Undergraduate Vocational Study of Naval Architecture - YACHT DESIGN & CONSTRUCTION

(Stručni prijediplomski studij brodogradnje - YACHT DESIGN & CONSTRUCTION)

	ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1st year	Sem. I	INTRODUCTION TO ENGINEERING MATHEMATICS (UVOD U INŽENJERSKU MATEMATIKU)								MECHANICS (MEHANIKA)						MATERIALS (MATERIJALI)					PRACTICAL DRAFTING (TEHNIČKO CRTANJE)						MARINE VESSELS (PLOVNI OBJEKTI)				
	Sem. II	PRACTICAL MATHEMATICS (MATEMATIČKI PRAKTIKUM)					SHIP STRUCTURAL ELEMENTS (STRUKTURNI ELEMENTI BRODA)						PRIMJENJENA MEHANIKA (APPLIED MECHANICS)			HULL GEOMETRY (BRODSKE FORME ST)					SHIP CLASSIFICATION AND CERTIFICATION (KLASIFIKACIJA BRODA I CERTIFIKACIJA)					CONSTRUCTION METHODS (TEHNOLOGIJA BRODOGRADNJE I)				
2nd year	Sem. III	HYDROSTATICS AND STABILITY (HIDROSTATIKA I STABILITET)								HULL CONSTRUCTION AND SCANTLINGS (KONSTRUKCIJA BRODA)						INTERIOR DESIGN (ERGONOMIJA I DIZAJN)									ELECTRICAL SYSTEMS (BRODSKA ELEKTROTEHNIKA)				
	Sem. IV	SHIP HYDRODYNAMICS (HIDRODINAMIKA BRODA)								SYSTEMS AND EQUIPMENT (OPREMA BRODA ST)						PROPULSION SYSTEMS (PORIVNI SUSTAVI)									CONSTRUCTION DESIGN (TEHNOLOG. BRODOGRADNJE II)				
3rd year	Sem. V	DESIGN EVALUATION (OSNIVANJE PLOVNIH OBJEKATA)								ENVIRONMENT PROTECTION (ZAŠTITA OKOLIŠA)						ORGANISATION AND ECONOMICS (ORGANIZACIJA I EKONOMIKA)					ELECTIVE SUBJECT (SLOBODNI KOLEGIJ)					ASSEMBLY AND OUTFITTING (TEHNOLOG. BRODOGRADNJE III)				
	Sem. VI	PROFESSIONAL PRACTICE or ERASMUS (STRUČNA PRAKSA ili ERASMUS)														FINAL THESIS (ZAVRŠNI RAD)															

ELECTIVE SUBJECT (SLOBODNI KOLEGIJ)				
MAINTENANCE AND OPERATION OF VESSELS (REMONT I EKSPLOATACIJA PLOVNIH OBJEKATA)	APPLIED COMPUTING VO (PRIMJENA RAČUNALA ST)	QUALITY ASSURANCE VO (OSIGURANJE KVALITETE ST)	AUTOMATION VO (AUTOMATIZACIJA ST)	PRODUCTION SYSTEMS (PROIZVODNI SUSTAVI)
COMMUNICATION SKILLS (KOMUNIKACIJSKE VJEŠTINE)	HYDRAULICS AND PNEUMATICS (HIDRAULIKA I PNEUMATIKA)	TECHNOLOGICAL PROCESSES VO (TEHNOLOŠKI PROCESI ST)	MEASURING TECHNOLOGY VO (MJERNA TEHNIKA ST)	RADIO COMMUNICATIONS VO (RADIOKOMUNIKACIJE ST)

Basic description		
Course title	**Applied Computing VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	elective	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	15+30+0

1. COURSE DESCRIPTION

1.1. Course objectives

Acquiring knowledge and skills necessary for active participation in an computer aided engineering environment. This primarily refers to acquiring basic knowledge of computer technology and the use of office software, as well as acquiring knowledge of the basics of programming in high-level programming languages.

1.2. Course enrolment requirements

No requirements.

1.3. Expected course learning outcomes

Adopt the basic concepts of computer technology. Use standard table calculators. Use high-level programming languages for general engineering purposes.

1.4. Course content

Basic concepts of computer technology (types of computers, computer hardware, operating systems, Internet, computer security). Tabular calculations. Programming in high-level programming language for engineering needs.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance, class participation, studying.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Continuous knowledge testing, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

N Brown, et.al., Beginning Excel 2019, Open Oregon Educational Resources
Računarsko inženjerstvo uz programski jezik Python (textbook), Faculty of Engineering, 2018. (e-book)

1.11. Optional / additional reading (at the time of proposing study programme)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
N Brown, et.al., Beginning Excel 2019, Open Oregon Educational Res.	on-line free	10

Računarsko inženjerstvo uz programski jezik Python (textbook), Faculty of Engineering, 2018. (e-book)	e-book	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Applied Mechanics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	4
	Number of hours (L+E+S)	15+15+0

2. COURSE DESCRIPTION

1.1. Course objectives

Ability to determine the dimensions and materials of load-bearing structures or their individual parts under external loads.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Define the concepts of strain, stress, and Hooke's law. Calculate stress and strain of members loaded with axial forces, subjected to shear and torsion, and determine their dimensions according to specified design criteria. Verify the strength of structural elements subjected to bending and determine their dimensions according to specified design criteria. Determine the deflection curve of beam. Determine the critical load of members subjected to buckling and determine their dimensions according to specified design criteria.

1.4. Course content

Stress and strain. Hooke's law. Axial loading. Shear. Torsion. Bending. Deflection curves. Buckling of structural elements. Design in accordance with external loading. Applications.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, active participation in class, a midterm test, and independent study.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Active participation in class, continuous knowledge assessment (midterm tests), a written exam, and an oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Brnić, J., Turkalj, G.: "Nauka o čvrstoći I", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004. (in Croatian)
Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Nash, W.: "Strength of Materials", Schaum's Outline Series, McGraw-Hill, New York, 1998.
Gross, D., Hauger, W., Schroder, J., Wall, W.A., Bonet, J.: „Engineering Mechanics 2", Springer, 2018.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996.	15	10
Brnić, J., Turkalj, G.: "Nauka o čvrstoći I", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.	19	10
1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences		
Through the Institution's quality assurance system.		

Basic description		
Course title	**Automation VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	3.	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	45+15+0

3. COURSE DESCRIPTION

1.1. Course objectives

Understanding the basic principles of automation and its impact on economic and social development.

1.2. Course enrolment requirements

No requirements.

1.3. Expected course learning outcomes

Explain the historical development of automation, the reasons for introducing automation, and the advantages and disadvantages of automation. Define levels of automation and explain the means of automation used in production and service activities. Analyse methods and strategies of automation. Define and apply methodologies for the analysis and synthesis of flexible and intelligent systems. Explain the characteristics of self-organising systems, including their structure, function, advantages and limitations, and analyse the evolution of automatic devices, machines and systems. Analyse representative examples of automatic devices, machines and systems and define control scenarios and control strategies. Analyse the current state and development trends in automation and identify key development barriers and possibilities for forecasting.

1.4. Course content

Historical review of the automatic circuits, devices and machines. Ancient and medieval automata. Five levels of automation: assembly, device, machine, system and plant. Automation of manufacturing and service activities. Modern means of automation of production: digital computers, manipulators, robots. Automation strategy. Leading ideas and methodology of synthesis of flexible and intelligent systems. Artificial Intelligence. Self-organizing and autonomous systems. Economic and social aspects of automation of human activities. Selected examples of modern automated machines and systems. Current scientific research projects. Present status and development trends of automation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance, activities in the classroom, homework and self-study

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Activities in the classroom, homework, two control written exam and final oral and written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Nikolić, G.: Pneumatics And Hydraulics: Part 1, Pneumatics, Školske novine, Zagreb, 2010. (in Croatian)
B. Katalinic, Industrieroboter und Flexible Systeme für Drehteile, VDI Verlag, Düsseldorf, 1990.
B. Katalinic, Intelligent Manufacturing Systems, skripta, Technische Universität Wien.

1.11. Optional / additional reading (at the time of proposing study programme)

Katalinic, B., Bionic Assembly Systems: Selforganizing Complex Flexible Assembly System, Acta Mechanica Slovaca, Vol. 6, No. 2/2002, pp. 15-20, ISSN: 1335-2393.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Nikolić, G.: Pneumatics And Hydraulics: Part 1, Pneumatics, Školske novine, Zagreb, 2010. (in Croatian)	1	10
B. Katalinic, Industrieroboter und Flexible Systeme für Drehteile, VDI Verlag, Düsseldorf, 1990.	1	10
B. Katalinic, Intelligent Manufacturing Systems, skripta, Technische Universität Wien.	2	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Assembly and Outfitting**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+60+0

4. COURSE DESCRIPTION

1.1. Course objectives

Acquisition of specific competencies in the construction and fitting-out of small vessels.

1.2. Course enrolment requirements

Completed the course Construction Design.

1.3. Expected course learning outcomes

Define procedures for the construction of vessels using wooden, plastic and metal materials. Define procedures for the installation of the propulsion engine and its associated systems. Describe activities related to the interior and exterior outfitting of vessels. Specify and plan procedures for the integration of vessel construction and outfitting. Prepare selected production drawings and the associated technical documentation.

1.4. Course content

Procedures for the construction of vessels made of wooden materials, plastic materials, and metals. Procedures for the installation of propulsion engines with associated systems. Interior and exterior vessel outfitting works. Procedures for integrating vessel construction and outfitting. Production drawings and technical documentation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Bolf.: Teaching materials published on the e-course platform, 2026.

1.11. Optional / additional reading (at the time of proposing study programme)

du Plessis, H.: Fibreglass Boats, International Marine, Camden, 1996.
Gougeon, M., The Gougeon Brothers on Boat Construction, GougeonBrothers Inc., Bay City, 2005.
Pollard, S.F., Boatbuilding with Aluminum, International Marine, Camden, 1993.
Steward, R.M. Boatbulding Manual, 4th edition, International Marine, Camden, 1994.

Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Bolf.: Teaching materials published on the e-course platform, 2026.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Communication Skills**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	elective	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	15+15+0

5. COURSE DESCRIPTION

1.1. Course objectives

The aim of the course is to enable students to acquire knowledge and skills related to the fundamental communication needs of engineers both in the domestic and international environment, such as presenting professional content, writing CVs, job applications, emails and reports in English and Croatian.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Apply the norms of the Croatian standard language in written and oral public communication. Apply the norms of the English standard language in written and oral public communication. Apply questioning skills and present professional content. Apply skills in writing formal and official correspondence. Critically assess one's own and others' communication skills. Negotiate and demonstrate assertive communication skills. Actively participate in teamwork.

1.4. Course content

Introduction, active learning methods, learning styles. Verbal and non-verbal communication. Active listening. Questioning skills. Persuading and negotiation. Written communication: writing emails, CVs, motivation letters, job applications and reports. Presentation skills. Strategies for eliminating stage fright and fear of public speaking. Presentation of professional content. Communication and participation in group and teamwork. Critical assessment and providing feedback. Intercultural competence, cultural differences and etiquette.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, active participation in the teaching process, autonomous learning.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation	x	Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Active participation, knowledge check (1 midterm test), preparing and giving a presentation, writing emails, a CV, a motivation letter, a job application and a report.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Thomas E. Harris, John C. Sherblom (2018), Small Group and Team Communication, Waveland Press
Kamilo Antolović, Nikša Sviličić (2020.), Komunikacijske vještine. Verbalne i neverbalne utjecajne tehnike, K&K promocija, Zagreb

1.11. Optional / additional reading (at the time of proposing study programme)

John W. Davies (2001), Communications skills
Mirjana Matea Kovač, Nina Sirković (2014), Presentation, writing and interpersonal communication skills, FESB

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Thomas E. Harris, John C. Sherblom (2018), Small Group and Team Communication, Waveland Press	1	10
Kamilo Antolović, Nikša Sviličić (2020.), Komunikacijske vještine. Verbalne i neverbalne utjecajne tehnike, K&K promocija, Zagreb	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Construction Design**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

6. COURSE DESCRIPTION

1.1. Course objectives

Within the course, students acquire fundamental knowledge in the construction of a vessel using a selected technology.

1.2. Course enrolment requirements

Completed the course Construction Methods.

1.3. Expected course learning outcomes

Describe and distinguish types of documentation. Define and prepare drawings of the hull and stiffening structure. Define and prepare deck drawings with reinforcements. Define and prepare drawings of connections between structural elements. Present characteristic cross-sections of structural elements. Prepare a material specification. Define the masses and positions of the centres of gravity of structural elements. Prepare documentation in accordance with the selected construction technology and applicable standards. Define preparatory tools and procedures for construction.

1.4. Course content

List of documentation. Hull and framing drawings. Deck drawings with reinforcements. Drawings of structural element joints. Characteristic cross-sections of structural elements. Material specifications. Masses and positions of centers of gravity of structural elements. Documentation in accordance with the selected construction technology and applicable standards. Preparation of tools and procedures for construction.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Bolf.: Teaching materials published on the e-course platform, 2026.

1.11. Optional / additional reading (at the time of proposing study programme)

ISO Norms
Rules and regulations of classification societies.

Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Bolf.: Teaching materials published on the e-course platform, 2026.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Construction Methods**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+15+0

7. COURSE DESCRIPTION

1.1. Course objectives

Students acquire knowledge in the field of vessel construction through the application of different technologies, with the aim of selecting the optimal construction technology in accordance with defined learning outcomes.

1.2. Course enrolment requirements

Completed the course Construction Methods.

1.3. Expected course learning outcomes

Interpret the development and specific characteristics of the shipbuilding process. Describe the storage and preparation of materials for ship hull structures. Describe and distinguish relevant technologies used in the construction of vessels. Explain methods for reproducing dimensions and shapes, as well as marking and processing elements of ship structures. Determine procedures, machines and equipment for material processing. Analyse the phases of vessel construction and material flows. Explain methods of outfitting and transport. Interpret the fabrication of elements using different construction technologies. Determine input parameters for multi-criteria analyses. Apply multi-criteria analysis to select the optimal vessel construction technology.

1.4. Course content

Basic principles of shipbuilding technology; the development and specific characteristics of vessel construction processes. Materials for vessel construction. Specific characteristics of steel and aluminum. Specific characteristics of composite materials. Phases of vessel construction. Automated production lines. Work surfaces and facilities for vessel construction. Outfitting and transportation. Multicriteria analysis.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Hadjina, Matulja, Bolf.: Teaching materials published on the e-course platform, 2026.

1.11. Optional / additional reading (at the time of proposing study programme)

Meade Gougeon: The Gaugeon Brothers on Boat Construction, 5th Edition, 2005.
Eric Greene Associates: Marine Composites, 2nd Edition,1999.
Ernest H. Sims: Aluminium Boatbuilding, 2000.
Thomas L. Saaty: Decision Making, 1994.
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Hadjina, Matulja, Bolf.: Teaching materials published on the e-course platform, 2026.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Design Evaluation**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+60+0

8. COURSE DESCRIPTION

1.1. Course objectives

Developing an understanding of the complexity of ship design. Based on fundamental knowledge of technical requirements and methods of compliance, establishing a broader foundation for understanding the key factors involved in vessel design.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Describe the concept of vessel design initiation and analyse the phases of design initiation within the second cycle of the design spiral. Define the concept of a design requirement as well as the concept design and preliminary design. Prepare a preliminary design. Define displacement and hull form elements and perform checks of floatability and stability. Analyse design rationality. Perform a preliminary propulsion calculation and prepare a prediction diagram. Define individual weight components in different iterative phases of the design process. Prepare the general arrangement, technical description and classification documentation. Apply computer-based tools for basic design calculations in the process of vessel design initiation. Prepare handover and delivery documentation.

1.4. Course content

Vessel design within the second loop of the design spiral. Phases of vessel design. Design requirements. Concept design. Preliminary design. Methods for developing a preliminary design. Determination of the principal characteristics of the ship. Determination of displacement and form characteristics, and verification of buoyancy and stability. Subdivision. Selection of hull form and development of ship lines. Determination of required power. Preparation of the general arrangement plan. Subdivision. Arrangement of ship spaces and tanks. Preliminary weight estimation. Final design. Technical description. Classification documentation. International regulations, standards, and conventions, as well as classification society rules related to vessel design. Application of computer tools for basic design calculations. Delivery and acceptance documentation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Marin, M.: Teaching materials published on the e-course platform, 2026.
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Marin, M.: Teaching materials published on the e-course platform, 2026.	On-line	10
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Environmental Protection**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+15+15

9. COURSE DESCRIPTION

1.1. Course objectives

Develop knowledge and skills to identify, analyze, and apply marine environmental protection measures in vessel design, construction, and operation, in line with sustainable development principles and applicable regulations.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Explain fundamental ecological concepts and the principles governing the functioning of marine ecosystems. Analyse the impact of anchoring and nautical infrastructure on the seabed and the coastal environment. Assess the toxicological risks of chemical agents used in the maintenance and production of vessels. Apply procedures for the management and disposal of hazardous waste in accordance with applicable regulations. Describe the methodology for preparing an environmental impact assessment. Apply relevant international conventions and national regulations in the field of marine environmental protection.

1.4. Course content

Introduction to ecology and environmental protection, including soil, atmosphere, inland waters, and seas, and their interaction with the environment. Coastal and marine ecosystems and the impacts of anchoring, including seabed disturbance, mechanical degradation, destruction of seagrass meadows, and the effects of concrete blocks on ecosystems. Environmentally sustainable anchoring systems and alternative mooring solutions. Toxicology of antifouling coatings, biocides, their mechanisms of action, and impacts on marine organisms. Vessel maintenance practices, hull cleaning and washing procedures, management of contaminated wastewater, and disposal of waste oils and filters following engine servicing. Production of composite vessels, waste streams generated during production, and disposal of resins, acetone, solvents, and glass fiber reinforcements. Environmental impact assessment methodology and content, with applications in the design of marinas and ports. International conventions and national regulations governing marine environmental protection. Principles of sustainable development in the nautical and maritime industries.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☒ seminars and workshops	☐ multimedia and network
	☒ exercises	☐ laboratories
	☒ long distance education	☒ mentorship
	☒ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper	x	Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Briški, F.: Zaštita okoliša, Fakultet kemijskog inženjerstva i tehnologije, Zagreb, 2016.
Črnjar, M.: Ekonomika i politika zaštite okoliša, Ekonomski fakultet, Rijeka, 2002.
Potters, G.: Marine Pollution, 1st edition, Bookboon.com, 2013. (ISBN 978-87-403-0540-1)
Arai, T., Harino, H., Ohji, M., Langston, W. J. (Eds.): Ecotoxicology of Antifouling Biocides, Springer, Tokyo, 2009. (ISBN 978-4-431-85708-2)
Regulation on Environmental Impact Assessment, Official Gazette (Narodne novine), No. 59/2000.

1.11. Optional / additional reading (at the time of proposing study programme)

Environmental Protection Act, Official Gazette (Narodne novine), No. 110/2007.
Regulation on Environmental Impact Assessment, Official Gazette (Narodne novine), No. 61/2014.
Regulation on Strategic Environmental Assessment of Strategies, Plans and Programmes, Official Gazette (Narodne novine), No. 3/2017.
Regulation on the Ecological Network and the Competences of Public Institutions for the Management of Ecological Network Areas, Official Gazette (Narodne novine), No. 80/2019.
Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora, Official Journal of the European Communities, No. L 206/7

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Briški, F.: Zaštita okoliša, Fakultet kemijskog inženjerstva i tehnologije, Zagreb, 2016.	1	10
Črnjar, M.: Ekonomika i politika zaštite okoliša, Ekonomski fakultet, Rijeka, 2002.	1	10
Potters, G.: Marine Pollution, 1st edition	On-line	10
Arai, T., Harino, H., Ohji, M., Langston, W. J.: Ecotoxicology of Antifouling Biocides	On-line	10
Regulation on Environmental Impact Assessment, Official Gazette (Narodne novine), No. 59/2000	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Final Work**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	20
	Number of hours (L+E+S)	-

10. COURSE DESCRIPTION

1.1. Course objectives

The final thesis constitutes independent work and an evaluation of the candidate's professional knowledge, and should demonstrate an appropriate engineering level of competence for the independent solution of a specific professional problem.

1.2. Course enrolment requirements

Enrolled in the course for which the final thesis has been selected.

1.3. Expected course learning outcomes

Apply the acquired knowledge and skills from the professional content of the relevant course. Solve a practical task. Acquire competencies for the independent resolution of a concrete professional task.

1.4. Course content

The content of the final thesis is based on the application of knowledge acquired during the undergraduate professional study program. The final thesis is generally assigned within a course of specialized professional content; exceptionally, it may be assigned within a course belonging to the group of common professional contents when it represents a broader unit linked to a specific specialized course. The student enrolls in the final thesis upon enrolment in the final semester. The topic of the final thesis is determined by the Final Examination Committee, upon the proposal of the course instructor or thesis supervisor.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of consultations, independent completion of the task, and preparation of the final thesis in written form.

1.8. Evaluation of student's work

Course attendance		Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check		Report		Practice	
Portfolio		Independent execution of the task.	x	Final work	x		

1.9. Assessment and evaluation of student's work during classes and on final exam

Assessment and evaluation are based on the accuracy and completeness of the solution to the assigned problem, the quality of the final thesis, and its oral defense.

1.10. Assigned reading (at the time of the submission of study programme proposal)

-

1.11. Optional / additional reading (at the time of proposing study programme)
-

1.12. Number of assigned reading copies with regard to the number of students currently attending the course		
Title	*Number of copies*	*Number of students*
-		

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences
Through the Institution's quality assurance system.

Basic description		
Course title	**Hull Geometry**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

11. COURSE DESCRIPTION

1.1. Course objectives

Developing an understanding of the spatial shaping of vessel forms, and fostering an appreciation for the fairness and smoothness of ship lines and surfaces.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Describe and define the hull forms of displacement, semi-displacement and planing vessels, and explain their fundamental characteristics. Describe and distinguish the hull forms of special types of vessels. Define and explain the geometric representation of hull form using lines plans. Define the principal dimensions of a vessel and analyse and justify hull form coefficients. Define the load line freeboard, its corrections, and describe and distinguish hull markings. Distinguish and justify numerical descriptions of hull form using computer-based methods. Define and describe appendage forms. Analyse similarities between hull forms and explain methods of hull form variation.

1.4. Course content

General overview of ship and small craft hull forms, with reference to technical requirements related to vessel design and operational performance. Hull forms of displacement, semi-displacement, and planing vessels. Hull forms of special vessel types, including hydrofoil vessels, SWATH vessels, underwater vehicles, and others. Special hull form features at the bow and stern. Hull forms of multihull vessels. Geometric representation of hull forms through ship lines, including 3D curved surfaces and 2D and 3D curves. Hull form coefficients and methods of hull form representation. Numerical modeling and description of hull forms using computer-based methods. Appendage forms such as rudders, keels, bilge keels, hydrofoils, and others. Hull form similarity and variation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Grubišić, I.: Ship Geometry, Digital Textbook.
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.11. Optional / additional reading (at the time of proposing study programme)

Classification society regulations (HRB), with particular emphasis on definitions of principal dimensions, terms and terminology, and the chapter on ship freeboard.
Guidelines for the use of software for ship hull form modeling.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Grubišić, I.: Ship Geometry, Digital Textbook.	On-line	10
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Hydraulics and Pneumatics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	elective	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	45+15+0

12. COURSE DESCRIPTION

1.1. Course objectives

Mastering the basics of hydrostatic and pneumatic power transmissions, the application of knowledge to assemble circuits and simulations on commercial computer program.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Explain the principles of power transmission in hydraulic and pneumatic systems. Define sources of hydraulic power and compressed air. Distinguish and explain control components used in hydraulic and pneumatic systems. Describe auxiliary devices in hydraulic and pneumatic systems. Define logic circuits and types of control. Interconnect hydraulic and pneumatic components in simple systems. Apply and implement acquired knowledge in complex hydraulic and pneumatic systems.

1.4. Course content

Development and application of hydraulic and pneumatic equipment and systems. Standardized symbols of hydraulic and pneumatic components. Working fluids. Energy and power in hydraulic and pneumatic systems. Sources of the hydraulic energy and compressed air (pumps and compressors). Actuators (motors and cylinders). Control components of hydraulic and pneumatic systems (valves, pressure valves, flow control valves). Auxiliary devices for the transmission of energy (pipelines, fittings, filters, tanks, hydro accumulators, devices for maintaining the temperature of the fluid, the elements of air treatment, contact-free sensors, pneumatic gates and reflex nozzles, switches, indicators, signal converters, silencers). Hydro-pneumatic devices. Vacuum devices. Pneumatic logic circuits. Designing of the fluid power systems.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☒ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, laboratory work, the application of knowledge to a specific system for fluid power transmission through an essay.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper	x	Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	x
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Class activity, assembling circuits in laboratory, continuous knowledge testing (two mid-term exams), essay, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Siminiati, D.: Oil Hydraulics, Tehnički fakultet Sveučilišta u Rijeci, Rijeka, 2012. (in Croatian)
Bauer, G.: Ölhydraulik, B. G. Teubner, Stuttgart, 1992.

Nikolić. J.: Pneumatic Control, Zagreb, 1976. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Krist, T.: Hydraulik, Fluidtechnik, Vogel Buchverlag, 1997.
Haug, R.: Pneumatische Steuerungstechik, Teubner, Stuttgart, 1991.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Nikolić. J.: Pneumatic Control, Zagreb, 1976. (in Croatian)	3	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Hydrostatics and Stability**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+45+0

13. COURSE DESCRIPTION

1.1. Course objectives

Developing a foundation for independent, physics-based understanding of buoyancy, stability (static and dynamic), unsinkability, grounding, and docking.

1.2. Course enrolment requirements

Completed the course Hull Geometry.

1.3. Expected course learning outcomes

State weights and define and interpret the concepts of centre of gravity, buoyancy and centre of buoyancy. Define the static equilibrium of a floating object and state and analyse the conditions of floatability. Define the calculation of the metacentric radius and metacentric height. Analyse parameters obtained from hydrostatic curves and diagrams. Define and analyse static stability. State and analyse factors affecting stability. Define and analyse flooding and describe the subdivision curve, and explain the statistical method of subdivision. Define the concept of dynamic stability. State and describe procedures for docking and undocking, grounding and refloating. Analyse and compare international regulations and classification society rules related to ship hydrostatics. Analyse computer-based processing of hydrostatics and stability of floating objects.

1.4. Course content

Weights and centers of gravity. Buoyancy and center of buoyancy. Static equilibrium and conditions of vessel buoyancy. Calculation of metacentric radius and metacentric height. Methods for buoyancy calculation. Determination of waterplane area characteristics. Hydrostatic curves. Static stability (transverse and longitudinal), including initial stability, stability at large angles, and special stability cases. Righting levers and static stability moments. Immersion (TPC) and moment to change trim (MCT). Effects of free surfaces and hull form on stability and metacentric curves. Unsinkability, load line limits, flooding, subdivision, and metacentric curves. Dynamic stability. Docking and undocking procedures, grounding and refloating operations. Application of computer-based methods for hydrostatic and stability analysis in ship design.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Rawson, K.J., Tupper, A.C.: Basic ship theory, Volume 1, 2001.
L.Larsson, et al: Principles of Yacht Design, 2022.

1.11. Optional / additional reading (at the time of proposing study programme)

Moore, C. S.: Principles of Naval Architecture Series: Intact Stability. The Society of Naval Architects & Marine Engineers (www.sname.org), 2010.
Biran, A. B.: Ship hydrostatics and stability, 2006.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Rawson, K.J., Tupper, A.C.: Basic ship theory, Volume 1, 2001.	On-line	10
L.Larsson, et al: Principles of Yacht Design, 2022.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Interior Design**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+45+0

14. COURSE DESCRIPTION

1.1. Course objectives

The aim of the course is to introduce students to ergonomic principles and methods of their application in vessel design, with an emphasis on the design of interior and exterior spaces in the context of yacht design. The course aims to develop the ability to analyze the relationship between the user, the vessel, and the operational environment, and to equip students with the skills needed to integrate ergonomic, safety, and usability requirements into design solutions. Special emphasis is placed on the application of applicable standards and classification society guidelines, as well as on the development of professional responsibility through mentor-guided project work and the use of modern digital tools.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Analyse user ergonomic requirements and operational scenarios in vessel design with regard to the safety, functionality and usability of interior and exterior spaces. Apply ergonomic principles and applicable standards in the design of interior spaces of vessels, including accommodation, circulation, living and working areas. Apply and compare ergonomic solutions for exterior areas of vessels, including decks, working and service surfaces and circulation routes, with respect to safety of movement and use. Evaluate vessel design solutions from ergonomic, safety and usability perspectives using guidelines of classification societies and international standards. Develop an ergonomically based vessel design concept through a mentor-guided project, providing reasoned justification of the selected solutions. Communicate and justify design solutions within a team and mentor-supported environment using digital tools and distance-learning methods. Assume responsibility for the planning, implementation and evaluation of the project task in accordance with professional standards of vessel design.

1.4. Course content

The role of ergonomics in vessel and yacht design. Interaction between the user, the vessel, and the operational environment. Ergonomic requirements throughout the different stages of vessel operation. International standards and classification society guidelines relevant to vessel ergonomics. Ergonomics of interior spaces: layout and functionality of accommodation, living, and working areas; internal circulation and movement; safety and usability aspects of interior design. Ergonomics of exterior areas: decks, working and service surfaces; safety of movement; access and circulation; maintenance and equipment handling. Evaluation of ergonomic solutions through case studies. Integration of ergonomics into the design process. Mentor-guided project work focused on developing an ergonomically grounded vessel design. Use of digital tools and distance learning methods for analysis, development, and presentation of the project solution.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	

Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Matulja, R.: Teaching materials published on the e-course platform, 2026.
Pauwels, M., Yacht Design Explained, Bloomsbury Publishing.

1.11. Optional / additional reading (at the time of proposing study programme)

Watson, D.,Practical Yacht Design, International Marine / McGraw-Hill.
IMO, Guidelines on ergonomics criteria for ship equipment, MSC/Circ.982, International Maritime Organization
ISO 9241-210: Human-centred design for interactive systems.
ISO 11591: Small craft – Visibility from the steering position.
ISO 15085: Small craft – Man-overboard prevention and recovery.
Guidelines and rules of classification societies (DNV, ABS, RINA) related to ergonomics, safety, and vessel design.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Matulja, R.: Teaching materials published on the e-course platform, 2026.	On-line	10
Pauwels, M., Yacht Design Explained, Bloomsbury Publishing.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Introduction to Engineering Mathematics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

15. COURSE DESCRIPTION

1.1. Course objectives

To provide an understanding of the fundamental concepts of linear algebra and differential calculus, and to develop the knowledge and skills necessary for solving mathematical problems in engineering applications.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Define and apply basic operations with matrices and determinants. Explain and apply methods for solving systems of linear equations and analyse the obtained solutions. Define and apply vector operations in the plane and in space, including vector addition, scalar product and vector product. Define and explain the concept and basic properties of functions of one variable, including evenness, periodicity, limits and continuity, and define, sketch and interpret elementary functions. Define and calculate derivatives of functions of one variable, including derivatives of elementary and selected composite functions. Apply derivatives in the analysis of functions and in optimisation problems. Define and explain the fundamental concepts and properties of indefinite and definite integrals of functions of one variable. Calculate indefinite and definite integrals.

1.4. Course content

Matrices and determinants. Systems of linear equations. Vectors in the plane and in space. Functions of one variable. Limits and continuity of functions. Elementary functions and their properties and graphs. Definition and properties of derivatives. Derivatives of elementary and composite functions. Higher-order derivatives. Applications of derivatives, including linear approximation, determination of extrema, function analysis, and optimization. Indefinite and definite integrals.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, studying, activity, homework, control tasks and tests.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework	x				

1.9. Assessment and evaluation of student's work during classes and on final exam

Homework assignments, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Štambuk, Lj.: Matematika I, Tehnički fakultet Sveučilišta u Rijeci, Rijeka, 2002. (in Croatian)

Jurasić, K., Dražić, I.: Matematika I, zbirka zadataka, Tehnički fakultet, Rijeka, 2008. (in Croatian)
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)

Teaching materials published on the e-course platform

1.11. Optional / additional reading (at the time of proposing study programme)

Slapničar, I.: Matematika 1, Sveučilište u Splitu FESB, Split 2002., online textbook
Finney, R. L.-Thomas, G.B.: Calculus, Addison-Wesley Publishing Company, NewYork, 1992.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Štambuk, Lj.: Matematika I, Tehnički fakultet Sveučilišta u Rijeci, Rijeka, 2002. (in Croatian)	14	10
Jurasić, K., Dražić, I.: Matematika I, zbirka zadataka, Tehnički fakultet, Rijeka, 2008. (in Croatian)	5	10
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)	19	10
Teaching materials published on the e-course platform	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Introduction to Mechanic**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

16. COURSE DESCRIPTION

1.14. Course objectives

Ability to establish equilibrium equations for rigid and deformable bodies (structures). Ability to determine the resultant of a system of forces in various types of force systems. Understanding the relationships between internal forces and the determination of those forces in planar structures. A thorough comprehension of the fundamental kinematic quantities, such as trajectory, displacement, velocity and acceleration. Understanding of the dynamic characteristics of the motion of particles and rigid bodies.

1.15. Course enrolment requirements

None

1.16. Expected course learning outcomes

Define the concept of force, moment of a force for a point and an axis, couple of forces, and the resultant of a force system. Draw free-body diagrams for planar and spatial force systems, formulate equilibrium equations, and determine reaction forces. Define the concepts of bending moment, shear force, and axial force. Determine the distribution of internal forces in truss, beam, and frame structures. Determine the centroids of lines, surfaces, and bodies. Calculate geometric characteristics of cross-sections of members. Determine the trajectory equation based on the equations of motion for the case of planar motion of a material particle. Define translational, rotational and planar motion of a rigid body. Define and explain Newton's laws and the concept of inertial force. Apply the fundamental theorems of particle dynamics to given motion cases. Determine the work and power resulting from the action of a force or a moment. Define the mass moments of inertia about the principal axes of a body. Define planar motion of a rigid body under the action of forces and moments. Analyze vibrations of systems with a single degree of freedom.

1.17. Course content

Planar systems of concurrent, parallel, and arbitrary forces. Determination of the resultant and equilibrium conditions for planar force systems. Moment of a force about a point. Moment theorem. Couple of forces and its properties. Spatial systems of concurrent, parallel, and arbitrary forces. Determination of the resultant and equilibrium conditions for spatial force systems. Moment of a force about an axis. Reduction of a spatial arbitrary force system. Centroids of lines, surfaces, and bodies. Geometric characteristics of planar cross-sections. Truss, beam, and frame structures.
Kinematics of a particle. Coordinate systems. Velocity and acceleration in rectilinear and curvilinear motion of a material particle. Kinematic diagrams. Kinematics of a rigid body. Velocity and acceleration in translational, rotational and planar motion of a body. Dynamics of a particle. Newton's laws. Inertial forces. D'Alembert's principle. Linear momentum. Mechanical work. Angular momentum. Potential energy. Kinetic energy. Power. Dynamics of a rigid body. Translation. Rotation. Mass moments of inertia. Planar motion. Vibration dynamics.

1.18. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.19. Comments		

1.20. Student's obligations

Attendance of classes, active participation in class, a midterm test, and independent study.

1.21. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	

Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework	x				

1.22. Assessment and evaluation of student's work during classes and on final exam

Active participation in class, continuous knowledge assessment (three midterm tests), a written exam, and an oral exam.

1.23. Assigned reading (at the time of the submission of study programme proposal)

Brnić, J.: "Statika", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004. (in Croatian)
Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996. (in Croatian)
Žigulić, R, Braut, S.: Kinematika, Tehnički fakultet Sveučilišta u Rijeci, Rijeka, 2012. (in Croatian)
Krpan, M., Butković, M,, Žigulić, R., Braut, S., Franulović, A.: Dinamika, TFR, Rijeka, 2001. (in Croatian)

1.24. Optional / additional reading (at the time of proposing study programme)

Matejiček, F., Semenski, D., Vnučec, Z.: "Uvod u statiku", Golden Marketing, Zagreb, 1999. (in Croatian)
Beer, F. P., Johnston, E.R., Eisenberg, E.R.:"Vector Mechanics for Engineers: Statics", McGraw-Hill, 2003.
Das, M. B., Kasimali, A., Sami, S.: "Engineering Mechanics, Statics", Irwin, Boston, 1994.
Gross, D., Hauger, W., Schroder, J., Wall, W.A., Rajapakse, N.: „Engineering Mechanics 1", Springer, 2013.
Beer , F.P., Johnston, E.R.: Vector Mechanics for Engineers – Dynamics, Mc.Graw Hill, New York, 1988.

1.25. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Brnić, J.: "Statika", Sveučilište u Rijeci, Tehnički fakultet, Rijeka, 2004.	19	10
Brnić, J.: "Mehanika i elementi konstrukcija", Školska knjiga, Zagreb, 1996.	15	10
Žigulić, R, Braut, S.: Kinematika, Tehnički fakultet Sveučilišta u Rijeci, Rijeka, 2012.	10	10
Krpan, M., Butković, M,, Žigulić, R., Braut, S., Franulović, A.: Dinamika, TFR, Rijeka, 2001.	17	10

1.26. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Maintenance and Operation of Vessels**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	elective	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	45+30+0

17. COURSE DESCRIPTION

1.1. Course objectives

The course provides students with knowledge of the technological processes of ship repair and operation, in line with defined learning outcomes.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Explain the concept of maintenance and operation. Prepare an annual maintenance plan. Record maintenance activities and services. Interpret ship breakdown structures. Organise vessel operation. Define hull maintenance. Specify maintenance activities for the deck and superstructure. Specify maintenance activities for the propulsion system. Analyse procedures in the event of failure or casualty. Define vessel storage. Plan overhaul activities.

1.4. Course content

Introduction: Concepts of maintenance and operation; Objectives: safety, longevity, reliability; Legal regulations and manufacturers' recommendations. Maintenance and operation planning: Preparation of an annual maintenance plan; Record-keeping of maintenance works and service activities; Pre-season and post-season inspections; Organization of operation (voyage schedules, loading). Hull maintenance: Regular washing and cleaning; Inspection and renewal of coatings (antifouling, gelcoat); Corrosion control and replacement of sacrificial anodes. Deck and superstructure: Cleaning and protection of wooden surfaces; Inspection of sealants and joints; Maintenance of metal components (polishing, protective treatments). Propulsion system: Regular oil and filter changes; Inspection of the cooling system; Inspection of propeller, shaft, and bearings; Engine operation (optimal operating regimes, fuel consumption). Vessel operation: Safety navigation rules; Optimal loading and cargo distribution; Fuel and water management; Procedures in case of failure or emergency. Winter maintenance regime: Engine preservation; Freeze protection; Vessel storage. Recommendations for long-term use: Wear reduction measures; Regular inspections; Overhaul planning.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☒ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio							

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, written and/or oral examination.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Matulja, T.: Course materials published on the e-learning platform for the course, 2026.
Ask, T.: Handbook of Marine Surveying, Waterlines books, UK, 2007.

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Matulja, T.: Course materials published on the e-learning platform for the course, 2026.	On-line	10
Ask, T.: Handbook of Marine Surveying, Waterlines books, UK, 2007.	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Marine Electrical Systems**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

18. COURSE DESCRIPTION

1.1. Course objectives

The course aims to provide students with fundamental knowledge of electrical engineering, including types of electric current, components of DC, AC, and three-phase circuits, and the basic principles of magnetic fields, transformers, and electrical machines, forming the foundation for the study of shipboard power systems. Students are further trained to apply this knowledge to understand the structure of shipboard electrical power systems, develop and interpret power balances, and comprehend single-line diagrams depicting power sources, distribution, consumers, electric propulsion, and power management systems.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Apply acquired knowledge in the qualitative and quantitative analysis of simple direct-current, single-phase and three-phase alternating-current circuits, and analyse and interpret the fundamental electrical quantities and relationships in such circuits. Identify, describe and interrelate the main subsystems of a shipboard electrical power system (sources, distribution, consumers, electric propulsion) and explain the manner of their interaction under normal (steady-state) operating conditions. Interpret single-line diagrams of a shipboard electrical power system, prepare and analyse a simple power balance, and relate the role of power management systems to the reliable supply of shipboard electrical consumers.

1.4. Course content

Structure of matter. Conductive, insulating, and semiconducting materials. Definition and types of electric current. DC voltage sources and DC circuits. Sinusoidal AC quantities, complex numbers, and phasor analysis. Circuit elements and analysis of AC circuits. Three-phase AC systems, including phase and line voltages and currents. Magnetic field properties and quantities. Transformers. Synchronous generators and motors. Asynchronous (induction) motors. Structure of shipboard electrical power systems. Onboard electrical power sources and shore power supply. Electrical switching and distribution on board ships. Shipboard electrical loads. Electric ship propulsion systems. Power balance of shipboard electrical systems. Power management systems. Hybrid propulsion systems.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Homework assignments, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

D. T. Hall: Practical marine electrical knowledge – 4th edition, Witherby Publishing Group, 2020.
B. Skalicki i J. Grilec: Brodski električni uređaji, Fakultet strojarstva i brodogradnje Sveučilišta u Zagrebu, Zagreb, 2008. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

M. Milković: Brodski električni strojevi i uređaji, Udžbenici Sveučilišta u Dubrovniku, Dubrovnik, 2005. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
D. T. Hall: Practical marine electrical knowledge – 4th edition, Witherby Publishing Group, 2020.	1	10
B. Skalicki i J. Grilec: Brodski električni uređaji, Fakultet strojarstva i brodogradnje Sveučilišta u Zagrebu, Zagreb, 2008. (in Croatian)	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution’s quality assurance system.

Basic description		
Course title	**Marine Vessels**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

19. COURSE DESCRIPTION

1.1. Course objectives

The course provides students with fundamental knowledge of the characteristics and classification of vessels, in line with defined learning outcomes.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Use basic concepts and professional terminology related to floating objects. Explain and interpret the fundamental properties and specifications of floating objects. Describe and illustrate the hull, superstructure and equipment of floating objects. Define the basic shapes, dimensions and characteristics of a ship's hull form. Distinguish and illustrate the basic components of the hull structure. Systematise and classify floating objects. Analyse the design requirement. Develop a database of similar vessels in accordance with the design requirement. Select the basic technical characteristics in accordance with the design requirement. Prepare a preliminary sketch of the general arrangement of a floating object.

1.4. Course content

Definitions of floating vessels. Vessel characteristics, concepts, and professional terminology. Vessel properties and basic structural characteristics. Hull form and principal dimensions. Systematization and classification of vessels. Design requirements. Development of a database of similar vessels. Selection of basic technical characteristics in accordance with specified design requirements. General arrangement plans of the vessel.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Homework assignments, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Hadjina, M.; Matulja, T.: Teaching materials available on the e-course, 2026.
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Hadjina, M.; Matulja, T.: Teaching materials available on the e-course, 2026.	On-line	10
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Materials**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+15+0

20. COURSE DESCRIPTION

1.1. Course objectives

Introduction to various types of engineering materials, their properties, and possibilities of application in shipbuilding. Introduction to mechanical and non-destructive testing. Introduction to different types of corrosion and protection methods. Classification and basic characteristics of material processing methods.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Distinguish the structure and properties of basic engineering materials. Analyse the applicability of individual groups of materials. Analyse the results of mechanical and non-destructive testing. Distinguish mechanisms of metal corrosion and methods of corrosion protection. Characterise material processing and treatment procedures.

1.4. Course content

Definition and classification of engineering materials. Structure of matter. Interatomic and intermolecular bonds. Structure, properties, and application of metallic, polymeric, ceramic, and composite materials. Testing of basic mechanical properties: hardness, strength, impact toughness, fatigue resistance, and creep resistance. Non-destructive testing of materials. Corrosion and corrosion protection. Classification and basic characteristics of material processing methods.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Homework assignments, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Smokvina Hanza, S., E-learning materials for lectures: Materials, RITEH, Rijeka, 2026.
Franz, M., Mehanička svojstva materijala, FSB, Zagreb, 1998. (in Croatian)
Filetin, T., Kovačiček, F., Indolf, J., Svojstva i primjena materijala, FSB, Zagreb, 2011. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

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1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Smokvina Hanza, S., E-learning materials for lectures: Materials, RITEH, Rijeka, 2026.	*online*	10
Franz, M., Mehanička svojstva materijala, FSB, Zagreb, 1998.	3	10
Filetin, T., Kovačiček, F., Indolf, J., Svojstva i primjena materijala, FSB, Zagreb, 2011.	15	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Measuring Technology VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+15+0

21. COURSE DESCRIPTION

1.1. Course objectives

Introduction to the fundamentals of measurement and quality control. Acquisition of specific skills in measurement and control methods and techniques. Introduction to trends in the development of measurement in manufacturing and science.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Interpret fundamental metrological concepts. Perform basic measurements in the field of industrial metrology. Classify measurement errors and assess the measurement uncertainty of measurement results. Analyse, compare and validate measurement results. Explain the basic principles of measurement using optical and 3D measurement systems.

1.4. Course content

Development and application of measurement. SI system of units. Base, derived, accepted, and Anglo-Saxon units. Metrology (scientific, industrial, and legal). Metrological conditions. Geometric, mechanical, and thermal influences on measurement results. Measurement errors (types, order, and limits). Measurement uncertainty. Accuracy classes. Rules of measurement. Experimental design in measurement. Measurement and measuring instruments for shape, position, contour, pressure, temperature, force, hardness, roughness, speed, noise, electrical and magnetic quantities. Comparator, control, optical, and sensor-based measurements. Computer-aided measurement and measurement software (LabVIEW, etc.). Computer-based processing of measured quantities. Displacement measurement (interferometry). Measurement of the chemical composition of materials. Coating thickness measurement. 3D contact coordinate and non-contact measuring devices (digitizers). Machine measuring systems. Measurements in standardization. Calibration, testing, and verification of measuring instruments. Calibration in measurements.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☒ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Attendance of classes, active participation in class, participation in laboratory exercises, completion of homework assignments, and independent study.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Laboratory exercises, continuous knowledge assessment (three midterm tests), and a written final exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Jay L. Bucher: The Metrology Handbook, ASQ Quality Press, 2004.
Puhar, J.: Tehnološke meritve, Fakulteta za strojništvo Ljubljana, 1996.
Graham T. Smith: Industrial Metrology, Springer, 2002.

1.11. Optional / additional reading (at the time of proposing study programme)

Zaimović Uzunović, N. Mjerna tehnika, Mašinski fakultet u Zenici, Zenica, 2006.
Jay L. Bucher: The Metrology Handbook, ASQ Quality Press, 2004.
Graham T. Smith: Industrial Metrology, Springer, 2002.
Bašić, H.: Mjerenja u mašinstvu, Mašinski fakultet, Sarajevo, 2008.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Bucher J. L.: The Metrology Handbook, ASQ Quality Press, 2004.	2	10
Puhar, J.: Tehnološke meritve, Fakulteta za strojništvo Ljubljana, 1996.	1	10
Smith G.T.: Industrial Metrology, Springer, 2002.	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Organization and Economics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+15+0

22. COURSE DESCRIPTION

1.1. Course objectives

Assuming theoretical concepts and knowledge of the organization and business economics.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Explain the concept of a business system and the establishment of a business system. Define the basic principles of organisation. Define system controllability and the role of information in a business system. Analyse types of organisational structures. Analyse job evaluation. Distinguish ownership, management and leadership. Define the principles of management and leadership. Analyse teamwork. Define business policy. Describe the principles and methods of planning. Define long-term and operational plans. Analyse network planning techniques. Define a factory as an economic system. Analyse revenues and costs. Distinguish between the income statement and the balance sheet. Define business performance effects.

1.4. Course content

The definition of a business system. The evolution of the business system. Factory as a business system. Building the business system. The basic principles of the organization. Definition and managing of business system. The information in the enterprise. Types of organizational structures. Design of the business system. Evaluation of jobs. Ownership. Management. Leadership. The principles of management and leadership. Teamwork. Business policy. Planning. Principles and methods of planning. Network planning techniques. Plans of the business system. Long-term and operational plans. Using of computers in planning. Factory as an economic system. Income and expenses. Types of costs. Break even. Income Statement. Balance Sheet. Effects of business.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance, class participation, independent learning.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Class participation, continuous assessment (two mid-term exams), written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Mikac, T., Ikonić, M.: Organization of Business Systems, Tehnički fakultet Sveučilišta u Rijeci, 2008. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Novak, M., Sikavica, P.: Business Organization, Informator, Zagreb, 1999. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Mikac, T., Ikonić, M.: Organization of Business Systems, Tehnički fakultet Sveučilišta u Rijeci, 2008. (in Croatian)	2	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Practical Drafting**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

23. COURSE DESCRIPTION

1.1. Course objectives

The achievement of the proficiency in the development of 2D geometrical models of 3D objects and implementation of traditional and computer techniques for geometrical modelling. The development of the ability to communicate design ideas using technical drawings in standard drafting formats.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Interpret and apply traditional and CAD techniques in the development of two-dimensional geometric models. Compare and distinguish methods of shape description. Compare simple bodies and interpret the formation of complex objects. Interpret and apply the ISO system of limits and fits, surface texture and geometrical tolerances. Recognise the role of standardisation and standards. Interpret engineering graphics. Organise engineering documentation in accordance with standards. Assess the contribution of one's own work and the work of instructors in the process of acquiring course content.

1.4. Course content

Graphical communications. The design process and the role of the design model. Traditional, 2D and 3D CAD techniques for the development of models. The shape description: projection theory, multi-view drawings, sectional views, pictorial representations. Standardization and standards. Technical documentation graphics: size description, tolerances and fits, texture of technical surfaces.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes and a project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

M. Kljajin, M. Opalić: Inženjerska grafika, Strojarski fakultet u Slavonskom Brodu, Slavonski Brod, 2010. (in Croatian)
G. Marunić, J. Butorac, S. Troha: Inženjerska grafika, Zbirka zadataka iz opisa oblika, Zigo Rijeka, 2008. (in Croatian)
B. Kraut: Inženjerski priručnik, SAJEMA, Zagreb, 2009. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

D.K. Lieu, S. Sorby: Visualization, Modeling, and Graphics for Engineering Design, Delmar Cengage Learning, 2009.
G. Scott Oween et al. : Hypergraph (on–line), ACM SIGGRAPH Education Committee, http://www.siggraph.org/education/materials/HyperGraph/hypergraph.htm, 2005.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
M. Kljajin, M. Opalić: Inženjerska grafika, Strojarski fakultet u Slavonskom Brodu, Slavonski Brod, 2010.	10	10
G. Marunić, J. Butorac, S. Troha: Inženjerska grafika, Zbirka zadataka iz opisa oblika, Zigo Rijeka, Rijeka, 2008.	10	10
B. Kraut: Inženjerski priručnik, SAJEMA, Zagreb, 2009.	6	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Practical Mathematics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+30+0

24. COURSE DESCRIPTION

1.1. Course objectives

To provide an understanding of the fundamental concepts of integral calculus, ordinary differential equations, and Taylor and Fourier polynomials, and to develop the knowledge and skills necessary for solving mathematical problems in engineering applications.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Calculate and apply definite integrals to determine areas of plane figures, arc lengths, and volumes and surface areas of solids of revolution. Apply analytical and numerical methods for the calculation of integrals. Define and analyse ordinary differential equations of the first and second order and determine their general and particular solutions in selected cases. Apply numerical methods for solving first-order ordinary differential equations. Explain and apply the approximation of functions using Taylor and Fourier polynomials in selected problems.

1.4. Course content

Applications of definite integrals. Numerical methods for computing integrals. First-order ordinary differential equations. Second-order linear differential equations. Numerical methods for solving first-order differential equations. Taylor approximation of functions and Fourier polynomials.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, studying, activity, homework, control tasks and tests.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework	x				

1.9. Assessment and evaluation of student's work during classes and on final exam

Homework assignments, continuous knowledge testing, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Slapničar I.: Mathematics 2, Sveučilište u Splitu FESB, Split 2002, online book (in Croatian)
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012, (in Croatian)
Teaching materials published on the e-course platform

1.11. Optional / additional reading (at the time of proposing study programme)

Sopta, L.: Mathematics 2, Tehnički fakultet Sveučilišta u Rijeci, Rijeka,1995.
Kamenarović, I.: Matrhematics for engineers I, Tehnički fakultet Sveučilišta u Rijeci, Rijeka,1997

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Slapničar I.: Mathematics 2, Sveučilište u Splitu FESB, Split 2002, online book (in Croatian)	On-line	10
Štefan Trubić M., Sopta L., Črnjarić-Žic N., Maćešić S.: Mathematics, a collection of tasks: integrals, ordinary differential equations, functions of several variables, Rijeka 2012 (in Croatian)	15	10
Teaching materials published on the e-course platform	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Production Systems**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

25. COURSE DESCRIPTION

1.1. Course objectives

Qualified for the design of production systems. Ability to analyze models of production structures. Understanding the principles of grouping the articles.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Define a production system. Describe the characteristics of a production programme. Explain the production availability of equipment and workforce. Analyse the utilisation of capacity and production systems from technical and economic perspectives. Distinguish models of material flow and processing flowcharts. Define the correlation coefficient between operations and equipment. Explain workpiece handling and workpiece transport, including inbound, inter-operational and outbound transport. Define the workpiece processing cycle and explain processing time, transport time and waiting time. Explain models of production systems, including single-item and multi-item systems, as well as line, batch and flexible production systems. Explain the organisation of workpiece flow through a production system. Explain methods of grouping workpieces. Describe layout planning, equipment and warehouse organisation. Develop a production system project, including task definition, variable analysis, project concept, processing plans, solution optimisation and selection of the production model (line, batch or flexible system). Select an appropriate transport system.

1.4. Course content

Definition of the production system. Characteristics of the production program. Production availability of equipment and manpower. Capacity and systems utilization: technical and economic. Models flow of material: current, wavy, linear, and flexible. Workflow processing: one-way, two-way. The correlation coefficient of operations and equipment. Handling and transport of the workpiece. Input, between operations and exit transport. The level of automation of transport. Workpiece processing cycle: during processing, time of transport and waiting. Models of production systems. Single or multi-workpiece line, serial and flexible systems. The organization of the work flow through the production system. Methods of grouping of workpieces. The process of designing production systems: the task, analysis of variables, the concept of the project, plans processing, optimization solutions, the choice of the production model (lines, serial or flexible system). Choosing of the transportation system.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☐ laboratories
	☐ long distance education	☐ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Attendance and activity in class, seminar work.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper	x	Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Activity in class, seminar work, written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Mikac, T., Ikonić, M.: Organization of Business Systems, Graphic, Zagreb, 2008. (in Croatian)
Mikac, T.: Optimization of the Concept of Production System, disertation, Tehnički fakultet Rijeka, 1994. (in Croatian)

1.11. Optional / additional reading (at the time of proposing study programme)

Veža, J.: Designing the Production Systems, Fakultet elektrotehnike, strojarstva i brodogradnje, Split, 1994. (in Croatian)

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Mikac, T., Ikonić, M.: Organization of Business Systems, Graphic, Zagreb, 2008. (in Croatian)	2	10
Mikac, T.: Optimization of the Concept of Production System, disertation, Tehnički fakultet Rijeka, 1994. (in Croatian)	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Professional Practice**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	10
	Number of hours (L+E+S)	-

26. COURSE DESCRIPTION

1.1. Course objectives

Student verifies and complements his own professional knowledge, along with a comprehensive view of the work process.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Apply acquired knowledge and skills from the professional content of completed courses. Gain experience in real working processes. Develop and further enhance competencies for solving concrete professional tasks. Analyse knowledge and skills acquired from the professional content of the relevant course. Solve a practical task. Acquire competencies for the independent execution of a concrete professional task.

1.4. Course content

Professional practice within Undergraduate Vocational Study of Naval Architecture is carried out individually in work organization that is engaged in the student's field of study, and with activities in accordance with the Professional Practice Rules and with Study Program curriculum. Within professional practice, student meets with the corresponding jobs that are studied through programs of education, with the task of verifying and complementing their own expertise, along with a comprehensive view of the work process.

1.5. Teaching methods	☐ lectures ☐ seminars and workshops ☐ exercises ☐ long distance education ☒ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Completion of a 35-working-day internship at a selected training base (280 hours) and preparation of a written report on the completed internship.

1.8. Evaluation of student's work

Course attendance		Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam		Essay		Research	
Project		Sustained knowledge check		Report	x	Practice	x
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

The student's commitment and performance, as well as the preparation of a report on the completed internship, are assessed and evaluated.

1.10. Assigned reading (at the time of the submission of study programme proposal)

-

1.11. Optional / additional reading (at the time of proposing study programme)

-

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Propulsion Systems**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	30+45+0

27. COURSE DESCRIPTION

1.1. Course objectives

Introduction to marine engines and the key systems required for their operation. Students will be trained in selecting propulsion systems and designing the layout of a ship's engine room.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Distinguish internal combustion engines according to their essential characteristics. Explain the fundamental physical principles on which engine operation is based. Explain the operating principles of modern engines. Sketch the basic components of high-speed four-stroke marine engines. Schematically represent auxiliary systems that enable engine operation. Analyse and compare the main characteristics of high-speed four-stroke marine engines based on manufacturers' data. Calculate the basic characteristics of the propulsion system. Select the engine and other elements of the propulsion system for a given vessel. Design the basic layout of a ship's engine room.

1.4. Course content

Introduction (history, significance, classification, trends). Theoretical foundations and principles underlying engine operation. Ideal and real processes in marine engines. Fuels and combustion, prevention of harmful emission products. Engine design. Dynamics of the piston mechanism. Auxiliary systems of marine engines. Engine calculation and selection. Ship engine room layout.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, active participation in class, and project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Kuiken, K.: Diesel Engines for Ship Propulsion and Power Plants from 0 to 100,000 kW, 3-rd edition, Whiterbys, Livingston, Scotland UK, 2024.
Heywood, J. B.: Internal Combustion Engine Fundamentals, McGraw Hill Book Co., 1988.
Dave Gerr: Boat Mechanical Systems Handboo, McGraw-Hill, 2009.

1.11. Optional / additional reading (at the time of proposing study programme)

Lecture notes.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Kuiken, K.: Diesel Engines for Ship Propulsion and Power Plants from 0 to 100,000 kW, 3-rd edition, Whiterbys, Livingston, Scotland UK, 2024.	1	10
Heywood, J. B.: Internal Combustion Engine Fundamentals, McGraw Hill Book Co., 1988.	1	10
Dave Gerr: Boat Mechanical Systems Handboo, McGraw-Hill, 2009.	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Quality Assurance VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	45+15+0

28. COURSE DESCRIPTION

1.1. Course objectives

The course is designed to provide the student with basic knowledge in quality assurance topics. Through exercises students are introduced with practical application of several course objectives.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Define the basic concepts of quality assurance and quality management, including quality control, quality planning, quality improvement and quality engineering. Classify quality characteristics of processes, products and services. Interpret quality-related costs. Interpret the features of the ISO 9001 standard and the principles on which it is based. Apply basic quality assurance tools. Interpret the results of statistical process control. Explain the influence of the measurement system on the assessment of process, product and service quality. Define the reliability of a complex system and acceptance sampling plans.

1.4. Course content

Definitions of quality. Quality of products, processes and services. Quality costs. Pareto principle. Economical level of quality. Optimal quality. Quality inspection. Quality assurance. International quality standards ISO 9000. Quality management. Total quality. Planning for quality. Quality improvement. Quality engineering. Method and tools for quality assurance and improvement. Cause-and-effect relationships. Causes of quality variability. Statistical process control methods. Common probability distributions. Control charts. Specification limits and tolerances. Products and processes quality assessment methods. Demerit method. Quality of measurement system. Acceptance sampling. Reliability.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Course attendance, active participation in the course, attendance at laboratory exercises, homework and independent learning.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework	x				

1.9. Assessment and evaluation of student's work during classes and on final exam

Sustained knowledge check (three midterm exams) and final written exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

-

1.11. Optional / additional reading (at the time of proposing study programme)

Montgomery, D.C., Jennings, C. L., Pfund, M. E.: Managing, controlling, and improving quality, John Wiley & Sons Wiley, 2011.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Radiocommunications VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	45+15+0

29. COURSE DESCRIPTION

1.1. Course objectives

Students will acquire knowledge of the nature of radio-wave communications and major components of radiocommunication systems, from the source to a receiver. The course will provide the knowledge of key principles, phenomena, techniques, and components of the system.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Apply decibels and nepers. Describe the wave equation and relevant coefficients. Analyse wave propagation in an unbounded medium. Analyse wave propagation along a transmission line. Design circuits for impedance transformation. Describe the basic parameters of antennas. Analyse the communication channel and propagation effects. Analyse an RF link. Analyse field strength in the broadcasting transmission regime.

1.4. Course content

Electromagnetic spectrum. Types of electromagnetic waves. A basic scheme of a radiocommunication system. Decibels and nepers. Plane wave in various media. Perpendicular and oblique wave incidence on media boundary. Transmission line model. The Smith chart. Quarter-wave impedance transformer. Binomial transformer. Fundamental antenna parameters. Communication channel and effects on the wave propagation. RF link budget. A brief overview of propagation models for field prediction. Intermodulation products. Frequency conversion. Image frequency.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☐ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Class attendance, literature reading, class preparation, and continuous studying.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project		Sustained knowledge check	x	Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Continuous knowledge examination (midterms) and final exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

D. M. Pozar, Microwave Engineering, 3rd ed., Wiley, 2005.

1.11. Optional / additional reading (at the time of proposing study programme)

J. D. Parsons, The Mobile Radio Propagation Channel, 2nd ed, Wiley, 2000.
C. A. Balanis, Antenna Theory: Analysis and Design, 3rd ed, Wiley-Interscience, 2005.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
D. M. Pozar, Microwave Engineering, 3rd ed., Wiley, 2005.	1	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Ship classification and Certification**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	6
	Number of hours (L+E+S)	30+15+0

30. COURSE DESCRIPTION

1.1. Course objectives

Introduction to the process of ship classification and statutory certification. Defining the roles of participants in the ship design and construction process: the classification society, the shipowner, and the shipyard. Overview of technical rules, regulations, and required documentation for ship design and construction for the purpose of classification and statutory certification.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

List and explain the roles of the main international organisations in the fields of maritime affairs and shipbuilding. List and explain the main international conventions relevant to the maritime industry and shipbuilding. Explain the concept and role of the Flag State and the Port State in maritime and shipbuilding contexts. Explain the purpose and procedure of classification for newbuildings and surveys of ships in service. Explain the purpose and procedure of statutory certification. Distinguish and provide a reasoned selection of appropriate rules and regulations for the design and construction of a selected vessel. Compile a list of the required technical documentation for a selected project of a small craft, yacht or ship. Select and apply appropriate ISO standards for the selected type of small craft.

1.4. Course content

Overview of stakeholders and their roles within the global maritime industry, shipping, and shipbuilding. The International Maritime Organization (IMO). International conventions and codes: ISM, ISPS, and MLC. The European context. The International Association of Classification Societies (IACS). Ship classification. Class in relation to statutory regulations. Flag State, Port State, Port State Control (PSC). The International Load Line Convention (ILL) and the International Tonnage Convention (ITC). International conventions for the safety of life (SOLAS) and environmental protection (MARPOL). Classification procedure for newbuildings. Statutory certification for newbuildings. Classification documentation. Classification procedure: surveys of ships in service. Statutory certification: surveys of ships in service. Rules and regulations for yachts. ISO standards for small craft.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/SOLAS98final.pdf
https://www.imo.org/en/about/conventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-%28marpol%29.aspx
https://www.samgongustofa.is/media/log-og-reglur/LOAD-LINES-Consolidated-2018.pdf
https://treaties.un.org/doc/Publication/UNTS/Volume%201291/volume-1291-I-21264-English.pdf
Pravilnik o brodicama, čamcima, jahtama https://narodne-novine.nn.hr/clanci/sluzbeni/2020_01_13_223.html
Classification Societies Rules and Regulations; CRS, LR, DNV ,GL

1.11. Optional / additional reading (at the time of proposing study programme)

ISO standardi za mala plovila

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
https://wwwcdn.imo.org/localresources/en/OurWork/Safety/Documents/SOLAS98final.pdf	On-line	10
https://www.imo.org/en/about/conventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-%28marpol%29.aspx	On-line	10
https://www.samgongustofa.is/media/log-og-reglur/LOAD-LINES-Consolidated-2018.pdf	On-line	10
https://treaties.un.org/doc/Publication/UNTS/Volume%201291/volume-1291-I-21264-English.pdf	On-line	10
https://narodne-novine.nn.hr/clanci/sluzbeni/2020_01_13_223.html	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Hull Construction and Scantlings**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+45+0

31. COURSE DESCRIPTION

1.1. Course objectives

Within this course, students will acquire fundamental knowledge of the structural elements and construction technologies of small craft, and they will become familiar with the empirical approach to the scantling's determination of hull structure for monohulls—motorboats or sailing yachts—as well as multihulls, up to 24 meters in length and intended for a restricted navigation area, constructed from composites, wood, or aluminium.

1.2. Course enrolment requirements

Completion of the course Structural Elements of Ships.

1.3. Expected course learning outcomes

Identify and correctly interpret the types of loads acting on small craft. Distinguish materials used for hull construction according to their mechanical properties. Calculate design loads of the hull in accordance with the rules and regulations of classification societies. List specific structural assemblies and define their functions. List specific structural elements within a structural assembly and explain methods of their connection. Identify and define the parameters required for the dimensioning of a structural element. Apply the rules and regulations of classification societies and calculate the dimensions of hull structural elements of small craft. Analyse and interpret calculation results with regard to compliance with dimensioning criteria in accordance with international standards and classification society rules.

1.4. Course content

Overview of small craft types with respect to their size, intended use, and the application of construction materials: composites, wood, and aluminium. Materials for hull construction: composites and wood. Basic construction methods and technologies with respect to the material. Hull structure. Fundamental concepts of structural mechanics as applied to the ship hull. Global and local loads. Longitudinal and transverse load distribution. Loads on the keel, rudder, and loads occurring during grounding or impact. Rig construction on sailing yachts. Hull structural scantlings. Principal dimensions. Rules and regulations. Methods for determining structural scantlings. Design loads. Mechanical properties and design stresses. Panel geometry definition. Dimensioning of plating and stiffeners of structural elements and assemblies with respect to the construction material. Dimensioning of appendages: keel and rudder. Dimensioning of sailing-yacht rigging. Structural layout and details. Specific characteristics of composite, wooden, and aluminium hull structures. Hull weight calculation.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, project development.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam		Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Larsson, L., Eliasson, E.R., Orych, M.: Principles of Yacht Design, 5th edition Adlard Coles, London, 2022.
Gougeon, M.: The Gougeon Brothers on Boat Construction, 5th Edition, Gougeon Brothers, Inc. Michiga, 2005.
Pravila ISO 12215-5-2019, ISO 12215-6-2018, 12215-9_2012, ISO_FDIS_12215-10
Bernardi, T.: Konstrukcija drvenih brodova, Zagreb, 1964.

1.11. Optional / additional reading (at the time of proposing study programme)

Gerr, D.: The Elements of Boat Strength, McGraw-Hill, 2000.
Pravila i propisi klasifikacijskih društava; BV, HRB, LR, DNV, GL

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Larsson, L., Eliasson, E.R., Orych, M.: Principles of Yacht Design, 5th edition Adlard Coles, London, 2022.	2	10
Gougeon, M.: The Gougeon Brothers on Boat Construction, 5th Edition, Gougeon Brothers, Inc. Michigan, 2005.	On-line	10
Pravila ISO 12215-5-2019, ISO 12215-6-2018, 12215-9_2012, ISO_FDIS_12215-10	10	10
Gerr, D.: The Elements of Boat Strength, McGraw-Hill, 2000.	1	10
Bernardi, T.: Konstrukcija drvenih brodova, Zagreb, 1964.	10	10
Rules and regulations of classification societies; BV, HRB, LR, DNV, GL	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Ship Hydrodynamics**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+45+0

32. COURSE DESCRIPTION

1.1. Course objectives

Understanding the fundamental principles of fluid mechanics and developing the student's ability to properly apply and interpret empirical methods in solving practical problems in ship hydrodynamics.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

State and correctly interpret the fundamental properties of fluids. State and correctly interpret laminar and turbulent flow of viscous fluids. Describe characteristic phenomena associated with water flow around a ship's hull. Correctly interpret the differences between viscous and ideal fluids in applications of ship hydrodynamics. Distinguish the components of ship resistance and explain methods for determining ship resistance. Explain and apply experimental, empirical and numerical methods for determining resistance and propulsion and seakeeping characteristics of floating objects. Explain the interaction between the ship's hull and propeller and explain the relationship between ship resistance and propulsion. State and explain the dynamic effects of vessel motions in waves. Explain the criteria of ship seaworthiness in the design of floating objects. Correctly interpret and explain the concept of vessel manoeuvrability and describe manoeuvring tests. Apply a selected method for the calculation of resistance and propulsion of a selected floating object.

1.4. Course content

Introduction to fluid mechanics. Basic physical quantities. Properties of fluids and the fundamental laws of fluid dynamics. Flow of water around a ship hull. Methods for determining ship resistance. Ship model testing. Holtrop–Mennen method for estimating ship resistance in the displacement regime. Savitsky method for estimating ship resistance in the planing regime. Influence of hull form on resistance. Ship propulsion. Marine propulsion devices. Ship propeller. Geometry of the ship propeller. Interaction between the propeller and the ship hull. Propulsion coefficients. Ship seakeeping. Ship response to harmonic waves. Seakeeping criteria. Seakeeping in ship design.

1.5. Teaching methods		
	☒ lectures	☒ individual assignment
	☐ seminars and workshops	☐ multimedia and network
	☒ exercises	☐ laboratories
	☒ long distance education	☒ mentorship
	☐ fieldwork	☐ other

1.6. Comments

1.7. Student's obligations

Attendance of classes, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Birk, L.: Fundamentals of Ship Hydrodynamics

1.11. Optional / additional reading (at the time of proposing study programme)

Fossati, F. Aero-Hydrodynamics and the performance of sailing yachts

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Birk, L.: Fundamentals of Ship Hydrodynamics	On-line	10
Fossati, F. Aero-Hydrodynamics and the performance of sailing yachts	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Ship Structural Elements**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**1.**	
ECTS credits and teaching	ECTS student 's workload coefficient	7
	Number of hours (L+E+S)	45+30+0

33. COURSE DESCRIPTION

1.1. Course objectives

Within this course, students will acquire fundamental knowledge about the structural elements of the single hull displacement vessels with a significant dimension in length, intended for the transport of commercial cargo and for an unrestricted navigation, as well as the structural elements of the hull of vessels up to 24 m in length with a restricted navigation, constructed from composites, wood, or aluminium.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

State and correctly interpret the types of loads acting on ship structures. Distinguish materials used for ship hull construction according to their mechanical characteristics. Compare the main features of transverse, longitudinal and mixed hull structural systems. List individual structural assemblies of the ship hull and define their functions. List individual structural elements within structural assemblies and explain methods of their connection. Distinguish primary and secondary elements of ship structures. Identify and define the parameters required for the dimensioning of a structural element. Sketch solutions for individual ship structural assemblies for different types of vessels.

1.4. Course content

Introduction to ship structures. Development of ship types and the evolution of construction materials: steel, aluminium alloys, composites, and wood. Overview of loads and the principles of structural design based on strength criteria and load-carrying mechanisms. Global and local strength analysis of the ship hull. Basic features of the longitudinal strength calculation. Plating and stiffening, panels and stiffened panels as fundamental structural components of ship construction. Basic characteristics of transverse, longitudinal, and mixed structural systems of the hull. Basic structural elements of the ship. Keel and stems. Elements of the single bottom structure. Elements of the double bottom structure: bottom plating and inner bottom, side girders, floors. Double bottom in the engine room and machinery foundations. Elements of the outer shell structure: shell plating, frames, web frames, longitudinal stiffeners, side stringers. Deck structure: deck plating, beams, underdeck girders, and pillars. Hatch openings, covers, and coamings. Bulkheads: plating and stiffening. Superstructures and deckhouses. Structural details of the hull. Alignment and continuity of structural elements.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

A project work, written and oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Grubišić, M.: Brodske konstrukcije, Viša pomorska škola – Split, 1974. (in Croatian)
Eyres, D.J., Bruce, G.J.: Ship Construction, 7th Edition, Butterworth-Heinemann, Oxford 2012.

1.11. Optional / additional reading (at the time of proposing study programme)

Taggart, R.: Ships Design and Construction, SNAME, New York 1980.
..., Rules and regulations of classification societies; IACS-CSR, LR, DNV, ABS, BV, GL, HRB.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Grubišić, M.: Brodske konstrukcije, Viša pomorska škola – Split, 1974	7	10
Eyres, D.J., Bruce, G.J.: Ship Construction, 7th Edition, Butterworth-Heinemann, Oxford 2012.	10	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Systems and Equipment**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	compulsory	
Year	**2.**	
ECTS credits and teaching	ECTS student 's workload coefficient	8
	Number of hours (L+E+S)	30+45+0

34. COURSE DESCRIPTION

1.1. Course objectives

Within the course, students acquire fundamental knowledge of the elements, equipment, and outfitting systems of vessels in accordance with the defined learning outcomes.

1.2. Course enrolment requirements

None

1.3. Expected course learning outcomes

Apply technical requirements, conventions, regulations and standards. Define and describe anchoring, mooring and towing equipment. Describe and distinguish rudders and steering gear. Describe and specify safety equipment. Describe and specify cargo-handling equipment. Describe and distinguish doors, windows and hatches. Describe equipment for the movement of crew and passengers. Distinguish steering, navigation and communication equipment, navigation lights and signalling devices. Arrange hull equipment and describe hull protection systems. Describe and illustrate elements and configurations of heating, ventilation and air-conditioning systems. Describe and illustrate insulation methods.

1.4. Course content

Technical requirements, conventions, regulations, standards. Hull equipment. Cargo handling equipment and devices. Special cargo handling equipment. Life-saving and safety equipment. Life-saving appliances. Firefighting equipment. Accommodation and special room equipment. Bulkheads, doors, windows, hatches. Handrails, gangways, catwalks, ladders. Stairways, platforms, decks, elevators. Ship stability equipment. Steering, navigation, and communication equipment. Lights and signaling devices. Anchoring, mooring, and towing equipment. Special equipment.

1.5. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☒ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☒ mentorship ☐ other
1.6. Comments		

1.7. Student's obligations

Attendance of classes, project.

1.8. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check		Report		Practice	
Portfolio		Homework					

1.9. Assessment and evaluation of student's work during classes and on final exam

Project work, a written and/or oral exam.

1.10. Assigned reading (at the time of the submission of study programme proposal)

Matulja, T.: Teaching materials published on the e-course, 2026.
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.

1.11. Optional / additional reading (at the time of proposing study programme)

Nicolson, I., The Boat Data Book, 7th Edition, ACN London, 2014.
Gerr, D., Boat Mechanical Systems Handbook. ACN London, 2009.
Payne, J.: The Marine Electrical and Electronics Bible. Adlard Coles Nautical, III. Edition, London, 2007.
Ask, T.: Handbook of Marine Surveying. Sheridan House, II. Edition, NY, 2007.
Delić, S.: Oprema krstaša. Biblioteka More, 2008.

1.12. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Matulja, T.: Teaching materials published on the e-course, 2026.	On-line	10
Larsson, L., Eliasson. R., Principles of Yacht Design, International Marine, 5th Edition, 2022.	On-line	10

1.13. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.

Basic description		
Course title	**Technological Processes VO**	
Study programme	**Undergraduate Vocational Study of Naval Architecture**	
Course status	optional	
Year	**3.**	
ECTS credits and teaching	ECTS student 's workload coefficient	5
	Number of hours (L+E+S)	30+30+0

35. COURSE DESCRIPTION

1.14. Course objectives

Introduction to the influential elements of the setting of the technological process. Mastering the knowledge, techniques and methods design and development process. Understanding trends in the development of manufacturing techniques and the impact on the characteristics of process.

1.15. Course enrolment requirements

None

1.16. Expected course learning outcomes

Define fundamental concepts in the field of production engineering. Interpret the influence of the type and mode of production on the technological process and its configuration. Explain the impact of product design on the process, including manufacturability. List and analyse elements of manufacturability of product components. State and interpret elements of planning and control of the technological process. State categories of time involved in operation execution, define technical norms, and analyse methods for their determination. Identify technological bases used in the design of technological processes and interpret their influence on process configuration and results. Explain the specific characteristics of technological preparation for NC machines. Develop a technological process project for a specific workpiece, including the preparation of basic technological documentation.

1.17. Course content

Fundamental concepts. Influential elements of the technological process. Influence of production and mediation of technological process and its setting. The impact product performance. Technological analysis of products and parts. Planning technology process. Operations and its decomposition. Input material. Technological base. Technological parameters. Categories of time. Production equipment and operating equipment. Technological background. Rigidity, vibration, temperature, internal stresses. Accessories for processing. The accuracy of the workpiece. The ability of the process. Effect of NC equipment to process characteristics. Specificity of technological preparations for NC - machines. The coordinate system and the characteristic points of the system. NC program and its structure. The program drawing, clamping plan, tools plan. Ways of making the NC program. Entering data into the control unit of the machine. Implementation and monitoring of the process.

1.18. Teaching methods	☒ lectures ☐ seminars and workshops ☒ exercises ☐ long distance education ☐ fieldwork	☒ individual assignment ☐ multimedia and network ☐ laboratories ☐ mentorship ☐ other
1.19. Comments		

1.20. Student's obligations

Course attendance, project development, self learning.

1.21. Evaluation of student's work

Course attendance	x	Activity/Participation		Seminar paper		Experimental work	
Written exam	x	Oral exam	x	Essay		Research	
Project	x	Sustained knowledge check	x	Report		Practice	
Portfolio		Homework					

1.22. Assessment and evaluation of student's work during classes and on final exam

Two mid-term exams, project, and final written and oral exam.

1.23. Assigned reading (at the time of the submission of study programme proposal)

Gačnik, V., Vodenik, F.: Technological Processes Design, Zagreb 1990. (in Croatian)
Curis, M.A.: Process Planning, New York, 1988.
Jurković, M., Tufekčić, D.: Tehnological Processes, Design and Modelling, Tuzla, 2000. (in Croatian)

1.24. Optional / additional reading (at the time of proposing study programme)

Mueller, G.: Gleichungen fuer Technologen. Veb Verlag Technik. 1988

1.25. Number of assigned reading copies with regard to the number of students currently attending the course

Title	*Number of copies*	*Number of students*
Gačnik, V., Vodenik, F.: Technological Processes Design, Zagreb 1990. (in Croatian)	4	10
Curis, M.A.: Process Planning, New York, 1988.	1	10
Jurković, M., Tufekčić, D.: Tehnological Processes, Design and Modelling, Tuzla, 2000. (in Croatian)	3	10

1.26. Quality monitoring methods which ensure acquirement of output knowledge, skills and competences

Through the Institution's quality assurance system.