Assessment		Presentation		Practical work	
Portfolio		Class participation		Seminar paper			

1.9. Assessment of Learning Outcomes

Active attendance of classes over 95 %.
Passed written exams (min 60 %). Final oral exams.

1.10. Main Reading

1. Žuškin, S., Ship stability – presentation and video materials (MERLIN), Sveučilište u Rijeci, Pomorski fakulteta, 2021.
2. Vademecum Maritimus, Podsjetnik pomorcima, Pomorski fakultet u Rijeci, Rijeka, 2002.
3. Milošević, M., i Š., Osnove teorije broda 1, Sveučilište u Zagrebu, Zagreb, 1981.
4. Milošević, M., i Š., Osnove teorije broda 2, Sveučilište u Zagrebu, Zagreb, 1981.

1.11. Recommended Reading

1. Uršić, J., Stabilitet broda I. dio, Sveučilište u Zagrebu, Zagreb, 1968.
2. Uršić, J., Stabilitet broda II. dio, Sveučilište u Zagrebu, Zagreb, 1968.
3. Barrass, B., Derrett, D. R., Ship stability for Masters and Mates, Elsevier, 2008.
4. Eyres, D. J., Ship Construction, Butterworth-Heinemann, London, 2007

1.12. Number of Main Reading Examples		
Title	*Number of titles*	*Number of participants*
Žuškin, S., Ship stability – presentation and video materials (MERLIN), Sveučilište u Rijeci, Pomorski fakulteta, 2021.	On-line	20
Vademecum Maritimus, Podsjetnik pomorcima, Pomorski fakultet u Rijeci, Rijeka, 2002.	10	20
Milošević, M., i Š., Osnove teorije broda 1, Sveučilište u Zagrebu, Zagreb, 1981.	5	20
Milošević, M., i Š., Osnove teorije broda 2, Sveučilište u Zagrebu, Zagreb, 1981.	5	20
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 analysed and appropriate measures are adopted.		