U N I V E R S I T Y O F S P L I T

FACULTY OF MARITIME STUDIES

ELABORATE PROPOSAL OF THE STUDY PROGRAMME

University undergraduate study programme in

MARINE ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGIES

SPLIT, 2025

GENERAL INFORMATION ON HIGHER EDUCATION INSTITUTION

Name	University of Split, Faculty of Maritime Studies
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GENERAL INFORMATION ON THE STUDY PROGRAMME

Name of the study programme	Marine electrical engineering and information technologies		
Provider of the study programme	University of Split, Faculty of Maritime Studies		
Other participants	No		
Type of study programme	Vocational study programme ☐	University study programme ☒	
Level of study programme	Undergraduate ☒	Graduate ☐	Integrated ☐
	Postgraduate ☐	Postgraduate specialist ☐	Graduate specialist ☐
Academic/vocational title earned at completion of study	Bachelor (baccalaureus/baccalaurea) of Science in Marine Electrical Engineering and Information Technologies (univ. bacc. ing. el.)		

1. INTRODUCTION

1.1. Reasons for delivering the study programme

Requirements to increase the safety and security of the ship's crew, passengers, and cargo, prevent possible pollution of the marine environment, increase the level of safety of shipping organizations and information flows on the one hand, and increasingly competitive market on the other, and impose the introduction and application of new technologies in maritime affairs. These trends require a high level of expertise from crew members and their managers and their increasing knowledge of electrical engineering, computer science, automatic control, and information technology.

This study makes a synthesis between technical sciences on the one hand, and practical developments in maritime transport on the other. Completion of the study enables students to work on the worldwide fleet, in maritime technology companies, coastguards, ports, as well as companies developing, designing, installing (e.g. in shipbuilding) and maintaining computer, electronic, communication and navigation systems and systems for automatic management of maritime processes.
In the job market, students and a previous, similar studio have been excellently quoted. In particular, this is even more promising because of the introduction of the title of electrical engineering officer into the maritime profession.

1.2. Relationship with the local community (economy, entrepreneurship, civil society, etc.)

From the point of view of assessing expediency in view of the needs of the labor market in the public and private sectors, the improvement of this study is an answer to the constant demands of the shipowners for the personnel who are able to work on modern ships with complex technical and technological systems and who are thoroughly acquainted with the maritime business with the views of all maritime participants.
The study finds application in all branches of the economy that are related to maritime and various fields of science, and at the same time forms the basis for successful interaction between entrepreneurship and competent social and state structures. Upon completion of their studies, students have been provided with employment opportunities in employment in institutions and in maritime, transport and commercial companies related to maritime affairs.

1.3. Compatibility with requirements of professional organizations

Such undergraduate study of Maritime Electrical and Information Technology represents a logical, substantive improvement of the existing study at the Faculty of Maritime Studies in Split. Particular attention was paid to the acquisition of the title of Electrical Engineer Officer (STCW III / 6).

When designing the program, special attention was paid to the harmonization of teaching contents and subjects with other international recommendations of the leading world institutions, in particular: International Maritime Organization (IMO), International Telecommunication Union (ITU), Association of Computer Machinery (ACM), Institute of Electrical and Electronic engineers (IEEE), International Federation for Information Processing (IFIP), UNESCO and the European Computer Driving License Foundation (ECDLF).
Undergraduate study programs are fully aligned with the spirit and intentions of the STCW Convention, IMO and ISO standards, and their specificity is the education of seafarers in terms of increasing their knowledge in the application of electrical engineering and information technology, and raising the level of maritime safety in the broadest sense.

1.4. Partners outside the higher education system that expressed interest in the study programme

In addition to companies and institutions from the narrow maritime industry (related to offshore work), there are also companies from the maritime industry related to the mainland (shipyards, overhaul offices, electronic centers, design institutions) and maritime crewing and training agencies for seafarers.

During their studies, students are encouraged and have the opportunity to familiarize themselves with the work and participate in the work of partner research centers, partner companies, and participate in scientific research and technology transfer. Some of the domestic partner research and industrial centers are:

- Croatian Hydrographic Institute (HHI) - a state-owned scientific research institute that actively conducts hydrographic research, hydrographic and geodetic research of the Adriatic Sea, creates navigation charts, conducts underwater research and publishes scientific publications in the field of hydrography.

- Maritime Electronics Center L.t.d. (PCE) - a state-owned naval electronics development and naval support company that has a significant development and research component.

- Končar Institute of Electrical Engineering - research and development institute that deals with research and development of electric power equipment and equipment for the use of renewable energy sources.

Some of the more prominent Croatian companies with which the Faculty of Maritime Studies in Split has partnership agreements are: Jadrolinija d.o.o., Plovput d.o.o., Pasat d.o.o., Sonata d.o.o., Bureau Veritas Croatia d.o.o., Socius d.o.o., Port Authority Split.

The Faculty cooperates with numerous research institutions and companies abroad through a series of partnership agreements. Among the prominent foreign partners are: NYK Shipmanagement Pte. Ltd., Tokyo, Japan; CMA CGM Marseille, France.

Students also have the opportunity to participate in the work of partner research centers and partner companies through their course *Internship*, where they can acquire and upgrade professional and research competencies.

1.5. Financing

The study program is primarily financed from the budget of the Ministry of Science, Education and Sport and part of the Faculty's income for special purposes.

1.6. Comparability of the study programme with other accredited programmes in higher education institutions in the Republic of Croatia and EU countries

When designing the programs, special attention was paid to the harmonization of curricula and courses with other reputable foreign universities in order to make the programs comparable.
It should be emphasized that the system of education of maritime professionals in the world is very diverse and there are no two countries where the education systems are the same. This applies to almost all the components of education: conditions of enrollment, aim and purpose of education, type and organization of studies, duration of studies, names of higher education institutions, etc.
An analysis of related institutions in Croatia and the European Union dealing with the education of seafarers has established a high degree of comparability of study programs with the following institutions:

- Faculty of Marine Electrical Engineering, Gdynia Maritime Academy, Gdynia, Poljska (link: https://umg.edu.pl/en/studies-faculty-electrical-engineering).

- Electrical engineering and information technologies in the maritime, University of Rijeka, Faculty of Maritime Studies (link: http://pfri.hr/web/hr/studij_pre_EL.php).

1.7. Openness of the study programme to student mobility (horizontal, vertical in the Republic of Croatia, and international)

The undergraduate program is in line with the relevant studies at the Faculties of Maritime Studies in Rijeka and Kotor, Department of Maritime Studies of the University of Dubrovnik, Faculty of Transport Sciences in Zagreb, and other higher education institutions in the world, with which the Faculty of Maritime Studies of the University of Split has established several forms of cooperation. Upon completion of undergraduate study, the student is given the opportunity to study at the graduate university study program at the Faculty of Maritime Studies in Split, as well as at other aforementioned institutions.

This guarantees that it is with these institutions that the objectives of the Bologna Declaration can be achieved: the compatibility of study programs and the mobility of teachers and students.

1.8. Compatibility of the study programme with the University mission and the strategy of the proposer, as well as with the strategy statement of the network of higher education institutions

The study program of Marine Electrical Engineering and Information Technologies is fully aligned with the mission and strategy of the Faculty of Maritime Studies, University of Split and with the mission and strategic goals set out in the Strategy of the University of Split for 2021-2025.

1.9. Current experiences in equivalent or similar study programmes

The Faculty of Maritime Studies in Split has many years of experience (formerly as the University College of Maritime Studies) in conducting very similar programs, i.e. studies under the name of "Marine Electrical Engineering and Electronics" of two-academic-year duration, and "Marine Electrical Engineering and Information Technology" of three-academic-year duration. This proposed program is an improvement of the existing study program and provides the opportunity to continue and graduate from the study in the field of electrical engineering.
Considering Croatia's maritime orientation and its desire to remain in the world's maritime top, we believe that the top-level education of seafarers in new technologies is a fundamental prerequisite for achieving this goal. There are no such programs at the University of Split.

2. DESCRIPTION OF THE STUDY PROGRAMME

2.1. General information

Scientific/artistic area of the study programme	Technical sciences; field of Traffic technology and transport
Duration of the study programme	3 years
The minimum number of ECTS required for completion of study	180
Enrolment requirements and admission procedure	Completed four-year secondary school

2.2. Learning outcomes of the study programme (name 15-30 learning outcomes)

1. Supervise, maintain, and effectively operate electrotechnical systems in the maritime industry.
2. Analyze diagrammes of electronic control and monitoring systems, and identify and eliminate the causes of their malfunctioning.
3. Test the operation of communication and navigation equipment.
4. Develop simpler electrical diagrammes for operation and control of low and high-voltage power systems on board.
5. Analyze load distribution in the ship's power system.
6. Design simpler analogue and digital electronic circuits.
7. Monitor, maintain, and effectively operate electronic systems on board ships.
8. Substantiate the processes of implementation and maintenance of hardware and software components of computer networks.
9. Create a database schema in the dedicated database management system, and link operation rules and conditions of database integrity.
10. Implement hardware and software support (PLC and/or microcontroller) for process control.
11. Plan and implement occupational safety measures when working with electrical appliances.
12. Categorize, interpret, and critically estimate the elements of maritime legislation for the purpose of protecting the safety of life at sea.
13. Interpret and critically estimate elements of maritime international and national legal regulations for the purpose of protecting the sea and the marine environment.
14. Integrate into the lifelong education system in a timely manner due to the inevitable changes to the technical requirements of the work environment.
15. Recognize and identify malfunctions of ship's electrical and electronic systems and handle tools for their repair.
16. Describe and distinguish marine mechanical and electrotechnical systems on ships.

17. Classify communication protocols in accordance with technical standards.

2.3. Employment possibilities

Students completing their studies can be employed in companies in the maritime industry (shipyards, repair yards, marine electronic center, and related services), domestic and foreign shipping companies, maritime crewing and training agencies, Croatian Army, Croatian Navy, Coast Guard.

2.4. Possibilities of continuing studies at a higher level

The Faculty of Maritime Studies in Split annually launches a tender for admission to the graduate university study of Marine Electrical Engineering and Information Technology.

2.5. Lower-level studies of the proposer or other institutions that qualify for admission to the proposed study

Undergraduate study can be enrolled by a person with the completed secondary school in duration of four (4) years.

2.6. Structure of the study

The undergraduate study program of Maritime Electrical Engineering and Information Technology is organized over a period of 3 years, through 6 semesters, in which students earn a total of 180 ECTS credits.
The enrollment requirements for the next semester, or next year, are defined in accordance with the Ordinance on Studies and the System of Study at the University of Split, the Ordinance on Study at the Faculty of Maritime Studies in Split and the decisions of the Faculty Council.
The number of students in the study groups for the lecture depends on the number of students who have enrolled in each course. For subjects with more students, the size of the group does not generally exceed 100 students. Exercise groups are also tailored to the number of students enrolled in the courses, with student numbers ranging up to 30, and exceptionally up to 36 students when it comes to just one group per course. Exercise groups in computer classrooms are smaller. The size of the groups in all forms of exercises enables efficiency and interactive teaching with students.
A student who has interrupted their studies may be allowed to continue their studies in accordance with the Ordinance on Study at the Faculty of Maritime Studies in Split and the decisions of the Faculty Council.
A student who has lost the right to study at another higher education institution or other component of the University may be allowed to continue and complete their studies under the conditions and within the time limits in accordance with the Ordinance on Study at the Faculty of Maritime Studies in Split and the decisions of the Faculty Council.

2.7. Guiding and tutoring through the study system

There is no formal student counseling system at the Faculty of Maritime Studies in Split, but the Head of the Study is constant communication with the students and advises and assists any student who needs it. The Dean and the Vice-Dean for Teaching and Academic Affairs also have scheduled dates and times for contacts with students.

2.8. List of courses that the student can take in other study programmes

2.9. List of courses offered in a foreign language (English) Courses delivered in English that the students can attend:

- Sea and marine environment protection
- Autonomous ships
- Medicine for seafarers
- Work organization and management on board
- Maritime communications
- Onboard high-voltage technologies
- Signal processing and analysis
- Maintenance of ship's power systems
- Maintenance of ship's electronic and control systems.

2.10. Criteria and conditions for transferring the ECTS credits

ECTS credits can be transferred between different studies. The criteria and conditions for the transfer of the ECTS credits are prescribed by the University Ordinance, and the Ordinance on Study at the Faculty.

2.11. Completion of study

Final requirement for completion of study	Bachelor thesis ☐ Master thesis ☐	Bachelor exam ☒ Master exam ☐
Requirements for final/diploma thesis or final/diploma/exam	Requirement for applying for Bachelor exam are passed all the exams included in the study curriculum.	
Procedure of evaluation of final/diploma exam and evaluation and defence of final/diploma thesis	In compliance with the Faculty Ordinance on Application for and the Course of Bachelor exam, and the Protocol of the Bachelor Exam.	

2.12. List of mandatory and elective courses

LIST OF COURSES							
Year of study: 1							
Semester: 1							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
Mandatory		Mathematics I	30		45		7
		Technical mechanics	15		15		3
		Thermodynamics	30		30		4
		Computer and computer network architecture	30		15		4
		Maritime English I	30		15		3
		Fundamentals of electrical engineering I	60		30		8
		Physical education I			30		1
	Total		195		180		30

LIST OF COURSES							
Year of study: 1							
Semester: 2							
STATUS	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
Mandatory		Marine radio systems	45		30		6
		Fundamentals of electrical engineering II	30		30		6
		Electronic components and sets	45		30		7
		Marine engineering	45		30		7
		Maritime English II	15		30		3
		Physical education II	0		30		1
	Total		180		180		30

LIST OF COURSES							
Year of study: 2							
Semester: 3							
	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
STATUS Mandatory		Mathematics II	15		45		6
		Ship automation I	30		30		5
		Databases and programming	30		30		5
		Maritime English III	15		15		2
		Electrical installations and lighting	30		15		4
		Safety at sea	45		15		5
	Total		165		150		27
Elective		Medicine for seafarers	30		15		3
		Maritime system	45		0		4
	Elective courses to be taken: 1 - 2						

LIST OF COURSES							
Year of study: 2							
Semester: 4							
	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
STATUS Mandatory		Digital electronics	30		30		5
		Ship automation II	30		30		5
		Power electronics	30		15		4
		Ship’s electrical machines and systems	45		30		6
		Modern technical software packages	15		30		3
		Sea and marine environment protection	30		0		2
	Total		180		135		25
Elective		Maritime communications	30		30		5
		Advanced programming	30		30		5
	Elective courses to be taken: 1 - 2						

LIST OF COURSES							
Year of study: 3							
Semester: 5							
	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
STATUS Mandatory		Introduction to mechatronics	30		15		4
		Signal processing and analysis	30		30		5
		Maintenance of ship's power systems	30		30		5
		Onboard high-voltage technologies	30		15		4
		Simulator and onboard training	0		30	30	2
		Work organization and management on board	30		15		4
		Electronic navigational devices and systems	15		15		3
	Total		165		150	30	27
Elective		Internship	0		0	150	6
		Fundamentals of maritime traffic	30		15		3
		Physical education	0		30		1
	Elective courses to be taken: 1 -2						

LIST OF COURSES							
Year of study: 3							
Semester: 6							
	CODE	COURSE	HOURS IN SEMESTER				ECTS
			L	S	E	F	
STATUS Mandatory		Electromotor propulsion	30		15		4
		Maintenance of ship's electronic and control systems	30		30		5
		Autonomous ships	45		0		4
		Technical-systems computer control	30		15		4
		Bachelor exam			10		9
	Total		135		60	0	26
Elective		Computer networks	30		15		4
		Maritime law	30		0		2
		Communication, leadership and technical aids in communication	30		15		3
	Elective courses to be taken: 1-2						

2.13. Course description

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MATHEMATICS I</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Tatjana Stanivuk, Ph.D., Full Professor</td><td>Number of credits (ECTS)</td><td colspan="4">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Marina Laušić, M.Sc. Math.
Goran Kovačević, M.Sc. Math.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>-</td><td>45</td><td>-</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">10</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquiring knowledge and skills in those fields of mathematics (basic algebra, mathematical analysis, and appropriate mathematical methods) that are necessary for following the syllabuses of other courses planned in the curriculum and for the expected practical application.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Know the basic concepts of set theory;
2. Solve tasks within sets of real and complex numbers;
3. Define and describe elements of linear algebra (interpret solutions of systems of linear equations and matrices, vector algebra and analytical geometry);
4. Examine the continuity and calculate the limit values of the functions;
5. Analyze the convergence of sequences and rows;
6. Apply differential calculus to the testing of properties of real functions;
7. Describe the properties of real elementary functions.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction.
2. Review of symbols. Sets.
3. Real and complex numbers.
4. Elements of linear algebra. (1/2)
5. Elements of linear algebra. (2/2)
6. Vector algebra.
7. Analytical geometry in space.
8. Elementary functions.
9. Continuity and function boundary values.
10. Infinite arrays and rows of real numbers.
11. The concept and meaning of derivation. Elementary function derivation techniques. Derivation of function composition.
12. Logarithmic derivation. Derivative implicitly and parametrically given functions. Higher order derivatives.
13. Tangent and normal lines to function graph. Basic theorems of differential calculus. Application of derivatives to evaluate the limits of functions.
14. Properties of continuous real functions and graph shetching.
15. Review of material and repetition.

Exercises:
1. Repetition of elementary mathematics.
2. Sets.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">3. Real and complex numbers.
4. Matrices and determinants.
5. Systems of linear equations.
6. Vector algebra.
7. Analytical geometry in space.
8. Elementary functions. In-term test 1
9. Continuity and function boundary values.
10. Infinite sequences and series of real numbers.
11. Elementary function derivation techniques. Derivation of function composition.
12. Logarithmic derivation. Derivation of implicitly and parametrically given functions. Higher-order derivatives.
13. Tangent and normal on function graph. Application of derivatives in determining the limits of functions.
14. Continuous real functions and drawing of function graphs.
15. In-term test 2.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☒consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">1. Responsibilities of full-time students:
Attendance at lectures and exercises of at least 80% of the estimated total hours. Active participation in classes and regular attendance at mid- and end-term examinations (two partial exams) taken during class. Both passed exams relieve the student of the final written exam, which is organized within the exam term of the lecturer, and following the application at Studomat. In case of insufficient number of attendances, students are not eligible for taking the final exam and are obliged to re-enroll in the course in the following year.

2. Responsibilities of part-time students:
differ from the responsibilities of full-time students only in the following items:
1. Attendance at lectures and classes at least 50% of the estimated total hours.
2. Possibility to take an in-term examination in agreement with the course teacher if the student, for justified reasons, could not take the in-term examination in the time stipulated for this purpose.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.875</td><td>Research</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Experimental work</td><td>-</td><td>Report</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Essay</td><td>-</td><td>Seminar essay</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>In-term / written exams</td><td>5.125</td><td>Oral exam</td><td></td><td>(Other)</td><td>-</td></tr>
<tr><td>Practical training</td><td></td><td>Project</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. Grading and evaluating the work of full-time students:
Each student presents himself/herself at the written examination.
The written part of the exam consists of two partial exams (mid- and end-term examinations), which are taken during the classes (8th and 15th week of classes), or the final written exam, which is organized within the term of exam periods.
In order for the student to take an in-term exam, they must score at least 50% of the maximum number of points. Both passed exams relieve the student of the final written examination. If a student has passed only one exam (out of the possible two), the same part of the material is released on the final written exam and the student writes only that part of the material that he did not pass. The written examination grade is formed as the mean of the marks obtained at the in-term exam or the points obtained at the final written exam (if the student did not pass the in-</td></tr>
</table>

term exam).
During the course, the attendance and activity of each student in relation with the course material is monitored and added to the overall grade of the course.

Evaluation of students' work:

Evaluation components	Success (min. %)	Percentage in grade (%)
Attendance at lectures and in-term activities	80 The most active students obtain 5 -10 points, depending on the activity.	10
In-term test 1	50	45
In-term test 2	50	45

Final exam:

Evaluation components	Success (min. %)	Percentage in grade (%)
Written exam	50	90
Previous activities (including all indicators of continuous assessment)	80	10
Total		100

Grading:

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

2. Grading and evaluating the work of part-time students:

The criteria for evaluating and grading are the same as for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Merlin; https://moodle.srce.hr/2021-2022/	-	YES
	2. MareMathics; https://maremathics.pfst.hr/	-	YES
	3. Tomašević, M.: Skupovi, brojevi funkcije, VPŠ, 2001.	20	YES
	4. Tomašević, M.: Diferencijalni račun, VPŠ, 2001.	20	YES
	5. Tomašević, M.: Matrični i vektorski račun, VPŠ, 1998.	20	YES
	6. Demidovič, B.P.: Zadaci i riješeni primjeri iz matematičke analize za tehnički fakultete, Zagreb, 1995.	15	YES
Optional literature (at the time of submission of study programme proposal)	1. B. Pavković, B. Dakić, Polinomi, Zagreb: Školska knjiga, 1988. 2. B. Apsen, Riješeni zadaci više matematike 1 i 2, Zagreb: Tehnička knjiga, 1989. 3. M. Ušćumlić, P. Miličić, Zbirka zadataka iz više matematike, Beograd: Naučna knjiga, 1989. 4. Group of authors: Matematika II dio, Pomorski fakultet Rijeka, 1993.		
Quality assurance methods that	University survey, student records, supervision of teaching by the Faculty board for		

ensure the acquisition of exit competences	teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">TECHNICAL MECHANICS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Tina Perić, Ph.D., Assoc.Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td></td><td>Percentage of e-learning</td><td colspan="4">20%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Familiarize the students with the basic laws and methods of mechanics and their application in considering the action of forces and their influence on the movements and states of the body. Develop a simple and logical way of thinking for students in analyzing and solving the practical engineering tasks of statics and kinematics of marine machine elements. Explain to students the basics of fluid statics. Teach the students about the forces of pressure and explain the application of the basic laws of fluid dynamics, which will allow them to more easily solve problems related to fluid motion.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Explain the basic concepts, laws, and methods of solids mechanics and the importance of their application in marine engineering.
2. Define the basics of solids statics (plane system of forces and moments, composition and resolution, equilibrium).
3. Solve and analyze simple equilibrium examples, analytically and graphically.
4. Define and understand the basic kinematic characteristics of straight and curvilinear motion (position, velocity, and acceleration) of the body in different coordinate systems.
5. Solve and analyze simple examples of straight and curved motion.
6. Explain the basic concepts, laws, and methods of fluid mechanics and the importance of their application in marine engineering.
7. Solve and analyze simple hydrostatics examples.
8. Apply the continuity equation and Bernoulli equation when solving practical examples of fluid flow and leakage.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction. Task and division of mechanics. Elements and basic laws of mechanics.
2. Statics of solids. Basic concepts and tasks.
3. Statics axioms. Connections and their reactions.
4. Collinear system of forces.
5. Competitive system of forces.
6. Moment of force. Momentary rule. Sprag force. Force reduction system.
7. The balance of the force system. Solving balance problems.
8. Friction. Sliding friction.
9. Kinematics. Particle kinematics. Basic kinematic sizes. Straight motion. Single movement. A single variable motion.
10. Curvilinear motion. Rendering in Descartes and in the natural coordinate system.
11. Fluid mechanics. Introduction. Basic terms.
12. Hydrostatics. Pressure. Fluid pressure change.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">13. Hydrostatic buoyancy. Archimedes' Law.
14. Fluid kinematics. Types of streaming. Continuity equation. Fluid flow through pipes. Venturi tube.
15. Fluid dynamics. Bernulli equation for ideal and real fluids.
Exercises:
1. Introduction. Scalar and vector magnitudes. Trigonometry in statics.
2. Force. Assembling and disassembling forces.
3. Freeing the body from the influence of connections.
4. Collinear system of forces.
5. Competitive system of forces.
6. The balance of the force system.
7. The balance of the force system.
8. Solving Skid Friction Tasks.
9. Particle kinematics. Straight motion.
10. Curvilinear motion.
11. Basic sizes in hydromechanics. Viscosity units.
12. Pressure. Fluid pressure change.
13. Hydrostatic buoyancy. Archimedes' Law.
14. Mass and volume flow.
15. Continuity equation and Bernoulli equation.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Attendance at lectures (min 80%) and exercises (80%) is obligatory because records are kept of the presence of students (form F04). In the case of insufficient number of student's attendances, the right to take the final exam is conditioned by the creation of additional assignments in the after-school classes. Students who do not attend classes due to illness are required to bring a valid certificate from a doctor.
Students who earn less than 50% of their attendance are not eligible for taking the final exam and are required to enroll again the following year. In the case of teaching units that are in accordance with the STCW Convention for a full-time student, he / she shall be deemed not to have fulfilled his / her obligations if he / she has been absent for more than 5% of the teaching hours of the lectures and the auditory exercises.
Students who pass the two exams are exempted from the full final exam. Students may retake only one in-term exam which they have not passed. If the student fails both exams, he / she is obliged to take the full final exam (written and oral).

Responsibilities of part-time students:
Total commitments may not be less than half the number of hours allocated to full-time students. In the case of teaching units that are in accordance with the STCW Convention for the part-time student, the same obligations apply as for the full-time student in that category (up to 95% of all forms of teaching).</td></tr>
<tr><td rowspan="4">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS</td><td>Class attendance</td><td>0.75</td><td>Research</td><td></td><td>Practical training</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Independent tasks</td><td>0.5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Tests</td><td>1.75 (altern</td><td>Oral exam</td><td>0.75</td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td rowspan="2">value of the course)</td><td></td><td>ative to written and oral exams)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td>1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">
There are two ways the student can meet the requirements for obtaining a final grade in the course:

1. OPTION 1 – Continuous assessment: Based on earned and graded points from continuous monitoring, classroom attendance, self-study assignments, and in-term grades. During the semester, two written tests (8th and 15th week of classes) are taken. Examinations are optional. A positive grade from both exams frees students from the final exam.

<table>
<tr><th>Assessment components</th><th>Success (min. %)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Lecture attendance</td><td>80 (95*)</td><td>10</td></tr>
<tr><td>Individual assignments</td><td>50</td><td>10</td></tr>
<tr><td>In-term test I</td><td>50</td><td>40</td></tr>
<tr><td>In-term test II</td><td>50</td><td>40</td></tr>
</table>
* teaching units are in compliance with STCW Convention

2. OPTION 2 - Final evaluation: based on the points earned and graded regarding attendance at the classes and the assessment of previous work monitoring and the completion of the final exam (written part) and passing the oral exam. If a student does not score positive on continuous assessment or does not take continuous assessment during the semester, he / she may take the exam within the regular exam periods. The examination in the regular examination periods consists of written and oral part. A student who is positive in the written exam can take the oral part of the exam. The oral part of the exam will be held no later than 7 days after the written part of the exam.

<table>
<tr><th>Evaluation components</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Lecture attendance</td><td>80 (95*)</td><td>10</td></tr>
<tr><td>Individual assignments</td><td>50</td><td>10</td></tr>
<tr><td>Written exam</td><td>50</td><td>50</td></tr>
<tr><td>Oral exam</td><td>50</td><td>30</td></tr>
</table>
* teaching units in compliance with STCW Convention

Grading:
Evaluation and grading of work are equal for full-time and part-time students.

<table>
<tr><th>Points (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0-49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50-64</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>65-79</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>80-89</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>90-100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td colspan="2">Availability via other media</td></tr>
<tr><td></td><td>Kulenović, Z.: Tehnička mehanika za pomorce,</td><td></td><td colspan="2">Faculty's Web</td></tr>
</table>

	Pomorski fakultet Sveučilišta u Splitu, Split, 2013.		pages
Optional literature (at the time of submission of study programme proposal)	1. Hannah, J., Hillier, M. J.: *Applied Mechanics*, Pearson Education Limited, Essex, 1995. 2. Muftić, O.: *Mehanika I*, Tehnička knjiga, Zagreb, 1991. 3. 3. Pečornik, M.: *Tehnička mehanika fluida*, Školska knjiga, Zagreb, 1989.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">THERMODYNAMICS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course teacher</td><td>Zdeslav Jurić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Distinguishing properties of ideal and real gases (vapours). Analysis and calculation of processes and cycles with ideal gases and vapors. Determination of the property of ideal gas mixtures. Carry out an assessment of the conversion of heat into operation (right-hand cycles). Analyze heat transfer modes.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Analyze processes and cycles (ideal and real) with ideal and real gases (vapor).
2. Calculate the conversion and the degree of conversion (efficiency) of heat into work.
3. Calculate the conversion and degree of conversion (efficiency) of work into heat (heat pumps)
4. Calculation of the amount of heat exchange and heat exchanger.
5. Independently evaluate and implement energy efficiency improvement measures.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Introductory information and definitions. Basic thermodynamic magnitudes.
2. Ideal gas. Boyl - Mariott, Gay - Lussac and Charles' Law. Ideal gas equation of state.
3. The first law of thermodynamics. Specific heat capacity.
4. Heat, work and inner energy. Energy conversion
5. Processes: isochors, isobars, and isotherms.
6. Processes: adiabatic and polytropic.
7. Thermodynamically closed and open (flow) systems. Enthalpy.
8. Steam and steam processes.
9. Steam processes and steam cycles.
10. Cooling cycles
11. Cooling and heating cycles. Coolants. Cooling device elements.
12. Heat transfer: thermal conduction and transfer.
13. Heat transfer: radiation and heat transfer.
14. Heat transfer: thermal radiation.
15. Technical heat exchagers</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">Responsibilities of full-time students:
Attendance is compulsory for all students. The student confirms his / her attendance by signing the prescribed records sheet. Students are required to attend at least 80% of the lectures and 80% of the exercises.</td></tr>
</table>

<table>
<tr><td></td><td>Students are assigned homework during the semester, which they are required to bring accurately to the following exercises, which determines their active participation in the class.
Students fulfilled their course obligations when they meet the requirements for attending classes and submitting all homework. Homework is considered committed when evaluated positively.
Students who have not completed the course obligations are not eligible to take the exam and re-enroll in the course next academic year.

Responsibilities of part-time students:
Students should attend at least 50% of the lectures and 50% of the exercises by the prescribed hourly rate.
Other obligations are equal to those of full-time students.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Activity at lectures</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>Homework/individual work</td><td></td></tr>
<tr><td>In-term tests</td><td>2.5 (alternative to written and oral exams)</td><td>Oral exam</td><td>1.25</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.25</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>
The final grade includes class attendance, homework grades, in-term exam grades / final exam grades. All components must be met at least with the minimum criteria for a student to pass the exam.
The exam consists of a written and an oral part. During the semester a pre-arranged continuous assessment will be carried out – in-term examinations (after 7, 11 and 15 weeks of classes). If the student passes all the exams with a positive grade, the exam is released. If one of the exams is not resolved with a positive mark, the student has the opportunity to retake the first exam in the first exam period that is not positive.
After the student has met the minimum criteria for the exam or in-term exam, the student has passed the exam.
If the student failed to pass more than two tests, the student should pass the exam.
Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Lecture attendance / active participation</td><td>80 %</td><td>15 %</td></tr>
<tr><td>Homework</td><td>80 %</td><td>10 %</td></tr>
<tr><td>In-term test 1 – 3 (tasks)</td><td>50 %</td><td>4 x 13.33 % = 40 %</td></tr>
<tr><td>In-term test 1 – 3 (theory)</td><td>50 %</td><td>4 x 11.67 % = 35 %</td></tr>
</table>
Final evaluation
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>(0 – 50)</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>(50 – 65)</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>(65 – 80)</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>(80 – 95)</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td>(95 – 100)</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">Required literature (available in the library and via other media)</td><td colspan="2">Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td colspan="2">1. O. Fabris: Osnove inženjerske termodinamike, Pomorski fakultet u Dubrovniku 1994.</td><td></td><td></td></tr>
<tr><td colspan="2">2. Ivan Pivac, Ivan Tolj, Sandro Nižetić: "Zbirka zadataka iz termodinamike i termotehnike", Fakultet elektrotehnike, strojarstva i brodogradnje, Split, 2024. (Tisak: Redak d.o.o.)</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="4">1. Bošnjaković, F.: Nauka o toplini I dio; Tehnička knjiga, Zagreb, 1976.
2. Bošnjaković, F.: Nauka o toplini II dio; Tehnička knjiga, Zagreb, 1976.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="4">University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="4"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">COMPUTER AND COMPUTER NETWORK ARCHITECTURE</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course teacher</td><td>Mirko Čorić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Toni Mišković</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquisition of detailed knowledge of the structure and principles of operation of microcomputers and personal computers and methods of communication with the periphery.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Explain the structure of computer components
2. define and explain the operating principle of microprocessors and computers
3. analyze and explain ways of addressing and types of instruction
4. Analyze data transfer techniques between microprocessors and peripherals
5. explain the ways of realization and principles of operation of subsystems for input, printing and permanent storage of data
6. analyze the ways of realization and organize the work of the local computer network
7. Analyze protocols for communication between computers
8. Analyze and explain the operating principles of network devices.
9. Define and implement hardware and software support for process control (AVR Studio)</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Introducing the course. Microprocessor, registers, types of microprocessors, organization of microprocessors around one or more buses.
2. Control unit, arithmetic logic unit, concept of machine and assembly instructions, microprocessor operating principle (8/16/32-bit micro-processors) or program execution.
3. Microcomputer Bus. Synchronous mode. Weather conditions. Bus types (MCA, PCI; USB, IEEE1394).
4. Memories (memory pyramid, RAM, ROM, handy and virtual)
5. Organization of inputs / outputs. In-term test.
6. Microprocessor addressing methods and instructions.
7. Data transfer techniques (programmed, intermittent and direct memory access).
8. Input / output interfaces (serial transmission, parallel transmission, DMA transmission).
9. Data storage subsystem (disk, tape), data printing subsystem.
10. System and application software, operating system, core operating system, interrupt management.
11. PC operating system, operating system functions (process management, memory management, unit / unit management, file management.
12. Computer networks (basic concepts, division, management methods).
13. Network protocols ((ISO / OSI standard); TCP / IP architecture).
14. Local Area Networks (IEEE 802.3 standard, CSMA / CD, IEEE 802.4 standard, IEEE 802.5 standard and IEEE 802.6 standard).
15. Computer and network maintenance basics. End-term test.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">Laboratory exercises
1. Exercise 1: BUILDING A PERSONAL COMPUTER (assembling a computer, adjusting the BIOS).
2. Exercise 2: Operating System Installation.
3. Exercise 3: MICRO-CONTROLLERS (block diagram, registers).
4. Exercise 4: MICRO-CONTROLLERS (memory organization, analog and digital I / O ports).
5. Exercise 5: PROGRAMMING MICRO-CONTROLLERS IN ASSEMBLER (working with registers, basic assembler commands).
6. Exercise 6: PROGRAMMING THE MICRO CONTROLLER IN ASSEMBLER (Input - Output Ports).
7. Exercise 7: PROGRAMMING THE MICRO-CONTROLLER - INPUT AND OUTPUT (commands for addressing the inputs and outputs of the micro-controller).
8. Exercise 8: Creating a Schematic of Implementing a Microcontroller in an Electronic Circuit).
9. Exercise 9: MICROCONTROLLER PROGRAMMING IN C LANGUAGE - I / O ports / LED).
10. Exercise 10: Network Infrastructure - UTP Cables (UTP Cable Pair Layout, Stream and Crossover Cables, Connecting and Testing Cables, Other Network Infrastructure).
11. Exercise 11: Networking Equipment (router and router, hub and switch - hub & switch, routing network traffic,
12. Exercise 12: Networking Equipment (Network Adapter and Network Adapters - Activate / Deactivate).
13. Exercise 13: Addressing Your Computer (IP Address Classes, Network and Computer IP Addresses, Reserved IP Addresses).
14. Exercise 14: An Example of Subdivision of a Network into Subnets and Online Services.
15. Exercise 15: Configuring a Network Card (manually defining the IP address of a network card, dynamically assigning an IP address to a computer, Auto-configuring a network card, network card status).</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Lectures and exercises are compulsory for students, and attendance records are kept. In order to exercise the right to take the exam, students must attend at least 80% of the lectures and 100% of the exercises and must pass the practical work. In case of an insufficient number of attendances, students do not have the right to take the exam and are obliged to re-enroll in the course the following year.

Responsibilities of part-time students:
In order to get the right to take the exam, students must be present at 50% of the lectures and 100% of the exercises and must pass the practical work. The remaining part of the material can be passed either continuously via in-term exams or via the final exam (written and oral).</td></tr>
<tr><td rowspan="2">Screening student work (name the proportion of ECTS</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Continuous participation</td><td>1</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td rowspan="3">credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>0.5</td><td>Final exam</td><td>0.875</td><td>(Other)</td><td></td></tr>
<tr><td>Continuous participation and knowledge testing</td><td>0.5</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td rowspan="4">Grading and evaluating student work in class and at the final exam</td><td colspan="6">Responsibilities of full-time students:
Students are required to attend lectures and exercises and sign the records sheet of attendance. In order to obtain the right to take the final exam, students must at least 80% of lectures and 100% of exercises. In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to enroll again next year. The exam can be taken continuously either through the in-term exam or through the final exam (written and oral exam).
Three exams from the theoretical part of the exam and two exams are planned, as well as program work with the test board from the practical part.
The student is required to take all the exams. At each in-term test, a minimum of 50% passing points is required.
The theoretical part of the theoretical part is held in writing. A student who successfully passes all three exams is exempt from the written / oral exam.
Students who have successfully completed one or two in-term examinations are credited as part of the final exam. The rest of the material is taken on the written part of the final exam in the first term of the exam term of the lecturer, with the application at Studomat, provided they have the right to take the final exam.
Students who do not take the theoretical part of the theoretical part and who have the right to take the final exam are required to take the written and / or oral part of the exam.
For the Exercise in-term test (practical part), a retrial will be organized for those students who have scored less than 50% of points (max. 2 times). Students who pass the in-term test at the first attempt must score at least 50% of the points; the total number of points will be reduced by 10% and 20% if they take the in-term test for the 2nd time.
Unless the student passes the exams and does the practical work, he / she is not eligible for taking the final exam and must re-enroll in the course next year.
Students who have accumulated a sufficient number of credits during the classes (they have passed all the exams in the theoretical and practical part) are obliged to apply for the exam through Studomat for the first examination period after the lecture and, depending on the result achieved, their grade is entered in the index.
The final exam is in the term of the exam term of the lecturer, with the application at Studomat. The exam consists of a practical (written) and theoretical (written and / or oral) part. It can be taken a maximum of four (4) times within one academic year.
The Practical Exam is a written exam that consists of network questions, program code, and test board testing. In order to take the theoretical exam, it is necessary to solve at least 50% of the offered tasks in the practical part of the exam.
Responsibilities of part-time students
In order to obtin the right to take the final exam, students are required to attend 50% of the lectures and 100% of the exercises and are required to pass an in-term test and practical work on a test board. The rest of the coursework can be taken either continuously by the in-term or through the final exam (written and oral exam.</td></tr>
<tr><td colspan="6">Continuous student assessment</td></tr>
<tr><td colspan="6"><table>
<tr><th>Assessment elements</th><th>Success (min. %)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Attendance at lectures and activity at exercises</td><td>The most active students (80-100% lecture attendances) obtain 5 -10 points, depending on the activity</td><td>10</td></tr>
<tr><td>Check of lab exercises</td><td>50-100, depending on the</td><td>1. in-term test - 10</td></tr>
</table></td></tr>
</table>

		degree of correctness and completeness	2. programme code and work with test board - 25 3. In-term test 2 - 10
	Continuous lecture check	50-100, depending on the degree of correctness and completeness	45
	Total		100

Grading

Points (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Responsibilities of part-rime students:
Evaluation and grading criteria are the same as for full-time students.

	Naslov	Broj primjeraka u knjižnici	Dostupnost putem ostalih medija
Obvezna literatura (dostupna u knjižnici i putem ostalih medija)	S. Ribarić, Naprednije arhitekture mikroprocesora, Školska knjiga, Zagreb, 1990	5	
	I. Ribarić, Arhitektura računala RISC i CISC, Školska knjiga, Zagreb, 1996		Da
	I Darko Grundler: Osobna računala - građa i primjena, INA Zagreb 1995		DA
Dopunska literatura	1. Mark Minesi: The Complete PC Upgrade and Maintenance Guide, Sybex inc., 2004. 2. Ronald J. Tocci, Frank J. Ambrosio: Microprocessors and Microcomputers-Hardware and Software, Prentice Hal. 2002.		
Načini praćenja kvalitete koji osiguravaju stjecanje utvrđenih ishoda učenja	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Ostalo (prema mišljenju predlagatelja)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME ENGLISH I</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">I.</td></tr>
<tr><td>Course teacher</td><td>Adelija Čulić-Viskota, Ph.D., Univ.College Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To master the terminology related to the structural parts of the ship and the ship's equipment, the types of ships and their operations, the types of cargo and modes of transport by sea, the ship's crew and its organization, weather systems, tides and currents, as well as relevant grammatical structures.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After passing the exam the student will be able to:

1. Identify English terms for structural parts of a ship and ship's equipment;
2. Differentiate English terms for different types of ships and relate them to the type of business of the ship;
3. Differentiate English terms for different types of cargo and modes of transport by sea;
4. Categorize English terms for crew members within individual ship departments;
5. Link English terms for crew members to their duties and responsibilities;
6. Compare in English the major weather systems;
7. Identify in English the causes and consequences of tides and currents.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Ship and Ship Terms I: basic structural terminology
2. Ship and Ship Terms II: more structural terminology and ship measurements
3. Ship and Ship Terms III: Ship’s equipment
4. Types of Ships _ Liners
5. Types of Ships - Tramps
6. Types of Ships - Specialized Vessels;
7. Types of Ships IV - Break Bulk Cargo Ships; Container Ships
8. Types of Ships V - Tug, Salvage Tug, Oil Rig Supply Vessel, etc.
9. The Merchant Ship and Its Organization I - Deck Department
10. The Merchant Ship and Its Organization II - Engine Department
11. Manning and different types of crew organisation on board
12. Meteorology: Weather systems
13. Tides;
14. Currents
15. Importance of weather forecasts, and their constituent parts

Exercises:
1. Shipbuilding I
2. Shipbuilding II
3. Shipbuilding III
4. Liners - a Type of Ship Operation
5. Tramp Trade - a Type of Ship Operation
6. Specialized Vessels - Different Types of Ship Operations or Cargoes</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">7. Break bulk cargo ships - a type of ship operation
8. Tugs and Supply Vessels, and Their Operation
9. In-term test I
10. Organization on Board - Deck Department
11. Organization on Board - Engine and Catering Departments
12. Types of Weather Systems and Their Characteristics
13. Types of Tides; their causes
14. Currents and their characteristics
15. In-term test II</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☒ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☐consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
The lectures are compulsory and the attendance records are kept. In order to be eligible for taking the final exam, students must attend at least 80% of the lectures. In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to enroll again next year.
Students have the opportunity to take the exam by continuous assessment during the semester by taking 2 in-term examinations. The student is required to access all the exams.
Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the written exam within the exam term.
Students, either individually or in a team, must address the given topics using e-learning material.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination period after the classes and to enter the mark in the exam term or to answer for a higher grade.

Responsibilities of part-time students
The total attendance requirements for part-time students may not be less than half the number of hours allocated to full-time students. Exams are the same as for regular students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Homework (Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1</td><td>Oral exam</td><td>0.875</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>(1) in case of failed in-term tests</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Attendance is compulsory for full-time students, ie a minimum of 80% of lectures (12 times) is required.
There are 2 in-terms written in the semester. The first in-term test, which covers grades 1 through 7, is written in week 8 of classes, and the second in-term test, which covers grades 9 through 14, is written in week 15 of classes. Exam questions for students are available at the end of each class. At each in-term test, a minimum of 50% passing points is required. Students who do not attend one of the in-term examinations for objective reasons or do not achieve a minimum percentage have the opportunity to correct in the term in which the 2nd in-term is written.
Students, either individually or in a team, must cover the given topics using e-</td></tr>
</table>

learning material.

The final grade includes class attendance, in-term test results, and individual / team assignments.

Continuous assessment of students' work

Assessment elements	Success (min.%)	Percentage in grade (%)
Lecture attendance	80	10
Individual/team assignments	100	10
In-term test I	50	40
In-term test II	50	40

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the written exam within the exam term. The same assessment criteria apply to the examination period as the continuous assessment.

Assessing and grading the work of part-time students
The condition for being eligible for taking the final exam is attendance at a minimum of 50% of lectures.
The assessment and grading are the same as those of full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	Van Kluijven, The International Maritime Language Programme, Alk & Heijnen Publishers, Alkmaar, The Netherlands, 2003 B. Pritchard; A Maritime English Course , http://www.pfri.uniri.hr/~bopri/	17	YES
	Standard Marine Communication Phrases	6	YES
	The International Maritime Language Programme, Alk & Heijnen Publishers, Alkmaar, The Netherlands, 2003 e-learning material	2	YES
Optional literature (at the time of submission of study programme proposal)	Grice, T., English for the Maritime Industry, Idris, 2012 MarEngPlus downloadable from www.utu.fi Luzer, Spinčić, Gramatička vježbenica engleskog jezika za pomorce, Pomorski fakultet u Rijeci, 1994.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the			

proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">FUNDAMENTALS OF ELECTRICAL ENGINEERING I</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">1.</td></tr>
<tr><td>Course teacher</td><td>Igor Vujović, PhD, Full. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">8</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nediljko Bugarin</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>60</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>mandatory</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To master the basic principles in direct current circuits, electrostatics and magnetism, which can be applied when studying other courses of the study program and in practical work. The physical properties of all materials used in electrical appliances and systems and their components shall be thoroughly indicated. Particular attention was paid to the application of acquired knowledge in the operation of electrical appliances and systems on board ships.
STCW 7.08.
1.1.3 Electro-technology and electrical machines theory 10/75 sati
1.1.4 Fundamentals of electronics and power electronics 5/45 sati
1.1.5 Electrical power distribution boards and electrical equipment 3/60 sati
1.1.9 Technology of electrical materials 14/15 sati
2.1.3 Detection of electric malfunction, location of faults and measures to prevent damage 10/10 sati
2.1.4 Construction and operation of electrical testing and measuring equipment 15/15 sati
Appendix 1: 1.1.3 Energy, Work and Power 2/12 sati
Appendix 6: 6.1 Basic electricity and electronics 25/50 sati</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Upon successful completion of the course, the student can:
1. Formulate and use all the laws of direct, electrostatic and magnetic circuits;
2. Analyze and understand the effect of electricity on marine systems and living beings;
3. Analyze and calculate complex electrical, electrostatic and magnetic circuits;
4. Plan and perform measurements in electrical circuits;
5. Analyze and understand all relevant safety measures when using electricity;
6. To classify electrical materials;
7. Know the basic properties of different groups of electrical materials;
8. To analyze and understand the influence of the environment, working conditions and material properties on the performance characteristics;
9. Analyze and understand the impact of degradation processes on material properties.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction: Measurement, physical quantities, units of measurement. International system of units of measurement. Classification of materials used in electrical engineering. Atomic structure of matter. Periodic Table of the Elements. Isotopes. Aggregate states. Crystal close packed structures. Covalent, metal, and ionic bonds. Division of Electrical Engineering Materials. Technological, chemical and physical properties of materials. Material testing and standardization. Standardization organizations. Definition of electric current. The effects of electricity. Physiological responses to electric shock.
2. DC Electricity: An electrical circuit. Electric current strength and density. Electric</td></tr>
</table>

	potential. Electric voltage. Electromotor voltage. Electrical resistance. Electrical conductivity. Dependence of electrical resistance on material type and dimensions. Dependence of electrical resistance on temperature. Resistors: linear, nonlinear, constant, variable, divisions, fabrication, labeling, Renard array. Rheostat and potentiometer. 3. Laws of Electrical Circuits: Ohm's Law. Kirchhoff's first law. Kirchhoff's Second Law. Operating modes of power sources, idle and short circuit. Serial, parallel, and mixed resistor connections. Resistor Connections in Star and Triangle. Transformations of compounds into star and triangle. 4. Serial, mixed, and parallel conductivity joints. Voltage and current divider. Serial and parallel source connections. Real and ideal instruments. Extension of measuring ranges of ammeter and voltmeter. U - I resistance measurement procedure. Wheatstone and Thomson Bridge. Ohmmeter. Compensator. 5. Solution of linear DC networks: Components of linear networks: branches, nodes and independent contours. Procedures for solving linear networks: direct application of Kirchhoff's laws, contour current procedure, node potential procedure, superposition procedure, reciprocity lesson, Thevenin's lesson, Norton's lesson, Millman's lesson. Properties and applications of conductive materials: Electrical conductivity. Basic Guide Properties. Copper. 6. Copper alloys. Solders. Aluminum. Aluminum alloys. Iron. Materials for resistors and incandescent elements. Materials for electrical contacts. Materials for thermobimetals. Materials for thermocouples. Materials for fuse breakers. Materials for conducting through glass. Materials for special applications. Superconductivity and superconductors. Material degradation: corrosion protection. Properties and applications of insulating and dielectric materials: Division of insulating and dielectric materials. Polarization. Dielectric losses. 7. Dielectric strength. Other physical and chemical properties. Gaseous insulating materials. Liquid insulating materials. Solid insulation materials. Inorganic materials: mica, asbestos, quartz, glass, ceramics, thin layers. 8. Organic materials: waxes, bitumen and asphalt, resins, rubber and rubber, fibrous structures, textile materials, varnishes, putties, adhesives. Silicones. Liquid crystals. Properties and application of optoelectric materials. Optical fibers and optical cables. Materials for optical fibers and cables. Properties and applications of semiconductor materials: Division of semiconductor materials. Current management in semiconductors. Semiconductor types and joints. Occurrences in semiconductors. 9. Principles of Semiconductor Electronics Operation. Materials for semiconductor diodes. Materials for transistors. Types of transistors. Materials for nonlinear resistors. Photoelectric materials. Fluorescent materials. Carbon products. Electricity Conversion: Electricity. Electrical work. Electric power. Usefulness. Adaptation cost to source. Joule's Law. Calculation of the power of the heater. Application of developing Joule heat in obtaining light. Fuses. Bimetal. Features of marine lighting. Sizing of lines. Ship cables. Measurement of power and operation of electric current. 10. Electrostatics: Coulomb's law. Electric field, electric field flow. Gauss's law. Electrical influenza. Charge distribution on the guide. Electrical potential, potential difference. 11. Electrical capacity. Capacitors: types, parameters, labeling. Capacitor connections: serial, parallel, mixed, star and triangle. Multilayer dielectric. The law of breaking. Transient occurrences in capacitors. Electrostatic networks. Electrostatic energy. Static electricity. Atmospheric electricity. 12. Transmission of electric current through gases and liquids: Outbreaks in gases. Current-voltage characteristic of eruptions in gases. Electrolytes. Electrolytic dissociation. Occurrences on the electrode contact surface - electrolyte. Faraday's laws of electrolysis. Polarization voltage. Electroplating. Electroforming. Direct current sources: Primary chemical sources: electrode potentials, Leclanché article, Weston article, alkali - MnO2 article, mercury oxide - zinc article, silver oxide - zinc article, lithium article. Secondary chemical sources: lead accumulators, steel accumulators, silver accumulators, gel

accumulators, AGM accumulators, battery goodness, usefulness of accumulators. Use and accommodation of batteries on ships. Thermal sources of electrical current. Light sources of electricity.

13. Magnetic Materials: Magnets. Electromagnets. Magnetic phenomena. Earth's magnetism. Magnetic declination. Magnetic inclination. Magnetic field. Magnetic properties of materials. Curie ferromagnetic temperature. Diamagnetic materials. Paramagnetic materials. Ferromagnetic materials, soft magnetic and hard magnetic materials. Antiferromagnetic materials. Ferromagnetic materials. Hysteresis and eddy current losses. Magnetostriction.
14. Construction and principle of operation of measuring and testing equipment. Measured instrument reading errors. Description of the material of standard measuring instruments for electrical quantities.
15. Description of the structure of standard test units for electrical magnitudes. Prevention of equipment damage and material degradation. Protection of measuring devices.

Auditory exercises:

1. Dependence of electrical resistance on material type and dimensions and temperature.
2. Serial, parallel, and mixed resistor and conductor joints (1).
3. Serial, parallel, and mixed resistor and conductor connections (2).
4. Transformation of the triangle of resistance into a star and vice versa.
5. Extension of measuring ranges of instruments.
6. Direct Application of Kirchhoff Laws.
7. Contour current procedure.
8. Superposition procedure. Millman's procedure.
9. Thevenin's lesson.
10. Norton Instruction. Procedure for node potential.
11. Power, Work, and Energy. Degree of utilization.
12. Forces on electric charges.
13. Mixed capacitor joints.
14. Electrostatic Networks.
15. Calculation of magnetic field strength and magnetic induction using the law of flow.

Laboratory exercises:

1. Lab work instructions. Safety and precautions when performing exercises. The influence of electrical current on the human body. Instrument Structure and Breakdowns - General Notes. Failure Prevention - General Notes. Electrical symbols and reading of measurement (electrical) diagrams and their connection, switching on and off.
2. Exercise 1: Recognition of constituent electronic components. Soft soldering process. Failure prevention and simple repairs. Electrical and Printing Schemes.
3. Exercise 2: Batteries, Maintenance, Material, Use, Measurements.
4. Exercise 3: Measure Voltage and Current with Analog and Digital Instruments. Structure and instrument failures, failure prevention.
5. Exercise 4: Measuring the resistance of an Ohmmeter and Wheatstone bridge. The structure of the instruments used and possible breakdowns, failure prevention.
6. Exercise 5: U-I characteristics of linear and nonlinear resistors.
7. Exercise 6: Simple Checking of Ship Cables - Material, Checking, Testing, Failures, Prevention. Marine Cables - Types and Recognition.
8. Exercise 7: Kirchhoff Laws.
9. Exercise 8: Extending Measurement Areas of Ammeters and Voltmeters
10. Exercise 9: Measurement of Electrical Resistance of Conductive and Insulating Materials. Micrometer screw. Insulation tester.
11. Exercise 10: Measuring Power in DC Circuits.
12. Exercise 11: Contour Current Procedure.
13. Exercise 12: Thevénin's lesson.

<table>
<tr><td></td><td colspan="6">14. Exercise 13: Serial, Parallel, and Mixed Capacitor Joints. Capacitor charging and discharging.
15. Exercise 14: Measurement of Dielectric and Magnetic Properties of Materials.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities and evaluation of students' work
Responsibilities of full-time students
Students are required to attend 95% of lectures and tutorials and 100% of laboratory exercises. Students should make up for classes and classes they did not attend. Compensations can be made at the agreed time or during the consultation, but they must be signed on the records sheet.
Students have the opportunity to take the exam by continuous assessment during the semester by taking 6 in-term exams. Students are required / not to take all the exams.
Students who do not pass all the in-term examinations during the semester and are eligible for taking the final exam are required to take the exam within the exam period.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination period after the classes and to enter the mark in the exam term or to answer for a higher grade.
Responsibilities of part-time students
The total commitments of part-time students are the same as for full-time students (the course is under the STCW Convention). Examination procedure is the same as for full-time students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>2.25</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work-laboratory exercises</td><td>0.375</td><td>Report</td><td></td><td>Report from laboratory exercises</td><td>0.125</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>5.25</td><td>Oral exam (for students who have not passed in-term tests or are dissatisfied with the grade)*</td><td>2.625</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam (for students who have not passed in-term tests or are dissatisfied with the grade)</td><td>2.625</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Examination:
During the lectures, it is envisaged to take the in-term examinations, which are held after the lectures and exercises have been completed in the course.
When attending laboratory exercises, the theoretical knowledge that is the basis for performing each laboratory exercise is tested. Upon successful completion of the laboratory exercises, the student writes a report on each individual laboratory exercise, which is also an element of the student's assessment of the subject.
The in-terms are held in writing and at least 40% are required for a positive evaluation. A student who passes all the exams positively is exempted from the written / oral exam and, depending on his / her score, at the first exam term of the final exam his / her grade is entered in the student’s book.
To the students who have positively completed part of the in-term exams they are</td></tr>
</table>

recognised as part of the final exam. The rest of the material is left for the final exam.

Continuous assessment of students' work

Assessment elements	Success (min.%)	Percentage in grade (%)
Lecture attendance	95	5
Lab exercises attendance	100	2,5
Preparation of report from lab exercises	100	2,5
6 in-term tests of equal number of points	40	90

Final evaluation

Evaluation indicators – final exam	Success (min. %)	Percentage in grade (%)
Lecture attendance	95	5
Lab exercises attendance	100	5
Written exam (for stdnts who failed at in-term tests or are not satisfied with grade)	40	45
Oral exam (for stdnts who failed at in-term tests or are not satisfied with grade)	40	45

Grading

Points (%)	Criterion	Grade
0-39	Does not satisfy minimum criteria	insufficient (1)
40-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
I. Kuzmanić: Brodska elektrotehnika i elektronika, Pomorski fakultet u Splitu, Split, 2006.	20	Web page – e-knjižara
I. Kuzmanić, I. Vujović: Osnove elektrotehnike – Zbirka riješenih zadataka, Pomorski fakultet u Splitu, Split, 2005.	20	Web page – selected topics
I. Vujović, I. Kuzmanić: Repetitorij s uputama za laboratorijske vježbe iz Osnova elektrotehnike i Brodske elektrotehnike i elektronike, Pomorski fakultet u Splitu, Split, 2008.	20	YES
I. Kuzmanić, R. Vlašić, I. Vujović: Elektrotehnički materijali, Visoka pomorska škola u Splitu, Split, 2001.	5	Web page – selected topics
I. Vujović, I. Kuzmanić, Elektrotehnički materijali i tehnologije s primjenom, Sveučilište u Split, PFST, Redak, kolovoz 2023. ISBN 987-953-6655-81-6. https://webknjizara.hr/proizvod/elektrotehnicki-materijali-i-tehnologije-s-primjenom-color-igor-vujovic-ivica-kuzmanic/		Web page

Optional literature (at the time of submission of study programme proposal)

1. V. Pinter: Osnove elektrotehnike – knjiga prva, Tehnička knjiga, Zagreb, 3. izdanje, 1980.
2. V. Pinter: Osnove elektrotehnike – knjiga druga, Tehnička knjiga, Zagreb, 3. izdanje, 1978.
3. Barnes M., Practical variable speed drives and power electronics, Elsevier, 2003
4. Bird J., Electrical circuit theory and technology, Elsevier 2002
5. Bose B. K., Power electronics and motor drives - advances and trends,

Elsevier, 2006.
6. Ellis Norman, Electrical interference handbook, Second edition, Publisher: NEWNES, ISBN-10: 9780750635479
7. Fardo S. W., Patric D. R., Electrical power systems technology, The Fairmont Press, Lilburn 2009
8. Gross Ch. A., Electric machines, CRC Press Taylor & Francis Group, Boca Raton, FL, 2007.
9. Hall D. T., Practical marine electrical knowledge, London, Witherby & Co Ltd, 1999.
10. Horovitz P., Hill W., The art of electronics, Cambidge University Press, 1989.
11. Hubert C. I., Triebel W. A., Operation, testing and preventive maintenance of electrical power apparatus, Prentice Hall 2002.
12. Jackson L. and Morton, T.D. General Engineering Knowledge for Marine Engineers. 5th ed. London, Thomas Reed Publications Ltd 1990 (ISBN 0947 637.761)
13. Jackson L., Instrumentation and control systems, Thomas Reed Publications Ltd., 1992.
14. Kasap S., Principles of electronic materials and devices, Third Edition, McGraw-Hill, 2006.
15. Kazmierkowski M. P., Tunia H., Automatic control of converter-fed drives, Elsevier 1994.
16. Khanna Vinod Kumar, The insulated gate bipolar transistor: IGBT theory and design, John Wiley & Sons, INC., Publication; ISBN 0-470-23845-7
17. Kiameh Philip, Electrical equipment handbook: troubleshooting and maintenance, McGraw-Hill Professional; ISBN: 978-0071396035
18. Kossowski K., Introduction to the theory of marine turbines. Foundation for the Promotion of Marine Industry. Gdansk 2005
19. Kothari D. P., Nagrath I. J., Electric machines, McGraw-Hill, New Delhi, 2006
20. Kraal E. G. R., Basic electrotechnology for engineers, 3rd Edition, Thomas Reed Publications Ltd.1985
21. Lister Eugene, Rusch Robert, Electric circuits and machines, McGraw-Hill, ISBN: 9780028018096
22. McGhee J., Henderson J. A., Korczynski J., Kulesza W., Scientific metrology, Lodart S.A., t.6dz, 1996.
23. Mohan N., First course on power electronics and drives, NMPERE Minneapolis, 2003.
24. Morris A. S., Measurement & instrumentation principles, Butterworth - Heinemann, 3rd edition, 2001.
25. REED's Volume 6: Basic electrotechnology for engineers; E. G. R. Kraal, Publisher: London: Thomas Reed Publications, [1985] ISBN: 0900335963
26. REED's Volume 7: Advanced electrotechnology for engineers. 2nd Ed., KRAAL, E.G.R. London, Adlard Coles Nautical, 2008.
27. Roy G. J., Notes on instrumentation and control, London Stanford Maritime Ltd. 1985.
28. Sherman E., Advanced marine electrics and electronics troubleshooting: a manual for boat owners and marine technician, International Marine, 2007.
29. Sherman E., Powerboater's Guide to electrical systems: maintenance, troubleshooting, and improvements, International Marine, 2000.
30. The basics of electricity, http://www.recampus.com/
31. The Physics Classroom, http://www.physicsclassroom.com/
32. Watson G. O., Marine electrical practice, Butterworth-Heinemann, 1991.
33. Whitaker J. C., Electronic systems maintenance handbook, Technical Press Morgan Hill, California, USA, 2002.
34. Whitaker J. C., The resource handbook of electronics, Technical Press Morgan Hill, California, USA, 2001.
35. Zachariason R., Electrical materials, Thomson, Delmar Learning, 2007.
36. I. Kuzmanić, R. Vlašić, I. Vujović. Elektrotehnički materijali. Split: Visoka pomorska škola u Splitu, 2001.

Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">PHYSICAL EDUCATION I</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">I.</td></tr>
<tr><td>Course teacher</td><td>Mislav Lozovina, PhD, Assoc.Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">1</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Marin Barišić</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td></td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>mandatory</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Enabling students to self-train in the workplace or in an adequate training ground on the vessel on which they live and work. Training students to choose and dosage exercises, especially for muscle groups at risk in the workplace. Training students to apply the procedures and techniques of abandoning a sinking vessel, getting out of the water, opening a life raft, climbing a raft, a boat; correcting a capsized raft, jumping into the water and swimming with a lifejacket on, jumping into the water and swimming in an isothermal suit, diving, surviving in water.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Acquire general and specific motor skills, knowledge, skills and habits
2. To preserve and improve the motor skills of the individual as a prerequisite for the health of the seafarers on board
3. Adapt exercises and techniques to your own abilities.
4. Apply acquired knowledge and motor habits for self-training in the workplace.
5. Demonstrate and apply the acquired knowledge and techniques of getting out of the water, opening a life raft, boarding a raft, a boat; uprighting a capsized raft, jumping into the water and swimming with a lifejacket on, jumping into the water and swimming in an isothermal suit, diving, surviving in water.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">The course Physical and Health Education I is taught in different locations: pool, gym, and at sea.
Weather conditions at sea will determine the number of hours of sailing. The ability to reconcile college hour and pool hour will determine the number of swimming hours. Good weather conditions will allow more hours of teaching at sea to be maintained. Classes in the gym will serve to maintain the health of seafarers and students through physical exercise.

Rules of behavior at the pool, jumping into the water, getting out of the water, testing your swimming knowledge. Rescuing and removing a person from the water in the event of a dangerous drowning and first aid. Swimming and drowning rescue. Diving beneath an imaginary oil slick. Wearing an isothermal suit. Getting out of the water, opening a life raft, climbing a raft, a boat; straightening of an overturned raft, jumping into the water and swimming with a life jacket on, jumping into the water and swimming in an isothermal suit, diving, surviving in water.
Boating - an elementary technique (rowing is performed depending on the availability of material and technical conditions.)
Fundamentals of Kinesiological Transformation (FKT) - The gym serves the purpose of teaching a student to achieve a psychophysical form that is sufficient for the proper performance of tasks and tasks within the profession.

ROWING – remark:
Classes are held on Saturdays and Sundays so that part-time students can fulfill the obligation, and every full-time student can participate in rowing classes. Rowing is</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">performed in a boat and / or boat. Part-time student may produce a seminar paper.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☒ seminars
☒ exercises
☐on line only
☐ mixed e-learning
☒ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
Exercises are compulsory for students because they keep track of attendance. In order to be eligible for taking the final exam, students must attend at least 80% of the exercises. In case of insufficient number of attendances, the students shall enroll in the course again the following year.

Responsibilities of part-time students
The total attendance requirements for part-time teaching may not be less than half the number of hours allocated to full-time students. Seminar work is possible for students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>Practical work</td><td>0.25</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Kolokviji</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are no grades in the Physical and Health Education course. Students with duly fulfilled obligations acquire the right to ECTS points.

Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percetage in grade (%)</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
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Final evaluation
<table>
<tr><th>Evaluation elements – final exam</th><th>Success (min. %)</th><th>Percentage in grade (%)</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
Grading
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
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</table>

	Percentage (%)	**Criterion**	**Grade**

	Title	**Number of copies in the library**	**Availability via other media**
Required literature (available in the library and via other media)	1. Lozovina V.: Sportovi na vodi, Sveučilišni udžbenik, Split 2001.	25	da
	2. Zec, D.: "Sigurnost na moru", Pomorski fakultet u Rijeci, Rijeka, 2001.		
	3. Lozovina V., Lozovina M. (2012): THEORY AND MATHEMATICAL MODULATION OF SPORTS TRAINING, Paradigm Of MethodologicalTheory And Mathematical Modulation Of Sports Training, LAP LAMBERT Academic Publishing, Saarbrücken, Germany, ISBN: 978-3-659-24998-3.		
	4. Bompa, T., Buzzichelli, C. (2015): PERIODIZATION TRAINING FOR SPORTS, Human Kinetics Publishers, Champaign, United States, ISBN10: 1450469434, ISBN13: 9781450469432.		
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARINE RADIO SYSTEMS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course teacher</td><td>Ivana Golub Medvešek, PhD, Assist.Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of basic processes and components of radio-communication devices. Ability to test and maintain ship's radio communications equipment.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Explain the basic features of radio communication systems.
2. Define and understand noise and distortion in the radio system.
3. Define and understand modulation procedures.
4. Define and understand the basic structures of radio equipment.
5. Define and understand transmission lines and impedance adjustment.
6. Define and understand communication antennas and electromagnetic wave propagation.
7. Analyze and calculate the basic circuits of a radio system.
8. Define and understand digital radio communication systems
9. Analyze and calculate maritime radio parameters.
10. Evaluate the specifications and testing of marine radio equipment.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction to radio-communication systems; Electric noise in the radio system; Distortion of signals in the radio system; Radio system constituents and processes. Electrical Signals and Systems. Modulating and detecting signals. Overview of RF Technologies. Thermal noise. Noise in linear systems. Noise temperature and noise factor. Noise of cascade coupled circuits. Intermodulation distortion. Distortion of cascade coupled circuits. Dynamic area.
2. Modulation procedures; Multiplexing and Multiple Access; Analog modulation. Binary digital modulation. Multi-digit digital modulation. Multiplexing based on division of time, frequency, and code. Multiple access.
3. Basic structures of the radio; Basic radio transmitter structures; Basic transceiver structures; Superheterodyne structure. Homodyne structure. Low interfacial structure. Bandwidth sampling structure. Electrical parameters of the receiver. Electrical parameters of the transmitter. Examples of radio equipment.
4. Transmission lines and microwave networks; Impedance Transformation and Adjustment; Transmission lines. Smith's diagram. Waveguides. Microwave Network Analysis. Serial and parallel resonant circuits. Microwave resonators. Adaptation to elements with concentrated parameters. Adaptation to elements with distributed parameters. RF and microwave filters.
5. Antenna technique; Electromagnetic wave propagation; Electromagnetic fields and plane wave. Transmitter and receiver antenna. Dipole and loop antennas. Antenna arrays. Travel wave antennas and broadband antennas. Antenna opening. Active antennas. Radio wave propagation.
6. Semiconductor radio frequency elements and technologies; Passive radio frequency components; RF diodes, bipolar transistors and unipolar transistors.</td></tr>
</table>

	RF and microwave integrated circuits. Connectors and waveguides. Attenuators and conclusions. Divide / join forces. Directional couplers. Ferromagnetic components. 7. Radio-frequency low-noise amplifiers; Reinforcement and stability of RF circuits. Amplifier topologies and power source. Principles of low noise amplification. Input impedance adjustment. Narrowband amplifiers. Broadband amplifiers. 8. Mixers; Frequency multipliers; Frequency Conversion Principles. Noise in the mixer. Topologies and examples of mixers. Diode frequency multipliers. Active frequency multipliers. Frequency Shift Assembly. 9. Oscillators; Phase synchronized loop; Frequency synthesizers; Feedback and negative resistance. Phase noise. Basic oscillator topologies. Generation of one-sided and quadrature signals. Frequency synthesis procedures. Phase synchronized loop. RF synthesizer structures. 10. Signal amplitude control circuits; Phase shifter; Attenuators and Switches. Variable gain amplifiers. Types of phase shifter. Phase shifter comparison. 11. Radio frequency power amplifiers; Classification of power amplifiers. High efficiency boosters. Impedance adjustment for large signal. Linearization procedures. 12. Digital radio communication systems; Signal processing in the fundamental frequency band; Signals and spectra. Formatting and modulating in the fundamental frequency band. Demodulation / detection in the fundamental frequency band. 13. Signal processing in the bandwidth; Channel coding; Bandwidth modulation. Demodulation / bandwidth detection. Types of channel-coding codes. A trade-off between channel modulation and coding. 14. Radio communication calculation; synchronize; Wireless channel. Link calculation analysis. Examples of link budgets. Synchronization principles. Synchronize the receiver. Network synchronization. 15. Radio frequency measurements and testing of marine radio equipment; Basic RF measuring equipment. Key RF measurements. Measurement of parameters and malfunction of marine RF and microwave devices. Electromagnetic compatibility of marine radio equipment. **Exercises**: 1. Passive RF elements and microwave components. 2. Transmission lines and impedance adjustment. 3. Measurement of antenna parameters. 4. Measurement of filter parameters. 5. Measurement of RF amplifier parameters. 6. Measurement of oscillator parameters and phase of the synchronized loop 7. Measurement of radio device parameters. 8. Analog modulation. 9. Analog-to-digital conversion. 10. Digital transmission in the fundamental frequency band. 11. Frequency limited digital transmission. 12. Digital modulation. 13. Channel capacity and coding. 14. Modeling of communication system. 15. Electromagnetic compatibility of marine radio equipment.	
Format of instruction	☒ lectures ☐ seminars ☒ exercises ☐ *on line* only ☐ mixed e-learning	☐ individual tasks ☐ multimedia ☒ laboratory ☐ mentoring ☐ consultations

	☐ field work	

Student responsibilities

Responsibilities of full-time students:
Students are required to attend lectures and exercises, so they keep track of attendance. In order to be eligible for taking the final exam, students must attend at least 70% of the lecture hours and 100% of the laboratory exercises. For students who have justified absenteeism 2 to 3, compensation is organized in the 15th week of classes. In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to enroll again next year.
Students must pass Ist and IInd laboratory exercise consisting of the practical implementation of measurements and simulation of the operation of radio-communication devices. The theoretical part can be passed through two exams or in the written examination within the examination period.
Responsibilities of part-time students:
Students must attend at least 50% of class hours and 100% of lab work hours. Exams and in-term exams are taken according to the same rules as for full-time students.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*

Lecture attendance	1.875	Research		Practical work	
Lab. Exercises	1.125	Report		Homework	
Essay		Seminar essay		(Other)	
In-term tests	2	Oral exam	1	(Other)	
Written exam	1	Project		(Other)	

Grading and evaluating student work in class and at the final exam

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	70	10
In-term test- lab. exercises I	50	22.5
In-term test. – lab exercises II	50	22.5
In-term test I	50	22.5
In-term test II	50	22.5

Final evaluation

Evaluation elements – final exam	Success (min. %)	Percentage in grade (%)
Practical exam (in-term tests, lab ex)	50	45
Theory exam (written)	50	45
Previous activities	100	10

Grading

Percentage (%)	Criterion	Grade
0 – 49	Does not satisfy minimum criteria	insufficient (1)
50 – 64	Satisfies minimum criteria	sufficient (2)
65 – 79	Average success with clear shortcomings	good (3)
80 – 89	Above average success with a few errors	very good (4)
90 – 100	Extraordinary success	excellent (5)

Required literature (available in the library and via other media)

Title	Number of copies in library	Availability via other media
1. F. Ellinger, Radio Frequency Integrated Circuits and Technologies, Springer-Verlag, Heidelberg, 2010.		YES

	2. B. Sklar, Digital Communications, 2nd ed., Prentice Hall, Upper Saddle River, 2001.		YES
Optional literature (at the time of submission of study programme proposal)	R. Vlašić, Brodski radiokomunikacijski uređaji, Autorizirana predavanja, Pomorski fakultet, Split, 2004.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">FUNDAMENTALS OF ELECTRICAL ENGINEERING II</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Igor Vujović, PhD, Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Miro Petković, PhD</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To master the basic principles that apply in AC circuits, which can be applied in the study of other courses of the study program and in practical work. Particular attention is paid to the application of acquired knowledge in the operation of electrical appliances and systems on board ships.
STCW 7.08
1.1.3. Electro-technology and electrical machines theory 25/75 sati
1.1.5. Electrical power distribution boards and electrical equipement 4/60 sati
2.1.6. The interpretation of electrical and electronic diagrams 10/30 sati
Appendix 1: Energy, Work and Power 4/12 sati
Appendix 6. Basic electricity and electronics 2,5/50 sati</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Enrolled course of Fundamentals of Electrical Engineering I.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After successfully completing the course, students can:
1. Define and use all the laws of alternating current circuits;
2. Analyze and calculate complex alternating circuits;
3. Plan and perform measurements in alternating, single-phase and three-phase systems;
4. Analyze and understand the operation of electrical machines.
5. Master the safeguards in working with AC power.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Magnetism. Magnets. Electromagnets. Magnetic phenomena. Earth's magnetism. Magnetic declination. Magnetic inclination. Magnetic field. Magnetic field display. Magnetic field strength.
2. Magnetic current. Magnetic current density. Magnetic field of flat conductor and coil. Right hand rule. Permeability. Ohm's law for magnetic circuits. The law of flow. Biot - Savart's Law. Electromagnetic induction.
3. Faraday's law of electromagnetic induction. Rotation voltage. Shift voltage. Self-induction. Međuindukcija. Forces in the magnetic field. Inductance in Circuit. Magnetic field energy. Eddy currents. Consequences and impact on marine equipment.
4. AC electrical circuits. Variable currents. Periodic sizes. Frequency. Circular frequency. Principle of alternating current generation. Mean value. Electrolytic mean. Effective value. Form factor. The parietal factor. The middle factor.
5. Symbolic display procedure. The alternating sizes described by complex numbers. Basic principles applied in AC circuits. Impedance. Reactance. Phase angle.
6. Alternating source loads. Surface effect. Individual loads in AC circuits: active device, coil and capacitor. Resistance triangle. Serial connections of individual load types. Single load parallel connections. Mixed compounds. Phasor diagrams.
7. Resonance. Serial (voltage) resonance. Parallel (current) resonance. Durable circles. Shaking Circle Energy: With and without choke.</td></tr>
</table>

8. Power in AC circuits. Labor, reactive and apparent power. Power triangle. Power factor. Power factor compensation. The lesson about maximum power. Applications in marine systems.
9. Solving AC networks. Conversion of serial to parallel circuit, and vice versa. Voltage and current source. Current and voltage dividers. Transformation triangle - star, and vice versa. Complex networks.
10. Transient occurrences in an alternating circuit. Transient phenomena in AC circuits. Non-sinusoidal periodic currents and voltages.
11. Four-pole devices. Quadrilateral equations. Types of parameters. Condition of symmetry of quadrilaterals. Alternate quadrilateral schemes. Input and output characteristic impedance of four poles.
12. Three-phase systems. The emergence of a three-phase system. Symmetrical wear. Symmetrical spacer connected to star. Symmetrical spacer connected to triangle. Procedure of single-phase display of three-phase systems.
13. Asymmetrical wear. Power in three-phase systems. Marine three-phase systems.
14. Graphic Symbols - Repetition. Symbols in power generation: generator, motor, transformer, contact, switch, relay, fuse, lighting. Graphic symbols in electronics. Diodes, transistors. TRIAC, MOSFET, IGCT, IGBT.
15. Basic differences between electrical diagrams: block, system, circuit, wiring (connection), view (layout).

Auditory exercises:

1. Calculation of magnetic field strength and magnetic induction by application of flow laws.
2. Magnetic Circuits.
3. Electromagnetic induction.
4. Current values of alternating quantities.
5. Vertical diagrams of serial combinations of devices.
6. Vertical diagrams of parallel combinations of devices.
7. Vertical diagrams of mixed spacer joints.
8. AC Power - Part 1.
9. AC Power - Part 2.
10. Power factor compensation.
11. Resonance.
12. Alternating Networks - Part 1.
13. Alternating Networks - Part 2.
14. Four terminal.
15. Symmetrical three-phase systems.

Laboratory exercises:

1. Introduction, security measures, and rules. Schemes and their interpretation.
2. Exercise 1: High Current Measurements in a Magnetic Circuit.
3. Exercise 2: Measuring AC Sizes with an Oscilloscope.
4. Exercise 3: Adjusting Different Waveforms Using an Oscilloscope.
5. Exercise 4: Serial connection of resistors, capacitors, and coils.
6. Exercise 5: Parallel connection of resistors, capacitors, and coils.
7. Exercise 6: Serial Resonance.
8. Exercise 7: Parallel resonance.
9. Exercise 8: Simulation and animation of electromagnetic waves and vibrational circuits.
10. Exercise 9: Power in AC Circuits.
11. Exercise 10: Power Factor Compensation.
12. Exercise 11: Three-Phase Source.
13. Exercise 12: Single Phase Transformer.
14. Exercise 13: A three-phase delta-connected load.
15. Exercise 14: A three-phase star-connected load.

<table>
<tr><td>Format of instruction</td><td colspan="6">☒ lectures
☐ seminars
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="6">☐ individual tasks
☐multimedia
☒ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="12">Responsibilities of full-time students
Students are required to attend 80% of lectures and tutorials, except for topics in STCW for which attendance is 100% and in laboratory exercises 100% (STCW).
Students should make up for lectures and exercises they did not attend.
Compensations can be made at the agreed time or during the consultation, but they must be signed on the records sheet.
Students have the opportunity to pass the exam by continuous assessment during the semester by taking in-term exams. Students are required / not to take all the exams.
Students who do not pass all the in-term examinations during the semester and are eligible for taking the final exam are required to take the exam within the exam period.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination period after the classes and to enter the mark in the exam term or to answer for a higher grade.

Responsibilities of part-time students
The total requirements for part-time students are the same as for full-time students (the course is partly under the STCW Convention). The way you take the exam is the same as for full-time students.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Laboratory exercises</td><td>0.5</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>4</td><td>Oral exam (for students who failed the in-terms or are not satisfied with the grade)*</td><td>2</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam (for students who failed the in-terms or are not satisfied with the grade)</td><td>2</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="12">Examination:

During the lectures, it is envisaged to take the in-term examinations, which are held after the lectures and exercises have been completed in the course.
When attending laboratory exercises, the theoretical knowledge that is the basis for performing each laboratory exercise is tested. Upon successful completion of the laboratory exercises, the student writes a report on each individual laboratory exercise, which is also an element of the student's assessment of the subject.
The in-term tests are held in writing and at least 40% are required for a positive evaluation. A student who passes all the exams positively is exempted from the</td></tr>
</table>

written / oral exam and, depending on his / her score, at the first exam term of the final exam, his / her grade is entered in the index.
Students who have positively completed one of the exams are admitted as part of the final exam. The rest of the material is taken for the exam.

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Lecture attendance	95	5
Lab.exercises attendance	100	2.5
Report from lab. exercises	100	2.5
In-term tests of equal number of points	40	90

Final evaluation

Evaluation elements – final exam	Success (min. %)	Percentage in grade (%)
Class attendance	95	5
Attendance of lab exercises	100	2,5
Written exam	40	45
Oral exam	40	45

Grading

Percentage (%)	Criterion	Grade
0-39	Does not satisfy minimum criteria	insufficient (1)
40-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

The assessment and grading of full-time and part-time students are the same.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. I. Kuzmanić, Osnove elektrotehnike i elektronike s odabranim temama iz brodske elektrotehnike, PFST, 2021.	0	e-knjižara
	2. I. Kuzmanić. Brodska elektrotehnika i elektronika. Split: Pomorski fakultet u Splitu, 2006.	20	YES
	3. I. Kuzmanić, I. Vujović. Osnove elektrotehnike – Zbirka riješenih zadataka. Split: Pomorski fakultet u Splitu, 2005.	20	YES
	4. I. Vujović, I. Kuzmanić. Repetitorij s uputama za laboratorijske vježbe iz Osnova elektrotehnike i Brodske elektrotehnike i elektronike. Split: Pomorski fakultet u Splitu, 2008.	20	YES
	5. I. Vujović, I. Kuzmanić, Elektrotehnički materijali i tehnologije s primjenom, Sveučilište u Split, PFST, Redak, kolovoz 2023. ISBN 987-953-6655-81-6. https://webknjizara.hr/proizvod/elektrotehnicki-materijali-i-tehnologije-s-primjenom-color-igor-vujovic-ivica-kuzmanic/	0	Web page
Optional literature (at the time of submission of study	1. V. Pinter: Osnove elektrotehnike – knjiga prva, Tehnička knjiga, Zagreb, 3. izdanje, 1980. 2. V. Pinter: Osnove elektrotehnike – knjiga druga, Tehnička knjiga, Zagreb, 3.		

programme proposal)	izdanje, 1978. 3. Bird J., Electrical circuit theory and technology, Elsevier 2002. 4. Fardo S. W., Patric D. R., Electrical power systems technogy, The Fairmont Press, Lilburn 2009. 5. Gross Ch. A., Electric machines, CRC Press Taylor Francis Group, Boca Raton, FL, 2007. 6. Horovitz P., Hill W., The art of electronics, Cambridge University Press, 1989. 7. Kasap S., Principles of electronic materials and devices, Third Edition, McGraw-Hill, 2006. 8. Kothari D. P., Nagrath I. J., Electric machines, McGraw-Hill, New Delhi, 2006. 9. Lister Eugene, Rusch Robert, Electric circuits and machines, McGraw-Hill, ISBN: 9780028018096 10. REED's Volume 6: Basic electrotechnology for engineers; E. G. R. Kraal, Publisher: London: Thomas Reed Publications, [1985] ISBN: 0900335963 11. REED's Volume 7: Advanced electrotechnology for engineers. 2nd Ed., KRAAL, E.G.R. London, Adlard Coles Nautical, 2008. 12. The basics of electricity, http://www.recampus.com/ 13. The Physics Classroom, http://www.physicsclassroom.com/ 14. I. Kuzmanić, R. Vlašić, I. Vujović. Elektrotehnički materijali. Split: Visoka pomorska škola u Splitu, 2001.
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">ELECTRONIC COMPONENTS AND SETS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course teacher</td><td>Hrvoje Dodig, PhD, Assoc.Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nediljko Kaštelan</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of basic properties of semiconductor materials and principles of operation of basic electronic components.
Analysis of diode circuits in static and dynamic operating conditions.
Ability to analyze electronic circuits with bipolar and field effect transistors under static and dynamic conditions.
Analysis of basic circuits with operational amplifiers.
Basic semiconductor electronic circuits for marine use.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. State the basic properties of semiconductor materials,
2. Explain the principle of operation of the basic electronic elements,
3. Calculate basic parameters of semiconductor materials and electronic elements,
4. Apply basic electronic element models for the calculation of elemental performances of bipolar and field effect transistors
5. Describe the influence of frequency on the operation of amplifiers with bipolar and unipolar transistors,
6. Explain the operation of operational amplifiers and basic circuits with an operational amplifier.
7. Explain basic semiconductor electronic circuits for marine use</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Introduction. Historical overview of the development of electronic and semiconductor elements. Semiconductor materials, intrinsic and extrinsic semiconductors. Charge carrier mobility. Energy bands in semiconductor material. Minority and majority holders.
2. PN junction and potential barrier. PN live connection. Semiconductor diode. Reverse saturation current. Shockly's equation.
3. Breakthrough voltage of the diode. Comparison of the characteristics of Ge, Si and GaAs diodes. The influence of temperature on the current-voltage characteristic of a diode. Ideal and real diodes. Static diode resistance. Dynamic diode resistance. Total diode resistance.
4. Average diode resistance. Equivalent diode circuits. Capacity of the diode and influence on the frequency of operation of the circuit. Reverse diode recovery time. Manufacturer Specifications of diodes. Diode enclosures. Testing diodes. Zenner diodes. LEDs. High power diodes.
5. Electronic diode circuits. Cargo Line Analysis. "I" and "OR" doors in diode technology. Half wave rectifier. Cutting assemblies. Tightening assemblies.
6. Electronic circuits with combined DC and AC sources. Circuits with Zenner diodes. Zenner's regulator.
7. Bipolar transistor. Basic operation of bipolar transistor. Joint base joint. Joint</td></tr>
</table>

	Broadcast Connector. Joint collector joint. Reinforcement as part of a joint broadcaster. Transistor operation limits with respect to transistor power. DC analysis of transistor operation. 8. DC analysis of the amplifier in the joint in a common emitter with a grounded emitter. Static operating point. DC analysis of amplifiers in common-emitter junction with emitter resistance. Static operating point stability analysis. 9. DC analysis of the amplifier in the joint of the common emitter with the voltage divider in the base circuit. Exact method of DC amplification analysis. Approximate DC gain analysis method. Collector feedback. Darlington assembly. 10. Power mirrors. Current sources with transistors. Transistor as a switch. Stabilization of the operating point. Practical circuits with transistors. 11. Introduction to AC Analysis of Transistor Assemblies. Transistor amplification energy balance in AC domain. AC modeling of transistor circuits. AC analysis of transistors in a joint emitter circuit. 12. Emitter follower. Impact of load and influence of generator resistance on transistor amplifier. Amplifier current amplification. Cascade amps. Darlington compound in AC conditions. Hybrid equivalent transistor model. 13. Field effect transistors. MOSFET transistors. Enriched type MOSFET transistor. CMOS transistors. MESFET transistor. DC analysis of FET and JFET transistors. DC analysis of MOSFET transistor operation. Voltage Regulated Amplifiers. Delay circuits with JFET transistor. Application of FET transistors for fiber optic communications. 14. Small signal model of JFET and MOSFET transistors. AC analysis of circuits with JFET transistor. 15. Operational amplifiers. Advantages of operating amplifier over transistor amplifier. Non-inverting operational amplifier. Inverting operational amplifier. Practical application of operational amplifiers on marine communication systems. **Exercises** 1. Semiconductor diode. Zener diode. LED. Tasks. 2. Transistor at common base junction. Transistor in a joint emitter junction. Transistor in common collector junction. Tasks. 3. Transistor as switch. Transistor as amplifier. Tasks. 4. Emitter coupled pair. Darlington couple. Tasks. 5. Field effect transistors. FET as a resistor. Tasks. 6. Amplifier in ZE junction. Amplifier in ZC junction. Amplifier in ZB junction. Cascade amplifiers. Tasks. 7. Amplifier in ZE junction. Amplifier in ZC junction. Amplifier in ZB junction. Cascade amplifiers. Tasks. 2. Differential amplifier. Differential amplifier derived by FET. Tasks. 3. Operation amplifier. Operational amplifier applications. Tasks. 4. High frequency response of ZE stage. High-frequency response of the ZC stage. Tasks. 5. High frequency responses of amplifiers with FET. Tasks. 6. Feedback amplifier. Tasks. 7. Phase shift oscillators. Oscillators with Wien Bridge. Tasks. 8. Polar pole adapter. Charging rectifier. Stabilizers. Thyristor control. Tasks. 9. Simulation and analysis of analog circuits using EWB.	
Format of instruction	☒ lectures ☐seminars and workshops ☒ exercises ☐*on line* only ☐ mixed e-learning	☒ individual tasks ☐ multimedia ☒ laboratory ☐ mentoring ☐ consultations

<table>
<tr><td></td><td colspan="6">☐ field work</td><td></td></tr>
<tr><td>Student responsibilities</td><td colspan="7"></td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.875</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Lab. exercises</td><td></td><td>Report</td><td>0.75</td><td>Laboratory exercises</td><td>0.75</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>2.625</td><td>Oral exam *</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam*</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">During the lectures, it is envisaged to take the in-term examinations, which are held after the lectures and exercises have been completed in the course.

When joining laboratory exercises, the theoretical knowledge that is the basis for performing individual laboratory exercises is tested. Upon successful completion of the laboratory exercises, the student writes a report on each individual laboratory exercise, which is also an element of the student's assessment of the subject.

Three in-term tests on theory and assignment (listed in the implementation plan) are planned. The in-term test is held in writing, and at least 50% correct and reasoned answers are required for a positive assessment. A student who passes all the exams positively is exempted from the written / oral exam and, depending on his / her score, at the first exam term of the final exam, his / her grade is entered in the index.

Students who have positively completed one of the exams are admitted as part of the final exam. The rest of the material is taken in the practical and theoretical exam.

Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Lecture attendance and activity at exercises</td><td>Most active (80-100% presence at lectures) obtain 5 -10 percent, depending on activity.</td><td>5%</td></tr>
<tr><td>Assessment of preparation and knowledge required for lab exercises</td><td>100%</td><td>10%</td></tr>
<tr><td>Doing lab exercises and writing report from lab exercises</td><td>100%</td><td>5%</td></tr>
<tr><td>Taking in-term tests</td><td>50%</td><td>80%</td></tr>
</table>
Final evaluation
<table>
<tr><th>Evaluation elements – final exam</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance and activity at exercises</td><td>The most active students (80-100% presence at lectures) obtain 5 -10 points, depending on activity.</td><td>5%</td></tr>
<tr><td>Assessment of preparation and knowledge required for lab exercises</td><td>100%</td><td>10%</td></tr>
</table></td></tr>
</table>

	Doing lab exercises and writing report from lab exercises	100%	5%
	Oral exam	50%	80%

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-63	Satisfies minimum criteria	sufficient (2)
64-80	Average success with clear shortcomings	good (3)
81-90	Above average success with a few errors	very good (4)
91-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the written exam within the exam term. The same assessment criteria apply to the examination period as the continuous assessment.

Evaluation and grading of part-time students
The condition for being eligible for taking the final exam is attendance at a minimum of 50% of lectures.
The evaluation and grades are the same as those of full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	J. Millman, A. Grabel, Microelectronics, McGraw-Hill,1987		
	D.Kovačević, Elementi elektronike, PFS, 2000		YES
	D.Kovačević, Analogna elektronika, predavanja		YES
Optional literature (at the time of submission of study programme proposal)	A.S. Sedra, K.C. Smith: Microelectronic Circuits, 6th edition, Oxford University Press, 2009 P. Horowitz, W. Hill, The art of electronics, Cambridge University Press, Cambridge, 1994.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)	Student papers for domestic and international conferences		

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARINE ENGINEERING</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1.</td></tr>
<tr><td>Course teacher</td><td>Zdeslav Jurić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">7</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Srđan Dvornik, M.Sc. Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The objective of the course is to acquaint students with the performance of main and auxiliary ship machines and devices in the function of ship propulsion, with ship pipelines (propulsion, general services and special purposes) at operation and control level, auxiliary ship machines in function of cargo transshipment, as well as with devices and onboard safety systems of different designs. Familiarization with safe exploitation and measures for the protection of the marine environment. Familiarity with work monitoring (local and remote).</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Explain the function of the ship pipeline and the measuring instruments within the pipeline.
2. Distinguish between ship pipelines.
3. Explain and distinguish the modes of operation of marine diesel engines, and apply the basics of thermodynamics in the calculation of power, mean pressures, and the degree of utility of diesel engines.
4. Distinguish between types of marine steam generators, and will be able to explain and sketch the schematic diagrams of load regulation, water level and temperature control of steam overheating.
5. Analyze the performance of offshore steam turbines, and sketch the conversion of energy forms in the offshore steam turbine system.
6. Explain and outline the thermal processes in a gas turbine, and analyze the advantages and disadvantages of individual gas turbine systems.
7. Explain, sketch and distinguish the principle of operation of marine pumps.
8. Explain the principle of automatic operation of a centrifugal fuel cleaner, oily water treatment plant, sewage treatment plant.
9. Distinguish between types and parts of the refrigeration process and will be able to calculate and explain the refrigeration process in the T-s diagram.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures

1. Structure of the ship's energy system, division of ship's processes, general characteristics of the ship's propulsion complex, ship's propulsion plants, propulsion complexes.
2. Pipeline, pipeline calculation, types of pipelines in shipbuilding, materials, selection of pipeline materials, pipe joints, valves, types of valves, marking of pipeline services by colors on board.
3. Fundamentals of thermodynamics, change in the state of ideal gases, I main paragraph of thermodynamics, circular processes, II law of thermodynamics.
4. Marine diesel engines, division of marine propulsion diesel engines, modes and terms, thermodynamic bases of diesel engines, diesel process, Sabathe process, design characteristics, fuel injection and combustion in the engine, change of working medium. Electronically operated marine</td></tr>
</table>

diesel engines. Marine and fresh water-cooling system, lubricating oil system, fuel system, compressed air, exhaust and exhaust air pipelines.

5. Electronically operated marine diesel engines. Marine and fresh water-cooling system, lubricating oil system, fuel system, compressed air, exhaust and exhaust air pipelines.
6. Steam, condensate and feed water system, division of steam generator, preparation and treatment of water for steam generator, role of condenser, lukewarm well, observation tank, measuring devices, regulation of feed water of steam generator, single-stage, two-stage, three-stage, load generator control, water level monitoring and alarm devices. Execution of exhaust gas generators (utilizers), connection of oil-fired steam generators and utilizers, regulation of steam generators at exhaust gas generators.
7. Marine steam turbines, ship steam turbine designs, thermal process, single stage action, single stage action with steam velocity, multi stage action with steam pressure step, multi stage reaction, combined turbines. Steam turbine parts: nozzles, blades, rotor, gaskets, bearings, housing, couplings, gearboxes, rotor turning device, steam turbine control system.
8. Gas turbines, open gas turbine process, post-compression air heating, two-stage expansion, two-stage compression and expansion. Main parts of gas turbine plant: gas turbine, compressors, combustion chambers, combustion air heaters, fuel system, lubrication system, safety system.
9. Marine auxiliary machinery, marine pumps, division, operation and regulation of pumps, application of pumps on board, conversion of energy, delivery height, power and degree of operation, centrifugal pumps, jet pumps, stapes, piston pumps, gear, screw pumps. Compressors and fans, compressor parts, sanitary system on board, fresh water system, hydrophore, evaporator - operating principle, germination device, wastewater system, wastewater division, operating principle for biochemical treatment of sewage.
10. Marine refrigeration equipment, basics of refrigeration process, purpose and division of refrigeration systems on board, refrigeration unit for maintenance of foodstuffs - screws, refrigeration unit for air conditioning, refrigeration unit for refrigerating and freezing of cargo, refrigerants. Main refrigerant components, compressor, condenser, evaporator, refrigerant dryer, control units.
11. Fire protection systems, automatic sprinkler fire extinguishing system, foam system, powder system, CO2 system, inert gas system. Fire detection and alarm devices.
12. Ship systems on tankers, refrigerated vessels, LNG and LPG vessels, inert gas system, crude oil tank washing system, chemical tank transport, liquefied gas transport vessels, liquefaction and evaporation control systems, heat exchangers, drying system, suction pumps and unloading systems.
13. Remote control of marine machinery, control points, components of the digital engine speed control system of the propulsion engine, electronically controlled control system, crankshaft position sensors.
14. Specific versions of the ship's machinery complex, gas turbine propulsion, electrical propulsion, nuclear propulsion, combined propulsion systems.
15. Maintenance and failures of marine machinery, maintenance approaches, corrective, preventive maintenance, software maintenance programs, maintenance costs, fault curve.

Exercises

1. Introduction to the simulator of a marine propulsion diesel engine system for the operation of crude oil tankers.
2. Compressed air system (reference and service), preparation and commissioning, seawater cooling system, fire protection system, ballast system.

<table>
<tr><td></td><td colspan="6">3. Fuel system, storage tanks, sediment and day tanks, fuel separation, fuel delivery system for main engine, steam generator and auxiliary engines.
4. Main engine oil lubrication system, oil separation. Auxiliary engine lubrication system. Onboard oil control and analysis.
5. Main engine cooling water system low temperature and high temperature circuit. Treatment of the cooling water of the main engine on board.
6. Main engine reference and control air system Main engine preparation and commissioning. Main engine control locations. Control, reversal, and maneuvering system.
7. Steam generator system, feed water, steam, condensate, boiler system, preparation and starting. Steam Generator Supply Water Treatment.
8. Exhaust boiler system, turbogenerator system. Main engine exhaust gas boiler maintenance system.
9. Seawater desalination system (evaporator). Hydrophore system. Ship’s freezer system. Air conditioning and ventilation system on board.
10. The bilge system in the engine room, the principle of operation of the bilge separator, the principle of operation of the waste water separator, devices for biochemical treatment of sewage. Waste oil and fuel incineration system on board. Introducing the Oil Record Book.
11. Power sources on board. Parallel operation of the electricity generator.
12. Steering gear, emergency steering, and stern pipe system.
13. Inert gas system, preparation, and starting. Cargo tank washing system, bilge and ballast system.
14. Fire systems, foam system, powder system, CO2 system, inert gas system. Fire detection and alarm devices.
15. Troubleshoot basic system-specific errors.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students

Students are required to attend lectures and exercises because they keep track of attendance. In order to be eligible for taking the final exam, students must attend a minimum of 80% of classes and 100% of exercises. In the case of insufficient number of attendances, meeting additional conditions is required by the creation of additional tasks (the so-called enhanced independent work).
Students who do not attend the classes due to illness must bring a valid apology from the doctor. Students who earn less than 80% of their attendance are not eligible for taking the final exam and are required to enroll again next year. Students can take the exam via two exams. Students may retake only one in-term exam, which they have not passed. If the student does not pass the exams, he / she is obliged to take the written and oral part of the exam.

Responsibilities of part-time students
The total attendance requirements for part-time students may not be less than half the number of hours allocated to full-time students. Exams are the same as for regular students.
Students will not be eligible for taking the final exam unless they have attended more than 5% of the total duration of the education program and have not attended the practical part of education or training in their entirety.</td></tr>
<tr><td>Screening student work (name the</td><td>Lecture attendance</td><td>1.875</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
</table>

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		(Other)	
	Essay		Seminar	1.125	(Other)	
	In-term tests	2	Oral exam	1	(Other)	
	Written exam	1	Project		(Other)	

Grading and evaluating student work in class and at the final exam

Evaluation and grading of full-time students' work

Attendance is compulsory for full-time students, ie a minimum of 80% of attendance is required.
There are 2 in-terms written in the semester. The first in-term test is written in the eighth week of teaching and covers the 1st to 5th learning outcomes, the second in-term test is written in the penultimate week of the classes, and covers the 6th to 9th learning outcomes.

Examples of in-term test questions are available on the Faculty website and at the end of each class. At each in-term test, a minimum of 50% passing points is required. Students who do not attend a single in-term for objective reasons or fail to achieve a minimum percentage are eligible for correction.
The final grade includes class attendance, in-term results, written exam, seminar paper, and oral exam.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	20
In-term test I	50	15
In-term test II	50	15
Oral exam	50	50

Grading:

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the written exam within the exam term. The same assessment criteria apply to the examination period as the continuous assessment.

Evaluation and grading of part-time students' work

Part-time student shall attend a minimum of 50% of the total hours of lectures and exercises Evaluation and grading are the same as for full-time students.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
Martinović,D.: Brodski strojni sustavi,Pomorski fakultet u Rijeci,2005.		
Martinović, D.: Brodski rashladni uređaji, Školska		

	knjiga Zagreb,1994.		
	Matković, M.: Protupožarna zaštita na brodovima, Pomorski fakultet u Rijeci,1996.		
	Tireli, E., Martinović, D.: Brodske toplinske turbine, Visoka pomorska škola Rijeka, 2001.		
	Milić, L.: Brodski dizelski motori I i II, Veleučilište Dubrovnik,1998.		
	Prelec, Z.: Brodski generatori pare, Školska knjiga, Zagreb, 1990.		
Optional literature (at the time of submission of study programme proposal)	Martinović, D., Stanković P.: Sustav inertnog plina, Faculty of Maritime Studies, Rijeka, 1995. Martinović, D., Stanković P.: Sigurnost na tankerima, Faculty of Maritime Studies, Rijeka, 1995. Martinović, D., Stanković P.: Pranje tankova sirovom naftom, Faculty of Maritime Studies, Rijeka, 1996. Ozretić, V.: Brodski pomoćni strojevi i uređaji, Split Ship Management, Split, 2004. Jurišić, K.: Termodinamika, Faculty of Maritime Studies in Split, 2004.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME ENGLISH II</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course teacher</td><td>Jelena Žanić-Mikuličić, PhD, senior lecturer</td><td>Number of credits (ECTS)</td><td colspan="3">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">10</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquisition of basic and specialist language knowledge and skills to train students to acquire, attest, and certify senior officers (as required by the STCW 1995 Convention as amended) - English as the official language of communication in the world maritime.
To train a student to present maritime topics in English.
Encouraging and developing students' cognitive abilities, as well as developing the basic four language skills: reading, listening, writing, and speaking.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After passing the exam in Maritime English II, the student will:
1. distinguish between the terms related to anchoring, mooring and departure of a ship from port;
2. identify devices on the navigation bridge, comment on their operation and integration into the navigation system;
3. comment on the most significant inventions in the history of navigation and relate them to navigation techniques and the use of nautical charts;
4. identify terms for buoy systems;
5. isolate and classify the tasks of the Master and crew when navigating during a storm;
6. distinguish between ship's security systems and comment on the rules of collision avoidance at sea;
7. distinguish between types of maritime communications and VHF messages in extraordinary circumstances;
8. discuss the cause and effect of marine pollution;
9. identify the basic types of ship documents.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Types of navigation
2. Anchoring/Anchors
3. Leaving berth. Underway
4. The navigating bridge; design and equipment
5. Electronic Aids to Navigation
6. Radar and radar errors</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">7. Sea charts
8. Understanding sea chart symbols
9. Safety at sea: buoyage
10. Ship motions in heavy weather
11. Safety systems on board ships: life-saving and fire-fighting appliances
12. Different types of VHF messages in emergencies: distress, urgency and safety messages
13. Maritime pollution.
14. Collision regulations; Accident report
15. Injuries and first aid administration on board ship.

Exercises:
1. Tenses: Revision / Describing types of navigation
2. Narrative Tenses / Describing anchors, berthing
3. Conditional Sentences: Types 0 &1 / Presenting the procedures while leaving berth and while underway
4. Conditional Sentences: Type 2 / Identifying parts of the ship's navigating bridge
5. Conditional Sentences: Type 3 / Identifying electronic aids to navigation
6. Modals: Present Deductions / Presenting marine radars
7. Modals: Past Deductions / Describing types of sea charts
8. In-term test I
9. Gerunds & Infinitives / Defining buoyage systems
10. Expressions of Quantity / Defining ship's motions and stresses in heavy weather
11. Reported Speech: Statements / Presenting safety equipment
12. Reported Speech: Commands / Transmitting distress, urgency and safety messages
13. Reported Speech: Questions / Discussing causes of maritime pollution and possible solutions
14. Defining / Non-defining Relative clauses / Filling in a form
15. In-term test II</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line only
☒ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Students' responsibilities
Students are required to attend and actively participate in classes, carry teaching materials and prepare assignments on a regular basis.
The minimum attendance continues at 80%.
In case they do not exercise their right to take the final exam, students are obliged to enroll and attend the course again the following year.</td></tr>
<tr><td rowspan="2">Screening student work (name the proportion of ECTS credits for each</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Lab. exercises</td><td></td><td>Report</td><td></td><td>Independent</td><td>0.25</td></tr>
</table>

<table>
<tr><td rowspan="4">activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td></td><td></td><td></td><td></td><td>learning and homework</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td>0.25</td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1</td><td>Oral exam</td><td>0.375</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>(1) in case of failed in-term tests</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">
Evaluation and grading of students' work
The exam consists of two parts, written and oral.
Students may take the written part of the exam via in-term exams. The material under study is covered in teaching materials and includes vocabulary and vocabulary. Students have the opportunity to take the written part of the exam and professional terminology before the exam deadlines. In this case, they only take the oral part of the exam (lessons) at the exam.
If the student fails to pass the written examination partially and fulfills the minimum teaching requirements throughout the semester, he / she will take the complete examination through the written assignment and oral part of the exam within the stipulated regular exam periods.
At the in-term / exam, a minimum of 50% points are required for the student to take the oral exam.
In order to take the course during the regular examination period and to enter the grade in the system, students are required to apply for the exam for the period of time they take the exam.
Registration and cancellation of the exam is done on Studomat online.

Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>80</td><td>10</td></tr>
<tr><td>In-term tests</td><td>50</td><td>30</td></tr>
<tr><td>Continuous check of seminar essays</td><td></td><td>10</td></tr>
<tr><td>Total</td><td></td><td>50 – in this case the student does not take final exam</td></tr>
</table>
Final exam:
<table>
<tr><th>Evaluation elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Practical exam (written)</td><td>50</td><td>50</td></tr>
<tr><td>Theory exam (written/orali)</td><td>50</td><td>50</td></tr>
<tr><td>Previous activities (including all indicators of continuous assessment)</td><td>100</td><td>50 (replaces final written exam)</td></tr>
<tr><td>Total</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. P.C. van Kluijven, *International Maritime English Programme*, De Alk&Heinen, Alkmaar, 2003.		YES
	B. Pritchard, *Maritime English 1*, Školska knjiga, Zagreb, 1995.		YES
Optional literature (at the time of submission of study programme proposal)	B. Pritchard, *Hrvatsko-engleski rječnik pomorskog nazivlja*, Školska knjiga, Zagreb, 1989. P.C. van Kluiven, *The International Maritime Dictionary Part 2*, De Alk & Heijnen, 2011. T. Carić i B. Plančić, *Englesko-hrvatski pomorski slikovni rječnik*, Pomorski fakultet Sveučilišta u Splitu, Split, 2008.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">PHYSICAL EDUCATION II</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">I.</td></tr>
<tr><td>Course teacher</td><td>Mislav Lozovina, PhD, Assoc.Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">1</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td></td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>Mandatory</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Enabling students to self-train in the workplace or in an adequate training ground on the vessel on which they live and work. Training students to choose and dosage exercises, especially for muscle groups at risk in the workplace.
To acquaint students with the importance of continuing to maintain the health of seafarers through physical training, basic, general and specific motor skills: climbing rope and naval ladders, drowning rescue, swimming, sailing rowing. Adequate kinesiological activities to satisfy the needs of students for movement as an expression of satisfaction of general needs that increase adaptive and creative abilities in contemporary living and study conditions. In addition, the objective of the course Physical and Health Culture is to convey to students basic information about the health, work and defense skills necessary for life.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5"></td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Acquire general and specific motor skills, knowledge, skills and habits
2. Solve motor tasks in distressing situations
3. Adapt exercises and techniques to your own abilities.
4. Apply acquired knowledge and motor habits for self-training in the workplace.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Teaching course Physical and health education II is performed at different locations: pool, gym, and at sea.
Weather conditions at sea will determine the number of hours of sailing. The ability to reconcile college hour and pool hour will determine the number of swimming hours. Good weather conditions will allow more hours of teaching at sea to be maintained. Classes in the gym will serve to maintain the health of seafarers and students through physical exercise. Seminar work can be written by part-time students.
The program is designed in such a way that the student achieves in such a psychophysical form that is sufficient for the proper performance of tasks and tasks within the profession. The applicable subjects are: natural movement forms, shaping exercises, swimming, rowing and diving.
Flight, reflection, landing, and possible accidents. Running to the point of alert. Climbing and descending the ladder. Work, fatigue, rest. Climbing up and down rope and sail ladder. General and specific physical preparation of seafarers. Explosive power of seafarers and reactions during an accident on board. Flexibility, balance of the organism. Precision. Speed of movement of seafarers. Lifting loads. Typical right and wrong movements. Breathing exercises. Chest breathing. Belly breathing. Testing and testing the body's motor knowledge and functional abilities. Sailor rowing in a lifeboat with adequate knowledge and skills.
Rules of behavior at the pool, jumping into the water, getting out of the water, testing your swimming knowledge, rescuing and pulling a person out of the water in the event of a dangerous drowning and first aid. Maintaining the health of seafarers through physical exercise. Measure heart rate at rest, after exertion (running) and</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">after recovery (2 minutes after running). Swimming Exercises - Jump mode, dive under the imagined seaside of fuel from the boat, emergence mode during a boat crash. Swimming exercises skating, floating, breathing technique, arm work, leg work, correcting typical breathing errors, strains, and legs. Swimming exercises in pain of various parts of the spine: neck, cross, vines. Swimming exercises for breathing, breathing techniques, leg work. Diving for breath, time and length. Rescue of drowning. Careful approach to the drowning man. Capture of drowning men. Mode of suffocation in the sea and waters.
Fundamentals of Kinesiological Transformation (FKT) - The gym serves the purpose of teaching a student to achieve a psychophysical form that is sufficient for the proper performance of tasks in general and tasks within the profession.
Navy rowing technique. Removing and carrying oars. Proper cutter load: bow, middle, stern, port, and starboard. Basic match alignment. Basic starting position: the position of the arms, torso, and oars. The active and passive phases are astounding. Rowing of bow, middle, and stern rowers. Basic sailor-rowing strokes. Short, medium, long and strong, powerful strokes. Rowing start, turn, finish.
ROWING - remark
Classes are held on Saturdays and Sundays so that part-time students can fulfill the obligation, and every full-time student can participate in rowing classes. Rowing is performed in a boat and / or boat. Part-time student may produce a seminar paper.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☒ seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☒ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
Exercises are compulsory for students because they keep track of attendance. In order to be eligible for taking the final exam, students must attend at least 80% of the exercises. In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to enroll again next year.

Responesibilities of part-time students
The total attendance requirements for part-time teaching may not be less than half the number of hours allocated to full-time students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>(Other)</td><td>0.25</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td colspan="6"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">There are no grades in Physical education II. Students who have met the requirements have the right to the ECTS points.

Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
</table>
Final evaluation</td></tr>
</table>

Evaluation elements – final exam	Success (min. %)	Percentage in grade (%)

Grading

Percentage (%)	Criterion	Grade

Percentage (%)	Criterion	Grade

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Lozovina V.: Sportovi na vodi, Sveučilišni udžbenik, Split 2001.	25	YES
	2. Zec, D.: "*Sigurnost na moru*", Pomorski fakultet u Rijeci, Rijeka, 2001.		
	3. Lozovina V., Lozovina M. (2012): THEORY AND MATHEMATICAL MODULATION OF SPORTS TRAINING, Paradigm of MethodologicalTheory And Mathematical Modulation Of Sports Training, LAP LAMBERT Academic Publishing, Saarbrücken, Germany, ISBN: 978-3-659-24998-3.		
	4. Bompa, T., Buzzichelli, C. (2015): PERIODIZATION TRAINING FOR SPORTS, Human Kinetics Publishers, Champaign, United States, ISBN10: 1450469434, ISBN13: 9781450469432.		
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MATHEMATICS II</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2.</td></tr>
<tr><td>Course teacher</td><td>Tatjana Stanivuk, PhD, Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Matko Maleš, Ph.D.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>-</td><td>45</td><td>-</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">10</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquiring knowledge and acquiring skills in those fields of mathematics (basic algebra, mathematical analysis, and appropriate mathematical methods) that are necessary for following the syllabuses of other courses foreseen in the syllabus and for the expected practical application.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended course Mathematics 1.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Define a primitive function and calculate an indefinite integral;
2. Interpret the methods of integration and apply the Newton - Leibniz formula in solving certain integrals;
3. Identify and solve incorrect integrals;
4. Apply certain integrals in the calculation of the surfaces, lengths of arches, circumference and surfaces of rotating bodies;
5. Analyze and solve problems from functions of two or more variables;
6. Interpret the solution of the first and second order differential equations and explain the meaning of them.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction. The concept of an indefinite integral and its property. Basic integrals.
2. Substitution method. Partial integration method.
3. Integration of rational functions. Integrating some irrational functions.
4. Integration of trigonometric functions. Certain integrals and their properties.
5. The relation of a definite and indefinite integral, Newton - Leibniz formula. Incorrect integrals.
6. Applying a certain integral: Calculating the surface of characters in a plane. Calculating the arc length of a curve.
7. Calculation of volume and surface of rotating bodies.
8. Functions of Multiple Variables: Function definition area and graphical representation. Partial derivatives.
9. Total function differentials. Partial derivatives of complex functions.
10. Extremes of functions of two variables: Ordinary extremes. Conditional (bound) extremes.
11. Differential equations: 1st order differential equations: Differential equations with separated variables.
12. Homogeneous, linear, Bernoulli and exact differential equations.
13. Second Order Differential Equations: Second Order Differential equations that are reduced to the First Order Differential Equations.
14. Linear Second Order Differential Equations with the const. by coefficients: Homogeneous and inhomogeneous linear Second Order Diff. Eq. with the const. coefficients.
15. Review of course contents and repetition.

Exercises:</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">1. Indefinite integrals: Basic methods of integration.
2. Substitution method. Partial integration method.
3. Integrating rational and some irrational functions.
4. Integration of trigonometric functions.
5. The relation of a definite and indefinite integral: Substitution in a certain integral. Partial integration in a given integral. Incorrect integrals.
6. Applying a certain integral: Calculating the surface of characters in a plane. Calculating the arc length of a curve.
7. Calculation of volume and surface of rotating bodies.
8. Functions of Multiple Variables: Function definition area and graphical representation. Mid-term test
9. Partial derivatives. Total function differentials. Partial derivatives of complex functions.
10. Extremes of functions of two variables: Ordinary extremes. Conditional (bound) extremes.
11. Differential equations: 1st order differential equations: Differential equations with separated variables.
12. Homogeneous, linear, Bernoulli and exact differential equations.
13. Second Order Differential Equations: Second Order Differential equations that are reduced to the differential equations of the first order.
14. Linear Second Order Diff. Eq. with the const. by coefficients: Homogeneous and inhomogeneous linear Second Order Diff. Eq. with const. coefficients.
15. End-term test</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☒ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">1. Responsibilities of full-time students
Attendance at lectures and exercises of at least 80% of the estimated hourly rate. Active participation in classes and regular taking of in-term examinations (two partial exams) taken during classes. Both passed exams relieve the student of the final written exam, which is organized within the term of the exam term of the lecturer, and with the application at Studomat. After passing the written exam, the index is entered.
In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to re-enroll in the course next year.
2. Responsibilities of part-time students
differ from the obligations of full-time students only in the following items:
1. Attendance at lectures and exercises at least 50% of the estimated hourly rate.
2. Possibility to take an in-term examination in agreement with the course teacher if the student, for justified reasons, could not take an in-term examination in the time stipulated for this purpose.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Experimental work</td><td>-</td><td>Report</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Essay</td><td>-</td><td>Seminar essay</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>In-term tests/Written exam</td><td>4.5</td><td>Oral exam</td><td>-</td><td>(Other)</td><td>-</td></tr>
<tr><td>Practical work</td><td></td><td>Project</td><td>-</td><td>(Other)</td><td>-</td></tr>
</table>

Grading and evaluating student work in class and at the final exam

1. Evaluation and grading of full-time students' work:

Each student takes the written examination.
The written part of the exam consists of two partial exams (in-term examinations), which are taken during the classes (8th and 15th week of classes) or the final written exam, which is organized within the term of exam periods.
In order for the student to pass an in-term exam, they must score at least 50% of the maximum number of points. Both passed in-term exams relieve the student of the final written examination. If a student has passed only one exam (out of two possible), the same part of the material is released on the final written exam and writes only that part of the material that he did not satisfy. The grade of the written part of the exam is formed as the mean value of the marks obtained at the in-term exams or the points obtained at the final written exam (if the student did not pass the in-terms).
During the course, the attendance and activity of each student in connection with the course material is monitored and added to the overall grade of the course

Continuous student assessment:

Assessment elements	Success (min. %)	Percentage in grade (%)
Lecture attendance and active participation	80	10
1. In-term test	50	45
2. In-term test	50	45

Final exam:

Evaluation elements	Success (min. %)	Percentage in grade (%)
Written exam	50	90
Previous activities (including all indicators of continuous assessment)	80	10

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

2. Evaluation and grading of part-time students

Evaluation and grading are the same as for full-time students.

Required literature (available in the library and via other	Title	Number of copies in the library	Availability via other media

media)	1. Merlin; https://moodle.srce.hr/2021-2022/	-	YES
	2. MareMathics; https://maremathics.pfst.hr/	-	YES
	3. Demidovič, B.P.: Zadaci i riješeni primjeri iz matematičke analize za tehnički fakultete, Zagreb, 1995.	15	YES
	4. Grupa autora: Matematika II dio, Pomorski fakultet Rijeka, 1993.	6	
Optional literature (at the time of submission of study programme proposal)	1. Apsen, B.: Riješeni zadaci više matematike 2, Tehnička knjiga, Zagreb, 1991. 2. Ušćumlić, M.; Miličić, P.: Zbirka zadataka iz više matematike I, Naučna knjiga, Beograd, 1989. 3. Kurepa, S.: Matematička analiza 1. sv., Tehnička knjiga, Zagreb, 1970.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SHIP AUTOMATION I</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Petar Matić, Ph.D., Assoc. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Mario Miličević, M. Sc. Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Understand the basic principles of control and regulation and the procedures for testing the stability of the system. Students need to master the basics of the automatic control systems in abundance aboard merchant navy vessels and be able to monitor progress in the field.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended courses Mathematics II and Fundamentals of electrical engineering II.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. formulate and understand the basic concepts and principles of automatic regulation and control;
2. analyze and understand the mathematical representation and description of continuous systems;
3. analyze and calculate, in the time and frequency range, automatic control and control systems;
4. plan, design and analyze frequency diagrams of components and systems of automation;
5. analyze and understand the analogies between different systems (mechanical, hydraulic, electrical) and their application in practice;
6. analyze and understand the impact of the marine environment and the marine environment on automatic control and control devices.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Fundamental concepts and principles of automatic systems management: The essence of automatic control. Automatic control objects. Examples of control facilities.
2. Basic management principles. Open system principle. Compensation principle. Feedback principle.
3. Direct and indirect regulation. Basic functioning algorithms. Stabilization. Program regulation. Successive systems.
4. SAR division. Continuous and discrete systems. Linear and nonlinear systems. Deterministic and stochastic systems. Adaptive systems. Requirements regarding the dynamic properties of an automatic control system.
5. Mathematical description of continuous linear systems, Mathematical approach to dynamic systems. Static and dynamic modes. Physical analogies.
6. Differential equations of simpler systems, Linearization of systems.
7. Time domain analysis. Standard excitation functions. Transitional functions. Temporal responses of the elementary dynamic components of an automatic control system.
8. Analysis in the field of complex variable. Laplace transform. Application of the Laplace transform. Portable function.
9. Transfer functions of elemental dynamic components of an automatic control system. Block Algebra.
10. Analysis in the frequency range. Sine transfer function. Frequency response graphs. Frequency responses of elementary systems.</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">11. Stability, accuracy and sensitivity. The notion of stability. Algebraic stability criteria. Frequency stability criteria.
12. Amplitude and Phase Reserves. Accuracy. Permanent regulatory deviation. Sensitivity.
13. Assessments of the quality of the management process. Logical operations.
14. Analysis of the state space management system. State vector and state space. Description of technical systems in the state space. Transmission matrix. Observability and controllability of linear systems.
15. Fundamentals of Ship Automation. Stages of development. Hierarchy levels. Automation objects. Functional diagram of the ship automation system.

Exercises
1. Physical analogies.
2. Transition functions.
3. Time responses of the elementary dynamic components of the automatic control system.
4. Laplace transform.
5. Application of the Laplace transform.
6. Transfer functions of elemental dynamic components of an automatic control system.
7. Structural view.
8. Block Algebra.
9. Modeling by transfer functions.
10. Analytical stability criteria.
11. Grapho-analytic stability criteria. Nyquist diagram.
12. Bode diagrams.
13. Accuracy.
14. Sensitivity.
15. Classification Society regulations for ship automation.</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td>☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students
Students are required to attend 80% of lectures and exercises. Students should make up for classes and classes they did not attend. Compensations can be made at the agreed time or during the consultation, but they must be signed on the records sheet.
Students have the opportunity to take the exam by continuous assessment during the semester by taking 2 in-term examinations. Students are required / not to take all the exams.
Students who do not pass all the in-term examinations during the semester and are eligible for taking the final exam are required to take the exam within the exam period.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination period after the classes and to enter the mark in the exam term or to answer for a higher grade.

Responsibilities of part-time students
The total commitments of part-time students are: attending lectures and exercises 50%, except for two lectures related to STCW - there is 95%. Compensation can be made at the agreed time or during the consultation, but they must be signed on the records sheet in each case. Exams are the same as for regular students.</td></tr>
</table>

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*	Lecture attendance	1.5	Research		(Other)	
	Lab.exercises		Report		(Other)	
	Report from lab.exercises		Seminar		(Other)	
	2 in-term tests (equal number of points)	3.5	Oral exam (for students who failed in-term tests or are not satisfied with the grade)*	1.75	(Other)	
	Written exam (for students who failed in-term tests or are not satisfied with the grade)*	1.75	Project		(Other)	

Grading and evaluating student work in class and at the final exam

Evaluation and grading of full-time students
In-term tests are taken during the 7th and 15th lectures.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Lecture attendance	80 (95*)	10
Attendance at lab exercises		
Preparing report from lab exercises		
2 in-term tests of equal number of points	40	90
Written exam (for stdnts who failed in-term tests or are not satisfied with the grade)*	40	45
Oral exam (for stdnts who failed in-term tests or are not satisfied with grade)*	40	45

Grading

Percentage (%)	Criterion	Grade
0-39	Does not satisfy minimum criteria	insufficient (1)
40-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Evaluation and grading of full-time and part-time students is the same.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
I. Kuzmanić: Automatizacija, Pomorski fakultet u Splitu, Split, 2005.	10	Web page – selected topics
Z. Vukić, Lj. Kuljača: Automatsko upravljanje – analiza linearnih sustava, Kigen d.o.o., Zagreb, 2005.	30	Da

Optional literature (at the time of submission of study programme proposal)

1. T. Šurina: Automatska regulacija, Školska knjiga, Zagreb, 1987.
2. W. S. Levine (ed.): The Control Handbook, CRS Press, Boca Raton, 1996.

Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">DATABASES AND PROGRAMMING</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2.</td></tr>
<tr><td>Course teacher</td><td>Anita Gudelj, PhD, Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">20%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The objective of the course is to introduce students to the basic concepts in database theory that underlies the construction of a database management system.
Students will be introduced to the methods of conceptual, logical and physical design of relational database.
Students are expected to independently create and manage a relational database (updating, searching, displaying results) using a database management system (MS Access, MS SQL).</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">Differentiate between database models
Confirm the structural, operational, and integrity component of the model for relational databases
Apply relational algebra as a query language
Apply model entities and links to a specific maritime problem
Create database schema in relational model using normal forms
Build an application using the appropriate database management system</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Course Introduction: Content. Literature. Forms of teaching and assessment. Basic terms and definitions. Database management system.
2. Data modeling and data models
3. Conceptual modeling of BP. Entity-Relationship Model.
4. Relational data model (introduction, structure, integrity)
5. Converting a conceptual schema into a relational one.
6. Relational Algebra-Part 1
7. Relational Algebra-Part 2
8. Functional dependencies
9. Normalization
10. In-term test. SQL database language. Data types.
11. SQL - Forming and Working with Tables. Data entry. Updating and deleting table data.
12. SQL: Selection, conditional expressions. Aggregate functions.
13. Group queries, "having" conditional expressions.
14. Fundamentals of Physical Organization of Data.

Exercises
1. Introduction.
2. Introduction to MS Visio: Data Modeling - Concept of Entities, Attributes, Data Types.
3. Entity-connection diagrams-different examples.
4. In-term test. Introduction to MS Access.
5. Creating tables. Relationships.
6. Input forms. Working with queries.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">7. Queries - Different Examples. reports
8. Exercise for the mid-term test.
9. Mid-term test
10. Database normalization.
11. SQL language. Commands: CREATE, ALTER, DROP.
12. Commands: INSERT, UPDATE, DELETE
13. Views. Queries - SELECT command over one table of WHERE clauses
14. Group queries, 'having' conditional expression. Exercise tasks.
15. End-term test</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Students are required to attend lectures and exercises and sign a record of their attendance. In order to be eligible for taking the final exam, a student must attend at least 80% of the classes and 100% of the exercises. In case of insufficient number of attendances, the student is not eligible for taking the final exam and is obliged to enroll again next year.
The examination can be taken either by continuous evaluation during the semester by means of in-term exams or by a final examination (written and oral examination). One exam is scheduled for the theoretical part of the exam and three examinations for the practical part (exercises on computers in the following areas: MS Visio, Access, SQL).
The student is required to take all the exams. At each in-term test, a minimum of 50% passing points is required.
A student who successfully completes one or two in-term examinations from the practical part will be credited as part of the final exam. The rest of the material is taken at the final exam in the term of the exam term of the lecturer, with the application to Studomat, provided they are eligible for taking the final exam.
The theoretical part of the theoretical part is held in writing. Students who have successfully completed the in-term exams will be credited with the final exam.
Students who have accumulated a sufficient number of credits during the classes (they have passed all the exams in the theoretical and practical part) are obliged to apply for the exam through Studomat for the first examination period after the lecture and, depending on the achieved result, their grade is entered in the index.
The final exam is in the term of the exam term of the lecturer, with the application at Studomat. The exam consists of a practical (computer work) and theoretical (written and / or oral) part. Students who do not pass the exams take the practical part of the exam (computer exam). In order to take the theoretical exam, it is necessary to solve at least 50% of the offered tasks in the practical part of the exam.

Responsibilities of part-time students:
Students are required to attend 50% of lectures and 100% of exercises to be eligible for taking the final exam. Exams are the same as for regular students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>Active participation in class</td><td>0.5</td></tr>
<tr><td>In-term tests</td><td>3</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>
Evaluation and grading of full-time students
Attendance is compulsory for full-time students. In order to be eligible for taking the final exam, students must attend a minimum of 80% of lectures (12 times) and 100% of exercises (15 sessions). In the semester, 3 exams and one theoretical exam are written. Exercise in-term tests cover practical work on a computer and are laid out as follows: creation of an ER model in week 4 of classes; In-term test from Access in the 9th week of classes; in-term test from SQL in week 15 of classes. A theory test is written in the 11th week of teaching.

Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Attendance at lectures and activity at exercises</td><td>80% presence at lectures, depending on the activity</td><td>10</td></tr>
<tr><td>Check of lab exercises</td><td>50</td><td>1. in-term test 15
2. in-term test 25
3. in-term test 25</td></tr>
<tr><td>Continuous lecture check</td><td>50</td><td>25</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
</table>
Students who fail in-term tests have to take the written and/or oral exam within exam term.

Final exam:
<table>
<tr><th>Evaluation elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Practical exam (written)</td><td>50</td><td>65</td></tr>
<tr><td>Theory exam (written and/or oral)</td><td>50</td><td>25</td></tr>
<tr><td>Previous activities (including lecture attendance and check of lab exercises)</td><td>50</td><td>10</td></tr>
<tr><td>Total</td><td></td><td>100</td></tr>
</table>
Grading
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0-49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50-61,9</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>62-74,9</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>75-87,9</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>88-100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
Evaluation and grading of part-time students
Evaluation and grading of part-time students are the same as for full-time students.
</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>1. Prezentacije sa predavanja i vježbi</td><td></td><td>YES</td></tr>
<tr><td>2. Tkalac, S.: Relacijski model podataka, DRIP, Zagreb, 1992.</td><td></td><td>YES</td></tr>
<tr><td>3. Pavić, M., Oblikovanje baze podataka, Odjel za informatiku Sveučilišta u Rijeci, 2013.</td><td></td><td>YES</td></tr>
</table>
</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>
1. Varga, M.: Baze podataka - konceptualno, logičko i fizičko modeliranje podataka, DRIP, Zagreb, 1994.
2. Radovan M.: Baza podataka - relacijski pristup i SQL, Informator, Zagreb, 1993
3. Garcia-Molina H.; Ullman J. D.; Widom J.: Database Systems: The Complete Book, Prentice Hall, 2002.
</td></tr>
</table>

	4. Date, C. J.: An Introduction to Database Systems, 8th ed., Addison Wesley, Boston, 2006.
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME ENGLISH III</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Adelija Čulić Viskota, Ph.D., senior lecturer</td><td>Number of credits (ECTS)</td><td colspan="3">2</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Compulsory</td><td>Percentage of e-learning</td><td colspan="3">10</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Master English terminology and grammatical structures relating to the ship's electrical system, distribution, safety and maintenance, generators and main circuit breakers, motors.
To train a student to present maritime topics in English.
Encouraging and developing students' cognitive abilities, as well as developing the basic four language skills: reading, listening, writing, and speaking.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended Maritime English I and II</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After passing the exam in Maritime English III, the student will be able to:

1) describe the ship's electrical system;
2) describe the distribution system;
3) distinguish and classify the tasks of a marine electrotechnical officer in maintaining electrical machinery and equipment, with the aim of increasing safety at sea;
4) list and describe the types of generators and main circuit breakers;
5) distinguish between types of marine engines and their characteristics.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Ship's electrical systems; electrical diagrams
2. Electric shock,insulation resistance, circuit and insulation testing
3. Multimeters, clampmeters
4. Maintenance of electrical equipment and breakdown diagnostics
5. Electrical power distribution and distribution systems
6. Earth failure, circuit breakers, transformers, instrument transformers
7. Shore power connection; cables
8. Generators and main circuit breakers: alternating generator operation, design and cooling
9. Excitation methods, automatic voltage regulation
10. Generators in parallel, emergency generators, generator protection, generator maintenance, main switchboard, main circuit breakers
11. Motors and their starters
12. Induction motor operation, starting modes
13. Speed regulation, motor protection
14. Propulsion auxiliaries, and maintenance
15. Single-phase motors, and maintenance</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">Exercises:
1. Ship's ancillary electrical devices
2. Special procedures on oil, gas and chemical carriers
3. Special safety meausures and protection
4. Use of electrical measuring devices in hazardous areas
5. Electrical survey on board
6. SOLAS – electrical requirements
7. Classification societies and their requirements
8. Revision and in-term test I
9. Motors and starters
10. Steering gear, navigation lights and UMS
11. Electric propulsion and HV
12. Ship's electrical supply system
13. Propulsion plant
14. Auxiliary services
15. Revision and in-term test II</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line only
☒ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of students
Students are required to attend and actively participate in classes, have student materials and prepare assignments on a regular basis.
The minimum attendance continues at 80%.
In case they do not meet the requirements for taking the final exam, students are obliged to enroll and attend the course again the following year.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Individual learning and homework (other)</td><td>0.25</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1</td><td>Oral exam</td><td>0.25</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>(1) in case of non-satisfactory in-term exams</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation and grading of students' work
The exam consists of two parts, written and oral.
Students may take the written part of the exam via an in-term exam. The material under study is covered in teaching materials and includes vocabulary and vocabulary. Students have the opportunity to take the written part of the exam and professional terminology before the exam deadlines. In this case,</td></tr>
</table>

they only take the oral part of the exam (lessons) at the exam.
If the student fails to pass the written examination partially and fulfills the minimum teaching requirements throughout the semester, he / she will take the complete examination through the written assignment and oral part of the exam within the stipulated regular exam periods.
At the in-term / exam, a minimum of 50% points are required for the student to take the oral exam.
In order to take the course during the regular examination period and to enter the grade in the system, students are required to apply for the exam for the period of time they take the exam.
Registration and cancellation of the exam is done on Studomat online.

Continuous assessment of students' work:

Assessment elements	Success (min.%)	Percentage in grade (%)
Attendance at lectures and acivity at exercises	max. 3 absences in semester	10
In-term tests	50	30
Continuous assessment of seminar essays		10
Total		50 – in this case the stdnt is exempted from taking final exam

Final exam:

Evaluation elements	Success (min.%)	Percentage in grade (%)
Practical exam (written)	50	50
Theory exam (written and/or oral)	50	50
Previous activities (including all elements of continuous assessment)	100	50 (instead of written final exam)
Total		

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. Hall, D.T., Practical Marine Electrical		Yes

	Knowledge, Witherby Publishers, 2014		
	e-material Electrical and Electronic Engineering by OceanTG		webpage
Optional literature (at the time of submission of study programme proposal)	Green, D.C.,Electrical and Electronic Principles for Technicians, Vol.2, Longman Scientific&Technical 1992 Bartolić, Lj., Technical English in Electronics and Electrical Power Engineering, Školska knjiga, Zagreb 1994. Payne, J.C., The Marine Electrical and Electronics Bible, Sheridan House; 3rd edition (April 13, 2007)		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">ELECTRICAL INSTALLATIONS AND LIGHTING</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2.</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, PhD, Assistant Professor</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nur Assani
Luka Čulić
Marko Zubčić, PhD</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge in design and planning of technical documentation - electrical installations.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After successfully completing the course the student will be able to
1. Explain the basic concepts, sizes and principles in the field of electrical installations and lighting (knowledge and understanding)
2. Describe the ways to control the electric lighting and the el. installations (understanding)
3. Perform measurements on electrical installations and lighting (application)
4. Make an overall measurement view of all measurements on the electrical installation part, (analysis)
5. Provide adequate protective equipment / devices that will meet the technological requirements (synthesis)
6. Analyze the environmental conditions in which electrical installation and lighting are installed
7. To choose an engineering approach to solving problems, based on the acquired knowledge in engineering physics, mathematics and power systems (evaluation)</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">LECTURES
1.Electrotechnical regulations. Electrotechnical regulation. Laws, regulations, standards, norms. Definitions of terms and division of low-voltage power networks and installations. Classification and characteristics of low-voltage devices. Electrical diagrams. Labeling of components.
2. Electrical installation material and accessories
Bare conductors. Cables and cable accessories. Voltage drop and current load of the cable
Installation pipes and accessories. Connection devices. Structure and elements of low voltage power networks and installations.
3. Fuses. Switches. FID switches. Surge arresters. Elements
lightning protection installations. European Installation Bus (EIB) components.
4. Protection in electrical networks. Effect of electricity on the human body. Electrical first aid hit. Protection against direct contact. Protection against indirect impact. Simultaneous protection from direct and indirect contact. Marking of mechanical protection
5. Electrical installation devices. Current meters. Distribution devices. Home connection. Equalization potential in the facility. Auxiliary sources of electricity. EIB installation system and its programming.
6. Telephone exchanges and telephone installation. Cable television systems. Intercoms. Fire alarm control panel and fire alarm installation. Devices for</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">permanent monitoring Isolation. Other systems.
7. Low voltage lines and networks. Low voltage switchgear and switchgear. Protection against short circuit and overvoltage, and grounding in low-voltage networks.
8. Electrical installation construction technology. Electrical installations in residential, industrial and special specific buildings, electrical installations in areas threatened by explosive mixtures.
9. Performing electrical installation works. Creation of grounding. Assembly of lightning protection installation. Cable laying, cable bundles. Execution of electrical installation. Performance of telecommunications and signal installations.
10. Electric lighting. Physical basis of light. Introductory considerations. Spectrum and theory of radiation. The spectrum of visible radiation. Light generation. Light and color. Color temperature. Human eye-sight. Perception.
11. Light sizes and units of light distribution in space. Introduction. Photometric equations. Luminous flux. Light intensity. Illumination.
Lumination. Other light technical sizes; general material properties.
12. Electric light sources. Division and properties. Incandescent light bulbs. Gas discharge lamps (low-pressure sodium, high-pressure, saving...). Lamps. Performance. Photometric characteristics.
13. Lighting design. Characteristics of light and requirements for proper and good lighting. Interior lighting. Outdoor lighting. Public street lighting.
14. Lighting measurements.
15. Example of an electrical installation and lighting project.

<u>EXERCISES</u>
1. Electrical diagrams
- basic symbols, brochures of different manufacturers
- residential buildings
- business premises
- low-voltage networks
- industrial premises
- public buildings - kindergartens, schools, hotels ...
- air conditioning and ventilation schemes
2. Short circuit current calculation
3. Calculation of voltage drop
4. Selection of the circuit protection element
5. Design and technical documentation of electrical installations
6. Lighting budget - appropriate program
- internal
- external
- selection of lamps
7. Electrical Installation Design - AUTOCAD
8. Electrical Installation Design – AUTOCAD</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td>☒ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ consultations</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students:
Attendance is compulsory and records of student attendance are maintained (Form F04). The full-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent more than 20% of the teaching hours of the lectures and the auditory exercises. Laboratory exercises / practical classes must be fully attended. In the case of teaching units that are in accordance with the STCW Convention for a full-time student, he / she shall be deemed not to have fulfilled his / her obligations if he / she was not present at more than 5% of the teaching hours and the classroom exercises. Laboratory exercises must be</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">attended at 100%.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td>0.5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td>-</td></tr>
<tr><td>In-term tests</td><td>1.875</td><td>Oral exam</td><td>Alt. – in-term</td><td>Auditory exercises</td><td>0.5</td></tr>
<tr><td>Written exam</td><td>Alt. – in-term</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">
1. THE FIRST OPTION - continuous assessment:
Based on earned and graded points from continuous monitoring, evaluation of attendance, preparation, and presentation of seminars, and in-term grades. During the semester, two in-term tests are written that are a combination of theoretical knowledge and practical application (tasks, calculations, electrical diagrams). In continuous assessment, it is important to note that each question carries two points for each question of the in-term test and a positively resolved in-term test represents 50% of the completed tasks at the in-term test, but collected by special teaching units and not only with a specific teaching unit (knowledge of the entire subject matter, not just individual parts). Students who do not attend the first in-term may not be admitted to writing the second in-term, while an in-term exam may be organized several times during the semester. The final grade evaluates the student activity, which includes the presence at lectures, classroom and laboratory exercises, and the results of the tests.
Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Activity in class (lectures, audit.ex.)</td><td>80-100 (95-100)*</td><td>12</td></tr>
<tr><td>Work in the lab – preparation, in-term test</td><td>100</td><td>8</td></tr>
<tr><td>I in-term test</td><td>50-100</td><td>40</td></tr>
<tr><td>II in-term test</td><td>50-100</td><td>40</td></tr>
</table>
*Teaching is in compliance with the STCW Convention.
In case of too many absences, thestudents do not obtain the right to take the final exam and have to enrol the course again in the following academic year.

Grading:
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0- 49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50 – 61</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>62 – 74</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>75 – 87</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>88 -100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
</td></tr>
</table>

2. THE SECOND OPTION:
Based on points earned and graded regarding class attendance and grades, previous assessment of work, and writing of final exam (written part) and passing oral exam.
If a student does not score positive on continuous assessment or does not take continuous assessment during the semester, he / she may take the exam within the regular exam periods.
The examination in the regular examination periods consists of written and oral part. A student who is positive in the written exam can take the oral part of the exam. The oral part of the exam will be held no later than 5 days after the written part of the exam.

Final evaluation

Evaluation elements – final exam	Success (min.%)	Percentage in grade (%)
Practical part (written)	50-100	40
Theory part (written and/or oral)	50-100	50
Previous activities	50-100	10

In case of insufficient number of attendances, students are not eligible for taking the final exam and are obliged to enroll again next year.
Responsibilities of part-time students:
The part-time student did not fulfill his / her obligations prescribed by the study programme if they are absent for more than 50% of classes. Laboratory exercises / practical training must be fully attended.
In the case of teaching units that are in accordance with the STCW Convention for the part-time student, the same obligations apply as for the full-time student in that category (up to 95% all forms of teaching and 100% laboratory work).
In case of insufficient number of attendances, students are not eligible for taking the final exam and are obliged to enroll again next year.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Srb, V.: Električne instalacije i niskonaponske mreže, Tehnička knjiga, Zagreb, 1991.	1	
	2. Svjetlotehnički priručnik, Elektrokovina, Maribor, 1985.		YES
Optional literature (at the time of submission of study programme proposal)	1. Tomić, B.: Električne instalacije, Školska knjiga, Zagreb, 1987. 2. Tomić B.: Električna rasvjeta, Školska knjiga, Zagreb, 1987.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SAFETY AT SEA</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Srđan Vukša, Ph.D., Assist.Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Toni Meštrović, M.Sc. Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>AE</td><td>F</td></tr>
<tr><td>45</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">20%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Familiarize yourself with the international navigation safety system. To learn the structure of search and rescue service, search and rescue means; means of communication; fire extinguishers; fire protection of the ship and fire fighting on board. Theoretical and practical knowledge of the structure, and the search and rescue procedures at sea. Know the program and procedures for the safety and security duties of seafarers on board.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended course Basic safety and first aid, from the Introductory differential programme (or possession of D2 – Certificate of Competency for Basic Safety on Board).</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Comment and understand the legal regulations of the international navigation safety system.
2. Describe the functional properties, technological features, use and maintenance of fire fighting equipment on ships.
3. Describe firefighting management procedures on ships.
4. Plan, conduct and analyze firefighting and abandon-ship exercises.
5. Understand the importance, organization and procedures of the crew at the basic level of safety protection.
6. Implement and analyze management procedures of safety protection procedures.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction to the course. International Convention for the Safety of Life at Sea - short description. Obligations to perform periodic inspections and maintain valid certificates.
2. Recordkeeping obligations. Master’s obligations and rights. Convention on International Regulations for the Prevention of Collisions at Sea (COLREG) 1972. Thorough knowledge of the regulations of the SOLAS Convention (Chapter II, III, XI-2).
3. Ship organization of fire protection. Locations containing fire-fighting devices and emergency evacuation routes. Fire protection plans. Maintaining the operability of rescue, fire protection and other safety systems. Arranging fire drills and ship abandonment exercises. Procedures to be taken to protect all persons on board in an emergency.
4. Elements of fire and explosion, types and sources of ignition. Theory of burning: Conditions and principles of burning. Properties of combustible substances. Flammable materials, fire hazard and fire spread. Emergency crew planning and response in the event of a fire. Limiting damage and repairing it after a fire or explosion.
5. The need for constant attention. Actions to be taken aboard - Recognition of alert signals, procedures and exercises of prescribed duties and actions. Procedure and actions - abandonment.
6. Methods and aids for fire prevention, detection and extinguishing. Fire and smoke detection systems, automatic alarm systems. Danger of fire and its</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">spread. Functions and use of life-saving appliances.
7. Fire classification and appropriate extinguishing media. Ship fire control. Fire Hazard Areas. Fire Precautions.
8. Extinguishing media: fire-fighting devices, equipment and its accommodation on board. Demonstrate the use of various types of portable fire extinguishers and breathing apparatus. Fire-fighting clothing and personal equipment. Fixed / built-in fire fighting installations.
9. Extinguishing methods: extinguishing smaller fires and extinguishing larger fires using water jets. Extinguishing with foam, powder or any other suitable chemical. Extinguishing Procedures: Ship in navigation. Ship in port. Dangerous cargo on board. Oil tankers.
10. Fire Extinguishing Procedures. Entering and going through the compartment injected with high expansion foam with safety rope but without breathing apparatus. Fire extinguishing with water mist or any other suitable fire extinguisher in the accommodation room or simulated engine room with fire and heavy smoke.
11. Use of breathing apparatus in fire fighting and rescue. Smoke extinguishing in confined spaces with breathing apparatus. Rescue in smoke-filled spaces by wearing a breathing apparatus. Methods of control of explosive conditions in the engine-room.
12. Maintaining the safety of life-saving appliances, fire-fighting and other safety systems on board. Contributing to improving security through increased awareness.
13. Identifying security threats. Understanding the need to maintain safety and alertness and their methods. Ship security plan.
14. Maintaining the conditions prescribed by the ship security plan. Identifying security risks and threats.
15. Undertaking regular security inspections of the ship. Proper use of safety equipment and systems (if any, depending on the type of ship).

Exercises:
1. Ship organization of fire protection. SOLAS Exercise Manual.
2. The locations of fire-fighting devices.
3. Emergency evacuation routes
4. Possible hazards, exercises and precautions. Actions to be taken on board.
5. Extinguishing media
6. Use of various types of portable fire extinguishers.
7. Extinguishing small fires
8. Breathing apparatus and its use.
9. Rescue in smoke-filled rooms with breathing apparatus.
10. Entering and passing through a compartment injected with high expansion foam with safety rope, but without breathing apparatus.
11. Fire extinguishing by water mist or any other suitable fire extinguishing agent in an accommodation or simulated engine room with a fire and thick smoke. Extinguishing oil fires with fog applicator and spray nozzles, dry chemical powder or foam applicator.
12. Basic knowledge of maritime security levels.
13. Basic knowledge of techniques used to circumvent security measures.
14. Recognizing procedures for conducting inspections and searches and for controlling and monitoring the security activities specified in the ship's security plan.
15. Knowledge of methods for monitoring the embarkation, disembarkation and access of persons and their objects on board.</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☒ mixed e-learning</td><td>☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ onboard practice</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">☐ field work</td><td></td></tr>
<tr><td>Student responsibilities</td><td colspan="7">Responsibilities of full-time students:

Lectures and exercises are compulsory, and attendance records are kept.
In order to exercise the right to take the exam and exercise the right to issue certificates of competency, the students must attend at least 95% of lectures and 100% of exercises (auditory and practical in the dedicated hall). The students did the practical part of the exercises at the training ground through the Basic Safety and First Aid course. In order to exercise the right to take the exam, students must attend at least 80% of the lectures and 80% of the exercises. In case of insufficient attendance at lectures and exercises, students do not have the right to take the exam and are required to re-enroll in the course in the following academic year. Written medical certificates or apologies cannot replace attendance at classes. Students who, due to illness or some other justifiable reason, did not meet the requirements for exercising the right to take the exam, and have less than 20% absences, will be able (with a written justification) to make up for that part of the material in supplementary classes, during the semester or after, but not later from one month after the end of the class.

Responsibilities of part-time students:
Part-time students are required to attend at least 50% of lectures and 50% of exercises in order to exercise the right to take the exam. If they want to exercise their right to certificates, the same rules apply to part-time students as to full-time students.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td colspan="7"><table>
<tr><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>3.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="7">Grading and evaluation of the work of full-time students:

Two in-term tests are written in the semester. The first test covering lectures 1 to 7 is written in the eighth week of classes, and the second test covering lectures 8 to 15 are written in the fifteenth week of classes. At each test, a minimum of 50% of total points must be obtained to pass. Students who do not pass the first test can write the second test. If a student does not pass one test and obtains the right to sit for the exam, they can take only the part they did not pass, in the written exam. Taking the exam in this way is valid until the end of the exam terms in the current academic year. Students who do not pass the in-term tests, but exercise the right to take the exam, can take the written exam during the exam terms. Students who have passed both in-term tests are required to register for the exam on Studomat and come to the exam time to register their grade or take a complete exam for a higher grade.

Continuous student assessment:

<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>80</td><td>7.5</td></tr>
<tr><td>Practical work</td><td>100</td><td>2.5</td></tr>
</table></td></tr>
</table>

	In-term tests I	50	45
	In-term tests II	50	45

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

The same evaluation criteria apply to the exam period as for continuous knowledge testing.

Grading and evaluation of the work of part-time students:

Grading and evaluation are the same as for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. D. Zec: „*Sigurnost na moru*“, Pomorski fakultet u Rijeci, Rijeka, 2001.		
	2. *Pravilnik o obavljanju inspekcije sigurnosti plovidbe*, Narodne Novine 34/97, 41/99 i 27/00		
	3. D. Zec: „*GMDSS sustav i sigurnost plovidbe*“, pomorski fakultet, Rijeka, 1995.		
Optional literature (at the time of submission of study programme proposal)	1. D. Zec: „*Sigurnost rada u luci*“, Fakultet za pomorstvo i saobraćaj, Rijeka, 1988. 2. D. Zec: „*Čovjek kao faktor sigurnosti plovidbe*“, Zbornik radova, str.38-50, Rijeka, 1988. 3. International Ship & Port facility Security Code and SOLAS Amendments 2002., International Maritime Organization 2003, 4 Albert Embankment, London SE1 7SR 4. Guide to Maritime Security and the ISPS Code, 2012 Edition, International Maritime Organization, London, 2012. 5. Pravila za statutarnu certifikaciju pomorskih brodova, Dio 31. – Sigurnosna zaštita broda, 2012. HRB., 01. listopada 2012. godine. 6. Mojaš, N., et.al., Sigurnosna zaštita na brodu, “Naše more” 60(3-4)/2013. - Supplement, pp. 39-45		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MEDICINE FOR SEAFARERS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2.</td></tr>
<tr><td>Course teacher</td><td>Zlatko Kljaić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Master the methods of first aid and medical care. Do not harm first aid and care. Check and secure the location of the accident. Make an orientation examination of the injured or sick person and make a working diagnosis. Apply urgent first aid procedures. To identify a state of certainty and apparent death. Apply resuscitation when apparent death has been identified. Set priorities for care if there are more injured. Examine the injured and sick and make a working diagnosis. Organization and implementation of medical care for the injured. Recognize the symptoms of the most common diseases. Assess when and how to administer medication and when to change therapy. Identify the effect of the medication, determine the route of administration and the most common side effects of the medicines found at the ship's pharmacy. Treat smaller wounds.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended course Basic safety and first aid, from the Introductory differential programme (or possession of D2 – Certificate of Competency for Administering First Aid).</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Assess the health of the injured or ill.
2. Conduct medical first aid in life-threatening situations.
3. Use basic medical equipment on board.
4. Interpret the seeking and implementation of Radio - medical advice.
5. Identify life-threatening conditions and injuries and apply first aid and medical care methods.
6. Identify different medical conditions on board and use appropriate procedures using basic medical equipment and medicines on board.
7. Assess when and how to administer medication and when to change therapy.
8. Assess the need of the injured person for transport by helicopter. Identify signs of death) (early and late signs of death, apparent death, causes of death) and arrange for a corpse procedure (examination of the body of the deceased, procedure with the body, funeral at sea).</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Introduction to medicine for seafarers. Basic concepts in maritime medicine. The importance and obligation to administer first aid on board. Difference in procedures and attitudes between first aid and offshore and shore-based procedures.
2. First Aid. Conditions requiring immediate intervention (cessation of breathing and heartbeat, severe bleeding, shock and unconsciousness). Control of vital functions. Resuscitation.
3. Familiarity with the revival mask and the oxygen applicator. Familiarity with the means of stopping external bleeding.
4. Care for the survivors: general principles of patient care; patient care; head and spine injuries; injuries to the ear, nose, throat and eyes; internal and external bleeding; nose tamponade; burns, scratches and frostbite; fractures, dislocations and sprains; types of wounds, healing, treatment of wounds; pain management; procedure for acute abdomen; small surgical procedures; bandages and bandages; pressure measurement; pulse measurement.</td></tr>
</table>

5. Care for the sick: treatment with an infectious patient on board; treatment with a mental patient on board; body temperature measurement; measurement of urine volume; procedure with infected wounds; procedure with a rescued survivor.
6. Diseases: Ways to acquire and transmit infection. Sexually transmitted diseases, tropical and infectious diseases, including intestinal infectious diseases.
7. Clinical features and therapy. AIDS, hepatitis A, B and C. Angina pectoris and heart attack. Acute abdomen. Measures to prevent and control infectious diseases. General measures for the prevention of infectious diseases, special measures for the prevention of infectious diseases, vaccination, prevention of diseases by preventive medication (chemoprophylaxis).
8. Alcohol and drug abuse. Factors that lead to addiction. Damage to the organism causing addictive agents. Prevention. Overdose signs and first aid procedure.
9. Teeth care. Procedure for bleeding from the wound after tooth extraction, procedure for loss of fillings and toothache, toothache with swelling, irritation of the right denture.
10. Medical care for rescued persons including death, hypothermia, and pregnancy exposure. Procedure in polythaumatized patient. Hypothermia and frostbite. Mechanisms of cooling and mechanisms of defense of the body against hypothermia. Procedure and care with a subconscious in the unconscious.
11. Death at sea. Signs of death, early and late signs of death, apparent death, causes of death, procedure with the corpse, examination of the body of the deceased, procedure with the body, funeral in the sea. ISM Navigation Procedures.
12. Third-party assistance: radio-medical advice; transportation of injured and sick including transport by helicopter; the care of sick and injured seafarers, including cooperation with port authorities or health facilities. ISM Navigation Procedures.
13. Checking the environment on board. Ship's kitchen, cleanliness, supply of drinking water to the ship, quality control of drinking water, treatment with waste materials on board, rodent destruction measures - pest control, insects - disinsection, harmful microorganisms - disinfection. Prevention of infectious diseases. ISM Navigation Procedures.
14. Regulations and record keeping: keeping a logbook; keeping a narcotics book; knowledge of international maritime health regulations. Medicines and medical equipment. Types of medicines - analgesics, antibiotics, antipyretics, spasmolytics, etc. Forms and method of taking medication. Possible side effects and procedure for side effects. Anaphylactic (penicillin) shock and onset. ISM Navigation Procedures.
15. Surgical equipment, instruments, and supplies. Familiarity with surgical instruments. Small surgical procedures - wound treatment, incision. Asepsis and antisepsis procedures. Instrument maintenance. Use of different types of health advice services. Introducing possible ways to seek health advice. ISM Navigation Procedures.

EXERCISES

1. Control of vital functions. The procedure for checking the heart rate. Designating a place for external heart massage. Performing an external heart massage on a doll. Resuscitation on a resuscitation doll.
2. Help with choking. Demonstration of artificial respiration methods.
3. Familiarity with the revival mask and the oxygen applicator.
4. Familiarity with the means of stopping external bleeding. Determining the location of digital compression as a method of stopping bleeding.
5. Immobilization for fracture of the limb, immobilization for suspected spinal injury.
6. Procedure for open head injuries, procedure with open and closed burns.
7. Treatment and suturing of the wound, disinfection of the skin and the

<table>
<tr><td></td><td colspan="6">surrounding area, skin disinfectants, procedure for incision of purulent accumulation.
8. Determining the location for pulse measurement. Urine testing with test strips.
9. Measurement of blood pressure.
10. Simulation of administration of intramuscular injection. Determining the place of administration.
11. Taking a medical history. Examination of patients.
12. Checking the environment on board. Getting acquainted with the means and methods of conducting disinsection and pest control. ISM Navigation Procedures.
13. Simulation of the procedure for bleeding from the wound after tooth extraction, procedure for the loss of fillings and toothache.
14. Familiarity with the forms and dosages of medicines. Familiarity with the Regulations on Minimum Equipment and Contents of the Ship Pharmacy. Getting to know the ways.
15. Seeking radio-medical advice, procedure, filling in forms. ISM Navigation Procedures.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☒ individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ onboard practice</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
Lectures are compulsory for students, and attendance records are kept. In order to have the right to take the exam, students must attend at least 95% of the lectures and 100% of the exercises. In case of an insufficient number of attendances, students do not have the right to take the exam and must enroll in the course again the following year. Students have the option to pass the exam with continuous assessment during the semester by taking two in-term exams. The student is obliged to attend all the tests. Students who do not pass the tests during the semester, but have the right to take the exam, are required to take the written exam during the exam period. Students who have met the criterion of class attendance and passed the in-term exams are required to register for the exam on Studomat so that their grade can be entered into the system.

Responsibilities of part-time students
The total attendance requirements for part-time students may not be less than half the number of hours allocated to full-time students. Exam procedures are the same as for regular students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td>0.375</td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests*</td><td>1.5 (alternativa pismenom i usmenom ispitu)</td><td>Oral exam</td><td>0.5</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>1</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>

Grading and evaluating student work in class and at the final exam

Evaluation and grading of full-time students

Attending classes is compulsory for full-time students. Attendance at at least 95% of lectures and 100% of exercises is a condition for obtaining the right to take the exam.
Two in-term tests are written in the semester. The first test covering the material from lectures 1 to 6 is written in the seventh week of classes, and the second test covering the material from lectures 7 to 15 is written in the fifteenth week of classes. Sample questions for the tests are available to students at the end of each lecture. At each test, it is necessary to obtain at least 60% of points to pass. Students who do not attend one test for objective reasons or do not achieve the minimum percentage have the possibility of correction. For these students, the 7th and 15th weekly to organize a correction. Students who do not pass the first test cannot take the second test.
Class attendance, in-term test results and seminar assignments are included in the final grade.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	7.5
Seminar essay	100	2.5
In-term test I	50	45
In-term test II	50	45

Grading

Percentage (%)	Criterion	Grade
0-58	Does not satisfy minimum criteria	insufficient (1)
60-70	Satisfies minimum criteria	sufficient (2)
72-80	Average success with clear shortcomings	good (3)
82-90	Above average success with a few errors	very good (4)
92-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and have the right to take the exam are required to take the written exam within the exam term. The same grading criteria apply to the examination period as to the continuous assessment.

Evaluation and grading of part-time students
The condition for being eligible for taking the final exam is attendance at a minimum of 95% of lectures and 100% of exercises.
The evaluation and grades are the same as those for full-time students.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. Mulić R, Ropac D. Medicina za pomorce, Medicinska naklada, Zagreb 2003.	10	YES
2. International Medical Guide for Ships. 3rd edition. World Health Organization, Geneva 2007.	-	YES

Optional literature (at the time of submission of study programme proposal)

1. International Maritime Law Embodied in International Conventions.
2. International Health Regulations, World Health Organization, 2005

Quality assurance methods that ensure the

University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.

acquisition of exit competences	
Other (as the proposer wishes to add)	According to the expressed interest of the students, classes in the course can also be conducted in English, according to the permission of the University of Split.

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME SYSTEM</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Veljko Plazibat, PhD, Assist.Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To acquaint students with activities that are the subject of study of the scientific discipline of transport and transportation technology, which is indicated by the concept of maritime, especially the maritime economy. Students are allowed to prepare for management jobs in the maritime economy.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Comment on system theory and system types
2. Classify system types according to different criteria
3. Identify the role of the maritime system in the economy
4. Distinguish the structure of the maritime system subsystem
5. Distinguish between transport (service) and production activities in the maritime industry
6. Comment on the role of maritime shipping, maritime shipbuilding, seaports, nautical tourism and marinas, marine fisheries, maritime agencies and brokers, salvage and towing, exploitation of marine resources and maritime policy</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Basic features of seafaring
2. System and types of system
3. Basic features of the Maritime System
4. Marine shipping as a subsystem
5. Seaports as a subsystem
6. Maritime shipping as a subsystem
7. Maritime agency as a subsystem
8. Shipbuilding as a subsystem
9. Nautical tourism and marinas as a subsystem
10. Marine resource exploitation as a subsystem
11. Protection of the marine environment and maritime transport safety as a subsystem
12. Maritime education system
13. Islands and island development policy as a subsystem
14. Maritime policy - maritime shipping and seaports
15. Maritime policy - marine engineering and nautical tourism</td></tr>
<tr><td>Format of instruction</td><td colspan="2">☒ lectures
☐seminars and workshops
☐exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ onboard practice</td></tr>
<tr><td>Student responsibilities</td><td colspan="5">1.Responsibilities of full-time students
Lectures are compulsory because the attendance records are kept. In order to be</td></tr>
</table>

<table>
<tr><td></td><td>eligible for taking the final exam, students must attend at least 80% of the lectures. In case of insufficient number of students, students are not eligible for taking the final exam and are obliged to enroll again next year.
Students have the opportunity to take the exam by continuous evaluation during the semester by taking 3 in-term exams. Students are required to access all the exams. Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the exam within the exam period.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination period after the classes and to enter the mark in the exam term or to answer for a higher grade.

2. Responsibilities of part-time students
The total attendance requirements for part-time students may not be less than half the number of hours allocated to full-time students. Exam procedures are the same as for regular students.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>2.875</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>Evaluation and grading of full-time students
Attendance is compulsory for full-time students, ie a minimum of 80% of lectures (12 times) is required.
There are 3 in-terms written in the semester. The first in-term test, which covers the 1st to 4th lectures, is written in the fifth week of classes, the second in-term test, which covers the 5th to the 9th lectures, is written in the tenth week of the classes, and the third august, which covers the 10th to the 15th, is written in the fifteenth week. Exam questions for students are available at the end of each class. At each in-term test, a minimum of 50% passing points is required. Students who do not attend a single in-term for objective reasons or fail to achieve a minimum percentage are eligible for correction. For these students at 10 and 15 p.m. a correction will be organized for the week. Students who do not pass 1 in-term cannot take the 2nd and 3rd in-terms.
Students who have not passed the in-term examinations and are eligible for taking the final exam, have an oral exam.
The final grade includes attendance at the classes and the results of the in-term or oral exam.

Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Lecture attendance</td><td>80</td><td>10</td></tr>
<tr><td>Individual/team assignments</td><td></td><td></td></tr>
<tr><td>In-term test I</td><td>50</td><td>30</td></tr>
<tr><td>In-term test II</td><td>50</td><td>30</td></tr>
<tr><td>In-term test III</td><td>50</td><td>30</td></tr>
<tr><td>TOTAL</td><td></td><td>100 – student is exempted from taking final written test</td></tr>
</table>
</td></tr>
</table>

Final test

Evaluation elements	Success (min.%)	Percentage in grade (%)
Exam or in-term exam (oral)	100	90
Theory exam (written)		
Previous indicators (incl. all elements of continuous assessment)	100	10
TOTAL		100

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and are eligible for taking the final exam are required to take the exam within the exam period. The same assessment criteria apply to the examination period as the continuous assessment.

Evaluation and grading of part-time students
The condition for being eligible for taking the final exam is attendance at a minimum of 50% of lectures.
The evaluation and grades are the same as those of full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Dundović, Č.: Pomorski sustav i pomorska politika, Pomorski fakultet u Rijeci, Rijeka, 2003.	20	
	2. Mrnjavac, E.: Pomorski sustav, Pomorski fakultet u Rijeci, Rijeka, 1998.	10	
Dopunska literatura	1. Zelenika, R.: Prometni sustavi, Ekonomski fakultet u Rijeci, Rijeka, 2001.		
Načini praćenja kvalitete koji osiguravaju stjecanje utvrđenih ishoda učenja	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Ostalo (prema mišljenju predlagatelja)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">DIGITAL ELECTRONICS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Joško Šoda, Ph.D., Assoc. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nediljko Kaštelan</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of the concepts and methods of the basic fields of digital electronics, and their application in marine systems. Developing a logical mindset for students in analyzing and developing practical tasks related to digital systems on board ships and in the maritime environment.
STCW 7.08.
1.1.4. Fundamentals of Electronics and Power Electronics 10/45
1.5.1. Main Features of Data Processing 15/45</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Attended courses:
Fundamentals of electrical engineering I
Fundamentals of electrical engineering II
Electronic components and circuits</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Classify impulse signals
2. Understand the basics of linear and nonlinear waveforming.
3. Design procedures for analyzing the performance of multivibrators and their applications
4. Analyze the impulse transmission line for the various output impedances
5. Classify and analyze circuits for generating sawtooth waves
6. Analyze the basic concepts, laws and methods of digital technology.
7. Design logic circuits of different applications in complex electronic systems
8. Design simpler practical circuits with meters and registers.
9. Define and understand the composition and application of AD and DA converters</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introduction. Basic signals in pulse and digital circuits. Linear and nonlinear waveforming. RC Integration Assembly. RC derivative assembly.
Second attenuator. Tightening assemblies. Limiters.
3. Transmission of impulses via electromagnetic line. Transmission of impulses through transformers.
4. Ebers-Moll Transistor Model. Transistor models in: saturation area, operating range and closing area. Transistor Switch Switch Time.
5. Operational amplifiers, properties and field of operation in pulse and digital circuits. Basic circuits with operational amplifiers.
6. Multivibrators: bistable, monostable and astable. Schmitt's operating amplifier bistable.
7. Sawtooth Wave Generators. Miller integrator.
8. Basic logic circuits. De Morgan's theorems and their modeling.
9. Complex logic circuits. DTL technique. TTL technique. MOSFET technique. CMOS FET technique.
10th SR-flip-flops. JK-flip-flops. Synchronous and asynchronous operation of the bistable.
11. Binary meter, decadal meter
12. Serial, parallel and mixed registers.
13. Logical matrices. Demultiplexer and multiplexer with applications in telecommunications. Basic data types, IEEE-754 standard, data formatting.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">14. Analog-digital circuits. AD conversion. DA conversion.
15. Memories: RAM, ROM, PROM and EPROM, and their applications. Dynamic memory.

Exercises:
1. RC waveform integrator in discrete and IC technique.
2. RC waveform derivator in discrete and IC technique
3. Voltage attenuation.
4. Bistable in transistor and IC technology.
5. Monostable in transistor and IC technology.
6. Astabil in transistor and IC technology.
7. Miller sawtooth generator
8. Schmitt trigger assembly
9. Basic logic circuits. De Morgan's theorems and their modeling.
10. Coupling Modeling of De Morgan Theorems.
11. Design and composition of meters by different modules.
12. Synchronous operation of the bistable.
13. Asynchronous operation of the bistable.
14. AD converter.
15. DA converter.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☐exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ onboard practice</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Student responsibilities and grading

Responsibilities of full-time students:
Students must attend 100% Exercise and 100% Lecture (STCW). Students are required to write reports on computer exercises. Students take the in-term tests in theory (lectures) and exercises. If the student was ill or at work and could not attend part of the classes, he / she must write a seminar paper.

Responsibilities of full-time students:
Students must attend 100% exercises and 95% lectures (STCW). Students are required to write reports on computer exercises. Students take the in-term tests in theory (lectures) and exercises. If the student was ill or at work and could not attend part of the classes, he / she must write a seminar paper.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>3.5</td><td>Oral exam</td><td>1.75 (alt.)</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>1.75 (alt.)</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Examination:
During the lectures, it is planned for the students to take the in-term examinations, which are held after the lectures and exercises have been completed in the course. Upon successful completion of the laboratory exercises, the student writes a report on each individual laboratory exercise.
Two in-term exams, from theoretical material and an exercise exam are scheduled. The in-term test is held in writing and at least 40% of correct and reasoned answers</td></tr>
</table>

are required for a positive assessment.
Students who have positively completed one of the in-term exams will be exempted from taking that part again within the final exam. The rest of the course material is tested in the written exam term.

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	95	15
In-term tests	40	85

Final evaluation

Evaluation elements – final exam	Success (min.%)	Percentage in grade (%)
Class attendance	95	15
Written exam	40	85

Grading

Percentage (%)	Criterion	Grade
0-45.9	Does not satisfy minimum criteria	insufficient (1)
46-64.9	Satisfies minimum criteria	sufficient (2)
65-79.9	Average success with clear shortcomings	good (3)
80 -89.9	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
J. Šoda. Digitalna elektronika, ppt prezentacija, Split 2019.		YES
P. Slapničar, Impulsna i digitalna tehnika, FESB Split, 2001.	8	
Darko Kovačević, predavanja (skripta), Pomorski fakultet Sveučilišta u Splitu, Split, 2013.		YES
Millman, J., Halkias, C., Parikh, D. C., Integrated Electgronics, Analog and Digital Circuits and Systems, Second Edition, McGraw Hill, 2010		
Ndjountche, T., Digital Electronics 1 i 2, ISTE Ltd and John Wiley & Sons, Inc, 2016		YES

Optional literature (at the time of submission of study programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SHIP AUTOMATION II</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Danko Kezić, PhD, Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nur Assani, M.Sc.Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquiring the knowledge necessary to understand the operating principles of automatic control systems of marine machinery. Understanding the operating principles of sensors, regulators, actuators, and the basics of setting up an automation system. Adoption of appropriate knowledge prescribed by STCW and IMO Model Courses 7.08 for the service of electrotechnical officer,.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Fundamentals of electrical engineering I
Mathematics I
Ship automation I</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Identify the basic components of the automatic control circuits,
2. To present the basic principles of operation of sensors and actuators in ship propulsion,
3. Design an open automation system, an offset compensation system and a closed loop control system,
4. Compare first, second and higher order process management systems,
5. Distinguish the characteristics of P, PI PID controller,
6. Identify parameters that affect the stability of the automatic control system,
7. Comment on how to set up sensors and encoders,
8. Distinguish basic controller adjustment techniques.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Repeating the division of P0, P1, P2, I0, I1, I2, D0, D1, D2, idle time system.
2. The concept of the controller. Block diagram of the controller. Controller parts. Two-position controller. Hydraulic, pneumatic, and electrical design. P controller. Proportional reinforcement. Response of the P controller to the bounce excitation. Response of the feedback system with the P controller to the jump start.
3. I-regulator, D-regulator. PI, PD and PID controller. Integration and derivation amplification and integration and derivation time. Regulator's response to a bounce-back. Closed-loop system response. Examples.
4. Setting the open and closed loop controllers (Ziegler-Nichelson, Cohen-Coon). Cascade regulation. - Examples on board.
5. Discrete time and event driven systems. Basic structures of digital control systems. Digital controllers.
6. Sensors and transducers. Sensor input, output, and transmission characteristics. Temperature sensors (resistors, thermocouples). Pressure sensors. Inductive, capacitive, piezoelectric converters.
7. Sensors of displacement, speed, force, torque, viscosity. Water sensors in oil. Viscometer. Fire alarm sensors.
8. Actuators - operating principle (electrical, hydraulic pneumatic). Hydraulic and pneumatic amplifiers (nozzle and cap systems) .Relays, pneumatic pilot relays.pneumatically operated valve, three-way valve, solenoid valve
9. Block diagram of a pneumatic system. Electro-pneumatic and pneumatic-electrical converters. Example of computer control of a pneumatic system.
10. Block diagram of hydraulic system. Electro-hydraulic and hydraulic-electrical</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">converters. An example of computer control of a hydraulic system.
11. Centralized, distributed, and integrated automation. An example of an integrated automation system for generating steam, cooling and lubricating engines,
12. Ship Automation Systems - Fuel Supply, Air Conditioning System, Power System.
13. Ship Automation Systems - Automatic Pilot System. Hierarchically Distributed Automatic Control System - Layers. Industrial computer network.
14. Fault tolerance control systems. Adaptive and expert management systems. Fuzzy control systems.
15. Diagnostics and maintenance of automation systems

Exercises:
1. Modeling of automatic control system in Matlab / Simulink
2. Time response of the automatic control system - transient and steady state analysis. System identification based on system response time
1. 3.Frequency response of the system - stability analysis using a computer in Matlab
3. Design of a simulation model of the electro-mechanical system in Matlab
4. Designing and adjusting the controller by manual tuning using the simulation model in Matlab.
5. Design and adjustment of the controller by the Ziegler-Nichols open loop method.
6. Design and adjustment of the controller by Ziegler-Nichols closed loop method.
7. Analysis of the operation of the automatic cooling system of the main engine.
8. Analysis of the operation of the automatic cooling system of the main engine.
9. Analysis of the operation of the automatic fuel supply control system for the main engine.
10. Analysis of the operation of the automatic fuel supply control system for the main engine.
11. Analysis of the operation of the automatic control system for the steam generating system.
12. Analysis of the operation of the automatic control system for the steam generating system.
13. Analysis of the automatic control of the electric power system.
14. Analysis of the automatic control of the electric power system.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ onboard practice</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Pohađanje nastave, odrađeni samostalni zadaci</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>3.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation and grading of full-time students

There are 2 in-term exams written in the semester. The first in-term test covers theoretical questions from lectures 1-7 and auditory exercises and is written in the</td></tr>
</table>

seventh week of classes. The second in-ter test comprises of the theoretical questions from the material dealt with in the eighth to the fifteenth weeks of teaching. Examples of in-term test questions for students are available on the Merlin e-learning platform. At each in-term test, a minimum of 50% passing points is required. Students who do not take one of the in-term tests for objective reasons or fail to achieve the minimum percentage, have the option of correction. For these students a correction will be organized in the 15th week.

The final grade includes class attendance and in-term test results.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Lecture attendance	80	10
In-term test I	45	45
In-term test II	45	45

Grading

Points (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester are required to take the written exam within the exam term. The same evaluation criteria apply to the examination terms as for the continuous assessment.

Evaluation and grading of part-time students
The evaluation and grades are the same as those of full-time students.

Required literature (available in the library and via other media)

	Title	Number of copies in the library	Availability via other media
1.	Antonić, R.: Automatizacija broda II, Pomorski fakultet u Splitu, 2007., 2. pon. izd.	10	
2.	Vukić, Z., Kuljača, Lj.: Automatsko upravljanje – analiza linearnih sustava, Kigen d.o.o, Zagreb, 2004.	5	
3.	Antonić, R.: Brodostrojarski simulator PPS2000 – upute za korištenje, VPŠ Split, 2001.	10	

Optional literature (at the time of submission of study programme proposal)

1. L. Jackson, T. Reed: Instrumentation and control systems; isbn:0947637869 , 2002.
2. R. G. Smith Application of automatic machinery and alarm equipment in ships, Iinstitute of marine engineers; isbn: 0900976152.
3. D. A. Taylor, Bill: Marine control practice; Butterworth-Heinemann; isbn: 978-0408013130

Quality assurance methods that ensure the acquisition of exit competences

University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.

Other (as the proposer wishes to add)

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">POWER ELECTRONICS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, PhD, Assistant Professor</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Nur Assani, M.Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To acquire basic knowledge in components and devices of power electronics. Compare the advantages and disadvantages of individual semiconductor energy valves. Understand the electrical circuits and operating principles of rectifiers, inverters, DC and AC converters used in the ship's power plant. Master the basic knowledge of fault diagnosis and maintenance of power electronics devices.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Passed exams in the following courses:

Fundamentals of electrical engineering II,
Electronic components and circuits.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Present the fundamental physical laws of semiconductors.
2. Identify basic electronic components.
3. Draw and analyze analog and digital circuits used to control energy valves,
4. Present the basic principles of electricity conversion.
5. Understand the basic operating principles of AC / DC, D / AC, DC / DC and AC / AC converters.
6. Identify the interferences that converters cause in the network and how to remedy them
7. Draw and explain the schematics of the inverter and the cycloconverter.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. The field of power electronics. Electrical energy conversion. The structure of the electronic energy converter,
2. 2.Passive components (resistors, capacitors, chokes, transformers), Active components (power diode), static and dynamic characteristics,
3. Active components (SCR, GTO, BJT, JFET, MOSFET, IGBT, MCT). Static and dynamic characteristics, parameters,
4. Protection of power electronics components, EM interference problem, thermal properties of components,
5. Basic principles of operation of power converters. Degree of action and power factor of the inverter,
6. Introduction to rectifiers. Single-phase unmanageable, semi-adjustable and controllable rectifiers. Steering and external characteristics. Phase-controlled rectifiers,
7. Development and topology of single-phase and three-phase rectifiers. Three-phase unmanageable, semi-adjustable and controllable rectifiers,
8. Networked Exchangers, Autonomous Exchangers, Basic Circuits, Waveforms,
9. Introduction to DC / DC converters. Descending DC converter. Ascending DC converter,
10. Descending DC converter. DC converters with galvanic separation,
11. Introduction to AC / AC converters. Principle of operation of AC voltage and frequency converter, Sync converters,
12. Cycloconverters, Matrix converters, application in electric motor drives
13. Electric motor drive speed control, vector control.
14. Harmonic disturbances in the network and their elimination,</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">15. Maintenance of power electronic devices.

Exercises:
1. Introduction to the simulation program PSIM.
2. Getting to know the PSIM simulation program.
3. Resistor, capacitor and choke in connection with a semiconductor valve
4. Resistor, capacitor and choke in connection with a semiconductor valve
5. Commutation with a voltage source
6. Commutation with a voltage source
7. Control trigger circuits
8. Control trigger circuits
9. Uncontrollable, semi-controllable and fully controllable rectifiers
10. Uncontrollable, semi-controllable and fully controllable rectifiers
11. Grid-connected and autonomous exchangers
12. Grid-controlled and autonomous exchangers
13. DC - DC converters. AC converters
14. DC - DC converters. AC converters
15. Matrix converters</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ onboard practice</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:

Attending classes is compulsory for full-time students. Attendance at a minimum of 80% of lectures, auditory and laboratory exercises is a condition for obtaining the right to take the exam.

Responsibilities of part-time students:
The condition for obtaining the right to take the exam is attendance at a minimum of 50% of lectures and exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>2.875</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation and grading of full-time students
There are 2 in-terms written in the semester. The first in-term test covers theoretical questions from Lectures 1-7 and is written in the seventh week of teaching. The second in-term test covers the course content from Lectures 8-15 and is taken in the fifteenth week of teaching. Examples of in-term test questions for students are available on the website. At each in-term test, a minimum of 50% passing points is required. Students who do not take one of the exams for objective reasons or fail to achieve the minimum percentage, have the option of correction. For these students a correction will be organized in the 15th week.

The final grade includes class attendance and in-term test results.

Continuous student assessment:</td></tr>
</table>

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	10
In-term test I	45	45
In-term test II	45	45

Grrading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and who have the right to take the exam are required to take the written exam within the exam term. The same grading criteria apply to the examination period as the continuous assessment.

Assessment and grading of the work of part-time students

The evaluation and grades are the same as those of full-time students.

Required literature (available in the library and via other media)	**Title**	**Number of copies in the library**	**Availability via other media**
	1. D. Kezić: „Energetska elektronika“-Interna skripta www.pfst.hr		YES
	2. Kezić D. „Energetska elektronika – sveučilišni priručnik za simulacijske vježbe“ISBN: 978-953-6655-41. http://www.pfst.hr		YES
	3. T. Brodić: Osnovi energetske elektronike 1-dio, Školska knjiga, Zagreb, 2002.	3	

Optional literature (at the time of submission of study programme proposal)	1. J. G. Kassakian, Martin F. Schlecht, George C. Verghese: *Topologije i funkcije pretvarača I dio, Graphis, Zagreb, 2000.* 2.Mohan, Undeland, Robbins: Power Electronics – Converters, Applications and Design, John Wiley & Sons, inc, 2003.
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SHIP'S ELECTRICAL MACHINES AND SYSTEMS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">2.</td></tr>
<tr><td>Course teacher</td><td>Petar Matić, PhD, Assist.Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">6</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">0</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">1. Interpretation of basic physical laws as the basis for the operation of electrical machines.
2. Knowledge of the design and operation of machines, with the possibility of reasoning based on replacement schemes, equations and calculation.
3. Knowledge of the layout and function of electrical equipment on board ships.
4. Interpretation of power distribution schemes on ships.
5. Understanding the symbols and reading the current control circuits and analyzing how the control systems work.
6. Distinguishing between marine electrical systems and their basic characteristics.
7. Knowledge of operating modes and distinguishing switchgear and occupational safety measures for low and high voltage marine electrical systems.
8. Knowledge of operation and control of the ship's power plant, the process of synchronization of the generators and their operation.
9. Knowledge of the ship's electrical propulsion system, performance, operating mode and control.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Passed exams in the following courses:

Fundamentals of electrical engineering I;
Fundamentals of electrical engineering II.

Attended courses:
Mathematics I;
Mathematics II.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After successfully completing the course the student will be able to:
1. interpret the basic physical laws underlying the operation of electrical machines and relate them to the mode of operation of the machine,
2. describe the operation of electrical machinery used on ships,
3. prepare synchronous generators for parallel operation and control the ship's power plant depending on the stages of ship exploitation,
4. to analyze the electrical circuit diagrams as well as the current control circuits,
5. distinguish between switchgear and their properties,
6. distinguish between marine electrical systems and describe their properties,
7. apply precautions for handling low and high voltage marine equipment.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Theory of Electrical Machines: Magnetism and Electromagnetic Induction The basic laws of physics underlying the operation of electrical machines: the law of flow, electromagnetic induction, the appearance of force on a conductor, and examples of the manifestation of these laws in electrical machines. (STCW, IMO Model Course 7.08 ETO: 1.1.3.4: 3 hours)
2. Theory of Electrical Machines: Fundamentals of Electrical Machines Operation. Definition, construction, division of marine electrical machinery. The materials that make up the machines and the properties of the materials. Heating and cooling of electrical machines. Energy losses. Historical overview of ship</td></tr>
</table>

	electrification from the first applications of electricity to ships to date. An overview of marine electrical systems on board ships today, marine electrical equipment, the specifics of working on board, and the jobs of electrical engineering officers on board. (STCW, IMO Model Course 7.08 ETO: 1.1.3.5: 3 hours) 3. Theory of electrical machines: Alternating Electrical Machines, Transformers - Material and Mode and Division. Schematic diagram of the ideal and real transformer, vector diagram and description of operation in basic operating states. Three-Phase Transformers: Designs, Connections, and Application. Application of transformers on ships, safety testing and routine maintenance work. (STCW, IMO Model Course 7.08 ETO: 1.1.3.7: 3 hours) 4. Theory of Electrical Machines: Alternating Electrical Machines, Asynchronous Motors. Rotating magnetic field. Three-phase asynchronous motors, cages: structure, performance and mode. Instantaneous feature and drive of three-phase cage electric motors. Current control circuits and basic connections for starting the engine. Speed control. Frequency converters. Slide-ring versions of three-phase asynchronous electric motors: structure, operating mode, specifics, starting, advantages and disadvantages in relation to the cage design. (STCW, IMO Model Course 7.08 ETO: 1.1.3.8: 3 hours) 5. Theory of Electrical Machines: Alternating Electrical Machines, Asynchronous Motors. single-phase asynchronous motors: structure and operating mode (rotating magnetic field for single-phase motors), versions. Adaptations for the operation of a three-phase asynchronous machine on a single-phase system. Application of asynchronous machines on ships. Safety testing and routine maintenance of asynchronous machines on board. (STCW, IMO Model Course 7.08 ETO: 1.1.3.8: 3 hours) 6. The theory of electrical machines: alternating electrical machines, synchronous. Synchronous generators: structure, mode, internal and external characteristics, replacement scheme, armature reaction, performances, excitation system. Marine Diesel Generator: Independent Operation, Parallel Operation, Devices and Synchronization Procedures. Maintenance of marine generators. Synchronous motors: structure, mode, performance, excitation system, starting and control of speed, torque characteristic, load angle, application on ships (STCW, IMO Model Course 7.08 ETO: 1.1.3.9: 3 hours) 7. Theory of Electrical Machines: DC Electric Machines: Structure, Mode, Performance, Reaction of Armature, Measures to Improve Commutation. DC generators: structure, mode, performance and characteristics with respect to excitation. DC Motors: Structure, Mode, Performance, Characteristics with regard to Excitation, Startup and Speed Control (STCW, IMO Model Course 7.08 ETO: 1.1.3.6: 3 hours) 8. Electricity production on board: basic and auxiliary sources of electricity on board, generator operation and control, generator excitation, voltage and frequency control (STCW, IMO Model Course 7.08 ETO: 1.3.1- 3 hours) 9. Onboard power generation: control of the process of production and consumption of electricity on board, connection of the generator to the main supply, parallel operation, synchronization and distribution of power, power factor compensation (STCW, IMO Model Course 7.08 ETO: 1.3.2 - 3 hours) 10. Power distribution on board, and switching equipment: ship's electric grid, basic electrical parameters, processes and environmental impact (STCW, IMO Model Course 7.08 ETO: 1.1.5.1 - 3 hours) 11. On-board electricity distribution and switchgear: versions of ship electrical systems with regard to the size and purpose of the ship and the type of propulsion; ship's electrical switchboard, main switchboard, loads and group starters (STCW, IMO Model Course 7.08 ETO: 1.1.5.4: 3 hours) 12. 12. On-board power distribution and switchgear: other on-board electrical equipment. Auxiliary power sources on board. Land connection. Batteries. (STCW, IMO Model Course 7.08 ETO: 1.1.5.2: 3 hours) 13. On-board power distribution and switchgear: marine electric cables, division, characteristics, laying (STCW, IMO Model Course 7.08 ETO: 1.1.5.4: 3 hours)

14. On-board power distribution and switchgear: other ship electric equipment; auxiliary sources of electricity on board. Shore connection (STCW, IMO Model Course 7.08 ETO: 1.1.5.5 - 3 hours)
15. Marine electric propulsion systems. Designs of electric propulsion systems and machines for electrical propulsion. (STCW, IMO Model Course 7.08 ETO: 1.4.3.3: 3 hours)

Auditory exercises:

1. Theory of electrical machines: Basics of operation of electrical machines. Calculation of magnetic circuits, flux law, electromagnetic induction, appearance of force on a conductor. (STCW, IMO Model Course 7.08 ETO: 1.1.3.5-1 hour).
2. Theory of electrical machines: AC electrical machines, transformers. Calculation tasks of electric and magnetic transformer circuits. (STCW, IMO Model Course 7.08 ETO: 1.1.3.7-1 hour).
3. Interpretation of electrical diagrams: interpretation of basic symbols and ways of reading electrical diagrams (STCW, IMO Model Course 7.08 ETO: 2.1.6.1-1 hour).
4. Interpretation of electrical diagrams: interpretation of diagrams for reference of asynchronous motors (STCW, IMO Model Course 7.08 ETO: 2.1.6.2-1 hour)
5. Interpretation of electrical diagrams: interpretation of the control scheme for starting the engine (STCW, IMO Model Course 7.08 ETO: 2.1.6.4-1 hour).
6. Theory of electric machines: AC electric machines, asynchronous. Calculation of losses of a three-phase asynchronous motor (power balance). (STCW, IMO Model Course 7.08 ETO: 1.1.3.8-1 hour).
7. Interpretation of electrical diagrams: interpretation of generator operation based on diagrams for different types of excitation systems (STCW, IMO Model Course 7.08 ETO: 2.1.6.3-1 hour)
8. Interpretation of electrical diagrams: generator excitation system (STCW, IMO Model Course 7.08 ETO: 2.1.6.4-1 hour).
9. Theory of electric machines: alternating electric machines, synchronous. Calculation of losses of a three-phase synchronous generator (power balance). (STCW, IMO Model Course 7.08 ETO: 1.1.3.8-1 hour).
10. Theory of electric machines: DC electric machines, calculation of DC motor parameters. (STCW, IMO Model Course 7.08 ETO: 1.1.3.6-1 hour).
11. Theory of electric machines: DC electric machines, calculation of DC generator parameters. (STCW, IMO Model Course 7.08 ETO: 1.1.3.6-1 hour).
12. Interpretation of electrical diagrams: interpretation of the ship's electrical system based on a single-pole diagram (STCW, IMO Model Course 7.08 ETO: 2.1.6.4-1 hour)
13. Distribution of electrical energy on board and switching equipment: sketching a single-pole diagram of electrical energy distribution on board. (STCW, IMO Model Course 7.08 ETO: 1.1.5.2-1 hour).
14. Power distribution on board and switching equipment: ship electrical cables. (STCW, IMO Model Course 7.08 ETO: 1.1.5.4-1 hour).
15. Power distribution on board and switching equipment: accumulators. (STCW, IMO Model Course 7.08 ETO: 1.1.5.5-1 hour).

Laboratory exercises:

Practice on the Kongsberg ERS-L11 MAN B&W-5L90MC–VLCC naval simulator.

1. Introduction to the ship's electrical plant, the distribution of electrical power on board and the systems in the service of the ship's electrical plant. (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)
2. Starting of emergency generator and distribution of emergency electricity, switching on lighting, emergency ventilation. (STCW, IMO Model Course 7.08 ETO: 1.3.2-1 hour)
3. Preparation of auxiliary systems necessary for diesel generator operation (DG1): pre-lubrication and heating of the drive machine. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)

<table>
<tr><td></td><td colspan="6">4. Preparation of auxiliary systems necessary for diesel generator operation (DG1): fuel system. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)
5. Preparation of the auxiliary systems necessary for the operation of the diesel generator (DG1): air system for reference. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)
6. Preparation of auxiliary systems necessary for diesel generator operation (DG1): sea and cooling water system. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)
7. Supplying the ship's electrical network with electricity using a diesel generator (DG1); commissioning of diesel generators and transition from emergency supply to regular electricity supply, generator load and regulation of network parameters. (STCW, IMO Model Course 7.08 ETO: 1.3.2-1 hour)
8. Preparation of auxiliary systems necessary for diesel generator operation (DG2): pre-lubrication and heating of the drive machine. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)
9. Preparation of the auxiliary systems necessary for the operation of the diesel generator (DG2): starting the drive machine and turning on the excitation - setting the generator (DG2) in the idle state. (STCW, IMO Model Course 7.08 ETO: 1.2.1-1 hour)
10. Generator operation management: connecting the generator (DG2) to parallel operation, synchronization and load distribution. (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)
11. Management of generator operation: regulation of network parameters during parallel generator operation. (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)
12. Generator operation management: generator protection testing. (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)
13. Management of the ship's electrical switchboard: black-out and re-establishment of regular supply (STCW, IMO Model Course 7.08 ETO: 1.3.2-1 hour)
14. Management of the ship's electrical power station: semi-automatic management of generator operation (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)
15. Automatic control of the ship's electrical switchboard, different operating modes (STCW, IMO Model Course 7.08 ETO: 1.3.1-1 hour)</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☒ multimedia
☒ laboratory
☐ mentoring
☒ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
The course is delivered through 45 hours of lectures, 15 hours of auditory and 15 hours of laboratory exercises that involve working on a ship engine simulator, and fully covers the content prescribed by the STCW Convention, so 100% student attendance is required. Also, in the course of acquiring the right to take the exam, students are required to pass the in-term exam from the simulator exercises. Attendance at the classes is recorded, and the in-term test from the simulator is graded. Compensations are organized outside regular teaching hours in agreement with the course teacher.
Responsibilities of part-time students are the same as those of full-time students.</td></tr>
<tr><td rowspan="4">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Lecture attendance</td><td>1,875</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Simulator training</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>3,125</td><td>Oral exam</td><td>Alt. to in-term</td><td>(Other)</td><td></td></tr>
</table>

equal to the ECTS value of the course)				tests		
	Written exam	Alt. to in-term tests	Project		(Other)	

Examination

Students/ have the possibility to pass the exam by continuous assessment during the semester, for which three in-term tests and an in-term test from laboratory exercises are evaluated, or through a final evaluation during the exam term.

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	5
Laboratory exercises on simulator	50	20
In-term test I	40	25
In-term test II	40	25
In-term test III	40	25

The in-term tests consist of 10 theoretical questions that are assigned points from 0 to 1, and include 2 tasks that carry a weight value of 3 points, so the in-term carries a total of 13 points. The overall grade is obtained as the arithmetic mean of the achieved points. Student activity, which includes attendance at lectures, auditory and laboratory exercises, and in-term test results, is included in the final grade.

Grading and evaluating student work in class and at the final exam

Final evaluation

Students who do not pass the in-term exams during the semester, and have exercised their right of taking them, can take the exam on regular exam dates, where the exam consists of a written and an oral part. The written exam consists of calculation tasks and theoretical questions with a ratio of 3:10. During the oral exam, the teacher has the right to check any part of the material. A student with a positive grade in the written exam can take the oral part of the exam. The evaluation method and the distribution of points are the same as in the in-term test evaluation. As a rule, the oral exam is held no more than seven days after the written exam.

Evaluation and grading criteria for part-time students are the same as those for full-time students.

Grading

Percentage (%)	Criterion	Grade
0-40	Does not satisfy minimum criteria	insufficient (1)
41-58	Satisfies minimum criteria	sufficient (2)
59-74	Average success with clear shortcomings	good (3)
75-88	Above average success with a few errors	very good (4)
89-100	Extraordinary success	excellent (5)

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Milković, M., Brodski električni uređaji i sustavi, Pomorski fakultet u Dubrovniku, Dubrovnik, 1996.	1	YES
	2. Mandić, I., Tomljenović, V., Pužar, M. *Sinkroni i asinkroni električni strojevi*, TVZ Elektrotehnički odjel, Zagreb, 2012.		YES
	3. Hall, D.T. *Practical Marine Electrical*		YES

	Knowledge, Witherby London 1999.		
	4. Ådnanes, A.K. *Maritime Electrical Installations and Diesel Electric Propulsion*, ABB AS, 2004.		YES
	5. ERS, Engine Room Simulator. *L11 5L90MC–VLCC. Operator's Manual Part 1-3. Machinery & Operation, Kongsberg Maritime, Doc. no*. SO-1136-D/11-Oct-05, 2005.		YES
Optional literature (at the time of submission of study programme proposal)	1. Chapman, S. *Electric machinery fundamentals*. Tata McGraw-Hill Education, 2005. 2. Wolf, R. *Osnove električnih strojeva*. Školska knjiga, Zagreb, 1995. 3. Patel, M.R. *Shipboard electrical power systems*. CRC Press, 2011. 4. Yakimchuk, A. *Ship Automation for Marine Engineers and ETOs*, Witherby Seamanship Int., Scotland, UK, 2012. 5. Molland, A.F., Ed. *The maritime engineering reference book: a guide to ship design, construction and operation*. Elsevier, 2011. 6. McGeorge, H. D., *Marine Electrical Equipment and Practice*, London Stanford Maritime, 1986. 7. D. Vučetić, Brodski električni strojevi i sustavi, Pomorski fakultete, Sveučilište u Rijeci, 2011.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MODERN TECHNICAL SOFTWARE PACKAGES</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Miro Petković, PhD, Assistant Professor</td><td>Number of credits (ECTS)</td><td colspan="4">3</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Mario Miličević</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">0</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The purpose of this course is to train students to work with modern technical software packages such as Matlab / Simulink, Octave, etc. This includes learning about the technical environment and practical programming exercises in the appropriate software package. Using the assistance provided. It is necessary to master programming of functions and m-scripts, use of toolbox functions, reading of program codes, solving polynomials, drawing functions in 1D, 2D and multidimensional space, collecting and recording of data and loading of existing data.
STCW Electro Technical Officer: 1.5.1, 2.1.1, 2.1.2, 2.1.4, 2.1.5, 2.1.6, 2.1.8.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Comment on program lines and functions.
2. Review the meaning of individual parts of the program.
3. Plan the course of the program.
4. Choose the most convenient set of commands to solve a problem.
5. Create a software solution for a given problem in Matlab.
6. Draw up a system chart in Simulink.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. In general about Matlab and Octave. Differences and similarities give the program and their origin. Introductory presentation of the program. Features and Modes in Matlab. Applications of Matlab. Literature. Commands help, look-for, quit, distinguish lower and uppercase letters. Functional structure of Matlab.
2. Types of variables and extracting parts of variables from the whole. Variables according to the content of the matrix (real, complex, symbolic, cell fields, structures). Variables by visibility (local and global). Variables by source of origin (internal and external). Saving Variables. Extraction of part of the data from variables.
3. Arithmetic operators with exemplars. Relational operators with examples. Logical operators with examples. Matrix operations. Perform basic mathematical operations. Built-in functions. Function division.
4. Polynomials and operation with polynomials. Functions for working with polynomials. M functions. Performance enhancement by memory prelocation and vectorization. Profiler.
5. Analytical operations in matlab (symbolic variables). Important functions (derivation, limes, integral, simplification, and more convenient representation of expressions, solve, dsolve, sum of order, linear algebra).
6. Save and load data of different formats and records (mat, avi, export to excel, etc. formats).
7. Display results in 1D, 2D, 3D mode.
8. Use of tools and functions. Application of the Laplace transform.
9. Determination of transfer function and system response time; determination of</td></tr>
</table>

poles, zeros and residuals.
10. Program flow control.
11. Simple Matlab programs (m-scripts) and functions.
12. Creating your own programs and functions.
13. Programming in Matlab: Advanced Features
14. About Simulink: presenting programs and modes, basic elements. Stability of numerical integration process. Stiff-system simulation. Algebraic loops. Subsystems. Conditional execution subsystems. Subsystems - masking. Controlling the system from the command window.
15. Modeling, adjusting simulation parameters, displaying simulation results in Simulink.

Exercises:
1. Getting to know the working environment of the Matlab software package: main window, desktop, workspace, current folder, command history window. Using built-in help and online services. Using Tutorial Help. Built-in features. Read error messages. Matlab versions and installation. Computing in the Matlaba command window. Using ";", "," and ".". Types of variables (integer, real, complex, logical, character, arrays, cell arrays, structures) and separating parts of variables from a whole by a smaller matrix, by rows, by columns or by individual elements (extraction of the desired part of a matrix / vector). Commands isvarname, iskeyword, clear, format long, compact, short. Examples of internal variables.
2. Examples of external variables. Defining a series of numbers. Overview of variables in the workspace: who, whos, size, length. Structures and fields. Deleting variables and windows (clc, clear all, clear). Saving variables to disk, printing (disp, type, echo, fprintf), looking (lookfor). Perform basic mathematical operations, relational operators, matrix operations. Element operations. Tags eps, i, j, inf, NaN, pi, realmax, realmin. Relational operators. Special matrices (eye, zeros, ones, diag, linspace, trill, flipr, circshift). Matrix operations (dot, multiplication, division, det, rank, ...). Built-in functions for mathematical operations. Functions: any, all, max, min, rand, find. Function division. Trigonometric and hyperbolic functions (sin, sinh, asin, cos, cosh, acos, acosh, tan, tanh, atan, atan2, atanh, sec, sech, asec, asech, csc, csch, acsch, cot, acot, ...). Logarithmic (log, exp, log10, log2, pow2, realpow, reallog, realsqrt, nthroot) functions. Functions of complex numbers (abs, angle, complex, real, conj, imag, unwrap, cplxpair). Other arithmetic functions. Vector and Matrix Processing Functions. String Processing Functions. Rounding functions (fix, floor, ceil, round, mod, rem, sign).
3. Polynomials and operation with polynomials. Characteristic values of polynomials and matrices. Normalization. Functions for working with polynomials and examples (polyfit, corrcoeff, mean, spline, interp2, std). Solving linear equations. Fsolve. SVD. System of nonlinear equations. Example of a nonlinear circuit with a diode and a resistor in an alternating circuit. An example of using roots and poly.
4. M functions. Performance enhancement by memory prelocation and vectorization. Profiler. Analytical operations in matlab (symbolic variables). An example of an NF circle analysis with symbolic variables. Simple examples. Comparison with numerical operations.
5. Save and load data of various formats and records (mat, avi, export to excel, etc. formats). Load, clear, save, close, pack, diary ...
6. Display results in 1D, 2D, 3D mode: figures, axis, plot, plot3, steam, bar, stairs, mesh, surf, etc. 2D data display options. 3D options. Easy-to-use graphical functions. Commands: axis, colormap, loglog, semilog ... Example of creating a movie.
7. Sample Vector Rotation Script. Use of tools and functions. Application of the Laplace transform.
8. Determination of transfer function and system response time; determination of poles, zeros and residuals. Impedance and energy calculations.

<table>
<tr><td></td><td colspan="6">9. Program flow control: if, while, for, continue, break, return, switch-case-otherwise, syntax, and examples (computing a histogram of a wave, ...). Commands: isequal, islogical, isfloat, true, false ...
10. Simple Matlab programs (m-scripts) and functions. Example of calculating and plotting the amount of charge that passes through the cross section of a conductor. Example of calculating and plotting diode characteristics.
11. Creating your own programs and functions. P-code. Manage search path (addpath, path, path2rc, pathtool, rmpath, savepath, userpath).
12. Programming in Matlab: Advanced Features. Transferring arguments from one function / script to another. Evaluation function (eval).
13. Programming in Matlab: Advanced Features.
14. About Simulink: presenting programs and modes, basic elements. Solvers, system representation of blocks and their introduction into a window, setting of simulation parameters. Tracking and saving variables. An example of managing a system from a command window.
15. Modeling, presentation of simulation results in Simulink. Creating simple models. Linking Simulink results to Matlab.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐ mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
Attendance at 80% of non-STCW topics and 95% of STCW hours is required. The presence at classes in computer exercises is 100%. Students should compensate for lost classes if they have not obtained the right to take the exam in the 15 weeks of teaching. Compensations can be made by seminar paper or homeworks if they are not covered by STCW, and through compensation of classes if their absences are from an STCW topic (lectures: 3, 5 and 7; exercises: weeks 2 and 6). Compensations can be made during consultations, when the students must sign the attendance record list.

Responsibilities of part-time students
The responsibilities are the same as for full-time students.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Homework</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>e-learning</td><td></td></tr>
<tr><td>In-term tests</td><td>0.375</td><td>Oral exam</td><td></td><td>Writing of a programme or model in Matlab with writing a seminar essay describing the programme/model</td><td>1</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>Attendance at lectures – computer exercises</td><td>0.5</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Assessment and grading of the work of full-time students
Attendance is compulsory for full-time students (see requirements under responsibilities).
During the semester, the student pulls out a task and solves it. In addition to solving the problem in the form of m-file or mdl-model, the student also presents their paper in MS Word in which they explain their work.

Continuous student assessment:</td></tr>
</table>

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	10
Individual/team tasks	100	10
In-term test I	50	40
In-term test II	50	40

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-9	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and have the right to take the exam, are required to submit the assignment done within the exam period. The same evaluation criteria apply to the examination period as to the continuous assessment.

Evaluation and grading of the work of part-time students
Same as for full-time students.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. I. Vujović, Tehnički programski paketi – predavanja, Pomorski fakultet u Splitu, 2017.	0	WEB
2. Matlab Tutorial and Help Desk, www.mathworks.com	0	WEB
3. I. Vujović: Zabilješke s predavanja o naprednim funkcijama i primjenama, 2012.	0	WEB

Optional literature (at the time of submission of study programme proposal)

1. Ž. Ban, J. Matuško, I. Petrović, Uvod u programski sustav Matlab, FER, 2010. ili prezentacija on-line: http://www.tel.fer.hr/_download/repository/matlab_dio1.pdf
2. Uvod u Simulink, on-line: http://www.tel.fer.hr/_download/repository/matlab_pred_2_simulink%5b1%5d.pdf
3. S. T. Karris, *Signals and Systems* with MATLAB® Applications, Orchard Publications, 2003, ISBN 0-9709511-8-3
4. MATLAB, *The Language of Technical Computing*, The MathWorks, Inc., 2002.
5. S.T. Karris, *Introduction to Simulink with Engineering Applications*, Orchard Publications, 2006
6. R. Priemer, Matlab for Electrical and Computer Engineering Students and Proffesionals with Simulink, Scitech Publishing, Edison, NJ, 2013.

Quality assurance methods that ensure the acquisition of exit competences

University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.

Other (as the proposer wishes to add)

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">SEA AND MARINE ENVIRONMENT PROTECTION</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">2</td></tr>
<tr><td>Course teacher</td><td>Merica Slišković, PhD, Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">2</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Defining potential sources of pollution and pollution of the marine environment from vessels. Prevent pollution from ships and take appropriate action if contamination is detected.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1. Identify the types and characteristics of pollutants and evaluate the effects of pollution on the marine environment and human life.
2. Categorize the most common sources of pollution from ships.
3. Interpret the basic content of the International Convention for the Prevention of Pollution from Ships 73/78 and its annexes, and other relevant international regulations for the prevention of pollution from ships (ASF Convention and BW Convention) from the aspect of pollutants.
4. Associate various pollutants from the ship with preventive and operational procedures to prevent contamination.
5. Comment on the purpose of regional cooperation on pollution prevention, preparedness and appropriate response to a pollution incident - Subregional Plan.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">1. Introduction to the subject. Marine pollution / pollution.
2. Marine pollution / pollution as a result of human activities.
3. Ship as a source of pollution of the marine environment. Harmful effect of the ship on the marine environment.
4. Prevention of marine pollution from ships - MARPOL 73/78 Convention
5. Annex I - Regulations for the Prevention of Pollution by Oil.
6. SOPEP - Shipboard Oil Pollution Emergency Plan: Mandatory and Optional Requirements.
7. Annex II - Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
8. Annex III - Prevention of Pollution by Harmful Substances Carried in Packaged Form.
9. Annex IV - Prevention of Pollution by Sewage from Ships.
10. Annex V - Prevention of Pollution by Garbage from Ships.
11. Marine garbage.
12. Annex VI - Prevention of Air Pollution from Ships.
13. Prevention of pollution of the sea by ballast water.
14. 14th International Convention for the Control and Management of Ships' Ballast Water and Sediments.
15. Contingency plan for sudden marine pollution in the Republic of Croatia.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☐ exercises</td><td colspan="3">☐individual tasks
☒ multimedia
☐ laboratory</td></tr>
</table>

<table>
<tr><td></td><td>☐on line only
☒ mixed e-learning
☐ field work</td><td>☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students
Students are required to provide lectures as they keep track of attendance. In order to be eligible for taking the final exam, students must attend at least 80% of the lectures. In case of insufficient number of students, students are not eligible to take the final exam and are obliged to enroll the course again next year.
Students have the opportunity to take the exam by continuous assessment during the semester by taking 2 in-term examinations. Students are required to access all the exams.
Students who do not pass the in-term examinations during the semester and have the right to take the final exam are required to take the written exam within the exam term.
Students, either individually or in a team, must address the given topics using e-learning material.
Students who have accumulated a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination term after the classes and to get their grade in the exam term or to take the exam again for a higher grade.

Responsibilities of part-time students
The total attendance requirements for part-time students may not be less than half the number of hours allocated to full-time students. Exams are the same as for full-time students.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td colspan="2">
<table>
<tr><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>e-learning</td><td>0.25</td></tr>
<tr><td>In-term tests</td><td>1</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="2">Evaluation and grading of full-time students

Attending classes is mandatory for full-time students. Attendance at at least 80% of lectures (12 times) is a condition for obtaining the right to take the exam.
Two in-term tests are written in the semester. The first in-term test covers material from lectures 1 to 6, and the second in-term test covers material from lectures 7 to 13. Sample questions for the in-term test are available to students at the end of each lecture. At each in-term test, it is necessary to obtain at least 50% of points to pass. Students who do not take one in-term test for objective reasons or do not achieve the minimum percentage have the possibility of correction. Students who do not pass the first in-term test cannot take the second in-term test.
The student must work independently or in a team using the given topics using e-learning material.
Class attendance, in-term test results and individual/team assignments are included in the final grade.

Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>80</td><td>7.5</td></tr>
<tr><td>Individual/team tasks</td><td>100</td><td>2.5</td></tr>
<tr><td>In-term test I</td><td>50</td><td>45</td></tr>
</table>
</td></tr>
</table>

	In-term test II | 50 | 45 Grading Percentage (%) | Criterion | Grade 0-49 | Does not satisfy minimum criteria | insufficient (1) 50-64 | Satisfies minimum criteria | sufficient (2) 65-79 | Average success with clear shortcomings | good (3) 80-89 | Above average success with a few errors | very good (4) 90-100 | Extraordinary success | excellent (5) Students who do not pass the in-term examinations during the semester and have the right to take the final exam are required to take the written exam within the exam term. The same assessment criteria apply to the examination period as to the continuous assessment. **Assessment and evaluation of full-time students' work** The condition for taking the final exam is attendance at a minimum of 50% of lectures. The evaluation and grades are the same as those for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Međunarodna konvencija MARPOL, 1973/78.	5	YES
	2. SOLAS konvencija, 1974. (poglavlje VII)	3	YES
	3. Slišković M.: Zaštita mora i morskog okoliša, nastavni materijali, Pomorski fakultet, Split, 2018.		YES
Optional literature (at the time of submission of study programme proposal)	1. Andersson K. et al.: Shipping and environment, Springer-Verlag Berlin Heidelberg, 2016. 2. Karim S.: Prevention of pollution of the Marine Environment form the Vessels, Springer International Publishing Switzerland, 2015. 3. Bićanić, Z.: Zaštita mora i morskog okoliša, Split, 2003.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)	According to the students' interest for the course shown during lectures; according to the permit of the University of Split, the course can be delivered in English		

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME COMMUNICATIONS</td></tr>
<tr><td>Code</td><td>PFE302</td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Dean Sumić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Paško Ivančić, M.Sc. Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3">10%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Familiarity with and acquisition of appropriate knowledge required by the STCW and IMO Model Course for on-board communication service. Particular attention has been paid to the Global Maritime Distress and Safety System (GMDSS) and the handling and use of radio equipment in various situations.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Independently perform all maritime communications tasks foreseen by the GMDSS system in all navigation categories.
2. Acquire competencies according to IMO STCW and IMO Model Course 1.25 A radio operator with general GOC authority.
3. Analyze the operation of the device using block diagrams, and in some cases at the element level.
4. Use the devices independently as practically practiced in the Transas TGS 5000 GMDSS simulator.
5. Apply and explain the physical characteristics of the propagation of electromagnetic waves depending on the frequency range (MF, HF or VHF).
6. Interpret, define and describe parts of the GMDSS system.
7. Present the operation of the GMDSS system in a practical manner in cases of danger, emergency, safety or routine communications.
8. Use the obligatory and supplementary literature of the ship's radio station, and keep the radio journal and other documentation properly.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Introduction, basic features of GMDSS
2. Principles of maritime communications
3. Global Maritime Distress and Safety System - DSC Call Types
4. List of priorities and call categories
5. General NBDP principles
6. Purpose and use of MSI
7. IAMSAR
8. Terrorist alerts and procedures
9. General communication procedures
10. Synthesis of terrestrial procedures, in-term test
11. Satellite communications principles
12. Visit to the ORP
13. Principles of the Inmarsat and Iridium Systems
14. Satellite alerting and procedures
15. Satellite Positioning Systems

Exercises
1. Familiarization with the radio station and the simulator
2. Introduction to Digital Selective Call-DSC
3. DSC Procedures</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">4. NBDP General Principles
5. VHF Naval Radio Station
6. MF / HF Naval Radio Station
7. MSI - Receivers
8. DSC alerting
9. Procedures for danger in terrestrial systems
10. Simulator procedure analysis and knowledge test (in-term test)
11. Inmarsat system terminals
12. Visit to the ORP (Coastal Radio Station)
13. Satellite alarms
14. General communications by satellite
15. COSPAS - SARSAT, SART, VHF – AIR</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☒ field work</td><td colspan="3">☐individual tasks
☒ multimedia
☒ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
Students are obliged to attend lectures because records of attendance is kept. In order to be eligible for taking the final exam, students must attend a minimum of 95% of classes. In case of insufficient number of attendances, students are not entitled to take the final exam and are obliged to enroll the course again next year.
Students have the opportunity to take the oral exam through continuous assessment during the semester by taking an in-term exam. Students are required to take the in-term exam.
Students who do not pass the in-term exam and have the right to take the final oral exam are required to take the final exam within the exam term.
Students can cover the given topics independently or in a team, using e-learning material.
Students who have passed the in-term exam are obliged to apply for the first exam term via Studomat and to enter the grade in the exam term or to re-take the exam for a higher grade.

Responsibilities of part-time students
The total attendance requirements for part-time students are equal to those of full-time students in accordance with the STCW recommendations. Exams are the same as for full-time students.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.5</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>2</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">1. Evaluation and grading of full-time students
Attendance is compulsory for full-time students, ie a minimum of 95% of lectures (14 sessions) and 100% of the exercises is required.
An in--term test is taken during the semester. The in-term exam covers the 1st to the 9th weeks of classes and is taken in the 10th week of classes. Exam questions for students are available on the Merlin e-learning platform. To pass the in-term exam, a minimum of 50% of points is required. Students who do not take the exam for objective reasons or do not achieve the minimum percentage have the opportunity to take an oral exam.</td></tr>
</table>

Students can cover the given topics independently or in a team, using the e-learning Videotel material.
The final grade includes the attendance at classes, the results of the in-term / oral exam and the written exam. Students who do not pass the in-term test during the semester, but have the right to take the exam, are required to take the oral exam during the exam period. The same evaluation criteria apply to the exam period as to continuous knowledge testing.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	minimum attendance: 95% of lectures and 100% of exercises	20
In-term test	50	30
Total		50 (in this case, the student need not take the final exam)

Final exam:

Evaluation elements	Sucecss (min.%)	Percentage in grade (%)
Exam or in-term test (oral)	50	30
Theory exam (written)	50	50
Previous activities (including all indicators of continuous assessment)	100	20
Total		100

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

2. Evaluation and grading of part-time students
The requirement for obtaining the right to the final exam is the attendance of a minimum of 95% of lectures and 100% of exercises. Evaluation and grading are the same as for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Bilić, Mirko: Komunikacije u GMDSS, Pomorski fakultet, Split, 1995.	3	YES
	2. Krile, Srećko: Komunikacijski sustavi u pomorstvu - Mobilne radiomreže, Europrint, Dubrovnik, 2011.	15	NO
Optional literature (at the time of submission of study	1. Manual for Use by the Maritime Mobile and Maritime Mobile-Satellite Services (Maritime Manual) Edition of 2016, ITU, Geneva, 2011 2. GMDSS Manual, 2017 Edition, IMO London, 2017		

programme proposal)	3. Radio Regulations Edition of 2008, ITU, Geneva, September 2008 4. General Operator's Certificate for GMDSS, 2015 Edition, IMO Model course 1.25 5. Restricted Operator's Certificate for GMDSS, 2015 Edition IMO Model course 1.31 6. Graham D. Lees, William G. Williamson: Handbook for Marine Radio Communication, Informa Professional, 2009 7. Inmarsat Maritime Communications Handbook, Issue 4, Inmarsat, London 8. Kasum, Josip: Radio služba za pomorce, drugo izmijenjeno i popravljeno izdanje, Hrvatski Hidrografski Institut, Split, 2008. 9. Calcutt, D., Tetley, L., Understanding GMDSS 1st Edition, Kindle Edition, 2012
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	Videotel material: GMDSS Training Course, stock code:1178 STCW Section B-IV/2 & GMDSS Manual 2017 According to the interest shown by students, teaching can be delivered in English, in compliance with the Permit issued by the University of Split.

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">ADVANCED PROGRAMMING</td></tr>
<tr><td>Code</td><td>PFP126</td><td>Year of study</td><td colspan="3">2</td></tr>
<tr><td>Course teacher</td><td>Anita Gudelj, Ph.D., Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Jelena Čulić-Gambiroža, Ph.D.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of e-learning</td><td colspan="3">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The course includes content related to advanced programming techniques that include dynamic memory allocation, pointer handling, and recursion, OOP. The aim of the course is to enable students to independently develop more complex and sophisticated programs based on the chosen programming language.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Demonstrate knowledge and understanding at a level that incorporates aspects of contemporary programming knowledge; interface design / coding, dynamic memory allocation, pointer manipulation and recursion, linked lists, various file organizations, application of advanced algorithms.
2. Analyze and interpret the test results of complex programs.
3. Apply and explain sorting and search algorithms.
4. Apply and explain dynamic memory allocation.
5. Apply and explain related lists.
6. Develop and write a program that uses files to store and retrieve data.
7. Implement dynamic programming on specific problems.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Lecture plan. Structural programming.
16. Complex data structures in C ++. Fields. Two-dimensional fields.
17. 3rd strings. Character and String Processing.
18. Structures (records).
19. Functions. Transferring Arguments.
20. Recursive function. The concept of global and local data.
21. Function overload. Fields in function.
22. In-term test. Pointers and dynamic structures in C ++.
23. A linked list. Adding an element to a list (beginning or end of a list). Eject an item from the list. List search.
24. Linked list. Sort by Bubb Sort. Merge Sort for list.
25. Double-bound list. Comparison of fields and bound lists.
26. Files. File pointers.
27. File Organization.
28. Header files.
29. End-term test.

Exercises
1. Repetition and introduction to C ++. Tasks for input / output functions. Program flow control commands.
2. Field Tasks.
3. Tasks with strings. String and character processing.
4. Tasks with structures (records) and structures field.
5. Define and invoke functions in the main program.
6. Transferring arguments. Recursion.</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">7. Exercise for the in-term test.
8. Mid-term test. Tasks with pointers. Using the address operator (&). Pointers Operators.
9. Linked lists. List Head Allocation. Adding a new element to the end of the list. Print list items. Search the list by key.
10. Linked lists. Sort the list using the Bubble Sort method.
11. Files. Modules and header files.
12. Text files.
13. Fixed file size files.
14. Header files. Processor time measurement. Real time measurement.
15. End-term test</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☒ seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td>☒ individual tasks
☐multimedia
☒ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Obligations of regular students:

Lectures and exercises are compulsory for students, and attendance records are kept. In order to get the right to take the exam, the student must attend at least 80% of the lectures and 100% of the exercises. In case of an insufficient number of attendances, the student does not have the right to take the exam and must re-enroll in the course the following year.
The exam can be taken continuously with in-term tests or at the final exam (written and oral exam).
During the semester, short tests are held at the lectures. Students who have received a positive grade from less than 50% of the short tests, and are entitled to take the exam, are required to take the oral part of the final exam during the lecturer's exam period, with registration on Studomat.
Students are required to make a seminar paper and present it during the lecture. They should present a specific thematic unit and process a program example (or possibly several examples). If the student does not defend the seminar paper, he is obliged to do so in the oral part of the final exam.
In the middle and at the end of the semester, two in-term tests will be held, which together carry 50 points. The student is obliged to attend all in-term tests. At each in-term test, it is necessary to obtain at least 50% of points to pass. Students who do not meet this requirement can take the remedial in-term test, which is on the written part of the final exam during the lecturer's exam period, and that with registration on Studomat.
Students who have collected a sufficient number of points during classes (they have passed all the in-term tests from the theoretical and practical part) are required to register for the exam on Studomat for the first exam period after the lecture and, depending on the result achieved, their grade is entered in Studomat.
Students who have not met the requirements for entering the grade, but have the right to take the exam, take the final exam.
The final exam is during the lecturer's exam period, and that is with registration on Studomat. The exam consists of a practical exam on computers and a theoretical (oral) exam.
The practical part on computers covers the material of the entire semester and carries a maximum of 50 points. Students are considered to have successfully passed the exam if they achieved at least 50% (the exam threshold is 50% of successfully solved tasks). In order to take the oral exam, it is necessary to pass the practical part of the exam.
Students who obtained a passing grade, but are not satisfied with it, can take the final knowledge test. It is carried out practically on computers, and the grade achieved on it may be lower than the grade obtained at the in-term test.</td></tr>
</table>

Obligations of part-time students:
In order to get the right to take the exam, students are required to attend 50% of the lectures and 100% of the exercises, and they are required to pass the 1st and 2nd in-term tests from the exercises. They can pass the materials either continuously via in-term tests or at the final exam (practical exam on computers and oral exam).

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*

Lecture attendance	1.5	Research		Practical work	1
Experimental work		Report		(Other)	
Essay		Seminar	0.5	Activity in class	1
In-term tests	1	Oral exam		Computer exercises	0.5
Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam

1. Evaluation and grading of full-time students

Attendance is mandatory for full-time students. In order to get the right to sit for the exam, students must attend at least 80% of the lectures (12 times) and 100% of the exercises (15 times). In the semester, two in-term tests are written from exercises and short tests of the theoretical part of the course. The quizzes from the exercises include practical work on the computer and are taken in the 8th and 15th weeks of classes.

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	Depends on the activity	10
Short knowledge check	50	10
Activity in exercises	50	40
Lab exercises check	50	In-term test I 20 In-term test II 30
Seminar	50, depends on the topic complexity	10
Total		**100**

Students who do not pass in-term exams are required to take the written and/or oral parts of the exam within the final exam term.

Final evaluation

Evaluation elements	Success (min.%)	Percentage in grade (%)
Practical exam (written)	50	50
Theory exam (oral)	50	40
Previous activities (incl. attendance at lectures and exercises)	50	10
Total		100

Grading

Percentage (%)	Criterion	Grade
0-49.9	Does not satisfy minimum criteria	insufficient (1)
50-61.9	Satisfies minimum criteria	sufficient (2)
62-74.9	Average success with clear shortcomings	good (3)
75-87.9	Above average success with a few errors	very good (4)
88-100	Extraordinary success	excellent (5)

<table>
<tr><td></td><td colspan="3">2. Evaluation and grading of part-time students
Evaluation and grading are the same as for full-time students.</td></tr>
<tr><td rowspan="6">Required literature (available in the library and via other media)</td><td>Naslov</td><td>Broj primjeraka u knjižnici</td><td>Dostupnost putem ostalih medija</td></tr>
<tr><td>Radošević, D.: Programiranje 2, TIVA Tiskara Varaždin, Fakultet organizacije i informatike, Varaždin, 2007.</td><td>10</td><td>YES</td></tr>
<tr><td>Lipljin, N: Programiranje1, TIVA Tiskara Varaždin, 2004.</td><td>10</td><td>YES</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Vulin, R.: Zbirka riješenih zadataka iz C-a, Školska knjiga, Zagreb, 1995.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">INTRODUCTION TO MECHATRONICS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Hrvoje Dodig, PhD, Assoc.Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">4</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">10%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The aim of the course is to provide the basics of practical knowledge in the field of mechatronic systems. Design, synthesis and analysis of mechatronic systems incorporating elements for motion, speed and position control. Introduction to mechatronic actuators. Application of software algorithms and mathematical methods in mechatronic systems. Introduction to machine elements used in mechatronics. Introduction to mechatronic sensors: translational motion sensors, rotary motion sensors, gyroscopes, accelerometers, capacitive sensors, inductive sensors.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Dimension and select mechanical components of mechatronic systems
2. Design the electronic components of mechatronic systems
3. Define standard actuators for mechatronic systems
4. Apply software algorithms to mechatronic systems
5. Assess sensor type according to mechatronic system requirements
6. Dimension and select standardized mechatronic circuit components</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures (3h):
1. Introductory lecture. Definition of mechatronics and mechatronic systems. System Elements. Fundamental block diagram of a mechatronic system. Examples of mechatronic systems.
2. Mechanical components of mechatronic systems. Mechanical energy transmitters. Shafts and shafts. Bearings. Gear, friction, belt, chain, curve, screw, lever gears.
3. Sensor transfer function and linear operating range. Sensor parameters: range, span, resolution.
4. Translational and rotary displacement sensors. Rotary transformers, resolvers and selsins. LVDT transformers.
5. Gyroscopes and gyroscopes for measuring angular velocity. Gyro error and accumulation error of gyro.
6. Acquisition of data from the sensor and adjustment of the signal affected by the sensor. Differential amplifiers, capacitive amplifier, current amplifier. Real amp parameters. Galvanic isolation of the input circuit.
7. A / D acquisition of sensor data and examples of A / D acquisition for different types of sensors
8. Digital electronic components of mechatronic systems. Modern ARM Microcontrollers and Microprocessors, Interapts and Use of DMA in Mechatronic Systems
9. Actuators for mechatronic systems. Stepper motors. Brushless DC motors. Torque characteristics, power and trapezoidal speed profile. Examples of converting rotational to translational motion.
10. D / A conversion, output amplifiers according to actuator type. Maximum Power</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">Transfer Theorem.
11. Examples of mechatronic feedback systems. Practical examples of PID and fuzzy logic controllers.
12. Definition of the degrees of freedom of the actuator. Actuator kinematics and dynamics. Mathematical description of actuators. Homogeneous coordinates, translation and rotation matrices.
13. Robot Dynamics. The Lagrange Equation. Kinetic energy. Potential energy. Lagrange-Eulerian dynamic model. Newton-Euler dynamic model. The principle of robot dynamics design. An example of robot dynamics.
14. Trajectory Planning The concept of trajectories and trajectories. Point to Point Movement - PTP. Continuous motion of the manipulator - CP. Interpolated motion.
15. Examples of mechatronic systems. An example of a CNC machine controlled by a PC. Robotic arm control. Mechatronic systems in navigation. Robots for underwater work and exploration.

Exercises (15h - auditory, simulation):

Exercise 1. Introduction to the ARM microcontroller ST32F7
Exercise 2. Getting to know the software for the ARM microcontroller
Exercise 3. Programming an ARM microcontroller and configuring a clock tree
Exercise 4. Configuring I / O ARM Microcontrollers
Exercise 5. Controlling the lighting level of LEDs by PWM control and ARM microcontroller
Exercise 6. Using Intercept and Creating a Practical Assembly with an ARM Microcontroller to Control the LEDs Using the Keys
Exercise 7. Using a timer with an ARM microcontroller
Exercise 8. Stepper motor control via ARM microcontroller and USB interface
Exercise 9. Connecting the ARM controller, stepper motor and rotary motion sensor and control
Exercise 10. Designing a servo motor control assembly and connecting to an ARM microcontroller
Exercise 11. DMA acquisition of sensor data using an ARM microcontroller
Exercise 12. Connecting an ARM Microcontroller and a Triaxial Gyroscope and Accelerometer
Exercise 13. Algorithms for eliminating gravity component from gyroscope and accelerometer readings
Exercise 14. Error accumulation with gyroscope and accelerometer
Exercise 15. Dynamic Positioning (DP) with Gyro, Accelerometer and ARM Microcontroller</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars
☒ exercises
☐ on line entirely
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Obligations of full-time students:
Attendance is mandatory for full-time students. Attendance at a minimum of 80% of lectures, auditory and laboratory exercises is a condition for obtaining the right to take the exam.

Obligations of part-time students:
Attendance is mandatory for part-time students. Attendance at a minimum of 50% of lectures, auditory and laboratory exercises is a condition for obtaining the right to take the exam.</td></tr>
<tr><td>Screening student</td><td>Lecture</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td rowspan="2">work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><td>attendance</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.375</td><td>Oral exam</td><td>1</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam*(if in-term tests are failed)</td><td>1.375</td><td>Project</td><td>0.5</td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and assessment of the work of full-time students:
Two in-term tests are written in the semester. The first test, which includes theoretical questions from the material from the first to the seventh lecture, is written in the seventh week of classes. The second test includes theoretical questions from the material from the eighth to the fifteenth lecture and is written in the fifteenth week of classes. Examples of questions for the test are available to students on the website. At each test, it is necessary to obtain at least 50% of points to pass. Students who do not attend one tests for objective reasons or do not achieve the minimum passing percentage have the possibility of correction. Correction will be organized for these students in the fifteenth week
Class attendance and in-term test results are included in the final grade.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min. %)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>80</td><td>10</td></tr>
<tr><td>In-term test I</td><td>45</td><td>45</td></tr>
<tr><td>In-term test II</td><td>45</td><td>45</td></tr>
</table>
Grading
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0-49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50-64</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>65-79</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>80-89</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>90-100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
Students who do not pass the in-term tests during the semester, but have the right to take the exam, are required to take the written exam during the exam period. The same evaluation criteria apply to the exam period as to continuous knowledge testing.

Evaluation and grading of the work of part-time students
The evaluation and grades are the same as those for full-time students.
</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>C.W. de Silva (2010), „Mechatronics: A Foundation Course“, CRC Press</td><td></td><td></td></tr>
<tr><td>J. Awrejcewicz, R. Szewczyk, M. Trojnacki, M. Kaliczyńska (2014), „Mechatronics: Ideas for Industrial Applications“, Springer</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

	W. Bolton, (2013) „Mechatronics“, 5. izdanje, Pearson Education Limited		
	Šurina T., Crneković M. (1990). „Industrijski roboti“, Školska knjiga, Zagreb,		
	Z. Kovačić, V. Krajči, S. Bogdan, (2000) „Osnove robotike“, Grafis, Zagreb.	5	
Optional literature (at the time of submission of study programme proposal)	G. Nikolić, B. Vranješ, Z. Kunica, B. Jerbić, „Projektiranje automatskih montažnih sustava“, Kigen, Zagreb 2009.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SIGNAL PROCESSING AND ANALYSIS</td></tr>
<tr><td>Code</td><td>PFE119</td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Igor Vujović, Ph.D., Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Nediljko Bugarin</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Acquiring knowledge in signal processing and analysis in various applications of modern technology and techniques.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">The prerequisite for admission is to have attended the course "Mathematics II" and to have passed the course "Fundamentals of Electrical Engineering II".</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Classify signals.
2. Present the differences in signal transformations.
3. Choose the correct filter for the appropriate purpose.
4. Classify transformations with regard to the field of application.
5. Compare elementary continuous and discrete signals.
6. Recommend sampling frequency for a given signal.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Introductory terms.
2. Signals, mapping and transforms.
3. Discrete signals. Transforms.
4. Fourier series and transforms.
5. The Fourier transform.
6. Filters and sampling.
7. FT and FFT.
8. FFT and filters.
9. Sampling and multi-cycle signal processing. Z-transform.
10-12. FIR and IIR.
13. Changing the sampling rate.
14. Modern spectral analysis.
15. Examples of signal processing.

Auditory exercises:
1.-3. Block diagrams and signal flow. Description of complex signals over elementary ones in the time domain. Derivatives of the δ-function in the description of complex signals. Signal periodicity.
4. Laplace transform of a signal and inverse transform.
5.-6. Fourier transform of signals and inverse transform.
7. Modulation. Power spectrum density.
8. Sampling. Interpolator.
9.-12. DFT.
13.-15. Z-transformation.

Laboratory exercises:
1. Introductory tasks in the Matlab or Octave software package: stationary signals, the difference between term summation and matrix summation, and the use of a loop. Random signals.
2. Bounce and delta function in continuous and discrete domain. Laplace and</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">inverse Laplace function in Matlab.
3. FT. Sampling. Oversampling. Time change: interp, resample.
4. Measurement of the time required for the execution of operations in data-by-data processing, frame-based and with different block sizes. Elliptical filter design.
5. System identification with Wiener filter coefficients. Error smoothing by averaging. Moving average system.
6. Time diskette signals. Calculation of impulse response. Cascade connection of filters.
7. Convolution. DTFT. Discrete-time Fourier transform convolution. DFT. Circonv.
8. Parseval. Z-transformation.
9. Designing an analog low-pass filter. Conversion of a rational transfer function into a factored form.
10. Implementation of FIR and IIR.
11. DAQ systems (example NI ELVIS).
12.-13. Audio signals in Matlab - processing and analysis.
14.-15. Video and image data-processing and analysis in Matlab.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars
☒ exercises
☐ on line entirely
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students
They are expected to collect enough points to meet the minimum requirements to pass. They are required to attend classes 80% and computer exercises 100%. Students should make up for exercises and lessons if they did not earn the right to take the exam in 15 weeks. Compensations can be achieved through seminar work or homework and through consultations, with the requirement that they must be signed on the record sheet in each case.
Students who have collected a sufficient number of points during classes are required to register for the exam through Studomat, for the first exam period after the lectures, and their grade will be entered during the exam period.

Responsibilities of part-time students
They need to collect enough points to meet the minimum requirements to pass. They are required to attend classes 50% and computer exercises 100%. Students should make up for exercises and classes if they did not earn the right to take the exam within 15 weeks. Compensations can be achieved through seminar work or homework and through consultations, with the requirement that they must be signed on the record sheet in each case.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Homework</td><td>0,5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td>1 (alt.)</td><td>Computer exercises</td><td>1</td></tr>
<tr><td>In-term tests</td><td>2</td><td>Oral exam</td><td></td><td>Other</td><td></td></tr>
<tr><td>Written exam*(if in-term tests are failed or not taken)</td><td>2 (alt.)</td><td>Project</td><td></td><td>Other</td><td></td></tr>
<tr><td></td><td colspan="5"></td></tr>
<tr><td>Grading and evaluating student work in class and at</td><td colspan="6">Grading and evaluating the work of full-time students

Attending classes is mandatory for full-time students, i.e. attendance at a minimum</td></tr>
</table>

the final exam

of 80% of lectures and auditory exercises, and 100% of computer exercises is a requirement for taking the exam.
2 in-term tests are written in the semester. The first test covering lectures 1 to 7 is written in the eighth week of classes, and the second test covering lectures 8 to 15 is written in the 15th week of classes. Sample questions for the tests are available to students on the Merlin e-learning platform. At each test, a minimum of 40% of points must be obtained to pass. Students who do not take a test for objective reasons or do not achieve the minimum percentage have the possibility of correction. Students who do not pass 1 in-term test can take the second in-term test.

Continuous student assessment:

Assessment elements	Success (min. %)	Percentage in grade (%)
Class attendance	80	10
Computer exercises and reports	80	20
Homeworks	50	10
In-term test I	40	30
In-term test II	40	30
Final exam (alt.)	40	80
Seminar paper (alt)	10	20

Grading

Points (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term tests during the semester, but have the right to take the exam, are required to take the written exam during the exam period. The same evaluation criteria apply to the exam period as to the continuous knowledge assessment.

Grading and evaluation of the work of part-time students
The requirement for taking the exam is attendance at a minimum of 50% of lectures and auditory exercises and 100% of computer exercises.
Grading and evaluation are the same as for full-time students.

Required literature (available in the library or via other media)	Title	Number of copies in library	Availability via other media
	1. I. Vujović. Zabilješke s predavanja.		YES
	2. I. Vujović. Upute za vježbe.		YES

Optional literature (at the time of submission of study programme proposal)

1. H. Babić. Signali i sustavi, Zagreb: FER, 1996. (dostupno na mrežnim stranicama)
2. T. Petković. Zbirka zadataka iz Signala i Sustava. Zagreb: FER (dostupno na mrežnim stranicama)
3. A. V. Oppenheim. Signals and Systems. Prentice-Hall Signal Processing Series.; bilo koje izdanje)
4. J. G. Proakis, D. G. Manolakis. Digital Signal Processing: Principles,

	Algorithms, and Applications. 3rd Edition. Prentice Hall, 1996. 5. A. Mertins. Signal Analysis. John Wiley & Sons Ltd., 1999. (Print ISBN 0-471-98626-7, Electronic ISBN: 0-470-84183-4). 6. S. T. Karris. Signals and Systems with MATLAB® Applications. Orchard Publications, 2003. (ISBN: 0-9709511-8-3). 7. A. D. Poularikas. Signals and Systems Primer with Matlab. London: CRC Press, 2007. (ISBN: 978-0-8493-7267-4).
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	According to the interst shown by the students, the course can be delivered in English, in compliance with the University of Split permit.

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MAINTENANCE OF SHIP'S POWER SYSTEMS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, PhD, Assist.Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>30</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of basic concepts and methods of maintenance of marine power systems. Developing a simple and logical way of thinking for students in analyzing and solving practical electrical tasks related to the maintenance of marine power systems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Supervise, maintain and effectively manage power systems in the maritime sector.
2. To analyze the basic concepts and procedures of maintenance of marine power systems.
3. Categorize, interpret and critically evaluate the problems of failure and malfunction of marine power systems.
4. Interpret and understand the occurrence of multiple (complex) problems in the operation of marine power systems.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Hazards when working with marine electrical equipment: moving parts (rotating), electric arc, electric shock, surge, influence of environmental factors (high temperature, humidity, rain, wind, fuel, steam leakage, ship motion - rolling, pitching, and yawing).
2. Personal Protective Equipment (PPE). IEC 1010-1Standard. Lockout-Tagout procedures. Work Permit.
3. Maintenance principles: periodically, daily. Failure analysis using technical documentation. Maintenance Systems (AMOS).
4. Principles of maintenance and repair of electrical components of main and auxiliary switchboard and distribution panels with emphasis on: switch, relay, contactor, bimetallic relay, fuses, busbars, fan and heating circuits, measuring instruments, PLC
5. Generator Maintenance and Repair Principles with Emphasis on: Stator and Rotor Coils, Excitation Circuit, Bearing Inspection, Air Filters, Automatic Voltage Management (AVR), Permanent Magnet Generator (PMG), Sliding Rings, Brushes
6. Principles of maintenance and repair of electric motors with emphasis on: inspection of bearings, windings and joints, heating and cooling system, couplings, electromagnetic brakes, actuators, speed control systems.
7. Principles of maintenance and repair of electric batteries of various types, frequency converters and UPS
8. Principles of maintenance and repair of the tank monitoring system and the electronic diagnostic system for diesel engines
9. Use of simulators or calibrators instead of sensors in the PLC system or other monitoring systems.
10. Mode of operation and components of ship crane systems</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">11. Principles of routine inspection of lifting equipment: power supply, cables, switchboards, connectors, control panels, portable controllers, PLC inputs / outputs, brakes, limit switches, ventilation and heating system, control of hydraulic pumps, motors and terminals, control of rake and other cargo transfer equipment
12. Principles of routine inspection of crane equipment: electric motors, electric motor brakes
13. Definitions and basic concepts for spaces threatened by the explosive atmosphere of gases and vapors. Acquaintance with technologies and plants that have spaces threatened by the explosive atmosphere of gases and vapors. Identifying the source of the flammable substance's release and defining the likelihood of an explosive atmosphere.
14. Electric motor drive (EMP) as a potential cause of ignition of an explosive atmosphere
15. IECEx, ATEX, standards for explosion protection

Exercises
1. Graphic symbols: generators, motors, transformers
2. Graphic symbols: contacts, switch, circuit-breaker, reley, fuse, time reley, bimetal reley, signal light
3. Graphic symbols: sensors, measuring instruments, lighting fixtures, electronic components: diode, bipolar transistor, thyristor, mosfet, triac, IGBT, IGCT
4. Block diagram, wiring diagram, system diagram, el. circuit diagram
5. Diagram interpretation –generator set
6. Diagram interpretation – distribution system
7. Diagram interpretation – crane system
8. Diagram interpretation – fire-fighting system
9. Electric motor drive for ship's crane systems
10. Keeping records of maintenance, repairs and testing
11. Maintenance of fire-fighting system
12. Influence of resistance and capacitance of long cables on measurement accuracy.
13. Maintenance and repair of container refrigeration systems, refrigeration equipment for maintaining food items - provisions, refrigeration equipment for air conditioning, refrigeration equipment for cooling and freezing cargo, refrigerants.
14. Explosion-proof equipment: „d“, „px,py,pz“, „q“, „o“, „e“, „ia,ib,ic“, „nA,nC,nL,nR, nP“, „ma,mb,mc“,“op is, op pr, op sh“
15. Principles of maintenance of electrical explosion-proof equipment</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td>☐ individual tasks
☐multimedia
☐ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities and evaluation of students’ work
Responsibilities of full-time students:
Attendance is compulsory and records of student attendance are maintained (Form F04). The full-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent more than 20% of the teaching hours of the lectures and the auditory exercises. Laboratory exercises / practical classes must be fully attended. In the case of teaching units that are in accordance with the STCW Convention for a full-time student, he / she shall be deemed not to have fulfilled his / her obligations if he / she was absent from more than 5% of the lecture hours and the classroom exercises. Laboratory exercises must be 100% attended. In case of insufficient number of attendances, students are not eligible for eligible</td></tr>
</table>

for taking the final exam and are obliged to enroll the course again next year.

Responsibilities of part-time students:
The part-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent for more than 50% of teaching hours of lectures and auditory exercises. Laboratory exercises / practical training must be fully (100%) attended.
In the case of teaching units that are in accordance with the STCW Convention, for the part-time student the same obligations apply as for the full-time student in that category (up to 95% of all forms of teaching and 100% laboratory exercises).

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*

Lecture attendance	1.5	Research		Practical work	0.5
Experimental work		Report		(Other)	
Essay		Seminar		(Other)	
In-term tests	2.5	Oral exam	Alt. to in-term test	Auditory exercises	0.5
Written exam	Alt. to in-term test	Project		(Other)	

Grading and evaluating student work in class and at the final exam

Examination:
1. THE FIRST OPTION - continuous assessment:
Based on earned and graded points from continuous assessment, evaluation of attendance, preparation and presentation of seminars, and in-term grades.
During the semester, two in-term exams are written, a combination of theoretical knowledge and practical application (tasks, calculations, wiring diagrams). In continuous monitoring, it is important to note that each question carries two points for each question of the in-term exam, and a positively resolved in-term exam represents 50% of the completed tasks at the in-term test, but collected by special teaching units and not only with a specific teaching unit (knowledge of the entire subject matter, not just individual parts). Students who do not attend the first in-term exam may not take the 2nd in-term exam while the exams are organized a number of times during the semester. The final grade evaluates the classroom activity, which includes the presence of lectures, classroom and laboratory exercises, and the results of the tests.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Activity in class (lectures, auditory exercises)	80-100 (95-100)*	12
Work in laboratory – preparation, in-term test	100	8
I in-term test	50-100	40
II in-term test	50-100	40

In case of insufficient number of attendances, students are not eligible to the right of taking the final exam and are obliged to enroll the course again next year.

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-63	Satisfies minimum criteria	sufficient (2)
64-80	Average success with clear shortcomings	good (3)
81-90	Above average success with a few errors	very good (4)
91-100	Extraordinary success	excellent (5)

2. THE SECOND OPTION:
It is based on points earned and graded regarding class attendance and previous assessment of work, and well as taking of final exam (written part) and taking oral exam.
If a student does not score positive in continuous knowledge assessment or does not present themselves for continuous assessment during the semester, he / she may take the final exam within the regular exam periods.
The examination in the regular examination terms consists of written and oral parts. A student who scores positive in the written exam can take the oral part of the exam. The oral part of the exam will be held no later than 5 days after the written part of the exam.

Final evaluation

Evaluation indicators – fial exam	Success (min. %)	Percentage in grade (%)
Practical part (written)	50-100	40
Theory exam (written and/or oral)	50-100	50
Previous activities	50-100	10

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Merlin; https://moodle.srce.hr/2021-2022/		YES

Optional literature (at the time of submission of study programme proposal)	Hall D.T., *Practical marine electrical knowledge*, 3rd ed., Scotland: Witherby Publishing Group Ltd, 2014. Yakimchuk A., *Ship automation for marine engineers and ETOs*, 1st ed., Scotland: Witherby Publishing Group Ltd, 2012.
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	According to the expressed interest of the students, classes in the course can also be conducted in English, according to the permission of the University of Split.

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">ONBOARD HIGH-VOLTAGE TECHNOLOGIES</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, Ph.D., Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Luka Čulić
Marko Zubčić, PhD</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">After successfully completing the course, the student will be able to describe the application of high voltages on vessels, classify overvoltages, and recommend appropriate protection measures for different vessels.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Passed exams in Fundamentals of electrical engineering I, Ship’s electrical machines and devices</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After successfully completing the course the student will be able to:
1. Distinguish basic concepts, sizes and principles from the field of high voltage technologies
2. Distinguish between land and ship high voltage power systems
3. Measure the electrical quantities on the part of the high voltage power plant
4. Make a total measurement view of all measurements on a given part of the system,
5. Provide a piece of equipment within the power system that will meet technological requirements
6. Analyze the environmental conditions in which the system operates
7. To choose an engineering approach to solving problems, based on the acquired knowledge in mathematics and fundamentals of electrical engineering, electrical machinery and devices</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5"><u>LECTURES</u>:
1. Introductory Lecture - Introducing students to the course material, learning outcomes, ECTS credits, teaching methods and knowledge assessment.
2. Production and distribution of high voltage power generation and distribution on board ships.
3. Electric drive system
4. Functional, operational and safety requirements for a high voltage system
5. Appointment of qualified personnel for maintenance and repair of various high voltage switchgear.
6. Advantages of high voltage systems.
7. Advantages of an isolated system
8. High-voltage system circuit breakers
9. High voltage switchgear - fuses, disconnectors, surge arresters
10. Corrective actions to be taken during high voltage system failures
11. Inclusion of isolated components of high-voltage systems
12. Selecting a suitable high-voltage insulation and testing gear
13. Inclusion and isolation procedures for high voltage systems, including safety documentation
14. Insulation resistance characteristics and polarization index of high voltage equipment
15. Rules and regulations for high-voltage safe operation. High-voltage equipment on board.</td></tr>
</table>

<table>
<tr><td></td><td colspan="2"><u>EXERCISES</u>:
1. Calculation of short circuit currents.
2. Monitoring of el. schemes – clarifications.
3. Introduction to general high-voltage protection measures.
4. Selecting el. protection – generators.
5. Selecting el. protection – transformers.
6. Selection of el. protection – high-voltage motors.
7. Selection of el. protection – cables.
8. Practice on a high-voltage simulator.
9. Demonstration Exercise I on a high-voltage distribution circuit with a high-voltage switch, bus-bars, ground disconnect bus, protective relay and control circuits
10. Demonstration Exercise II on a high-voltage distribution circuit with a high-voltage switch, bus-bars, ground disconnect bus, protective relay and control circuits
11. Demonstration Exercise III on a high-voltage distribution circuit with a high-voltage switch, bus-bars, ground disconnect bus, protective relay and control circuits
12. Demonstration Exercise IV on a high-voltage distribution circuit with a high-voltage switch, bus-bars, ground disconnect bus, protective relay and control circuits
13. Safe control and maintenance of high-voltage systems - use of protective equipment
14. Safety management and maintenance of HV systems - how to use fixed and portable HV measuring and control devices for testing the insulation resistance of high voltage machines, cables and other equipment
15. Testing and usage the high-voltage testers</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td>☒ individual tasks
☐multimedia
☐ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students:
Attendance is compulsory and records of student attendance are kept (Form F04). The full-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent for more than 20% of the teaching hours of the lectures and auditory exercises. Laboratory exercises / practical classes must be fully (100%) attended. In the case of teaching units that are in accordance with the STCW Convention for a full-time student, he / she shall be deemed not to have fulfilled his / her obligations if he / she was absent from more than 5% of the teaching hours and auditory exercises. Laboratory exercises must be 100% attended.
In case of insufficient number of attendances, students are not eligible to the right of taking the final exam and are obliged to enroll the course again next year.

Responsibilities of part-time students:
The part-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent for more than 50% of teaching hours of lectures and auditory exercises. Laboratory exercises / practical training must be fully (100%) attended.
In the case of teaching units that are in accordance with the STCW Convention for the part-time student, the same obligations apply as for the full-time student in that category (up to 95% of all forms of teaching and 100% laboratory work).
In case of insufficient number of attendances, students are not eligible to the right of taking the final exam and are obliged to enroll the course again next year.</td></tr>
</table>

<table>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td>0.5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.875</td><td>Oral exam</td><td>Alt. to in-term tests</td><td>Auditory exercises</td><td>0.5</td></tr>
<tr><td>Written exam</td><td>Alt. to in-term tests</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td></td><td colspan="6"></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">
THE FIRST OPTION - continuous assessment of knowledge:
Based on earned and graded points from continuous assessment, evaluation of attendance, preparation and presentation of seminars, and in-term grades. During the semester, two in-term tests are written, a combination of theoretical knowledge and practical application (tasks, calculations, wiring diagrams). In continuous assessment, it is important to note that each question carries two points for each question of the in-term exam, and a positively graded in-term exam represents 50% of the completed tasks at the in-term exam, but collected over different teaching units and not only from a specific teaching unit (knowledge of the entire contents of the course is required, not just individual parts). Students who do not take the first in-term test may not take the second in-term test, while the in-term tests including tasks to solve are organized a number of times during the semester. The final grade is obtained evaluating the classroom activity, which includes the presence at lectures, classroom and laboratory exercises, and the results of the in-term tests.

Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Activity in class (lectures, audit.ex.)</td><td>80-100
(95-100)*</td><td>12</td></tr>
<tr><td>Practice in laboratory – preparation, in-term test</td><td>100</td><td>8</td></tr>
<tr><td>1st in-term test</td><td>50-100</td><td>40</td></tr>
<tr><td>2nd in-term test</td><td>50-100</td><td>40</td></tr>
</table>
*Teaching delivered in compliance with STCW Convention.

In case of insufficient number of attendances, students are not eligible for the right to take the final exam and are obliged to enroll the course again next year.

Grading :
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0- 49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50 - 61</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>62 - 74</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>75 - 87</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>88 -100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
THE SECOND OPTION:
It is based on points earned regarding class attendance and previous assessment of work, as well as taking of final exam (written part) and then taking the oral exam. If a student does not score positive in the continuous assessment or does not participate in the continuous assessment during the semester, he / she may take the final exam within the regular exam terms.
</td></tr>
</table>

<table>
<tr><td></td><td>The examination in the regular exam terms consists of written and oral parts. A student who scores positive in the written part can take the oral part of the exam. The oral part of the exam will be held no later than 5 days after the written part of the exam.

Final evaluation
<table>
<tr><th>Evaluation elements – final exam</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Practical exam (written)</td><td>50-100</td><td>40</td></tr>
<tr><td>Theory exam (written and/or oral)</td><td>50-100</td><td>50</td></tr>
<tr><td>Previous activities</td><td>50-100</td><td>10</td></tr>
</table></td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>1. Krčum, M.: Zabilješke s predavanja, Sveučilište u Splitu, Pomorski fakultet, Split, 2012.</td><td></td><td>YES</td></tr>
<tr><td>2. Vlahinić, I., Električni sistemi plovnih objekata, Fakultet za pomorstvo i saobraćaj, Rijeka, 1988.</td><td>1</td><td></td></tr>
<tr><td>3. Hall, D.T.: Practical Marine Electrical Knowledge,Witherby, London, 1999</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>1. Pinter, V., Skalicki, B.: Elektrotehnika u strojarstvu - Osnove elektrotehnike i električnih strojeva, Sveučilište u Zagrebu, Fakultet strojarstva i brodogradnje, Zagreb, 1979.
2. HRB - Pravila za tehnički nadzor pomorskih brodova, dio 12., Hrvatski registar brodova, Split, 1994.
3. McGeorge, H. D.: Marine Electrical Equipment and Practice, Stanford Maritime, London, 1986.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td>According to the expressed interest of the students, classes in the course can also be conducted in English, according to the permission of the University of Split.</td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">SIMULATOR AND ONBOARD TRAINING</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, Ph.D., Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">2</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Srđan Dvornik, M.Sc.Eng.
Nediljko Kaštelan
Mario Miličević</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>0</td><td>0</td><td>30</td><td>30</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Prepare the students for work in the engine room, in compliance with STCW and SOLAS Conventions.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. To explain the function of the ship's pipeline and the measuring instruments inside the pipeline, and to distinguish between the designs of the ship's pipelines.
2. Explain and distinguish between seawater and fresh-water cooling system, lubricating oil system, fuel system, compressed air system, exhaust gas and scavenge air system.
3. Explain and differentiate the working principle of marine pumps.
4. Explain the principle of automatic operation of a centrifugal fuel cleaner, device for cleaning oily water, device for feces.
5. Explain the principle of operation of the rotary burner of the ship's steam generator, and will be able to explain the principle scheme of load regulation, water level and steam superheat temperature regulation.
6. Differentiate fire protection systems, explain automatic sprinkler fire extinguishing system, foam system, powder system, CO2 system, inert gas system. Differentiate and explain fire detection and alarm devices.
7. Analyze and distinguish indications of malfunctions in the system, the possibility of canceling restrictions in case of overload protection, and the possibility of choosing the operating mode.
8. Analyze the possible causes of the engine stopping or decelerating the engine in an emergency, and the possible cancellation of the possibility of stopping or decelerating in an emergency.
9. Analyze the conditions that must be met for the normal operation of the remote-control system of the main engine.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Exercises:
1. Introduction to fire and abandon-ship duties. Introduction to fire fighting systems. CO2 engine-room shutdown procedure.
2. Operation of fire pump. Handling of breathing apparatus and personal fire-fighting equipment.
3. Introduction to ship construction.
4. Keeping engineering watch. Handover and and takeover of the watch.
5. Introduction to bilge system and bilge separator. Introduction to the wastewater system and wastewater treatment plant.
6. Introduction to the fresh, potable, and seawater systems.
7. Introduction to structural tanks and sounding methods. Introduction to the compressed-air system.
8. Introduction to bunkering procedure and fuel system. Introduction to the operation of the hydraulic system; steering gear.
9. Introduction to deck equipment; cranes, warping winches and windlasses.</td></tr>
</table>

<table>
<tr><td></td><td>10. Preparation for starting the main engine. Main engine systems; seawater system, cooling-water, oil, and fuel systems. Local control of the main engine. Main engine monitoring and control.
11. Introduction to the main switchboard. Introduction to the 380V, 220V and 24V distribution. Charging methods and battery maintenance. Introduction to the engine-room alarm devices.
12. Preparation of diesel generators for starting. Starting of diesel generators. Generator parallel operation. Generator monitoring and control in operation. Shore-power supply to main switchboard.
13. Introduction to the heat boiler and the exhaust-gas boiler.
14. Introduction to the operation of refrigeration devices.
15. Engine room ventilation. Ship air-conditioning.</td></tr>
<tr><td>Format of instruction</td><td>☐lectures
☒ seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work

☐individual tasks
☐multimedia
☐ laboratory
☐ mentoring
☒ onboard training</td></tr>
<tr><td>Student responsibilities</td><td>Exercises attendance (min. 95%), participation in field work (required 100%).</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>Practical work</td><td>0.5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td></td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>95</td><td>100</td></tr>
</table>
Evaluation and grading of part-time students are the same as for full-time students.</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>1. V. Ozretić: „Brodski pomoćni strojevi i uređaji“, SSM, Split, 2004.</td><td></td><td></td></tr>
<tr><td>2. D. Martinović: „Brodski strojni sustavi“, Pomorski fakultet, Rijeka, 2005.</td><td></td><td></td></tr>
<tr><td>3. M. Matković: „Protupožarna zaštita na brodovima“, Pomorski fakultet, Rijeka, 1996.</td><td></td><td></td></tr>
<tr><td>4. D. Martinović: „Brodski rashladni uređaji“, Školska knjiga, Zagreb, 1994.</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>1. Instruction manuals for marine two-stroke and four-stroke engines
2. Instruction manuals for ship simulator Konsberg ERS MAN B&W 5L90MC-C L11 VLCC</td></tr>
<tr><td>Quality assurance methods that ensure the</td><td>University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
</table>

acquisition of exit competences	
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">WORK ORGANISATION AND MANAGEMENT ON BOARD</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Pero Vidan, PhD, Full Professor</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Mislav Maljković</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">10%</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Introducing the student to the organisation of a multinational crew with respect to cultural and sociological differences. Learn how to plan works on board. Provide insight into correct crisis management. Teach students leadership models (command/management/leadership).</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1. Organize crew and plan jobs and exercises on board.
2. Identify specific situations as hazardous on board (e.g. stress, alcohol, workload, high authority, etc.) and analyze seafarers' attributes (attitude, value, authority, positive initiative).
3. Design a good or bad organizational structure of jobs on board.
4. Analyze the cultural differences of multinational crews, and optimize the organization of crews.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures:
Leadership structure of the ship. Organization of duties and responsibilities on board.
Ergonomics and design of ships, human errors due to automation
Attitudes, values, personality, attributes of crew members. Application of ISM policy.
Keeping and handing over the ship's guard.
Organization of exercises on board.
Fatigue on board, work hours planning, ILO Convention.
Seafarers' contracts under the ITF.
Stress, fears, human limitations.
Mobbing, drug and alcohol abuse.
Short-term strategy, leadership, types of leadership,
Authority, positive initiative.
Communication on board. Decision making in emergencies. Conducting meetings.
Teamwork. Management errors.
Cultural differences, sociological differences (individualism, collectivism, parochialism, short and long distance from power).
Study of cases of distress due to errors. Errors in highly-automated vessels.
MCRM software package.

Exercises
1. Human characteristics and limitations.
2. Attitudes.
3. Situational awareness.
4. Cultural differences.
5. Communication and meetings.
6. Authority.
7. Advice and answer.
8. Short-term strategy.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">9. Working hours.
10. Man and automation.
11. Team work.
12. Error Management.
13. Management styles.
14. Decision-making.
15. Ocean Learning Platform (OLP) CBT – result check.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☒ multimedia
☐ laboratory
☐ mentoring
☒ MCRM programme package/OLP</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Attending classes is mandatory for full-time students, i.e. attendance at at least 80% of lectures and 100% of exercises is a requirement for taking the final exam. In order to exercise the right to be entitled to the STCW certificates, attendance is mandatory for 95% of the lectures and 100% of the exercises.

Responsibilities of part-time students:
Attending classes is mandatory for part-time students, i.e. attendance at at least 50% of lectures and 50% of exercises is a requirement for taking the exam. In order to exercise the right to be entitled for STCW certificates, attendance is mandatory for 95% of the lectures and 100% of the exercises.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>CBT</td><td>0.675</td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Remote learning</td><td>0.2</td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>2</td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written and oral exams</td><td>2 (altern. to in-terms)</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Responsibilities of regular students:
Attending classes is mandatory for full-time students, i.e. attendance at at least 80% of lectures and 100% of exercises is a requirement for taking the final exam. In order to exercise the right to be entitled to the STCW certificates, attendance is mandatory for 95% of the lectures and 100% of the exercises.

Responsibilities of part-time students:
Attending classes is mandatory for part-time students, i.e. attendance at at least 50% of lectures and 50% of exercises is a requirement for taking the final exam. In order to exercise the right to be entitled to the STCW certificates, attendance is mandatory for 95% of the lectures and 100% of the exercises.</td></tr>
<tr><td></td><td colspan="6">Continuous student assessment
<table><tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr><tr><td>Class attendance</td><td>80-100</td><td>15</td></tr></table></td></tr>
</table>

		(95-100)*	
	MCRM CBT	85	15
	Remote learning	85	15
	In-term tests/written exam/oral exam	50	55

*To be entitled to the STCW certificates of competency

Grading

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Evaluation and grading of the work of part-time students
The evaluation and grading are the same as those for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Student Workbook, MCRM Maritime Crew Resource Management, OAA, 2010.		YES
	2. Vidan, P.: Nastavni matrijali, Pomorski fakultet u Splitu		YES
	3. Ocean Learning Platform		YES
Optional literature (at the time of submission of study programme proposal)	1. A. J. Swift. Bridge Team Management. Second Edition. FNI, 2004. 2. Various authors. Bridge Watchkeeping. Second Edition. 2003. 3. R. A. Cahill. Strandings and their Causes. FNI, 2002. 4. R. Jeffery. Leadership Throughout. MNI, 2007.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)	According to the expressed interest of the students, classes in the course can also be taught in English, according to the permission of the University of Split.		

MANE OF THE COURSE	ELECTRONIC NAVIGATIONAL DEVICES AND SYSTEMS					
Code		Year of study	3			
Course teacher	Ivana Golub Medvešek, Ph.D., Assist. Prof.	Number of credits (ECTS)	3			
Teacher associates		Format of instruction (number of hours in semester)	L	S	E	F
			15	0	15	0
Status of the course	compulsory	Percentage of e-learning	/			
COURSE DESCRIPTION						
Course objectives	Knowledge necessary to understand the principles of operation and maintenance of various electronic navigation devices.					
Course enrolment requirements and entry competences required for the course	No requirements.					
Learning outcomes expected at the level of the course (4 to 10 learning outcomes)	1. Explain the basic concepts of marine radiodetermination devices and systems. 2. Define and understand the components and processes of marine radars. 3. Define and understand the components and processes of satellite navigation systems. 4. Define and understand the components and processes of underwater acoustic devices. 5. Evaluate positioning accuracy using different navigation systems. 6. Analyze the integrated navigation system.					
Course content broken down in detail by weekly class schedule (syllabus)	**Lectures** 1. Principle of operation, errors of measurement and maintenance of the compass and electronic compass; Principle of operation of sound and electronic compass. Compass errors. Components and maintenance of a compass and electronic compass. 2. The principle of operation, measurement errors and maintenance of the depth gauge and speedometer; The principle of operation of underwater acoustic devices. Depth and speedometer errors. Components and maintenance of depth sounders and speedometers. 3. Technological development of electronic navigation systems; Overview of electronic navigation systems. Frequency range. Antennas and electromagnetic wave propagation. 4. GPS, DGPS, GLONASS, Galileo satellite navigation systems, development directions and basic user segment maintenance settings; The principle of operation of satellite navigation systems. positioning errors. Components and maintenance of GPS and DGPS receivers. Components of GLONASS and Galileo systems. 5. Electronic charts, raster and vector; Types and systems of electronic charts. Electronic chart accuracy. Updating the electronic chart. 6. ECDIS system, use, accuracy and maintenance; Using ECDIS. Components and maintenance of ECDIS. 7. Inertial navigation, operating principle, accuracy, errors, and maintenance; Principles of inertial navigation. Inertial navigation accuracy. Components and maintenance of inertial navigation systems. 8. Navigational radar; Principles of radar operation. Navigational radar components. Navigation radar processes. 9. Navigational radar maintenance; Navigation radar technical specifications. Measurement of navigational radar parameters. 10. Search and Rescue Radar Transponder - SART; Principle of operation of SART					

<table>
<tr><td></td><td colspan="6">Transponders. SART Transponder Components and Processes. Maintenance of SART Transponders.
11. ARPA radar; Principle of operation of ARPA radar. The components and processes of ARPA radar. ARPA radar accuracy and errors.
12. Automatic Identification System - AIS; The principle of operation of the AIS system. AIS system components and processes. Maintenance of AIS transponders.
13. Voyage data recorder - VDR; The principle of operation of VDR devices. Components and processes of VDR devices. Maintenance of VDR devices.
14. Television in navigation; Principles of television application in navigation. The components and processes of a navigational television system. Maintenance of the navigational television device.
15. Integrated navigation systems; Technical specifications of integrated navigation system. Integrated navigation system components and processes. Examples of integrated navigation system.

Exercises
1. Specifications, use and maintenance of depth sounder
2. Specifications, use and maintenance of speedlog
3. Specifications and maintenance of GPS receiver
4. Use of GPS receiver
5. Use of ECDIS device
6. Navigational radar specifications and maintenance
7. Use of navigational radar
8. Specifications, use and maintenance of SART Transponders
9. ARPA Radar Specifications and Maintenance
10. Use of ARPA radar
11. Specifications, use and maintenance of AIS Transponders
12. Specifications, use and maintenance of VDR devices
13. Use of Integrated Navigation System I.
14. Use of Integrated Navigation System II.
15. Seminar paper: electronic navigation device</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ other</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Students are required to attend lectures and exercises, so a record of attendance is kept. In order to be entitled to take the exam, students must attend to at least 80% of the lecture hours and 100% of the laboratory exercises. For students who have justified 2-3 absences, compensation is organized in the 15th week of classes. In case of insufficient number of attendances, students are not entitled to take the final exam and should enroll the course again next year.
Students must independently produce and present a seminar paper on a given topic from the contents of the course. The theoretical part can be passed through two in-term exams or at the written exam in the exam term.

Responsibilities of part-time students:
Students must attend at least 50% of lecture hours and 100% of lab hours. Exams and written exams are conducted according to the same rules as for full-time students.</td></tr>
<tr><td>Screening student work (name the</td><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td rowspan="4">proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>2.25</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>2.25 (alt. to in-term tests)</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">
Grading and evaluation of the work of full-time students:
Two in-term tests are written in the semester. The minimum passing rate for two tests is 50%; in case students do not pass the in-term tests, they are required to take the written part of the exam in the exam term. The minimum passing rate for the written exam is 50%. Students who pass the in-term tests are required to register for the exam and enter the grade deserved.

Grading and evaluation of the work of part-time students:
Grading and evaluation of the work of part-time students is the same as for full-time students.

Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>70</td><td>10</td></tr>
<tr><td>In-term test I</td><td>50</td><td>30</td></tr>
<tr><td>In-term test II</td><td>50</td><td>30</td></tr>
<tr><td>Written test (alternative to in-term tests</td><td>50</td><td>30</td></tr>
</table>
Grading
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0 – 49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50 – 64</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>65 – 79</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>80 – 89</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>90 – 100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td colspan="6">
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>1. L. Tetley, D. Calcutt, Electronic navigation systems, 3rd ed., Butterworth-Heinemann, Oxford, 2001.</td><td></td><td>YES</td></tr>
<tr><td>2. M. I. Skolnik, (ed.), Radar Handbook, 3rd ed., McGraw-Hill, New York, 2008.</td><td></td><td>YES</td></tr>
</table>
</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="6">3. D. Dardari, E. Falletti, M. Luise, (eds.), Satellite and Terrestrial Radio Positioning Techniques, Elsevier, Oxford, 2012.</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="6">University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the</td><td colspan="6"></td></tr>
</table>

proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">INTERNSHIP</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Luka Vukić, PhD, Assoc. Prof.
Ivan Pavić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">6</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">-</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>150</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3">0</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The aim of the course is the student's participation in the business or research process of one of the partner companies or institutions. By participating in the business process, the student becomes familiar with the business process and acquires business and economic competencies and communication skills in a real business environment. Familiarity with basic shipboard electronic and power systems in their real environment on board and familiarization with basic procedures for maintenance, detection and prevention of failures, as well as safe handling of measuring equipment. Getting to know the different sensors on board and the alarm and fire detection system. Knowledge of the role of the most important marine electric motors and basic methods of integration with electromechanical devices. Getting to know the components of navigation and communication devices. The student will be able to recognize basic components of navigation and communication systems, antenna systems, identify faults and use basic testing and measuring equipment safely.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">The course "Internship" is enrolled by students who apply and are selected through an open tender.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Describe the business process in a partner company or institution and develop communication skills in a real environment.
2. Describe the function of the most important electric motors on the ship as well as the basic integration with the ship's electromechanical and mechanical devices.
3. Describe the function of basic shipboard electronic sensors and be familiar with the operation of shipboard alarms.
4. Test the operation of communication, navigation equipment and navigation lights.
5. Identify the ship's power supply systems and ship's batteries and measure system parameters.
6. Know the components of navigation systems (compass, gyro-compass, GPS) and detect basic malfunctions.
7. Familiarize themselves with ship's antenna systems.
8. Use theoretical knowledge about measuring instruments for the purpose of locating faults. Handle measuring instruments in electrical engineering and electronics in a correct and safe manner.
9. Create an electrical diagram of a simple faulty device and identify the faulty electronic component. Create documentation about the malfunction.
10. Recognize and locate electrotechnical systems and electronic devices on board and be able to identify components of communication and electrical networks and installations on board.</td></tr>
<tr><td>Course content</td><td colspan="5">Internship is realized by working with a supervisor from the teaching base, through</td></tr>
</table>

<table>
<tr><td>broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">the completion of specific work assignments. The internship lasts for 16 working days (128 hours). With the consent of the supervisor from the Faculty of Maritime Studies, the supervisor from the teaching base plans work assignments. The remaining 22 hours are related to the preparation of the Report on Internship and its defence before the supervisor from the Faculty of Maritime Studies in Split.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☐ lectures
☐seminars and workshops
☐ exercises
☐ on-line only
☐mixed e-learning
☒ field work</td><td colspan="3">☐individual tasks
☐ multimedia
☐ laboratory
☒ mentoring
☐ other</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">The student who enrolls the Internship is obliged to work for 128 hours in 16 working days according to the schedule determined by the supervisor from the teaching base. The student is obliged to follow the instructions of the supervisor and to work diligently on the set work assignments. Upon completion of the internship, the student is obliged to prepare a Report on the Internship, which he / she must defend before the supervisor and students from the Faculty of Maritime Studies in Split.</td></tr>
<tr><td rowspan="6">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td></td><td>Research of literature</td><td></td><td>Practical work</td><td>4.5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Consultations with supervisor</td><td>1</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td></td><td>Oral exam</td><td></td><td>Writing interneship report</td><td>0.3</td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>Defence of internship report</td><td>0.2</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Internship is evaluated descriptively by the supervisors of the teaching base and the Faculty of Maritime Studies in Split. The supervisor from the teaching base continually monitors the orderliness of practice and diligence in solving the set work assignments and at the end of the internship assigns one of the following two descriptive grades to the student:
• The student has successfully completed the internship.
• The student has not successfully completed the internship.

If the supervisor from the teaching base passed the grade "Student has not successfully completed internship", the grade should be explained in writing. In this case, the supervisor from the Faculty of Maritime Studies in Split does not evaluate the Report on Internship, but only defines the final evaluation of the internship as "Not Passed".

If the grade of a supervisor from the teaching base "Student has successfully completed internship", the supervisor from the Faculty of Maritime Studies in Split analyzes the Report on internship, discusses work assignments with the student and assigns one of the following two descriptive grades:

• The student successfully prepared and defended the Internship Report
• Student has not successfully prepared and defended the Internship Report.

If the supervisor from the Faculty of Maritime Studies in Split passed the grade “Student has not successfully prepared and defended the Report on Internship”, the grade should be explained descriptively in written form.</td></tr>
</table>

<table>
<tr><td></td><td colspan="3">Internship is considered to have been passed only if the descriptive grades of both supervisors have confirmed the successful realisation of the internship / Internship Report. If the descriptive grades of both supervisors are positive, the supervisor from the Faculty of Maritime Studies in Split enters the descriptive grade "Passed" in the student’s Studomat.</td></tr>
<tr><td rowspan="2">Required literature (available in the library and via other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability via other media</td></tr>
<tr><td>Professional literature determined by the supervisor at the teaching base</td><td></td><td></td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td colspan="3">Professional literature determined by the supervisor at the teaching base</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td colspan="3">University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td colspan="3"></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">FUNDAMENTALS OF MARITIME TRAFFIC</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Zvonimir Lušić, PhD, Full Professor</td><td>Number of credits (ECTS)</td><td colspan="3">3</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Stipe Galić, M.Sc.Eng.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3">20%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Get to know the concepts of the maritime market and the maritime economy. Get to know the basics of legal regulations related to ship safety and geometry. Obtain a routine in charting, determining the course and position of the ship. Master the basic principles of loading a ship. Learn the basic concepts of ship stability. Identify the types of ship, ship’s cargo and the type of cargo equipment on board. Particular attention should be paid to ship propulsion and its safe navigation.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Comment on the legal regulation of the Global Maritime Distress and Safety system.
2. Use the acquired knowledge in practice with understanding.
3. Be able to determine the course and position on the chart.
4. Be able to interpret the markings on the chart.
5. Be able to interpret the stability calculation from the point of view of a proper and irregularly loaded ship.
6. Divide and categorize types of ship and cargo. Analyze the concepts of ship geometry.
7. Pay special attention to the cargo facilities on board.
8. Use meteorological forecasts.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Introduction to shipping.
2. Conventions and safety.
3. Maritime development, division and types of merchant ships.
4. Dimensions, main meaurements of a ship.
5. Merchant ship equipment.
6. General tips on navigation.
7. Navigation aids
8. Fundamentals of coastal navigation.
9. Basic concepts in marine meteorology.
10. Basic rules for avoiding collisions at sea.
11. Cargo-handling gear
12. Role of inspection services and ship registers
13. Basic seamanship.
Exercises
1-5 Plotting the position of the ship on the chart
5-6 Plotting a course
7-9 Basic concepts (data) of the chart (variation, deviation, corrections)
10-12 Meteorological information
13-15 Synoptic chart.</td></tr>
</table>

Format of instruction	☒ lectures ☐seminars and workshops ☒ exercises ☐ *on-line* only ☒ mixed e-learning ☒ field work ☐individual tasks ☒ multimedia ☐ laboratory ☐ mentoring ☐ other
Student responsibilities	Attendance of lectures, exercises, in-term tests, final exam. Students are required to attend lectures and exercises, and a record is kept of their attendance. In order to have the right to take the final exam, students must attend at least 80% of lectures and 80% of exercises. In case of an insufficient number of attendances at lectures and exercises, they will not be eligible to the right to take the exam. Written excuses or certificates cannot compensate for or replace attendance at classes. Part-time students are required to attend a minimum of 50% of lectures and 50% of exercises.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Lecture attendance	1.125	Research		(Other)	
	Experimental work		Report		(Other)	
	Essay		Seminar		(Other)	
	In-term tests	1.875	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam

In the semester, one in-term test is written, which covers the material from the first to the fifteenth lectures and is written in the fifteenth week of classes. Sample exam questions for students are available on the Merlin e-learning platform. At each test, it is necessary to obtain at least 75% of points to pass.
Class attendance, in-term test results and individual/team assignments are included in the final grade.

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	7.5
Individual/team assignments	100	2.5
In-term	75	90

Grading

Percentage (%)	Criterion	Grade
0-75	Does not satisfy minimum criteria	insufficient (1)
75-80	Satisfies minimum criteria	sufficient (2)
81-87	Average success with clear shortcomings	good (3)
88-94	Above average success with a few errors	very good (4)

	95-100	Extraordinary success	excellent (5)

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Ivica Đ. Tomaš Sredstva pomorskog prometa, Sveučilište u Dubrovniku, 2011.		YES
	2. R. Radulić, Stručna praksa, Sveučilište u Zadru, 2011.		YES
	3. Z. Furlan, N. Lučin, A. Pavelić: Osnove brodogradnje, Školska knjiga, Zagreb, 1989.		YES
Optional literature (at the time of submission of study programme proposal)	1. D. Ugrinović: Osnivanje broda I. dio, Split 1977. 2. D. Ugrinović: Osnivanje broda II. dio, Split 1977. 3. I. Buljan: Poznavanje broda i plovidbe, Školska knjiga, Zagreb, 1974. 4. Uršić, J.: Čvrstoća broda I, II i III dio, FSB, Zagreb, 1991. 5. SEAGULL e-learning programmes 6. VIDEOTEL videos		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">PHYSICAL EDUCATION</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Mislav Lozovina, Ph.D., Assoc. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">1</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Marin Barišić, M. Sc. Cin.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>P</td><td>S</td><td>V</td><td>T</td></tr>
<tr><td>0</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Training students for self-practice at the workplace or an adequate practice area on the vessel where they live and work.
Training students to choose and dose exercises, especially for muscle groups that are at risk in the workplace.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Demonstrate a multi-purpose complex of shaping exercises and basic techniques for handling a basketball, football and volleyball ball.
2. Use natural forms of movement (running) to compose and perform interval training.
3. Adapt exercises and techniques to one’s own abilities.
4. Apply acquired knowledge and motor skills for self-practice at the workplace.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">The program is designed so that the student, through exercise, achieves such a psychophysical form that is sufficient for the proper performance of work and tasks within the profession. A program organized in this way has a dominant effect on the development of the energy component. The contents that are applied are: natural forms of movement, shaping exercises, strength exercises with an emphasis on repetitive strength, running, elementary games, basketball, swimming, waterpolo, rowing, sailing, diving and hiking.

1. Swimming
Rules of behavior at the pool, diving, getting out of the water, testing swimming skills, rescuing and recovering a person from the water in case of imminent drowning, and providing first aid.
Introductory preparatory part: Shaping exercises, 400 m mixed
Criterion; 1,000 m freestyle
Waterpolo; basic technique and game
Basics of kinesiological transformations (OKT)
Introductory preparatory part (UP): introductory run with tasks, shaping exercises (VOB) (20 X 12 p)
Development of repetitive strength of arms, shoulder girdle and legs, squat-jump-push-ups (4 -3; 8-3; 10-3; 8-3; 6-3; 4-3. P 30 s)
Series pace running pace 20 X 50 m P 30 s
Basketball - street basketball (3:3)

2. Swimming
Getting out of the water, opening the life raft, climbing into the raft, boat; righting an overturned raft, diving and swimming with a life jacket, diving and swimming in an isothermal suit, diving, water survival.
Introductory preparatory part: VOB, 400 m mixed</td></tr>
</table>

	2 X 500 m freestyle, P 120 s Water polo: elementary technique and game OCT UP – introductory run with tasks, VOB (20 X 15) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups (4 -3; 8-3; 10-3; 8-3; 6-3; 4-3. P 30 s) Serial running pace 20 X 50 m P 25 s Basketball - street basketball (3:3) 3. Swimming Introductory preparatory part: VOB, 400 m mixed 100, 200, 400, 200, 100 m free P 60, 90, 120, 90, 60 s 3. 3. Water polo: elementary technique, game Water polo: elementary technique and game OCT UP – introductory run with tasks, VOB (20 X 20) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (8-5) P 30 s Serial running pace 20 X 50 m P 20 s Basketball - street basketball (3:3) 4. Swimming Introductory preparatory part: VOB, 400 m mixed 5 X 200 m free P 120 s Water polo: elementary technique and game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 30 s Serial running pace 20 X 50 m P 30 s Basketball - street basketball (3:3) 5. Swimming Introductory preparatory part: VOB, 400 m mixed 10 X 100 m free P 60 s Water polo: elementary technique and game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 30 s Serial running pace 30 X 50 m P 25 s Basketball - street basketball (3:3) 6. Swimming Introductory preparatory part: VOB, 400 m mixed 20 X 50 m free P 30 s Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 25 s Serial running pace 30 X 50 m P 30 s Basketball - street basketball (3:3) 7. Swimming Introductory preparatory part: VOB, 400 m mixed 40 X 25 m free P 20 s Water polo: elementary technique, game

	OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 20 s Serial running pace 30 X 50 m P 20 s Basketball - street basketball (3:3) 8. Swimming Introductory preparatory part: VOB, 400 m mixed 1000 m freestyle - criterion Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 15 s Serial running pace 30 X 50 m P 15 s Basketball - street basketball (3:3) 9. Swimming Introductory preparatory part: VOB, 400 m mixed 40 X 25 m free P 20 s Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (10-5) P 10 s Serial pace of running (30 X 50) P 10 s Basketball - street basketball (3:3) 10. Swimming Introductory preparatory part: VOB, 400 m mixed 20 X 50 m free P 30 s Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 20 s Serial tempo running (30 X 50 m) P 5 s Basketball - street basketball (3:3) 11. Swimming Introductory preparatory part: VOB, 400 m mixed 10 x 100 m free P 60 s Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30) Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 15 s Serial tempo running (30 X 50 m) P 10 s Basketball - street basketball (3:3) 12. Swimming Introductory preparatory part: VOB, 400 m mixed 5 X 200 m free P 90 s Water polo: elementary technique, game OCT UP – introductory run with tasks, VOB (20 X 30)

<table>
<tr><td></td><td colspan="2">Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 10 s
Serial tempo running (30 X 50 m) P 10 s
Basketball - street basketball (3:3)

13. Swimming
Introductory preparatory part: VOB, 400 m mixed
100, 200, 400, 200, 100 m freestyle, P 30, 60, 90, 60 s
Water polo: elementary technique, game
OCT
UP – introductory run with tasks, VOB (20 X 30)
Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 5 s
Serial tempo running (30 X 50 m) P 10 s
Basketball - street basketball (3:3)

14. Swimming
Introductory preparatory part: VOB, 400 m mixed
1000 m freestyle
Water polo: elementary technique, game
OCT
UP – introductory run with tasks, VOB (20 X 30)
Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 5s
Serial tempo running (30 X 50 m) P 10 s
Basketball - street basketball (3:3)

15. Swimming
Introductory preparatory part: VOB, 400 m mixed
1000 m freestyle, criterion
Water polo: elementary technique, game
OCT
UP – introductory run with tasks, VOB (20 X 30)
Development of repetitive strength of arms, shoulder girdle and legs, Squat-jump-push-ups 10 X (15-5) P 5 s
Serial tempo running (30 X 50 m) P 10 s
Basketball - street basketball (3:3)

MOUNTANEERING
Mountaineering classes, organised in 60 teaching hours per year, including six ascents to Mosor (mountaineering tour), three in each semester, and as a full-day mountain tour. Students cover 1,000 - 1,300 m difference in height, covering 18 - 26 km of road. Teaching takes place on Saturdays and Sundays so that part-time students can fulfill their obligations, and every full-time student can also participate in mountaineering classes (once a semester).</td></tr>
<tr><td>Format of instruction</td><td>☐ lectures
☐seminars and workshops
☒ exercises
☐ on-line only
☐ mixed e-learning
☒ field work</td><td>☐individual tasks
☐ multimedia
☐ laboratory
☐ mentoring
☐ other</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students
Exercises are mandatory for students, as records of class attendance are kept. In order to get the right to take the exam, students must attend at least 80% of the exercises. In case of an insufficient number of attendances, students do not have the</td></tr>
</table>

	right to take the exam and are obliged to enroll in the course again the following year. **Responsibilities of part-time students** The total attendance obligations of part-time students cannot be less than half the number of hours allocated to full-time students.

Screening student work *(name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)*						
	Class attendance	1	Research		(Other)	
	Experimental work		Report		(Other)	
	Essay		Seminar		(Other)	
	In-term tests		Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam

There are no grades for the course Physical Education. Students with properly completed obligations earn the right to ECTS credits.

Continuous student assessment

Assessment elements	Success (min.%)	Udio u ocjeni (%)

Grading

Percentage (%)	Criterion	Grade

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. Lozovina V.: Sportovi na vodi, Sveučilišni udžbenik, Split 2001.	25	YES
2. Polić B., Vitas M., Opavsky P.: Vježbe oblikovanja, Institut za fizičku kulturu, Partizan, Beograd 1954.		YES
3. Lozovina V., Lozovina M. (2012): THEORY AND MATHEMATICAL MODULATION OF SPORTS TRAINING, Paradigm of MethodologicalTheory And Mathematical Modulation Of Sports Training, LAP LAMBERT Academic Publishing, Saarbrücken, Germany, ISBN: 978-3-659-24998-3.		YES
4. Bompa, T., Buzzichelli, C. (2015): PERIODIZATION TRAINING FOR SPORTS, Human Kinetics Publishers, Champaign, United States, ISBN10: 1450469434, ISBN13: 9781450469432.		

Optional literature (at the time of submission of study programme proposal)	
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">ELECTROMOTOR PROPULSION</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, PhD, Assistant Professor</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Marko Zubčić, PhD</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Introduction to the basic principles of energy conversion and operation of electrical machines. A complete understanding of the operation of electric motor drives, their selection, maintenance, monitoring, control and commissioning based on the adopted engineering mindset. Set priorities in the operation of the ship's power system. Part of the knowledge required for the service of the machine, electrical engineer officer, in the field of operation of electric motor drives on board (STCW Convention) is achieved.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">Passed exams in Fundamentals of electrical engineering I, Mathematics I, Ship’s electrical machines and systems, and attended course Mathematics II</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">After successfully completing the course the student will be able to
1. Analyze the conditions in which electric motor drives are installed on board / vessel
2. Test by measuring the performance of electrical machines, specific experiments and how to control the operation of individual machines
3. Make a general measurement overview of all measurements on the given machine, select the electric motor and control mode
4. Distinguish between different types of ship propulsion and know their peculiarities
5. Select an electrical machine according to the mechanical characteristics of the operating mechanisms (synchronous, asynchronous or DC machine)
6. Compare the controls of individual electrical machines (synchronous, asynchronous, direct and universal electric machines)
7. To choose an engineering approach to solving problems, based on the acquired knowledge in physics, mathematics and fundamentals of electrical engineering, electrical machinery and systems</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5"><u>LECTURES</u>
1. Introductory lecture with teaching materials, learning outcomes, ECTS credits, manner of teaching, method of grading and passing the in-term / exam. Basic terms and definitions of electromotor drives (EMP). The most common EMP on vessels
2. Static and dynamic states of EMP
3. Mechanical characteristics of typical working mechanisms. Marine electric motor drives: pumps, fans, compressors, steering gear, side boosters, elevators, load characteristics, intermittent operation, speed control.
4. Electromechanical and electrical characteristics of electric motors.
5. Asynchronous, synchronous motor as an element of EMP. DC and universal motor as an element of EMP.
6. Advantages and disadvantages in the application of individual electric motor drives</td></tr>
</table>

	7. Collector machines: types of excitation (serial parallel, independent, compound) and torque characteristics, manuals, speed control with thyristor rectifiers and Ward-Leonard coupling, use of DC motors. 8. Collector machines: universal engine, dynamo scales, tachogenerator, fault maintenance and diagnostics. IN-TERM TEST I 9. Asynchronous machines: principle of operation, synchronous speed, sliding, construction, performance and cooling, torque and current characteristics, counter-current braking, replacement scheme, vector diagram 10. Asynchronous machines: Guides for cage asynchronous motors (direct instruction, star - triangle, autotransformer instruction manual, choke guide, thyristor instruction). Asynchronous motor protection. 11. Asynchronous machines: Current suppression, multi-speed motors, Effect of voltage and frequency change on AM operation. Speed control using frequency converter, engine influence, maintenance, and fault diagnosis. Nameplate. 12. Principle of operation of synchronous motor, reference, torque characteristic, power factor and V-curves, synchronous compensator, excitation types 2 (with brushes, contactless, with permanent magnets), reluctant motor, maintenance and fault diagnosis 13. Special-purpose motors: single-phase induction motors, reluctance motors, stepper motors, permanent magnet motors. 14. Electrical protection of electric motors and related protective devices: overcurrent, short-circuit, undervoltage, single-phase operation, and thermal protection. 15. Selection of EMD engines and components, design. IN-TERM TEST II **EXERCISES** **<u>Auditory exercises:</u>** 1. Static state of electric motor drives with DC independently excited motor 2. Static states of electric motors with asynchronous motors 3. Static states of electric motor drives with synchronous motors 4. Mechanical characteristics of working mechanisms and reduction of mechanical quantities 5. Dynamic states of electric motor drives with independently excited DC motor **<u>Laboratory exercises</u>** 1. Introduction to work in the laboratory and laboratory equipment - lab. design for electric motor drives - Lucas Nuelle 2. Starting an asynchronous three-phase motor: directly to the network; star-triangle (Lucas Nuelle) 3. Idle, short-circuit and overload on asynchronous three-phase motor - characteristics (Lucas Nuelle) 4. Static and dynamic mechanical characteristics of an asynchronous three-phase motor (Lucas Nuelle) 5. Protection of asynchronous three-phase motor (Lucas Nuelle) 6. Frequency converter (Lucas Nuelle) 7. An example of an electric motor drive with a DC independent excited motor - Matlab / Simulink 8. Example of an electric motor drive with an asynchronous / synchronous three-phase motor - Matlab / Simulink 9. An example of an electric motor drive with an asynchronous three-phase motor - simulating engine load based on the Lucas Nuelle lab. lining 10. Example of control of electro-hydraulic and electro-pneumatic system.
Format of instruction	☒ lectures ☐seminars and workshops ☒ exercises ☐ *on-line* only ☒ individual tasks ☐ multimedia ☒ laboratory ☐ mentoring

<table>
<tr><td></td><td colspan="6">☐ mixed e-learning
☐ field work</td><td colspan="2">☐ other</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">Responsibilities of full-time students:
Attendance is compulsory and records of student attendance are maintained (Form F04). The full-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent for more than 20% of the teaching hours of the lectures and the auditory exercises. Laboratory exercises / practical classes must be fully attended. In the case of teaching units that are in accordance with the STCW Convention, a full-time student shall be deemed not to have fulfilled his / her obligations if he / she has been absent from more than 5% of the teaching hours and the classroom exercises. Laboratory exercises must be 100% present.
In case of insufficient number of attendances, students are not eligible for taking the final exam and are obliged to enroll the course again next year.

Responsibilities of part-time students:
The part-time student has not fulfilled his / her obligations prescribed by the study program if he / she has been absent for more than 50% of teaching hours of lectures and auditory exercises. Laboratory exercises / practical training must be fully (100%) attended.
In the case of teaching units that are in accordance with the STCW Convention, for the part-time student the same obligations apply as for the full-time student in that category (up to 95% for all forms of teaching and 100% laboratory work).
In case of an insufficient number of attendances, students are not eligible for the final exam and are obliged to enroll the course again next year.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td>0.2</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td>-</td></tr>
<tr><td>In-term tests</td><td>2.375</td><td>Oral exam (for students who failed in-term tests or are not satisfied with the grade)*</td><td>Alt. to in-term tests</td><td>Auditory exercises</td><td>0.3</td></tr>
<tr><td>Written exam</td><td>Alt. to in-term tests</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="8">1. THE FIRST OPTION - continuous assessment:
Based on earned points and grades from continuous assessment, evaluation of attendance, preparation and presentation of seminars, and in-term grades.
During the semester, two in-terms are written they are a combination of theoretical knowledge and practical application (tasks, calculations, electrical diagrams). In continuous assessment, it is important to note that two points are assigned for each question of the in-term test, and an in-term test is positively gradede with a minimum of 50% points collected from the completed tasks, but collected from different teaching units and not e.g. from only one teaching unit (knowledge of the entire subject matter, not just individual parts is required). Students who do not take the first in-term test may not take the second in-term test, while in a semester several exams may be organised. The final grade evaluates the classroom activity, which includes the presence at lectures, auditory and laboratory exercises, and the results of the in-term tests.
Continuous student assessment:
<table>
<tr><th>Assessment elements</th><th>Success (min.%)</th><th>Percentage in grade (%)</th></tr>
</table></td></tr>
</table>

	Class activity (lectures, auditory exercises)	80-100 (95-100)*	12
	Practice in laboratory – preparation in-term test	100	8
	1st in-term test	50-100	40
	2nd in-term test	50-100	40

*Teaching is in compliance with STCW Convention.
In case of an insufficient number of class attendances, students do not earn the right to taking the final exam and have to enroll the course again the following year.

Grading:

Percentage (%)	Criterion	Grade
0- 49	Does not satisfy minimum criteria	insufficient (1)
50 - 61	Satisfies minimum criteria	sufficient (2)
62 - 74	Average success with clear shortcomings	good (3)
75 - 87	Above average success with a few errors	very good (4)
88 -100	Extraordinary success	excellent (5)

2.THE SECOND OPTION:
Based on the points earned and grades after considering the class attendance and graded previous work as well as taking of final exam (written and oral parts).

If a student does not score positive in continuous assessment or does not take part in the continuous assessment during the semester, he / she may take the exam within the regular exam terms.
The examination in the regular examination terms consists of written and oral parts. A student who scored positive in the written exam can take the oral part of the exam. The oral part of the exam will be held no later than 5 days after the written part of the exam.

Final evaluation:

Evaluation elements – final exam	Success (min.%)	Percentage in grade (%)
Practical part (written)	50-100	40
Theoretical part (written and/or oral)	50-100	50
Previous activities	50-100	10

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. Skalicki B., Grilec, J.: Električni strojevi i pogoni, Sveučilište u Zagrebu, Zagreb, Fakultet strojarstva i brodogradnje, 2005.	1	
	2. Krčum, M.: Zabilješke s predavanja, Sveučilište u Splitu, Studijski centar za stručne studije, Split, 2007.		YES
	3. Krčum, M.: Repetitorij s laboratorijskim vježbama iz električnih strojeva, Sveučilište u Splitu, Studijski centar za stručne studije, Split, 2009.		YES
Optional literature (at the time of submission of study programme	1. Krčum, M.: Električni strojevi I, Sveučilište u Splitu, Centar za stručne studije, 2009. 2. Krčum, M.: Električni strojevi II, Sveučilište u Splitu, Centar za stručne studije, 2009.		

proposal)	
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MAINTENANCE OF SHIP'S ELECTRONIC AND CONTROL SYSTEMS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, Ph.D., Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>30</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">/</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of basic concepts and methods of maintenance of marine and electrical systems. Developing a simple and logical way of thinking of students when analyzing and solving practical electrotechnical tasks related to the maintenance of shipboard and electrotechnical systems.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Monitor, maintain, and effectively manage electronic systems in the maritime industry.
2. To analyze the basic concepts and procedures of maintenance of ship electrotechnical systems.
3. Categorize, interpret, and critically evaluate the problems of failure and malfunction of ship electrotechnical systems.
4. Analyze occasional failures of ship electrotechnical systems.
5. Plan preventive maintenance procedures to prevent transient occurrences and massive damage to ship electrotechnical systems.
6. Define and understand the control problem in the operation of ship electrotechnical systems.
7. Design procedures for analysis and detection of the problem of overheating and noise of ship electrotechnical systems.
8. Understand and understand the occurrence of multiple (complex) problems in the operation of ship electrotechnical systems.
9. Involve in the lifelong learning system in a timely manner because of the inevitable changes to the technical requirements of the work environment.
10. Define and understand the operation of microprocessors that support the operation of ship electrotechnical systems.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures
1. Introduction to electrical symbols and passive components (resistors, capacitors, coils, ...)
2. Getting to know the basics of transistor and operating amplifiers. Special purpose analog circuits.
3. Introduction to basic logic circuits (logic gates, meters, registers, memory indicators)
4. Systematic approaches in fault diagnosis (top-bottom, bottom-top).
5. Cable testing (short circuit, open circuit, misalignment).
6. Ways to test circuits in operation.
7. Device diagram identification. Testing the condition of printed circuit boards. Diagnostics of faults in "live" and "dead" DC circuits. Diagnosis of faults in "live" and "dead" alternating circuits. Analogue and digital signal monitoring using various measuring devices.
8. Analog integrated-circuit fault diagnostics.
9. Malfunction diagnostics of complex digital systems including digital memory.</td></tr>
</table>

<table>
<tr><td></td><td>10. Basic diagnostics of microprocessor and computer failures. Analysis of operation and condition of PLC outputs and inputs.
11. Power-supply fault diagnostics. Failure analysis.
12. Malfunction diagnostics and repair of DC and AC motors and generators. failure diagnostics. Checking control systems. Load testing.
13. Fault diagnostics and transformer repair. Failure analysis. Switchboard-failure-conditions analysis.
14. Malfunction/failure diagnostics and appliances (refrigerators, washing machines and dishwashers, air-conditioners). Failure analysis.
15. Alignment, final inspection, and reconnection of electrical circuits and appliances. Keeping records.

Exercises
1. Passive component failures.
2. Transistor amplifier failures.
3. Operational amplifier failures.
4. Determining the location and type of cable fault.
5. Logic gate failure diagnostics.
6. Diagnostics of counter and register breakdowns.
7. Indicator failure diagnostics.
8. DC power supply diagnostics.
9. Rectifier repair.
10. Basic diagnostics of microprocessor and computer failures.
11. Testing and repairing dead circuits.
12. Testing and repairing DC and AC motors.
13. Transformer testing and repair.
14. Refrigerator testing and repair.
15. Washing machine / dishwasher testing and repair.</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☐ seminars and workshops
☒ exercises
☐ on-line only
☐ mixed e-learning
☐ field work

☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentoring
☐ other</td></tr>
<tr><td>Student responsibilities</td><td>Obligations of full-time students:
Lectures and exercises are mandatory for students, so attendance records are kept. In order for students to get the right to take the exam, they must be present at a minimum of 80% of lectures and laboratory exercises. In case of an insufficient number of attendances, students do not have the right to take the final exam and must enroll in the course again the following year.

Obligations of part-time students:
Students must be present at a minimum of 50% of the classes in order to get the right to take the exam.</td></tr>
<tr><td>Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>
<table>
<tr><td>Lecture attendance</td><td>1.5</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests*</td><td>2.5</td><td>Oral exam</td><td>2.5 (alternative to in-term test)</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>
</td></tr>
<tr><td>Grading and evaluating student work in class and at</td><td>Two in-term tests are written in the semester. The first in-term test covering lectures 1 to 7 is written in the eighth week of classes, and the second in-term test covering lectures 8 to 15 is written in the fifteenth week of classes. At each in-term test, a</td></tr>
</table>

<table>
<tr><td>the final exam</td><td>minimum of 50% of points must be obtained to pass. Students who do not pass the first in-term test can write the second in-term test. If a student does not pass one of the in-term tests and obtains the right to take the exam, he/she can only take the part he/she did not pass in the in-term test. Taking the exam in this way is valid until the end of the exam terms in the current academic year. Students who do not pass the in-term test and earn the right to take the exam, can take the written exam during the exam terms. In case the number of students taking the exam is lower than 5, then the written exam is replaced by an oral exam. Students who have passed both in-term tests are required to register for the final exam on Studomat and come to the exam term time to register their grade or take a complete exam for a higher grade.

Continuous student assessment
<table>
<tr><th>Assessment elements</th><th>Success (min. %)</th><th>Percentage in grade (%)</th></tr>
<tr><td>Class attendance</td><td>80</td><td>20</td></tr>
<tr><td>In-term test I</td><td>50</td><td>40</td></tr>
<tr><td>In-term test II</td><td>50</td><td>40</td></tr>
<tr><td>Written / oral exam (alternative to in-term tests)</td><td>50</td><td>80</td></tr>
</table>
Grading
<table>
<tr><th>Percentage (%)</th><th>Criterion</th><th>Grade</th></tr>
<tr><td>0- 49</td><td>Does not satisfy minimum criteria</td><td>insufficient (1)</td></tr>
<tr><td>50 - 61</td><td>Satisfies minimum criteria</td><td>sufficient (2)</td></tr>
<tr><td>62 - 74</td><td>Average success with clear shortcomings</td><td>good (3)</td></tr>
<tr><td>75 - 87</td><td>Above average success with a few errors</td><td>very good (4)</td></tr>
<tr><td>88 -100</td><td>Extraordinary success</td><td>excellent (5)</td></tr>
</table>
Evaluation and grading of the work of part-time students are the same as for full-time students</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>
<table>
<tr><th>Title</th><th>Number of copies in the library</th><th>Availability via other media</th></tr>
<tr><td>Darko Kovačević, Kvarovi digitalnih sklopova (skripta), Pomorski fakultet Sveučilišta u Split, Split, 2013.</td><td></td><td>YES</td></tr>
<tr><td>Darko Kovačević, Predavanja (skripta), Pomorski fakultet Sveučilišta u Splitu, Split, 2013.</td><td></td><td>YES</td></tr>
</table>
</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>1. J. Perozzo, Practical Electonics Troubleshooting, Delmar Publishers, New York, USA
2. D. Tmal, N. Widmer, Electronic Troubleshooting, McGraw-Hill, New York, USA</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.</td></tr>
<tr><td>Other (as the proposer wishes to add)</td><td></td></tr>
</table>

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">AUTONOMOUS SHIPS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Rino Bošnjak, Ph.D., Assoc.Prof.
Ranka Petrinović, Ph.D., Full Prof.
Anita Gudelj, Ph.D., Full Prof.
Hrvoje Dodig, Ph.D., Assoc.Prof.
Marko Katalinić, Ph.D., Assoc. Prof.
Helena Ukić Boljat, PhD</td><td>Number of credits (ECTS)</td><td colspan="3">4</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="3">20 %</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The main objective of the course is to provide students with a vision and a general framework for the development of autonomous ships. Students will learn about new technologies and their implementation at different levels of ship autonomy, intelligent monitoring and control systems, safety challenges and how they can be solved, legal frameworks and regulatory challenges, and economic challenges.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Identify and explain the division and characteristics of the level of autonomy of ships.
2. Comment on the technologies used in autonomous ships.
3. Differentiate and connect the level of autonomy of today and the expected level of future autonomy of ships.
4. Classify artificial intelligence, machine learning and human-machine interaction.
5. Classify and plan the principles of remote control according to the level of autonomy.
6. Present the role of e-Navigation.
7. Explain the security perspectives of autonomous ships.
8. Interpret the level and methods of application of network security and connectivity.
9. Interpret legal frameworks and regulatory challenges.
10. Explain the economic factors affecting the development of autonomous ships.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. Maritime operations and the impact of autonomous vessels (the fourth shipping revolution)
2. Application of advanced technologies on autonomous vessels and definition of their development phases.
3. New control centers STCC (Ship Traffic Control Center) for controlling the navigation of autonomous ships. Integration of new monitoring centers for autonomous ships.
4. Defining new necessary technologies and different solutions needed for autonomous ships.
5. The concept of an autonomous ship.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">6. Implementation and further development of e-Navigation with regard to autonomous ships.
7. Autonomous ships, automation and control.
8. Artificial intelligence, machine learning, human-machine interaction.
9. Applications of artificial intelligence in autonomous ships.
10. Remote control.
11. Cyber threats and security of autonomous ships.
12. Network security.
13. Classification, qualifications, and security perspectives.
14. Maritime legislation and legal perspective and regulation of autonomous ships.
15. Economic factors and their impact on the industry of autonomous ships.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☒ seminars
☐ exercises
☐ on line, CBT training
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☒ multimedia
☐ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Lectures are compulsory for students (records of class attendance are kept). Students must attend at least 80% of classes. In case of an insufficient number of attendances, the students will not have the right to take the exam.
Students who, due to illness or some other justifiable reason, did not meet the requirement, and have an attendance rate of 70% or more, will be able to do the rest (up to 80%) in additional terms, during the semester and after, but not for a longer period than one month after the end of the classes. All other students, i.e. those who attended less than 70% of the classes, do not have the right to take the exam and must re-enroll in the course the following year.

Responsibilities of part-time students:
Part-time students are required to attend a minimum of 50% of classes.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Individual tasks</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>Demonstration of work on simulator</td><td>0.5</td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td>0.5</td><td>On-line CBT training and testing</td><td>0.375</td></tr>
<tr><td>In-term tests</td><td>1</td><td>Oral exam</td><td>1</td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Examination:
After passing the in-term tests from the contents of the lectures, i.e. completing all obligations, students can take the oral part of the exam. The oral part of the exam is not taken by the students who successfully pass the in-terms in theory during the semester, via the Merlin system.
The in-term tests (parts of the exam) are taken exclusively via the Merlin system during the course, and the final exam is taken within the official exam terms. If the student does not pass all the in-terms, the part they passed can be recognised, so they take only the remaining part of final exam in the exam term. Online CBT training is held during the semester.
Time for writing the in-term test is 1 teaching class.

Continuous student assessment</td></tr>
</table>

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	20
I in-term test	50	30
II in-term test	50	30
Seminar	100	10
CBT training and testing	75	10

Grading:

Percentage (%)	Criterion	Grade
0-49	Does not satisfy minimum criteria	insufficient (1)
50-64	Satisfies minimum criteria	sufficient (2)
65-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	„*Autonomus Ships - The Next Step, Ship, Intelligence Marine*“, Rolls-Royce		YES
	Connectivity for Autonomous Ships: Architecture, Use Cases, and Research Challenges Höyhtyä M., Huusko J., Kiviranta M., Solberg K., Rokka J., Connectivity for Autonomous Ships: Architecture, Use Cases, and Research, October 2017.		YES
	Roberts G. N., Sutton, R., Advances in Unmanned Marine Vechiles, IET control enginnering series.		YES
	Gary C. Kessler, Steven D. Shepard: Maritime Cybersecurity: A Guide for Leaders and Managers, September 2, 2020		YES
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)	According to the expressed interest of the students, and according to the permit of the University of Split, course can be delivered in English.		

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">TECHNICAL-SYSTEMS COMPUTER CONTROL</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, Ph.D., Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Associate teachers</td><td rowspan="2">Luka Čulić</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td>Percentage of e-learning</td><td colspan="4"></td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Provision of appropriate basic knowledge in the management of technical systems and processes with the help of computers in the maritime industry. Familiarity with the principles and integration of various maritime technical systems into a managed hierarchically organized computer system. SCADA.
STCW 7.08. (2014.g.) Electro-technical officer. Part of the material from: 1.1.6. Ch. 6.1. (PLC, digital control systems, measurement, controllers, sequence control); 1.1.7. ch. 7.1. Competence 1.5. Ch. 1.5.1.1.1., Part 1.5.2. Ch.2.1.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1. Distinguish the basic elements of computer-controlled systems.
2. Compare different program codes for the same project and evaluate it accordingly.
3. Create code in a ladder diagram based on a given problem.
4. Demonstrate the differences in how computer systems operate in on-line and off-line modes.
5. Present the mode of operation of ship automated systems from the diagrams.
6. Critically evaluate the hierarchical structure of a computerized management system.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="6">Lectures:
1. Introductory terms. Overview of the system for RUTS.
2. Overview of the system for RUTS. Analog sensors, errors, A/D, D/A, multiplexing.
3. Analog sensors, errors, A/D, D/A, multiplexing (continued). Multiplexing, role, A/D and errors.
4. Multiplexing, role, A/D and errors (continued). THAT. Communication interfaces.
5. Data transmission and communication channels. Hierarchical organization of the RU system.
6. Hierarchical organization of the RU system (continued).
7-8. Synthesis of RSU.
9. PLC, DSP, FPGA. Elements in the processing of measurement signals and noises.
10. Noise suppression. Control signal. PID. Manual mode.
11. Ship's automated processes.
12. Examples of ship's RSU.
13.-15. Use of computers on the bridge and in the engine room.

Exercises:
1. Introduction to PLC devices. Introduction to Siemens PLC LOGO or Step7. Installation, wiring. Hardware support for PLC devices.
2.-5. Software support for PLC devices.
6.-7. Examples of PLC systems in shipping. PLC system for starting and protecting</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">asynchronous motors.
8.-9. Examples of PLC systems in shipping. PLC control system for asynchronous gear-motor.
10.-11. Examples of PLC systems in shipping. PLC control system for water-supply-system pumps.
12.-13. PLC industrial-door control system.
14. Interfaces (HMI interface, multipanels and operating panels).
15. SCADA system – Program control and monitoring system, programming example.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐on line only
☐mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐multimedia
☒ laboratory
☐ mentoring
☐simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Obligations of full-time students
They are required to attend 80% of classes if the topics are not in the STCW and 95% of the classes that are in the STCW. Attendance at computer exercises (laboratory) is 100% required. Students should make up for exercises and lectures if they did not earn the right to take the exam in the 15 weeks of teaching. Compensations can be achieved through seminar work or on supplementary classes if the material is covered by the STCW, or through teaching in consultations, with the requirment that those students must sign the records of attendance sheet.

Obligations of part-time students
They are required to attend 80% of the classes with topics that are not in the STCW and 95% of the classes that are covered by the STCW. Attendance at computer exercises is 100% required. Students should make up for exercises and classes if they did not earn the right to take the final exam within the 15 weeks of teaching. Compensations can be made through seminar work or homework if the students do not need them for the corresponding STCW, and supplementary classes if the material is covered by the STCW, or through teaching in consultations, with the requirement for those students that they must sign the records of attendance sheet.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td>1</td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.875</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td>(1.875 alt.)</td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Grading and evaluation of the work of full-time students
Class attendance is mandatory for full-time students, i.e. attendance at a minimum of 95% of lectures and 100% of computer exercises is a requirement for taking the exam.
2 in-term tests are written in the semester. The first test covering lectures 1 to 7 is written in the 8th week of classes, and the second test covering lectures 8 to 15 is written in the 15th week of classes. Sample questions for the test are available to students on the website. At each test, a minimum of 40% of points must be obtained to pass. Students who do not take a test for objective reasons or do not achieve the minimum passing percentage have the possibility of correction. Students who do not pass one test can take the second test.

Continuous student assessment</td></tr>
</table>

Assessment elements	Success (min. %)	Percentage in grade (%)
Lecture attendance	80 (95 for STCW topics)	9,375
Exercises attendance – lab exercises	100%	3,125
In-term test I	40	20,3125
In-term test II	40	20,3125
In-term test in exercises	50	46,875
Final exam (alternative to in-terms)	50	50
Seminar paper (alternatively)	50	50

Ocjenjivanje

Percentage (%)	Criterion	Grade
0-39	Does not satisfy minimum criteria	insufficient (1)
40-64	Satisfies minimum criteria	sufficient (2)
64-79	Average success with clear shortcomings	good (3)
80-89	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Students who do not pass the in-term tests during the semester, but have the right to take the final exam, are required to take the written exam during the exam term. The same evaluation criteria apply to the exam term as to the continuous knowledge testing.

Assessment and evaluation of the work of part-time students
The same as for the full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	2. I. Petrović, Računalno upravljanje tehničkim sustavima, FER Zagreb, 2011.		YES
	3. I. Vujović, Računalno upravljanje tehničkim sustavima, nastavni materijali na web stranici		YES
	4. D. Kezić, G. Smiljanić, I. Vilović, Računalno upravljanje tehničkim sustavima, Pomorski fakultet u Splitu, 2007.		YES
	4. Siemensov LOGO, Siemens.		YES
Optional literature (at the time of submission of study programme proposal)	1. Bolton, W.: Programmable logic controllers, Bidlles Ltd., 2002. 1. EL-Hawary, F.: The Ocean Engineering Handbook, CRC Press, 2001.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to			

add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="8">BACHELOR EXAM</td></tr>
<tr><td>Code</td><td></td><td colspan="2">Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td></td><td colspan="2">Number of credits (ECTS)</td><td colspan="4">9</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2" colspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>0</td><td>0</td><td>10</td><td></td></tr>
<tr><td>Status of the course</td><td>compulsory</td><td colspan="2">Percentage of e-learning</td><td colspan="4">40 %</td></tr>
<tr><td colspan="9">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="8">The student will:
• systematize the knowledge acquired during their studies,
• learn to publicly present the basic ideas and the contents of the study.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="8">The student can take the final exam after taking and passing all courses provided in the curriculum and after having met the obligation from the Introductory Differential Program.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="8">After passing the final Bachelor exam, the students will be able to:
1. Supervise, maintain, and effectively operate ship electrotechnical systems.
2. Analyze the diagrams of electrical and electronic systems and identify and eliminate the causes of their malfunctioning.
3. Test the operation of electrical equipment.
4. Develop simpler electrical diagrams for operation and control of ship systems.
5. Analyze and regulate load distribution in the ship's electric power system.
6. Confirm the processes of implementation and maintenance of hardware and software components of computer networks.
7. Create a database scheme in the appropriate database management system and link the business rules and conditions of database integrity.
8. Implement hardware and software support (PLC and / or microcontroller) to manage the shipboard processes.
9. Plan and implement occupational safety measures when working with electrical devices.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="8">/</td></tr>
<tr><td>Format of instruction</td><td colspan="4">☐ lectures
☐ seminars
☐ exercises
☐ on line entirely
☒ e-learning and taking final exam
☐ field work</td><td colspan="4">☒ individual tasks
☐ multimedia
☐ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="8">The student independently prepares for the final exam according to the questions from the question database available through the Faculty website. The database of questions is composed of different fields covered in the undergraduate courses covering the core profession.</td></tr>
<tr><td rowspan="2">Screening student work (name the proportion of ECTS credits for each</td><td>Lecture attendance</td><td></td><td>Research of literature</td><td></td><td>(Other)</td><td colspan="3"></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td colspan="3"></td></tr>
</table>

activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Essay		Seminar		(Other)	
	In-term tests		Oral exam	1.5	(Other)	
	Written exam	1.5	Project		Indipendent work	6
Grading and evaluating student work in class and at the final exam	The students are obliged to follow the instructions of the members of the committee, and to effectively complete the assigned tasks. The members of the committee, on the basis of the results, agree on the Bachelor exam grade.					

	Title	**Number of copies in the library**	**Availability via other media**
Required literature (available in the library and via other media)	According to the courses included into the Bachelor exam		
Optional literature (at the time of submission of study programme proposal)			
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">COMPUTER NETWORKS</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">3</td></tr>
<tr><td>Course teacher</td><td>Ivan Pavić, PhD, Assistant Professor</td><td>Number of credits (ECTS)</td><td colspan="4">4</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Luka Čulić</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td></td><td>15</td><td></td></tr>
<tr><td>Status of the course</td><td>Elective</td><td>Percentage of e-learning</td><td colspan="4">15%</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Knowledge of the basic structures and types of computer networks both in home use and in the industry with maritime and shipboard applications. Developing a logical mindset with students in analyzing and developing practical tasks related to computer networks on board ships and in the maritime environment.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Develop a proposal for a local computer network.
2. Predict IP addresses and network structure.
3. Use available equipment such as switches, routers and access points.
4. Propose a virtual private network.
5. Categorize types and layers of industrial network.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">Lectures:
1. Overview of the development of telecommunications and computer networks
2. Types of computer networks. Industrial networks and divisions. Internet. Ways to connect your device to a network. Ways to divert network traffic. Data transfer. Hierarchy.
3. Network components. End devices, network devices, data media, network protocols. Encryption. Authentication.
4. OSI model and division. TCP / IP model.
5. The physical layer of the network. Data transmission media wired and wireless. Cabling of LANs. Adapters. Routers.
6. Link layer. The format of the so-called frame. Managing access media. Direction of communication. Ethernet. VLANs.
7. Network Layer. IPv4 standard. IPv4 address structure and types. Division of networks into classes.
8. NAT. ICMP, ARP. IPv6 Network Model. Header, addressing. Transition from IPv4 to IPv6.
9. Transport layer. Introduction. UDP. TCP.
10. Application layer. Introduction. P2P model. FTP. Electronic mail protocols. SMTP, POP and IMAP. DNS. DHCP.
11. Virtual Private Network (VPN). VPN paradigms. VPN and tunneling protocols in practice. Authentication in VPN. PAP. VPN encoding.
12. Architecture Industrial Networks. Introduction. Protocols. CMSA, flag sharing, box.
13. AS-i standard
14. PROFIBUS DP, PA and FMS layers. A shipboard example.
15. CANBUS introduction and open standard. An example on ships and in cars.

Exercises:</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">1. Introduction to laboratory equipment.
2. NETGEAR GS108E-300PES 8-Port Smart Switch. Basic functions and interface operation.
3. Using the NETGEAR GS108E to create two-way communication port aggregation. Hierarchical assignment of data transfer direction. Entrance only. Only exit. Two-way.
4. Using the NETGEAR GS108E to create two-way communication port aggregation. Hierarchical assignment of data transfer direction. Entrance only. Only exit. Two-way.
5. Router, Linksys WRT-1900AC, Introduction. Basic functions and interface.
6. Asus RT-AC3200 Router. Introduction. Introduction to the router. Functions and interface.
7. Ubiquiti access point UAP-AC-LR. Introduction. Introduction to the access point.
8. Functions and interface. Connect via Android and iOS applications remotely. Router management.
9. Ubiquiti access point UAP-AC-LR. Introduction. Introduction to the access point. Functions and interface. Connect via Android and iOS applications remotely. Router management.
10. Create a local area network using the Asus router and ubiquiti access points.
11. Creating virtual networks via WRT and ubiquiti access point.
12. Use of switches, routers, and access points to create complex network structures.
13. Using switches, routers, and access points to create complex network structures.
14. Using switches, routers and access points to create complex network structures.
15. Using switches, routers, and access points to create complex network structures.
16. Using switches, routers and access points to create complex network structures.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars
☒ exercises
☐ on line entirely
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☒ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Students must attend 80% exercise and 100% lectures (STCW). Students are required to write reports on computer exercises. Students take the in-term tests in theory (lectures) and exercises. If the student was ill or at work and could not attend part of the classes, he / she must write a seminar paper.

Responsibilities of part-time students:
Students must attend 50% of exercises. Students are required to write reports on computer exercises. Students take the in-term tests in theory (lectures) and exercises. If a student was ill or at work and could not attend part of the classes, he / she must write a seminar paper.</td></tr>
<tr><td rowspan="4">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>Practical work</td><td>1.4375</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.4375</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
</table>

equal to the ECTS value of the course)	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam

Examination:
During the classes, the students are supposed to take the in-term examinations, which are taken after the lectures and exercises completed in the course.
Upon successful completion of the laboratory exercises, the student writes a report on each individual laboratory exercise.
One in-term test from the theoretical part of the class is planned. The test is taken in written form, and for a positive grade, at least 49% of correct and explained answers must be obtained. From the laboratory exercises at the end of the semester, all reports on the exercises completed must be submitted. If the students have attended at least 80% of the classes and submitted reports from the exercises, they have the right to access the exam.

For part-time students, the conditions are the same as for full-time students, with the exception that they must have a minimum of 50% of class attendances and the reports from exercises submitted to be eligible to take the exam.

Continuous student assessment

Assessment elements	Success (min.%)	Percentage in grade (%)
Class attendance	80	15
In-term tests	49	85

Final evaluation

Evaluation elements – final exam	Success (min.%)	Percentage in grade (%)
Class attendance	80	15
Written exam	49	85
Report on exercises	100	10

Grading

Percentage (%)	Criterion	Grade
0-48,9	Does not satisfy minimum criteria	insufficient (1)
49-64,9	Satisfies minimum criteria	sufficient (2)
65-79,9	Average success with clear shortcomings	good (3)
80 -89,9	Above average success with a few errors	very good (4)
90-100	Extraordinary success	excellent (5)

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. Perlman., R.; Interconnections Second Edition, Routers, Bridges, Switches and Internetworking Protocols, Addison-Weseley Professional Computing Series, 1999.		
2. Serpanos, D., Wolf, T.; Architecture of Network Systems, Elsevier, The Morgan Kaufman Series in computer architecture and design, 2010.		

Optional literature (at the time of submission of study programme proposal)

Quality assurance methods that ensure the acquisition of exit

University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.

competences	
Other (as the proposer wishes to add)	

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">MARITIME LAW</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Nikola Mandić, PhD, Assoc. Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">2</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3">-</td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The main task of the course is to acquaint students with: international and national regulations governing the boundaries of maritime authority, the rights and obligations of states and other entities of international law at sea, their mutual relations with regard to the exploitation of the wealth of the sea, and the seas and their protection; compliance with (international) conditions on the safety of navigation, in particular on the protection of human life at sea and the protection of the marine environment; organization of maritime administration of the Republic of Croatia; the control of the flag State and the port State; maintaining order in the ports; the regime of seaports and maritime domain; procedures for completing maritime management formalities on arrival, stay and departure of a ship from port; the legal status of the ship; the seafarers' employment, the rights and obligations of the shipmaster and other crew members, and with the maritime law institutes and the content of international and Croatian maritime property law. Particular emphasis is placed on liability provisions.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. To analyze the basic institutes of international law of the sea, maritime administrative law, maritime labor law and maritime property law.
2. To categorize types of craft.
3. To identify, distinguish, and compare maritime domains in accordance with international law of the sea.
4. To elaborate on the organization of navigation service and inspection.
5. To analyze the structure, activities and functions of maritime administration and legal regulation of the maritime domain and seaports in the Republic of Croatia.
6. To distinguish the specifics of the legal position of the master and crew of the ship.
7. To distinguish maritime transport documents.
8. To distinguish and compare maritime accidents.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">1. The concept, division, meaning, and sources of maritime law and international law of the sea; Methods of international harmonization of maritime law and the law of the sea. Maritime Code of the Republic of Croatia; International Maritime Organization; European Maritime Safety Agency.
2. Legal concept of the ship (and other maritime facilities), types of ships, individualization and registration of ships.
3. Sources of international law of the sea; UN Convention on the Law of the Sea, 1982; Marine and undersea areas of the Republic of Croatia; Inland sea waters; Territorial sea; Economic zone; Protected eco-fishing domain; The continental shelf.
4. Right of persecution - the archipelago sea; International straits; sea canals; Right of access of landlocked States to the sea and from the sea and freedom of transit; open sea; marine scientific research; categorization of marine</td></tr>
</table>

	environmental regulations; International regulations for the protection of the marine environment - global and regional conventions. 5. Organization of navigation safety service in the Republic of Croatia; Harbor Master's Offices; Coast Guard of the Republic of Croatia. Maritime domain; Legal status of seaports, types of ports and order in ports; Port authorities; Pilotage. Inspection control. Paris Memorandum on Port State Control. Categories of navigation in the Republic of Croatia. 6. International conventions on the safety of navigation; Liability under the SOLAS Convention; International Ship and Port Facility Security Code - ISPS Code; International Safety Management Regulations - ISM Code. Protection of the marine environment; Liability under the MARPOL Convention - 73/78 as ammended: I. (oil), II. (harmful liquid substances), III. (harmful substances in packaged form); Liability under the MARPOL Convention - 73/78 as ammended: IV. (sewage), V. (waste) and VI. (prevention of air pollution from ships). 7. Ship documents and books such as Certificate of Registry, International Loadline Certificate (1966), International Certificate of Calibration, Passenger Ship Certificate, Cargo Ship Safety Equipment Certificate, Cargo Ship Design Safety Certificate, Cargo-Ship Safety Radio Certificate, Certificate of Fitness for the Carriage of Dangerous Chemicals, International Oil Pollution Prevention Certificate, International Pollution Prevention Certificate for the Carriage of Noxious Liquid Substances in Bulk; Class Hull, Machinery, and Refrigeration Certificates, Logbook, Engine-Room Logbook, Medical Logbook, Radio logbook, Cargo manifest, Crew list, Passenger list, Fumigation Certificate or Fumigation Exemption Certificate. 8. Classification societies; Liability under International Convention on Loadlines, 1966/88; Determining the Seawortiness of a Ship; Declarations relating to seafarers' health care and requirements under international health care regulations; International health regulations; Registration of the arrival of the ship at a port and the required documents; Procedure on arrival of a ship at a port and the documents required; Convention on the Facilitation of International Maritime Traffic, 1965 9. Maritime labor law; Ship crew - general; Division of departments on board; Crew members' rights and obligations; Maritime Labor Convention, 2006 (No. 186); Rulebook on ranks and certificates of competency of seafarers; Legal position of the master of the ship; Administrative functions (public authority) of the ship master; Master's duty regarding safety of the ship and navigation; Master's duties in case of an accident. 10. Legal aspect of seagoing vessels exploitation – the concept and systematics of contracts; International regulations for the carriage of goods by sea; Carriage of goods by sea; Concept, elements and parties to the contract; Time-based charter party; Voyage-based charter party. 11. Documents on the contract of carriage of goods by sea; bill of lading; marine bill of lading; Electronic transport document; Shipowner (carrier) liability for damage to property and delay; Limitation of liability; Special cases of exemption of carrier liability. 12. Legal characteristics of the carriage of passengers and baggage by sea; Legal relations in towing. Transports with multiple carriers; Ship charter. 13. The concept of ship average; Legal sources; The role of insurance in maritime accidents; P. & I. clubs; Salvage at sea - legal sources, concept of rescue, types of rescue; Salvage award; Recovery of sunken objects; Removal of wreckage. 14. Marine environmental pollution; Dual Conventional Oil-Spill Compensation System: International Convention on Civil Liability for Oil Pollution Damage, 1992, and Convention for the Establishment of an International Pollution Damage Fund, 1992; International Convention on the Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS Convention); The International Convention on Civil Liability for Oil-Pollution Damage (Bunker); Shipowner's liability for

<table>
<tr><td></td><td colspan="6">damage; The role of the shipmaster in the prevention of marine pollution.
15. Collision of ships; Legal sources; International Convention for the Unification of Certain Rules of Law with respect to Collisions Between Vessels, 1910; The concept and types of collisions; Compensation of damage in case of ship collision; The role of the shipmaster in case of a ship collision.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars
☐ exercises
☐ on line entirely
☐ mixed e-learning
☐ field work</td><td colspan="3">☐ individual tasks
☐ multimedia
☐ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Students are required to attend classes, and record is kept of their attendance. In order to be eligible for taking the final exam, students must attend at least 80% of the lectures. In case of insufficient number of attendances, students are not entitled to taking the exam and are required to re-enroll the course in the following academic year.
The examination can be taken by continuous assessment during the semester by means of in-term exams or a final exam (written and / or oral exam).
Students who do not pass the in-term examinations and who have the right to take the final exam are required to take the written and / or oral examination within the examination term.
Students who have collected a sufficient number of credits during the classes are obliged to apply for the exam through Studomat for the first examination term after the classes and to register the grade in the exam term or to re-take the exam for a higher grade.

Responsibilities of part-time students:
In order to obtain the right of taking the final exam, students are required to attend a minimum of 50% of lectures. Examination procedures are the same as for regular students.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Lecture attendance</td><td>0.75</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>1.25</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td colspan="6">Evaluation and grading of the work of full-time students
Three in-terms are written during the semester. The first in-term covering the contents from the 1st to the 5th lectures is written in the 6th week of teaching, the second in-term comprising the materials from the 6th to the 9th lectures is written in the 10th week of the classes, while the third in-term test covers the materials from the 10th to 15 lectures and is written in the 15th week of classes. Exam questions for students are available at the end of each class. At each in-term, a minimum of 50% of the points is required for a passing grade. Students who do not take one of the exams for objective reasons or fail to achieve the minimum passing percentage of points are eligible for correction. For these students, a special in-term is additionally organized.
The final grade includes attendance and activity at lectures and continuous assessment.</td></tr>
</table>

Continuous student assessment:

Assessment elements	Success (min.%)	Percentage in grade (%)
Attendance and activity at lectures	80%	10
1. in-term test	50%	30
2. in-term test	50%	30
3. in-term test	50%	30

Grading:

Percentage (%)	Criterion	Grade
0 to 49,9	Does not satisfy minimum criteria	insufficient (1)
50 to 61,9	Satisfies minimum criteria	sufficient (2)
62 to 74,9	Average success with clear shortcomings	good (3)
75 to 87,9	Above average success with a few errors	very good (4)
88 to 100	Extraordinary success	excellent (5)

Students who do not pass the in-term examinations during the semester and who have the right to take the final exam are required to take the written and / or oral exam within the exam term. The same evaluation criteria apply to the examination term as to the continuous assessment.

Evaluation and grading of the work of part-time students
The evaluation and grading are the same as those for full-time students.

Required literature (available in the library and via other media)

Title	Number of copies in the library	Availability via other media
1. Grabovac, I. – Petrinović, R.: Pomorsko pravo – pomorsko javno, upravno i radno pravo, Split, 2006.	20	-
2. Pavić, D.: Pomorsko imovinsko pravo, Split, 2006	6	-

Optional literature (at the time of submission of study programme proposal)

1. Bolanča, D.: Hrvatsko plovidbeno upravno pravo, Split, 2015.
2. Bolanča, D.: Prometno pravo, Split, 2016.
3. Grabovac, I.: Suvremeno hrvatsko pomorsko pravo i Pomorski zakonik, Split, 2005.
4. Luttenberger, A.: Pomorsko upravno pravo, Rijeka, 2005.
5. Milošević Pujo, B. – Petrinović, R.: Pomorsko pravo za jahte i brodice, Split, 2008.
6. Pavić, D.: Pomorsko osiguranje – pravo i praksa, Split, 2012.
7. Pomorski zakonik, Narodne novine, br. 181/04, 76/07, 146/08, 61/11, 56/13, 26/15 i 17/19.

Quality assurance methods that ensure the acquisition of exit competences: University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.

Other (as the proposer wishes to add): -

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="5">COMMUNICATION, LEADERSHIP, AND TECHNICAL AIDS TO COMMUNICATION</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="3">3</td></tr>
<tr><td>Course teacher</td><td>Mila Nadrljanski, Ph.D., Full Prof.</td><td>Number of credits (ECTS)</td><td colspan="3">3</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2"></td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>0</td><td>15</td><td>0</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="3"></td></tr>
<tr><td colspan="6">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The basic goal is to familiarize students with the principles and application of technical means in maritime communication and beyond. These are the application of communication and business processes and business leadership.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="5">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="5">1. Analyze the components of the communication process.
2. Apply technical aids in communication processes.
3. Analyze organization, technical management, crew and behavior issues,
4. Analyze factors of taking attitude, risk management, finance, legal aspects of international conventions and regulations, achieving safety, maritime insurance.
5. Understand why events and situations take place as they do.
6. Make real-time decisions about how to optimize them.</td></tr>
<tr><td>Course content broken down in detail by weekly class schedule (syllabus)</td><td colspan="5">LECTURES

1. Introduction to Communication
2. Importance of communication and types of communication.
3. Change management.
4. Team management.
5. Time management.
6. Communication in crises.
7. Risk management.
8. Organization, technical management, crew.
9. Good manners in business communication.
10. Communication networks and computer technology.
11. Identification navigation systems.
12. Long Range Tracking System (LRIT)
13. Automatic Identification System (AIS).
14. BMP tools are used to help companies visualize and model, and measure and analyze.
15. BPM tools are used to assist companies in operational optimization, monitoring and control

EXERCISES
1. Writing CVs, business letters (application)
2. Preparing for the first interview, interview by the employer.
3. Simple surveys or snapshots of the situation, the importance of questions and answers.
4. Communication tools that can be used in a local context.
5. Information workshops, press conferences.
6. Check lists.</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">7. Meetings.
8. Seminars and conferences.
9. Being a coach.
10. Creating a message.
11. Directives for officials.
12. Public consultation exercises.
13. Press releases.
14. Speeches and presentations.
15. Various Media (TV, radio, open publicity)</td></tr>
<tr><td>Format of instruction</td><td>☒ lectures
☒ seminars
☒ exercises
☐ on line entirely
☐ mixed e-learning
☐ field work</td><td>☒ individual tasks
☐ multimedia
☐ laboratory
☐ mentor work
☐ simulator training</td></tr>
<tr><td>Student responsibilities</td><td colspan="2">Responsibilities of full-time students
Lectures and exercises are compulsory for students and a record of attendance is maintained.
In order to have the right to take the exam, a student must attend at least 80% of lectures and 100% of exercises. In case of insufficient number of attendances, the student is not entitled to take the exam and is obliged to enroll the course again next year.
If the student does not attend the exercises for objectively justifiable reasons, the method and form of compensation for the exercise should be agreed with the teaching assistant in the following week.
The examination can be taken either by continuous assessment during the semester by means of an in-term exam or a final exam (written and oral exam) within the exam term.
During the semester, two in-term tests are taken from the theoretical part of the course and three tests from the practical part.
The student is required to take all the in-term exams. An in-term exam is considered passed if at least 50% of the possible points have been collected.
Students who have written homework for the 15 exercises can take the final exam.
Students who have collected a sufficient number of credits during the classes (they have passed all the exams in the theoretical and practical part) are obliged to apply for the exam through Studomat for the first examination term after the classes and, depending on the result achieved, their grade is entered in Studomat.
Once a certain part of the exam is passed, it is no longer necessary to repeat it. The passed part of the exam will be valid within the academic year in which the student has enrolled in the course.
In course of the preparation for the exam, students can seek help of the appointed student teaching assistant according to the schedule times.
The final exam is scheduled within the official exam term, with the prior application through Studomat.
The exam consists of the theoretical (written and / or oral) part.
Only students who have the right to take the final exam can sit for the exam.
Responsibilities of part-time students
In order to get the right to take the final exam, students are required to attend 50% of lectures and 100% of exercises, and do the homework assignments. The rest of the material can be passed either continuously through the in-term exams or by taking the final exam (written and oral exam) in the exam terms.</td></tr>
<tr><td>Screening student work (name the</td><td>Lecture attendance</td><td>1.125</td><td>Research</td><td></td><td>(Other)</td><td></td></tr>
</table>

proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)	Experimental work		Report		Homework	0.5
	Essay		Seminar		(Other)	
	In-term tests	1.375	Oral exam		(Other)	
	Written exam		Project		(Other)	

Grading and evaluating student work in class and at the final exam

Evaluating and grading of full-time students work

During the classes, students are supposed to take the in-term exams, which follow after determined topics have been dealt with in the lectures and exercises.
Two (2) theoretical in-term tests are scheduled (in week 7 and week 15 of the course). The tests are taken in written form and at least 50% of correct and reasoned answers are required for a positive grade. A student who passes all the exams is exempted from the written / oral final exam and, depending on his / her score, at the first exam term his / her grade is entered in the Studomat.

Continuous assessment of students:

Assessment elements	Success (min.%)	Percentage in grade (%)
Attendance at lectures and activity at exercises	min 80% presence at lectures; 5 homeworks	10
Continuous check of exercises and homeworks	50	45
Continuous check of lectures	50	45
Total		100

To students who have passed one of the in-term tests, this will be considered as part of the final exam. The rest of the coursework is taken in the practical and theoretical parts of the final exam.

Final exam:

Evaluation elements	Success (min.%)	Percentage in grade (%)
Practical exam (written)	50	20
Theory exam (written and/or oral)	50	45
Previous activities (incl. all indicators of continuous assessment)	50	35
Total		100

Grading

Percentage (%)	Criterion	Grade
0 – 49.9	Does not satisfy minimum criteria	insufficient (1)
50 – 61.9	Satisfies minimum criteria	sufficient (2)
62 – 74.9	Average success with clear shortcomings	good (3)
75– 87.9	Above average success with a few errors	very good (4)
88 – 100	Extraordinary success	excellent (5)

Evaluation and grading of the work of part-time students
Evaluation and grading are the same as for full-time students.

	Title	Number of copies in the library	Availability via other media
Required literature (available in the library and via other media)	1. M. Nadrljanski; Upravljanje procesima i komunikacijama u pomorstvu, Split, 2019, Redak 2. S. Jukić & M. Nadrljanski; Komunikologija, Split, 2015, Redak 3. M. Nadrljanski; Komunikologija i menadžment, Split 2010, Redak	10 10	YES YES
Optional literature (at the time of submission of study programme proposal)	1. R. Buckland. Book of Spirit Communications. Levelin publication, 2004. 2. J. Litster, B. Ennis, L. Liu. Science and Engineering of Granulation Processes. Australia: The University of Queensland ,2004.		
Quality assurance methods that ensure the acquisition of exit competences	University survey, student records, supervision of teaching by the Faculty board for teaching, self-evaluation, analysis of passing rates at the end of the academic year, external evaluation of the grading process.		
Other (as the proposer wishes to add)			

2.14. Addendum to the Detailed proposal of the Study Programme – Introductory differential programme

The students who have not finished the maritime high-school, and wish to obtain the certificates of competency D2 and D19, are supposed to enrol in the introductory differential course Basic Safety and First Aid. The ECTS collected in this introductory differential course are not added to the ECTS credits necessary for the completion of the study.

<table>
<tr><td>NAME OF THE COURSE</td><td colspan="6">BASIC SAFETY AND FIRST AID</td></tr>
<tr><td>Code</td><td></td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course teacher</td><td>Zlatko Kljajić, PhD, Assist. Prof.</td><td>Number of credits (ECTS)</td><td colspan="4">2</td></tr>
<tr><td rowspan="2">Teacher associates</td><td rowspan="2">Paško Ivančić, M.Sc.</td><td rowspan="2">Format of instruction (number of hours in semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>45</td><td></td><td>25</td><td>5</td></tr>
<tr><td>Status of the course</td><td>elective</td><td>Percentage of e-learning</td><td colspan="4">20 %</td></tr>
<tr><td colspan="7">COURSE DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">Master the basic principles of personal survival. Recognize possible hazards, assess critical situations and be able to take appropriate measures to protect human lives in the event of emergencies and maritime accidents. Set priorities in the fire protection of the ship and identify the most favourable ways of dealing with the current circumstances. Pay particular attention to personal safety and social responsibility and consistently correct errors in the organization of these systems. Master first-aid methods. How not to harm while providing first aid. Check and secure the location of the accident. Conduct a routine screening of the injured or sick person and make a working diagnosis. Apply urgent first aid procedures. Understand when to apply resuscitation. Set priorities for care if there are more injured.</td></tr>
<tr><td>Course enrolment requirements and entry competences required for the course</td><td colspan="6">No requirements.</td></tr>
<tr><td>Learning outcomes expected at the level of the course (4 to 10 learning outcomes)</td><td colspan="6">1. Assess the current situation and choose the best ways to rescue people at risk.
2. Investigate options and plan rescue procedures thoroughly.
3. Identify possible fire hazards in a timely manner, properly deploy fire crews and assets, and resolve issues in ways that guarantee the least damage.
4. Set all work on board to the minimum capabilities of crew and passengers, for their safety, and adjust the degree of social responsibility to possible practice.
5. Identify possible negative phenomena in a timely manner, investigate the causes and select the best ways to eliminate them.
6. Assess the health status of the injured or ill. Identify the types of injuries or illnesses.
7. Save life by providing first aid if possible.
8. Prevent permanent consequences (damage, disability, death).
9. Shorten the duration of treatment and rehabilitation by providing proper</td></tr>
</table>

	procedures. 10. Use basic medical and additional equipment on board.
Course content broken down in detail by weekly class schedule (syllabus)	**Lectures:** 1. Safety and survival at sea, emergency cases. 2. Abandoning the vessel and basic means of survival, and survival at sea. 3. Survival craft. 4. Helicopter rescue and communication in distress. 5. Principles of fire protection, combustion theory. 6. Fire protection. 7. Fire detection. 8. Installed fire extinguishing systems. 9. Fire fighting agents. 10. Shipboard fire extinguishing equipment 11. Methods of fire extingushing. 12. Safety aboard and interpersonal relationships. 13. Understanding orders and the ability to understand the assigned duties. 14. Emergency procedures, pollution prevention measures. 15. Interpresonal relationships aboard. **Exercises:** 1. Abandoning the vessel. 2. Basic life-saving apparatus. 3. Basic life-saving apparatus. 4. Basic life-saving apparatus. 5. Basic life-saving apparatus. 6. Means of communication in distress. 7. Communication in distress, communication with the helicopter/plane. 8. Handilng of fire extinguishers. 9. Extinguishing small fires. 10. Extinguishing larger fires. 11. Extinguishing in smoke-filled spaces. 12. Extinguishing in smoke-filled spaces. 13. Interpersonal relations. 14. Understanding commands, emergency procedures. 15. Environmental pollution prevention measures. **Lectures:** 1. Basic principles of providing first aid aboard. The importance and obligation of providing first aid aboard. 2. Difference in procedures and attitudes between providing first aid at sea and on shore. 3. First-aid equipment. 4. Conditions requiring urgent intervention (stop of breathing and heartbeat, severe bleeding, shock, and unconsciousness). 5. Control of vital functions. Pulse and respiration check. 6. ABC rule and examination outcomes. Signs of certain and apparent death. 7. Resuscitation principles. 8. Types and causes of shock and first aid. External heart massage. 9. Methods of artificial respiration. 10. Types of bleeding, stopping bleeding. 11. Fractures, types and signs. First aid procedures, immobilization.

<table>
<tr><td></td><td colspan="6">12. Burns, first-aid procedures.
13. On-board poisoning and first aid.
14. On-board eye injuries and first aid.
15. Hypotermia and heat wave, first aid. Types of wounds and first aid.

Exercises:
1. Demonstration of first aid equipment and medical first aid on board.
2. Orientation on the condition of the injured person and making a diagnosis.
3. External heart massage.
4. Artificial respiration
5. Help against choking. Demonstration of artificial respiration methods.
6. Determining the point for pulse measurement.
7. CPR mask and oxygen tank.
8. Means of stopping external bleeding. Determining the point of digital compression as a method of stopping bleeding.
9. Immobilisation with fracture of limbs, immobilisation of suspected spinal injury.
10. Procedure with open and closed burns.
11. Agents for the disinfection of the wound and the surrounding area, skin disifectants.
12. Eyewash.
13. Simulation of first aid for poisoning.
14. Simulation of first aid for hypothermia.
15. Securing the injured for transport.</td></tr>
<tr><td>Format of instruction</td><td colspan="3">☒ lectures
☐ seminars and workshops
☒ exercises
☐ on line in entirety
☐ partial e-learning
☒ field work</td><td colspan="3">☐ independent assignments
☐ multimedia
☐ laboratory
☐ work with mentor
☐ (other)</td></tr>
<tr><td>Student responsibilities</td><td colspan="6">Responsibilities of full-time students:
Lectures and exercises are compulsory for students, and attendance records are kept. In the case of an insufficient number of attendances at classes, students have not met the condition of class attendance and are required to re-enroll in the course the following year.
Students have the option to pass the exam with continuous assessment during the semester by taking two in-term tests. Students are required to take both tests.
Students who do not pass the in-term tests during the semester, but have fulfilled the condition of attending classes, shall take the written exam during the exam period.

Responsibilities of part-time students are the same as those of full-time students. Exams and evaluation are the same as those for full-time students.</td></tr>
<tr><td rowspan="5">Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course)</td><td>Class attendance</td><td>1.875</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Essay</td><td></td><td>Seminar essay</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>In-term tests</td><td>0.125</td><td>Oral exam</td><td></td><td>(Other)</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td>(Other)</td><td></td></tr>
</table>

<table>
<tr><td>Grading and evaluating student work in class and at the final exam</td><td>

Evaluation and grading of full-time students:

To obtain the certificate D2 - Basic safety on board (STCW A-VI/1) 95% attendance at classes and 100% attendance at exercises is required.
To obtain the certificate D19 – Medical First Aid (STCW VI/4-1) 95% attendance at classes and 100% attendance at exercises is required.

Two in-term tests are written in the semester. The first test, covering lectures 1 to 6, is written in the seventh week of classes, and the second test, covering lectures 7 to 14, is written in the fifteenth week of classes. Sample questions for the tests are available to students at the end of each lecture. At each test, it is necessary to obtain at least 60% of the points for a passing grade. Students who do not take an in-term test for objective reasons or do not achieve the minimum passing percentage have the possibility of correction. Correction will be organized for these students in the seventh and fifteenth weeks of teaching.

There are no conventional grades in this course. The course is considered passed when all the exams are passed and all obligations are fulfilled as stated below.

Continuous assessment:

Assessment elements	Success (min. %)	Percentage in grade (%)
Class attendance	95	7.5
Seminar paper	100	2.5
In-term test I	60	45
In-term test II	60	45

Students who do not pass the in-term tests during the semester, and who have met the condition of class attendance, shall take the written exam during the exam period. The same evaluation criteria apply to the exam period as to continuous knowledge testing.

Grading

There are no conventional grades in this course. The course is considered passed when all the exams are passed and all obligations are completed.

</td></tr>
<tr><td>Required literature (available in the library and via other media)</td><td>

Naslov	Broj primjeraka u knjižnici	Dostupnost putem ostalih medija
1. D. Zec. Sigurnost na moru. Rijeka: Pomorski fakultet u Rijeci, 2001.	10	YES
2. R. Mulić, D. Ropac: Medicina za pomorce. Zagreb: Medicinska naklada, 2003.		
3. .....: *International Medical Guide for Ships*, 3rd edition. WHO, Geneva, 2007.		YES

</td></tr>
<tr><td>Optional literature (at the time of submission of study programme proposal)</td><td>/</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of exit competences</td><td>The quality of study is continuously monitored in accordance with the ISO 9001 system implemented at the Faculty of Maritime Studies in Split. An analysis of the passing rates at exams is made annually and a student survey is conducted once a semester.</td></tr>
</table>

Other (as the proposer wishes to add)	