FACULTY OF MARITIME STUDIES

UNIVERSITY OF SPLIT

DETAILS OF THE STUDY PROGRAMME

POSTGRADUATE UNIVERSITY STUDY

TECHNOLOGIES IN MARITIME AFFAIRS

SPLIT, 2025

BASIC INFORMATION ABOUT THE UNIVERSITY

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GENERAL INFORMATION ABOUT THE STUDY PROGRAMME

Name of study programme	Postgraduate University Study *Technologies in Maritime Affairs*		
Study programme provider	University of Split		
Co-principals of the study programme	Faculty of Maritime Studies (PFST), University of Split		
Type of study programme	Professional study program ☐	University study program ☒	
Level of study programme	Undergraduate ☐	Graduate ☐	Integrated ☐
	Postgraduate university ☒	Postgraduate specialist ☐	Graduate specialist ☐
Academic/professional title acquired upon completion of studies	Doctor of Science in Technical Field		

1. INTRODUCTION

1.1. Assessment of the justification for conducting a postgraduate study

Postgraduate education is of importance for the development of Croatia, especially the Dalmatian region. Technical knowledge in maritime science is applied in many economic systems: maritime transport, inland navigation, shipbuilding, mechanical engineering, fisheries, logistics, shipping, etc. The European Commission, together with the industry, is engaged in encouraging the development of new educational programmes in this area as a prerequisite for the development of society. The need to increase the number of educated experts and scientists in the technical field of maritime transport is highlighted in the Development Strategy of the Republic of Croatia for the 21st Century. [1]

The relatively rapid development of technology, driven by new knowledge and achievements, also requires an appropriate level of education. A prerequisite for the development of society is investment in education and science and the promotion of new and innovative solutions that are the basis for the development of industry. Knowledge related to maritime transport is developing daily with the development of technology. Croatia has around 27,000 seafarers (BIMCO, Report 2015). The Faculty of Maritime Studies in Split has been educating experts in the field of maritime affairs for decades. Many students who wanted to continue their education in the field of technical sciences, traffic technology and transport, decided to continue their studies at related faculties (Faculty of Maritime Studies in Rijeka, Faculty of Transport Sciences in Zagreb), while others focused on the fields of electrical engineering, mechanical engineering and naval engineering (FESB Split, FSB Zagreb, Technical Faculty Rijeka, etc.). Until 2019, the Faculty of Maritime Studies in Split was only marginally involved in the education of its own postgraduate candidates, which was considered one of its biggest shortcomings.

It is also of fundamental importance that scientists from the Faculty of Maritime Studies in Split actively participate in the development of scientific and professional fields through direct participation and management of scientific research and projects. Scientific cooperation with renowned foreign scientific institutions is one of the fundamental commitments of the Faculty.

Since the establishment of the Faculty, there has been intensive cooperation with economic entities directly interested in transferring experience from practice to teaching, i.e. updating teaching materials, but also in establishing cooperation through numerous projects and

[1] http://www.mvep.hr/files/file/publikacije/NPPEU_2004_1.pdf

scientific research:

- companies: Brodosplit, Brodotrogir, Croatian Register of Shipping, TLM, Adriawinch, Končar EU, Plovput, Globtik, Pasat, Jadroplov, etc.,
- institutes: Croatian Hydrographic Institute, Oceanographic Institute,
- local governments: Port Authority, City of Split, Split-Dalmatia County.

This cooperation is particularly evident through teaching bases, student professional practice, the preparation of studies and reports, and cooperation at an international scientific conference.

The Faculty organizes the International Maritime Science Conference (IMSC) and publishes the journal Transactions on Maritime Science (ToMS), which is indexed, among other things, in Web of Science (ESCI) and Scopus.

The Maritime Faculty in Split is an educational centre that attracts students from several Dalmatian counties, including Split-Dalmatia, Dubrovnik-Neretva, Šibenik-Knin and Zadar counties.

The Faculty of Maritime Studies in Split systematically develops its scientific and research activities through participation in several national and international projects, financed from various sources, including its own institutional funds, programmes of the Ministry of Science and Education (especially through the Multiannual Institutional Financing of Scientific Activities - VIF), European infrastructure funds, and cooperation with international scientific networks and organizations. In the past period, numerous projects have been implemented focused on navigation safety, maritime surveillance and management systems, sustainability of maritime tourism, environmental aspects, as well as interdisciplinary research related to the human factor. Although some projects have been completed, their scientific and developmental contribution remains permanently present through the improvement of research capacities, the development of new teaching content and the raising of the competences of research staff. The Faculty is currently participating in several current scientific and research initiatives that include cooperation with international partners, the exchange of experts, and the development of modern work methods and equipment. It was also a partner in a large infrastructure project aimed at strengthening scientific excellence and better integration with the economy and society.

All of the above confirms the Faculty's strategic orientation towards the development of science and innovation, as well as its increasing recognition in the national and international research space.

1.2. Compliance with the requirements of professional associations

The Postgraduate University Study Technologies in Maritime Affairs is aligned with the recommendations of the European Society for Engineering Education (SEFI) and the principles

established within the framework of the Bologna Process and the Croatian Qualifications Framework (HKO). The basic recommendations of SEFI, on which this study programme is based, include:

- The undergraduate must be the result of an individual and original research work.
- The undergraduate is the third level of qualifications within the Bologna Process.
- The programme should enable flexibility in the organization of postgraduate education.
- It is necessary to ensure an improved quality of mentoring and support for postgraduate students.
- Study enrolment must be clear and transparent.
- The study programme should not have the classic structure of a formal curriculum but rather be focused on research and development of competencies for independent scientific work.

These principles are integrated into the regulations, teaching framework and organization of the Postgraduate University Study Technologies in Maritime Affairs, ensuring its compliance with European standards and national regulations in the field of higher education.

1.3. Partners outside the higher education system

Many teachers at the Faculty of Maritime Studies in Split have established scientific cooperation with numerous universities and research institutes around the world. Of particular importance and long-term importance is the Faculty's cooperation with leading international and domestic economic entities through joint projects, scientific research and knowledge transfer, in which postgraduate students are actively involved.

Cooperation with the environment takes place through various formal and informal forms of partnerships, including cooperation agreements aimed at promoting scientific and educational activities. Partners include organizations from various sectors:

- Economic and public sector: Split-Dalmatia County, Croatian Academic and Research Network – CARNet, Croatian Register of Shipping, Brodosplit, Siemens.
- Companies engaged in the boarding of seafarers in the Republic of Croatia: Pasat, Gollar Shipping, Globtik.
- Maritime and logistics companies: Jadroplov, NYK, Brodospas, Dorian, Tankerska plovidba, Plovput d.o.o.
- Local and regional self-government units and other relevant institutions and organizations.

Possible partners outside the higher education system who have so far shown interest and established cooperation during the preparation of postgraduate study programmes (some of them are ready to act as teaching bases and provide assistance with available equipment) and plan to train young people are:

- Croatian Register of Shipping,

- Croatian Hydrographic Institute,
- Plovput d.o.o.,
- Pasat d.o.o.,
- IVA d.o.o.,
- Jadrolinija d.o.o.,
- Jadroplov d.d.

1.4. Financing method

The financing of postgraduate studies is based on tuition fees paid to the Faculty by postgraduate students, their home institutions or employers. The tuition fees are used specifically for the costs of scientific and research work. The Faculty may use additional available funds (e.g. CEEPUS, Erasmus+, etc.) to finance international cooperation and mobility. The costs of studies of postgraduate students employed in collaborative positions may be subsidized by the Faculty from its own or state funds.

1.5. Comparability of the study programme with programmes of accredited higher education institutions in Croatia and the European Union

The Faculty actively monitors the development of higher education in the world, especially in Europe. When organizing the postgraduate study programme in Maritime Technologies, similar European and non-European postgraduate programmes were considered. The education systems of scientists and experts in this field are very diverse and interdisciplinary, with no two countries having the same education model.

The programme covers a wide range of technical sciences with an emphasis on maritime technologies. It should be noted that the choice of subjects is completely free in agreement with the mentor, which allows for orientation towards interdisciplinary research in various scientific fields.

The programme of the Postgraduate University Study Technologies in Maritime Affairs is comparable to several similar postgraduate studies in Croatia, among which the following stand out:

- Postgraduate study in Maritime Studies, Faculty of Maritime Studies, University of Rijeka
- Postgraduate study in Technological Systems in Traffic and Transport, Faculty of Transport and Communications, University of Zagreb

The programme is also comparable to similar studies at renowned European universities. The comparability of the study programme with study programs can be particularly emphasized:

- École Polytechnique Fédérale de Lausanne – EPFL, Lozana, Switzerland (http://phd.epfl.ch/EDME),

- Faculty of Mechanical Engineering, University of Maribor, Maribor, Slovenia (http://www.fs.uni- mb.si/podrocje.aspx?id=733),
- Universidade de Lisboa, Lisboa, Portugal (https://ciencias.ulisboa.pt/en/cursos/doutoramento/estatistica-e-investigacao-operacional)

1.6. The openness of studies towards student mobility (horizontal, vertical in the Republic of Croatia and international)

The Postgraduate University Study Technologies in Maritime Affairs supports the mobility of students and teachers within the Republic of Croatia and internationally. Study cooperation is established with institutions such as the Faculty of Mechanical Engineering and Naval Architecture of the University of Zagreb, the Faculty of Technology of the University of Rijeka, the Faculty of Mechanical Engineering in Slavonski Brod (Josip Juraj Strossmayer University in Osijek), the Faculty of Maritime Studies in Rijeka, the Maritime Departments of the Universities of Zadar and Dubrovnik, the Faculty of Transport and Communications in Zagreb, the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture in Split, etc.

Students are allowed to complete part of their study programme at related higher education institutions in Croatia or abroad. International cooperation encourages student and teacher mobility through the Erasmus+, CEEPUS and similar mechanisms.

The study is based on the principles of internationalization, which includes teaching in English, guest lecturers from abroad, mobility of teaching staff, and enrolment of foreign students.

1.7. Compliance with the mission and strategy of the University and the proponent, as well as with the strategic document of the higher education

The development of the postgraduate study programme Technologies in Maritime Affairs is based on valid national and institutional strategic documents, with an emphasis on encouraging the development of human resources in the STEM field, strengthening research excellence and internationalization.

In 2015, the National Council for Human Resources Development, in accordance with Article 10 of the Act on the Croatian Qualifications Framework (NN 22/13), adopted recommendations on a sector-oriented approach to defining enrolment quotas in secondary and higher education.[2] It is recommended:

[2] https://vlada.gov.hr/UserDocsImages//Sjednice/2016/12%20sjednica%20Vlade//12%20-%204.pdf

- Maintaining the overall level of enrolment quotas in higher education with their redistribution,
- Increasing quotas in the fields of science, technology, engineering and mathematics (so-called STEM fields),
- Reducing quotas in the field of social sciences, except for qualifications identified as being in short supply.

The recommendation includes the implementation of measures through defining the amount of full participation subsidy for full-time students and concluding programme agreements between higher education institutions and the Ministry of Science, Education and Sports. Furthermore, the 2017 recommendations further emphasize the need to introduce an analytical approach to planning enrolment quotas, considering labour market needs, regional characteristics and sectoral priorities.

At the institutional level, the University of Split defined its mission and vision with the Strategy 2015-2020 and then with the Strategy 2021-2025 through an emphasis on[3]:

- Improving scientific and research excellence,
- Transfer of knowledge and technology to the economy,
- Encouraging interdisciplinarity and innovation,
- International mobility and cooperation,
- Strengthening the role of the University in the European Research Area (ERA).

Within the strategic domain "Science, Research, Art and Creativity", the following objectives have been defined:

- The University of Split becomes a recognizable research university in the European Research Area,
- Scientific and research activities contribute to the development of the region, Croatia and the European Union,
- Interdisciplinary cooperation with scientific and economic institutions in the country and abroad is encouraged,
- Artistic creativity is developed through the connection of cultural heritage and modern creative industries.[4]

The study programme is aligned with the Development Strategy of the Faculty of Maritime Studies in Split for the period 2024-2030, which specifically emphasizes the goals of strengthening scientific research activities, internationalization, cooperation with the economy, and the development of study programmes in the field of maritime technologies and sustainable development.

The Postgraduate University Study Technologies in Maritime Affairs is fully aligned with the

[3] www.kvalifikacije.hr/fgs.axd?id=1061
[4] www.unist.hr/Portals/0/docs/.../UNIST_STRATEGIJA_2015_2020_.pdf

strategic document Network of Higher Education Institutions and Study Programmes in the Republic of Croatia, which specifically encourages the opening of programmes in the STEM field.

The structure of the Postgraduate University Study Technologies in Maritime Affairs is based on:

- "Conclusions and recommendations", Bologna Seminar on “Doctoral Programmes for the European Knowledge Society”, Salzburg, 2005.
- "Final conclusions", Bologna Seminar on “Matching Ambition with Responsibilities and Resources”, Nice, 2006.
- "Doctoral studies in Europe: excellence in researcher training", LERU – League of European Research Universities, 2007.
- Europe’s Universities beyond 2010: Diversity with a common purpose, Lisbon Declaration, 2007.
- Europe’s Universities – Looking Forward with Confidence, Prague Declaration, 2009.
- Postgraduate studies, Croatian Science Foundation, 2006.

In accordance with the Strategy of Education, Science and Technology of the Republic of Croatia (Croatian Parliament, 2014), emphasis is placed on:

- research excellence,
- interdisciplinary research,
- international cooperation and mobility,
- inclusion of mentors and postgraduate candidates from abroad,
- transversal skills and professional development of researchers,
- linking research with projects, institutes and the business sector.

The University of Split also actively participates in the European university alliance SEA-EU (European University of the Seas), which further strengthens the components of mobility, cooperation and internationalization of postgraduate education. Through SEA-EU, teachers and postgraduate students are involved in joint European projects, exchange, development of bilingual modules and networking with partners from other universities. In addition, the development and implementation of the Postgraduate University Study Technologies in Maritime Affairs contributes to fulfilling the objectives of the National Recovery and Resilience Plan (NRRP), especially in the segments:

- modernization of higher education,
- investments in STEM and digital competencies,
- strengthening scientific infrastructure,
- strengthening internationalization and connecting science with the economy.

The study is structured to meet the contemporary needs of the labour market and the scientific community. In the future, it is planned to include this study programme in the Postgraduate School of the University of Split, which will further strengthen its institutional framework and integration into the university system.[5]

Unlike other postgraduate programmes in a related field in Croatia, this study programme stands out, among other things, for its greater share of research work in relation to formal teaching, its international dimension through teaching in English, and the inclusion of domestic and foreign lecturers.

1.8. Previous experience in implementing equivalent or similar programmes

During the implementation of related postgraduate studies in Croatia and the region, numerous challenges have been identified that could have influenced the reduced completion rate of studies, especially among students outside scientific and research institutions. Research and reports show that earlier studies were often burdened by unclear rules, late inclusion of mentors in the research process, and weaker connections with industry and the economy.

The low pass rate in some study programmes was partly because students often chose their postgraduate thesis topic and mentor only in the later stages of their studies, which limited the continuity of research work and collaboration. Also, earlier entry requirements did not always ensure a sufficient level of selection and motivation of candidates for research work, especially for those employed in industry, where academic progress does not condition career development.

Considering these experiences, the Postgraduate University Study Technologies in Maritime Affairs is structured so that:

- obligates candidates to submit a proposal for a research area and appoint a preliminary mentor when applying for the study,
- introduces a mandatory interview with the Council as part of the admission procedure to assess scientific potential,
- encourages close cooperation between postgraduate candidates and mentors from the very beginning, with clearly defined obligations and annual progress evaluations,
- introduces clear and measurable promotion criteria based on scientific results,
- supports research work through a structured system of ECTS credits, internationalization and opportunities for co-financing from tuition fees,

[5] https://narodne-novine.nn.hr/clanci/sluzbeni/2014_10_124_2364.html

- enables the acquisition of transversal skills in managing research projects and writing project proposals, which increases the employability of postgraduate candidates.

In the new Rulebook (2025), greater responsibility of mentors for the successful completion of studies is ensured, including a limit on the number of mentoring sessions and mechanisms for monitoring the quality of mentoring.

In this way, the new study programme is based on the experiences of previous generations and is aligned with the latest national and European guidelines for quality assurance of postgraduate studies.

2. STUDY PROGRAMME DESCRIPTION

2.1. General

Scientific/artistic field of the study programme	Technical Sciences
Duration of the study programme	At least 3 years
Minimum number of ECTS credits required to complete the study	180
Study admission requirements and admission procedure	The Postgraduate University Study Technologies in Maritime Affairs provides scientific training for applicants with different educational profiles. The enrolment requirements relate to: • applicants with completed university undergraduate and graduate studies in relevant scientific fields, with at least 300 ECTS credits, • applicants with completed university undergraduate studies in relevant scientific fields according to the Law on Higher Education Institutions (NN 59/96) or the laws on Higher Education in force until then, • applicants who have completed postgraduate scientific studies (Master of Science) in relevant scientific fields, • applicants who have passed all exams in postgraduate studies for the Master of Science degree, but have not defended their Master's thesis, • applicants who have started a related postgraduate

	study, in which case the Postgraduate Study Council may recognize previously achieved ECTS credits and determine any differential exams. The corresponding scientific fields and branches are: 2.02 Shipbuilding, 2.05 Civil engineering (bearing structures, hydraulic engineering), 2.08 Metallurgy, 2.09 Computer science, 2.10 Mining, petroleum and geological engineering, 2.11 Mechanical engineering, 2.12 Traffic and transport technology (road and rail transport, maritime and river transport), 2.14 Aviation, 2.15 Basic technical sciences. The admission requirements apply to all categories of applicants, and it is necessary to submit: • Knowledge of English, • Average grade of not less than 3.5 – exceptionally, applicants with a lower average may be accepted (minimum is 3.0) provided that at least one condition is met, which includes submission of published scientific and/or professional papers, participation in projects, and recommendations from at least two university professors, • Applicant's CV. Before enrolling, the applicant must have a selected preliminary mentor with whom he/she determines the area of research. Prepare and submit a list of published papers (if any), their copies and certificates of other activities (projects, participation, conferences); A mandatory interview with the Postgraduate Study Council, which is an integral part of the enrolment procedure, and which assesses the candidate's scientific potential. Postgraduate students who have started studying at other related postgraduate studies may apply for enrolment in the Study with the recognition of ECTS credits and with the possible passing of differential exams. The recognition of credits and the content of differential exams are determined by the Postgraduate Study Council. Applicants who have completed a relevant university graduate study at foreign universities are eligible for

	admission to the Postgraduate University Study Technologies in Maritime Affairs by the Postgraduate Study Council. Enrolment is conducted based on the decision of the Faculty Council. The call for enrolment (competition) is published publicly on the Faculty website and in the press. **Number of applicants and selection process** The number of applicants who can enrol in the Postgraduate University Study Technologies in Maritime Affairs is determined by the Faculty Council and confirmed by the Senate of the University of Split. There is no classic admission procedure for enrolment in the study programme.

2.2. Learning outcomes of the study programme

The postgraduate student acquires the highest level of competences (8.2) according to the Croatian Qualifications Framework (HKO), which relate to the creation and evaluation of new facts in the field of scientific research, which leads to the advancement of the boundaries of knowledge. He also develops social skills, independence and responsibility in work. Specific learning outcomes at the Postgraduate University Study Technologies in Maritime Affairs level:

1. Apply advanced mathematical, physical and scientific principles in the research and development of new technologies, ideas or processes in technical sciences.
2. Create and evaluate new facts, procedures and theories that, based on research results, lead to the advancement of knowledge in the field of scientific research.
3. As an author or co-author, write and successfully publish a paper in an internationally peer-reviewed journal referenced in the SCI, CC or SCI-Expanded database.
4. Prepare and present a public statement on the results and scientific knowledge at an international scientific conference.
5. Argue your opinion and defend your position in a discussion with other scientists in the field of research.
6. As a collaborator or project leader, design scientific research in the field of technical sciences.
7. Critically assess published original scientific results of other authors in their field of research.
8. Analyse and evaluate new and specialized knowledge, methods, tools and instruments in the field of scientific research.

9. Apply methods for defining and protecting intellectual property.
10. Collect and analyse information (literature and database searches).
11. Present and explain the results of scientific research to other scientists and laypersons.
12. Take ethical and social responsibility for the success of research and the possible consequences of the impact on the wider community.
13. Plan and lead multidisciplinary and international scientific projects (drafting scientific research, organizing research, timely detection of potential problems, determining necessary resources, leading a research team);
14. Write and report (speaking and listening skills, ability to present data and research results).
15. Express personal, professional and ethical stance.
16. Face new challenges of society and the economy and contribute to social and economic development by applying the results of scientific research.
17. Analyse and evaluate different sources of scientific data.
18. Write and present scientific work in a technical field using scientific methods.
19. Select appropriate scientific methods suitable for research in a technical field.
20. Plan and conduct research independently under the supervision of a mentor or as part of a team.

2.3. Employment opportunities

Doctor of Science who successfully complete the Postgraduate University Study Technologies in Maritime Affairs acquire the highest level of scientific and professional competencies and become competitive candidates for employment in the academic, scientific and industrial environment in the Republic of Croatia and abroad.

Academic and scientific institutions

The most successful postgraduate students can be employed at universities, scientific institutes and research centres in the technical field. Among the most important institutions in Split and the Republic of Croatia, the following distinguished:

- University of Split and its technical departments,
- Croatian Register of Shipping,
- Croatian Hydrographic Institute,
- Institute of Oceanography and Fisheries.

Industry and applied research

Given the technical focus of the studies and the possibility of participating in programmes such as the European Industrial Doctorates (EID) and the Marie Skłodowska-Curie Actions funds, emphasis is also placed on employment in the industrial sector, especially in

cooperation with economic sectors such as shipbuilding and ship repair, mechanical engineering and energy, electronics and information technology, maritime transport and logistics. Numerous relevant entities operate in the Split-Dalmatia County and beyond, including:

- Brodosplit,
- Brodotrogir,
- Brodoremont Trogir,
- Adriadocs Trogir,
- several smaller shipyards with a tradition in the construction and maintenance of small vessels.
- Dalstroj d.d. Split / Adriawinch d.o.o. – manufacturers of ship deck equipment.
- Končar Električni uređaji d.d. Split – engineering, design and testing of low and medium voltage electrical devices,
- OIV – Odašiljači i veze d.o.o. – development centre for complex electronic systems,
- Plovput d.o.o., Split
- Jadroplov d.d. Split,
- Marin Consult,
- Luka Split (Port of Split),
- maritime agencies for seafarer embarkation: Golar, IVA, Orient d.o.o., Pasat d.o.o. and others.

The study prepares postgraduate students for involvement in international research projects and collaborations with industry, and provides a foundation for future scientific, professional and development roles in sectors key to the sustainable development of the maritime economy.

2.4. Possibility of continuing studies at a higher level

Completing postgraduate studies and obtaining the academic degree of Doctor of Science enables the continuation of scientific research and professional development through postgraduate research and lifelong learning programmes in the country and abroad.

2.5. Study/s of the lower level of the proposer or other institutions in the Republic of Croatia from which it is possible to enrol in the proposed study

Graduate university studies leading to admission to the University Postgraduate Study Programme in Maritime Affairs:

- Graduate University Study Programme in Mechanical Engineering,
- Graduate University Study Programme in Industrial Engineering,
- Graduate University Study Programme in Nautical Studies,

- Graduate University Study Programme in Marine Engineering,
- Graduate University Study Programme in Marine Electrical and Information Technologies,
- Graduate University Study Programme in Marine Systems and Processes,
- Graduate University Study Programme in Marine Technologies of Yachts and Marinas,
- Graduate University Study Programme in Navigation and Technology of Maritime Transport,
- Graduate University Study Programme in Naval Engineering and Technology of Maritime Transport,
- Graduate University Study Programme in Technology and Organization of Transport,
- Graduate University Study Program in Logistics and Management in Maritime and Transport,
- Graduate University Study Programme in Maritime Management,
- Graduate University Study Programme in Road Transport,
- Graduate University Study Programme in Urban Transport,
- Graduate University Study Programme in Information and Communication Transport,
- Graduate University Study Programme in Postal Transport,
- Graduate University Study Programme in Water Transport,
- Graduate University Study Programme in Air Transport,
- Graduate University Study Railway Transport,
- Graduate University Study Intelligent Transport Systems and Logistics,
- Graduate University Study Logistics,
- Graduate University Study Aeronautics,
- Integrated Military Maritime Studies (Military Nautical Studies and Military Naval Engineering),
- Graduate University Study Electrical Engineering,
- Graduate University Study Electronics,
- Graduate University Study Computer Science.

2.6. Conditions and method of studying

Enrolment

Admission to the Postgraduate University Study Technologies in Maritime Affairs programme is based on the quality of the applicant. Before enrolment, the applicant is required to select a preliminary mentor (and, if necessary, a co-mentor), with whose consent the applicant registers the area of research.

The preliminary mentor, in agreement with the applicant, prepares:

- proposal of scientific field of research,
- list of previous works of the applicant (if any),
- documentation of other scientific and professional activities (certificates, ECTS credits,

etc.).

The application is considered at an interview before the Postgraduate Study Council, which assesses the candidate's scientific and research potential and makes a proposal for admission to the Faculty Council.

Admission is possible only after the preliminary mentor accepts the postgraduate candidate and confirms his/her readiness for scientific and research cooperation. The final decision on admission is made by the Faculty Council.

Duration of study

The Postgraduate University Study Technologies in Maritime Affairs lasts at least three (3) years, or six (6) semesters, which results in the acquisition of at least 180 ECTS credits. The study is conducted as:

- full-time studies, which are usually completed within 3 years, and a maximum of 6 years (including 3 years of graduation),
- part-time studies, which last up to 8 years.

In cases of suspension of obligations due to justified reasons (e.g. maternity/parental leave, illness, military service), the deadline is extended proportionally in accordance with the decision of the Faculty Council. During the study, postgraduate students are required to participate in the following activities:

- taking mandatory and elective exams according to the implementation plan,
- scientific research work under mentorship, which includes the preparation and defence of a postgraduate thesis,
- publishing scientific papers in relevant international journals,
- presenting results at domestic and international scientific conferences,
- professional and scientific stays at other higher education or research institutions in the country and abroad.

The study load structure is clearly defined: 25 ECTS credits are achieved through teaching, while 155 ECTS credits are achieved through scientific and research activities.

Subjects

The possibility of choosing individual subjects allows postgraduate students to upgrade and direct their knowledge in accordance with their scientific interests and research plan. The subjects serve the scientific profiling of the postgraduate student within his/her narrow field of research and are aligned with current scientific and technological trends.

During the first year of study, the postgraduate student enrols in a total of five (5) subjects: two (2) mandatory and three (3) electives, in accordance with the curriculum. The mandatory subjects are determined by the study programme, while the elective subjects are chosen in agreement with the mentor to follow the individual research direction of the postgraduate student. One of the elective subjects may be the mentor's subject.

If fewer than ten (10) postgraduate students enrol in the course, classes are not conducted in the classic lecture format, but in the form of consultation classes, which include individual or group consultations with the course leader, in accordance with the curriculum. The same applies to postgraduate students enrolled in the part-time study.

Scientific research paper

During study, the postgraduate candidate is obligated to continuously and actively conduct scientific research related to the topic of the postgraduate thesis under the supervision of a preliminary mentor.

The postgraduate candidate is obliged:

- publish at least one scientific paper as the first author in an international peer-reviewed journal, indexed in WoS-CC, SCI or SCI-Expanded, thematically related to the field of the postgraduate thesis,
- publish and present at least one paper as the first author in the proceedings of an international peer-reviewed scientific conference, also thematically related to the thesis.

Published papers must be the result of research work carried out within the framework of the postgraduate thesis.

The postgraduate student may, with the consent of the mentor, publish additional scientific papers in other relevant journals or participate in international conferences, with a certificate of participation and presentation.

The mentor is obliged to fill out a form on the postgraduate student's work and his/her progress in the study at least once a year. The form is considered and must be accepted by the Postgraduate Study Council.

The postgraduate student is also obliged to fill out a form for evaluating the mentor's work at least once a year, which is submitted to the Postgraduate Study Council to gain insight into the quality of the mentor-postgraduate relationship.

Application and defence of the topic of the postgraduate thesis

The process of submitting a postgraduate thesis topic is initiated by submitting the prescribed Topic Application Form, with the consent of the mentor and co-mentor.
The requirements for topic application are:

- passed all exams in the enrolled subjects,
- published and presented at least one scientific paper at an international scientific conference with peer review, related to the field of postgraduate research.

The defence of the postgraduate thesis topic includes a presentation of the research plan before the Postgraduate Study Council, with an emphasis on the scientific justification of the topic, methodology, and feasibility of the expected original scientific contribution. Based on the defence and submitted documentation, the Council makes a proposal for acceptance of the topic, which is confirmed by the Faculty Council.

Writing a postgraduate thesis

The procedure for preparing and defending a postgraduate thesis includes the preparation of the written text of the thesis, its application, evaluation and public defence before an expert Council, in accordance with the Regulations on Postgraduate Studies.

A postgraduate thesis can be prepared and submitted in the form of:

1. Scientific monographs - a complete author's text presenting the research, its methodology and original scientific contribution. In the case of a postgraduate thesis in the form of a scientific monograph, the postgraduate candidate is required to have published at least one internationally peer-reviewed paper in a journal, thematically related to the postgraduate research, in which he/she is the first author, before submitting the postgraduate thesis for evaluation. The paper should be published in a journal indexed in the SCIE (Science Citation Index Expanded) citation database, ranked in the Q1 or Q2 quartile, in branches corresponding to the field of postgraduate research. The paper that was used as a condition for submitting the postgraduate thesis topic cannot be used at the same time to fulfil this obligation.
2. A set of published scientific papers with critical review chapters (so-called compilation or Scandinavian model): introduction, review of previous research, methodology, research results, discussion, conclusion and list of relevant literature. A critical review refers to the papers and provides an overview of the results of the postgraduate thesis in the context of existing scientific knowledge. This form of thesis is possible only as part of research work in the postgraduate study, and scientific papers must be published after enrolment in the postgraduate study. Scientific papers that are proposed together as a postgraduate thesis must form a complete whole of at least five papers published in journals indexed in the WoSCC (Web of Science Core Collection) – SCIE (Science Citation Index Expanded) indexed citation database, ranked in the Q1 or Q2 quartiles. At least three of the listed papers must be published in journals ranked in the Q1 quartile, and the remaining two in the Q2 quartile, and none of them must be a review paper. The papers must be published by at least three publishers and only a mentor and, if necessary, a co-mentor may work with the postgraduate candidate. The listed works do not carry ECTS credits.

Points system

The teaching and scientific-research workload of the study is expressed in ECTS points, with each subject or activity being assigned a certain number of points, which is proportional to the workload of the postgraduate student. The total workload of the Postgraduate University Study Technologies in Maritime Affairs is 180 ECTS points. The ECTS credit schedule is shown in Table 1.

Table 1. Content of the *Postgraduate University Study Technologies in Maritime Affairs* and distribution of ECTS credits

Semester	I	II	III	IV	V	VI		ECTS points
Study subjects	2 man.	3 elec.	-	-	-	-	-	25
Preparation and implementation of the defence of the topic	-	-	-	1	-	-	-	20
Scientific-research work and preparation of a postgraduate thesis	+	+	+	+	+	+	-	95
Preparation and implementation of the defence of the postgraduate thesis	-	-	-	-	-	-	1	40
Total points after defending the postgraduate thesis								180

According to Table 1, the distribution of points related to individual postgraduate student activities is as follows:

- Teaching (compulsory and optional subjects) – 25 ECTS
- Scientific research work – 95 ECTS
- Application and defence of the topic of the postgraduate thesis – 20 ECTS
- Postgraduate thesis defence – 40 ECTS

Within the postgraduate study programme, scientific research constitutes a fundamental component of the study load and is valued at a total of 95 ECTS credits. These activities are classified into two categories according to the level of contribution and type of engagement:

- Category A – High-level scientific contribution and
- Category B - Supplementary scientific and development activities.

Category A includes the scientific activities of a postgraduate student that directly contribute to the development of scientific knowledge and include:

- Published or accepted scientific paper in journals ranked in the Q1 or Q2 quartiles according to WoS or Scopus databases, in which the postgraduate student is the first author, and in which only one postgraduate student from this study participates: 30 ECTS credits
- Same conditions for papers in the Q3 or Q4 quartiles: 25 ECTS credits

- Papers outside the databases, but with international peer review and first authorship by the postgraduate student: 10 ECTS credits
- Active participation in an international scientific conference as the first author: 10 ECTS credits
- Applied and accepted patent: 20 ECTS credits

All the above-mentioned scientific papers are evaluated depending on the number of authors. If the publication has a maximum of four authors, the postgraduate candidate may be recognized with a full share (100%), provided that all other prescribed criteria for the evaluation of publications are met. In the case of a publication with five authors, a 75% share is recognized, while for six authors a 50% share is recognized, and for seven authors a 25% share. If the publication has more than seven authors, the postgraduate candidate is recognized with a share proportional to the number of authors, according to the formula 100/n%, where n is the total number of authors of the publication.
A postgraduate candidate may submit an unlimited number of requests for recognition of activities from this category during his/her studies, with the obligatory supporting documentation and using the official form. Each request is decided by the Postgraduate Study Council.

Category B includes activities that complement the postgraduate candidate's research experience and enable the development of research and transversal skills:

- Abroad research of at least 3 months (e.g. laboratory work, scientific consultations, work with databases): 25 ECTS
- Abroad research of at least 1 month: 15 ECTS
- Collaboration on an international scientific project or with an international research group (at least 3 months of active collaboration in Croatia or abroad): 20 ECTS
- Participation in an international summer school: 3 ECTS
- Leading workshops for postgraduate students, with prior approval of the Council: 3 ECTS
- Attending a transversal skills development programme (e.g. YUFE, SEA-EU, postgraduate schools, etc.) where a one-day programme is credited with 1 ECTS point, and a multi-day programme with 3 ECTS points.

Each individual activity from this group can be recognized a maximum of twice during the study.

For recognition, it is necessary to fill out an official form and attach complete documentation (certificates of participation, description of duration and content and, where applicable, the opinion of the mentor on the relevance of the activity to the thesis topic). Each request is decided by the Postgraduate Study Council.

2.7. System of counselling and guidance throughout the study

Study conditions

A postgraduate candidate should select a preliminary mentor and research area before enrolling in the postgraduate programme. The mentor, in cooperation with the postgraduate candidate, defines the area of scientific research. The preliminary mentor becomes the official mentor and the postgraduate thesis topic becomes official after the public defence of the topic before the Council for Evaluation and Defence of the Topic and after the final approval of the Faculty Council.

The mentor is obliged to submit a report on the postgraduate student's progress to the Postgraduate Study Council at least once a year, while the postgraduate student simultaneously completes the annual evaluation of the mentor.

During the study, the relationship between the mentor and the postgraduate student is based on mutual responsibility and regular communication. The mentor is obliged to monitor the progress of the postgraduate student, provide professional guidance, be available for advice and ensure timely feedback regarding the development of the research and the preparation of the postgraduate thesis. On the other hand, the postgraduate student is obliged to regularly report to the mentor on the activities carried out and the progress achieved in accordance with the agreed plan. Such a two-way relationship contributes to the continuity of work, timely recognition of challenges and achievement of research goals.

The study is based on the mentoring model, whereby the postgraduate student develops research competencies through independent and guided scientific work, using the resources of the Faculty such as laboratories, library funds, scientific equipment and professional support.

The aim of the postgraduate study is to create highly qualified and innovative researchers, ready to contribute to the development of scientific knowledge and the application of research in the industrial and educational environment, especially in the field of maritime and technical sciences. An additional aim of the study is to strengthen the connection between universities and industry, through joint projects, knowledge exchange and the creation of feedback on market and technological needs. Strategies aimed at increasing success and shortening the duration of the study are presented in Table 2.

Table 2. Actions and conditions aimed at reducing study time and increasing student success

Intervention	Measures	Intervention description	Expected outcome
Enrolment strategy	Clear and predefined enrolment criteria	Before enrolling, the postgraduate student, in agreement with the preliminary supervisor, defines the field of research. With his signature, the preliminary mentor confirms his readiness to guide the postgraduate student.	Candidates already have a structured research intention and confirmed mentoring support upon enrolment, which increases the probability of successful and timely completion of studies.
	Interdisciplinary openness in enrolment	The study encourages the enrolment of candidates from different, but compatible, technical and related scientific fields, with the possibility of determining differential obligations to equalize previous knowledge.	It enables the development of interdisciplinary topics and the introduction of innovative approaches to research.
Programme regulation	Postgraduate student progress report	A progress report is prepared once a year and submitted by the mentor to the Postgraduate Study Council. At the same time, the postgraduate student completes a mentor evaluation. The reports serve as a key tool for monitoring the dynamics of the work and the quality of the mentoring relationship.	Systematic monitoring of the individual progress of postgraduate students, timely identification of difficulties and improvement of the mentoring process.
Strengthening research and transversal skills	Formal education and transversal skills	Introduction to the study includes: research methods, academic writing, research ethics, presentation of results, as well as project management skills, communication and collaboration. It is planned to organize workshops led by postgraduate students for colleagues, with the exchange of knowledge, experiences and skills.	Acquiring academic and transversal competencies necessary for a successful scientific and professional career. Strengthening mutual cooperation and self-confidence among postgraduate students.

2.8. List of subjects that can be presented in a foreign language

All courses within the postgraduate study programme can be taught in English, especially when foreign lecturers participate in the teaching or when mixed groups of postgraduate

students are involved. The public defence of the topic and the preparation and defence of the postgraduate thesis are in English.

2.9. Criteria and conditions for transferring ECTS credits

ECTS credits earned at other university postgraduate studies may be recognized if they are related to the research topic and achieved with an appropriate workload (30 hours = 1 ECTS). Recognition is approved by the Postgraduate Study Council with the recommendation of the mentor, based on the course documentation.

2.10. Completion of studies

The Postgraduate University Study Technologies in Maritime Affairs is completed by fulfilling all study obligations, which include:

- passing the exam from the enrolled compulsory and optional subjects,
- fulfilling scientific research activities that include the publication of prescribed scientific works,
- public defence of the topic of the postgraduate thesis,
- preparation and public defence of the postgraduate thesis.

The requirements for applying for and defending a postgraduate thesis topic, as well as the procedure for submitting the work for assessment, its evaluation and defence, are presented in Table 3.

Table 3. Requirements for applying and defending a topic and postgraduate thesis

Submitting a postgraduate thesis topic	The requirements for submitting a postgraduate thesis topic are: • passed all enrolled courses • authorship of at least one complete scientific paper published in a scientific journal, indexed in the Web of Science database, which thematically belongs to the field of postgraduate research. The total number of co-authors on the paper must not exceed four, whereby the postgraduate candidate must be indicated as the first author and must be the only postgraduate candidate enrolled in this study who participates as the author of that paper. • The Faculty Council appoints the Council for the Evaluation and Defence of the Postgraduate Thesis Topic. • The Council for the Evaluation and Defence of the Topic consists of 3 (three) or 5 (five) members whose scientific activity is in the research field of the applicant's postgraduate thesis. Members of the Council for the Evaluation and Defence of the Topic may be persons elected to scientific positions, senior scientists and teachers, as well as experts with a Doctor of Science and published internationally recognizable works in the field of the thesis. One of the members of the Council for

	the Acceptance of the Topic must be a foreign member from the countries of the European Economic Area (EEA). Exceptionally, the Council for Science and Postgraduate Studies may, upon a reasoned request from a postgraduate candidate, approve recognition from another country (outside the EEA) if it assesses that the member meets the appropriate scientific and academic standards. • At least 2 (two) members of the Council for the Evaluation and Defence of the Topic must be members elected to a scientific and teaching position in the field of the postgraduate candidate's postgraduate thesis topic. • At least one member of the Council for the Acceptance of the Topic must not be an employee of the Faculty of Maritime Studies in Split. • The President of the Council for the Evaluation and Defence of the Postgraduate Thesis Topic must be an employee of the Faculty elected to a scientific and teaching position of assistant professor or higher, as a rule in the scientific field of the postgraduate thesis topic. • The preliminary mentor and co-mentor are not members of the Council. The public defence of the postgraduate thesis topic is conducted by the Council for Evaluation and Defence of the Postgraduate Thesis Topic. The Council for Evaluation and Defence of the Postgraduate Thesis Topic submits a report on the acceptance or rejection of the postgraduate thesis topic to the Postgraduate Study Council. The final decision on the acceptance or rejection of the postgraduate thesis topic is made by the Faculty Council upon the proposal of the Postgraduate Study Council.
Evaluation and defence of the postgraduate thesis	The requirements for submitting a postgraduate thesis are: • Before submitting the postgraduate thesis (scientific monograph) for assessment, the postgraduate student is required to have published at least one internationally peer-reviewed paper in a journal, thematically related to the postgraduate research, in which he is the first author. The work should be published in a journal indexed in the SCIE (Science Citation Index Expanded) citation database, ranked in the Q1 or Q2 quartile, in branches corresponding to the field of postgraduate research. The work that was used as a condition for submitting the topic of the postgraduate thesis cannot be used simultaneously to fulfil this obligation. • Before submitting a postgraduate thesis (a set of published scientific papers, the so-called compilation model), the postgraduate student is required to have scientific papers that are proposed as a postgraduate thesis and must form a rounded whole of at least five papers published in journals indexed in the WoSCC (Web of Science Core Collection) - SCIE (Science Citation Index Expanded) indexed citation database, ranked in the Q1 or Q2 quartiles. At least three of the listed papers must be published in journals ranked in the Q1 quartile, and the remaining two in the Q2 quartile, and none of them must be a review

	paper. The papers must be published by at least three publishers, and only a mentor and, if necessary, a co-mentor may work with the postgraduate candidate. The listed papers do not carry ECTS credits. • The Faculty Council appoints the Postgraduate Thesis Evaluation Council and the Postgraduate Thesis Defence Council. • The Postgraduate Thesis Evaluation Council consists of 3 (three) or 5 (five) members whose scientific activity is in the research area of the candidate's postgraduate thesis. Members of the Postgraduate Thesis Evaluation Council may be persons elected to scientific positions, senior scientists and teachers, as well as experts with an undergraduate and published internationally recognizable works in the field of the thesis. One of the members of the Postgraduate Thesis Evaluation Council must be a foreign member from the European Economic Area (EEA). Exceptionally, the Postgraduate Study Council may, upon a reasoned request from the postgraduate candidate, approve recognition from another country (outside the EEA) if it assesses that the member meets the appropriate scientific and academic standards. • The mentor and co-mentor are not members of the Council. • The text of the postgraduate thesis is published on the Faculty website at least 30 days before the date of the public defence of the postgraduate thesis. • The Postgraduate Thesis Evaluation Council submits the postgraduate thesis evaluation to the Postgraduate Study Council. The final decision on the evaluation of the postgraduate thesis is made by the Faculty Council on the proposal of the Postgraduate Study Council. • The postgraduate thesis is defended before the Postgraduate Thesis Defence Council • The members of the Defence Council may be the same members as for the Postgraduate Thesis Evaluation Council and are appointed by the Faculty Council. • If the Defence Council is elected, it is elected in the same manner and under the same conditions as the postgraduate thesis evaluation Council. • The postgraduate thesis defence is public. • The postgraduate thesis defence Council issues a grade after the defence. • A postgraduate thesis is defended only once.

2.11. Description of mandatory subjects

<table>
<tr><td>SUBJECT</td><td colspan="5">SCIENTIFIC RESEARCH METHODOLOGY</td></tr>
<tr><td>Code</td><td>PFD001</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Tenured Full Prof. Dragan Poljak, Ph.D.
Assoc. Prof. Hrvoje Dodig, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Required</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Postgraduate students will learn about various scientific methods. They will be able to choose a suitable scientific method for researching a particular problem. Familiarization with the method of reviewing scientific articles. Analysing ethics in writing scientific articles. Getting to know different ways of citing. Analysis of plagiarism detection software.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed university graduate studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. Independently use citations and references correctly
2. Critically analyse methods of plagiarism
3. Independently assess the quality of a scientific article
4. Independently conduct a review
5. Combine plagiarism detection programmes</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures:
1. Research methods. (2 hours)
2. Citation and referencing methods. (1 hour)
3. Writing styles. (1 hour)
4. Writing ethics. (1 hour)
5. The concept of plagiarism and computer programmes for detecting plagiarism. (2 hours)
6. Writing a scientific article: selection of literature, content of a scientific article (1 hour)
7. Selecting a journal for searching the article. (1 hour)</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">8. Preparing the article according to the instructions for authors. (1 hour)
9. Assessing the value of a scientific article. (1 hour)
10. Review. (1 hour)
11. Working in electronic journal systems for sending articles. (2 hours)
12. Communication with the journal editorial board. (2 hours)
13. Procedure after acceptance of the article. (1 hour)
14. End Note computer programme for managing references. (1 hour)
15. Article evaluation (original scientific, review, preliminary communication, professional paper). (1 hour)
16. Using a plagiarism detection programme (1 hour)

Seminar:
1. Examples of plagiarism (databases, methods of detection, types). (2 hours)
2. Critical attitude towards a scientific article. (2 hours)
3. Conversion of bibliographic data (2 hours)
4. Creation of posters (2 hours)
5. Creation of presentations (2 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td>1</td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student is required to attend lectures, seminars and exercises, and to participate independently and defend the seminar paper. The postgraduate student is assessed orally.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td>Required literature</td><td colspan="3">Title</td><td colspan="2">Number of copies in</td><td>Availability through other</td></tr>
</table>

(available in the library and through other media)		**the library**	**media**
	Creswell J.W, „Research design – Qualitative, Quantitative and Mixed Methods Approaches“, 3rd ed., SAGE, 2009		
	Nagel E., Cohen M.R., „An Introduction to Logic and Scientific Method“, G. Routledge & Sons, 1934		
	Montgomery D.C., „Design and Analysis of Experiments“, Wiley, 2008		
	Gauch H.G., „Scientific Method in Practice“, Cambridge University Press, 2003.		
	Gastel B., Day R.A., „How to write and publish scientific paper“, 8th ed, Greenwood, 2016		
Supplemental literature	1. Markel, Mike: „Writing in the Technical Fields“, IEEE Press, 1994. 2. Thorsten, Ewald: Writing in the Technical Fields: A Practical Guide, Oxford University Press, 2014		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (in the opinion of the proposer)			

Teaching method key:
L - Lectures
S - Seminars/workshops
E - Exercises
F - Field work

<table>
<tr><td>SUBJECT</td><td colspan="5">SCIENTIFIC PROJECTS ORGANIZATION AND BIBLIOMETRICS</td></tr>
<tr><td>Code</td><td>PFD002</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Joško Šoda, Ph.D.
Tenured Full Prof. Merica Slišković, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>18</td><td>2</td><td>10</td><td>0</td></tr>
<tr><td>Subject status</td><td>Required</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Postgraduate students will be able to independently design a project, from the basic idea to writing an application. They will be introduced to the design of quality hypotheses and the methods of possible proofs. They will be introduced to the methods of database searches and bibliometrics of journals and the methods of searching and comparing journal features. Postgraduate students will gain insight into the functioning of the editorial board of a scientific journal and conferences through concrete examples.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed university graduate studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. Independently design a project from idea to application
2. Critically judge and formulate a hypothesis
3. Independently search scientific databases
4. Independently search and evaluate journal metrics
5. Analyse the work of journals and conferences</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures/exercises/seminars
1. Writing successful projects in the technical field (presentation of the meaning and importance of the project, explanation of general principles of proposal writing, organization of time and resources, division of tasks, problems, obstacles) (3 hours)
2. From idea to title and summary. (2 hours)
3. Elaboration of hypothesis and assumptions. (2 hours)
4. Procedures, protocols, plans. (1 hour)
5. Goals and expected results. (2 hours)</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">6. Bibliometrics (concept of base, concept of citation, IF). (3 hours)
7. Web of Science. (1 hour)
8. Scopus. (1 hour)
9. Organization of the magazine. (1 hour)
10. Organization of conferences. (2 hours)
11. Seminar work/exercises (12 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>2</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate candidate is required to attend lectures, seminars and exercises. It is also necessary to independently prepare and present a seminar paper. The topic of the seminar paper includes the design of the project, from the idea to the expected results. The postgraduate candidate is assessed orally based on the seminar presentation.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="4">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Thomas S. Mullaney, Christopher Rea: ''Where Research Begins: Choosing a Research Project That Matters to You (and the World)“, University of Chicago Press, First Edition, 2022, ISBN-10: 022681744X, ISBN-13 : 978-0226817446</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Sanjay Bhattacharya, Vaskar Saha, How to write a research grant proposal, Indian Journal of Medical Microbiology, Volume 49, 2024, 100482, ISSN 0255-0857, https://doi.org/10.1016/j.ijmmb.2023.100482.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">https://www.acs.org/content/dam/acsor</td><td></td><td colspan="2"></td></tr>
</table>

	g/funding/grants/prf/programs/information-for-applicants/Writing%20Competitive%20Proposals.pdf		
	https://usic.sheffield.ac.uk/blog/how-to-do-a-research-project		
	https://scientific-publishing.webshop.elsevier.com/research-process/writing-scientific-research-project-proposal/		
	https://clarivate.com/academia-government/lp/the-value-of-bibliometric-databases-data-intensive-studies-beyond-search-and-discovery/		
	https://clarivate.com/academia-government/webinars/basics-of-bibliometrics-workshop/		
	https://clarivate.com/academia-government/webinars/basics-of-bibliometrics-workshop/		
Additional literature	1. Martins Zaumanis: „Write a Winning Research Proposal: How to Generate Grant Ideas and Secure Funding Using Research Project Canvas (Peer Recognized)“, Independently Published By Peer, 2023, ISBN-10 : 3907363191, ISBN-13 : 978-3907363195 2. Shiri Noy: “Project Management for Researchers: A Practical, Stress-Free Guide to Getting Organized“, University of Michigan Press ELT, 2024, ISBN-10 : 0472039806, ISBN-13 : 978-0472039807. 3. Jonathan L. Portny, Stanely E. Portny: "Project Management For Dummies, 6th Edition", John Wiley & Sons, Inc., Hoboken, New Jersey, 2022.		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (in the opinion of the proposer)			

2.12. Description of elective courses

<table>
<tr><td>SUBJECT</td><td colspan="5">EXPERT SYSTEMS IN MARITIME AFFAIRS</td></tr>
<tr><td>Code</td><td>PFD003</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Hrvoje Dodig, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Getting to know expert systems in maritime and acquiring knowledge for the application and creation of expert systems in maritime. Design of expert systems for navigation with the help of fuzzy logic. Fuzzy logic in autopilot and collision avoidance at sea. Fuzzy logic when positioning the ship. DSS (Decision Support System) and CBR (Case Based Reasoning) expert systems and applications for marine autopilot. Neural networks and application in ship expert systems: steering control, ship motion modelling, automatic ship mooring systems. Belief networks and the Dempster-Shafter theory.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed university graduate studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Present the architecture of an expert system and its components: knowledge bases, reasoning, inference
2. Interpret the operation of a DSS and CBR expert system and design and simulate a marine CBR autopilot system.
3. Design and simulate a marine expert system based on fuzzy logic.
4. Simulate and design a marine collision avoidance system based on fuzzy logic.
5. Design and simulate a marine expert system based on neural networks.
6. Combine different inference methods and apply the most appropriate method to a maritime problem.</td></tr>
<tr><td>The content of the course is elaborated</td><td colspan="5">Lectures
1. Introduction: Artificial intelligence and expert systems. (2 hours)</td></tr>
</table>

<table>
<tr><td>in detail according to the timetable classes</td><td colspan="6">2. Expert system architecture (1 hour)
3. Knowledge bases and knowledge representation (1 hour)
4. Reasoning and inference (1 hour)
5. DSS and CBR - expert systems for decision support (1 hour)
6. Application of CBR expert system in ship autopilot (1 hour)
7. Fuzzy logic (1 hour)
8. Fuzzy logic in expert systems (2 hours)
9. Application of fuzzy logic system in expert systems on board ship
10. Analysis of collision avoidance system at sea based on fuzzy logic (2 hours)
11. Neural networks (2 hours)
12. Neural networks as part of expert systems (1 hour)
13. Application of neural networks in automatic ship mooring systems (2 hours)
14. Belief networks and Dempster-Shafter theory (1 hour)
15. Other expert systems in traffic and transport. (1 hour))

Seminars
1. DSS and CBR expert systems (2 hours)
2. Fuzzy logic and application in maritime (2 hours)
3. Neural networks and application in maritime transport (2 hours)
4. Application of the Dempster-Shafter theory (2 hours)
5. Neural networks in transport (2 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td>1,75</td><td>Seminar paper</td><td>0,25</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6"></td></tr>
</table>

LITERATURE			
	Title	**Number of copies in the library**	**Availability through other media**
Required literature (available in the library and through other media)	Deisenroth M.P., Faisal A.A., Ong C.S., "Mathematics for Machine Learning", Cambridge University Press, 2020		
	Krishnamoorthy C.S., Rajeev S., "Artificial Intelligence and Expert Systems for Engineers", CRC Press, 2018		
	Dr. K. Uma Rao, „Artificial Intelligence and Neural Networks", Pearson, 2011		
	T.J. Ross, "Fuzzy Logic with Engineering Applications", 3rd ed, Wiley, 2011		
	Nikolopoulos C., "Expert systems – Introduction to First and Second Generation and Hybrid Knowledge Based Systems", Taylor & Francis, 1997		
	Giarratano and J. Riley, „Expert Systems: Principles and Programming", PWS Publishing Company, Boston, 1994		
Additional literature	G. Shafer, "Mathematical Theory of Evidence", Princeton University Press, 1976		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (in the opinion of the proposer)			

<table>
<tr><td>SUBJECT</td><td colspan="5">INTELLIGENT TRANSPORTATION SYSTEMS IN MARITIME STUDIES</td></tr>
<tr><td>Code</td><td>PFD004</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Tenured Full Prof. Pero Vidan, Ph.D.
Assoc. Prof. Mate Barić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>15</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Analysing ship management systems from the perspective of intelligent technologies. Critical thinking towards new advanced management systems. Comparative analysis of possible IT systems. Directing thinking towards new technology innovations for the purpose of obtaining reliable autonomous ships. Methods of modelling traffic problems. Methods and methods of simulating traffic problems. Marine traffic engineering and its application in research in maritime sciences.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed university graduate studies in a technical field.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. Independently search and analyse scientific literature in the field of intelligent technologies,
2. Write and present a scientific paper on modern technological solutions in the field of design and analysis of intelligent systems in the maritime sector,
3. Critically assess the features of new methods of design and analysis of intelligent transport systems,
4. Propose optimal solutions in the design and design of intelligent systems.
5. Apply methods and calculations of maritime engineering knowledge in optimizing and modelling maritime transport solutions and solve maritime transport challenges using scientific methods.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable</td><td colspan="5">Lectures
1. The concept of intelligence and maritime traffic engineering in traffic (3 hours)
2. Analysis of SOLAS electronic navigation devices in autonomous</td></tr>
</table>

<table>
<tr><td>classes</td><td colspan="6">and automated ships (2 hours)
3. Comparative analysis of modelling, optimization and simulation methods in maritime traffic (5 hours)
4. Integrated ship system - analysis, legal regulations (2 hours)
5. Automation of the bridge and engine room (SOLAS) (1 hour)
6. E-navigation, concept, legal regulations (2 hours)

Seminars
1. Modelling ship management and port processes (2 hours)
2. E-navigation systems in the world (2 hours)
3. Application of AI in navigation and traffic optimization (2 hours)
4. Simulation of ITS on board (1 hour)
5. Human error in ITS (1 hour)
6. Writing a scientific article or seminar (7 hours)
7. Advanced systems in E-navigation (2 hours)
8. Unmanned ship (1 hour)
9. Telemetry in maritime transport (2 hours)
10. Ergonomics and design (2 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATION</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td rowspan="4">Scientific article</td><td rowspan="4">1 or 5 (if the postgraduate student wants to prove that he has mastered the material with a scientific article)</td></tr>
<tr><td>Essays</td><td>1</td><td>Seminar paper</td><td>1</td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate candidate is required to attend lectures, seminars and exercises and to write a scientific article in co-authorship with the subject teacher. The postgraduate candidate is assessed after the publication of the scientific article.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="2">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td colspan="2">Number of copies in the library</td><td>Availability through other media</td></tr>
<tr><td colspan="3">Artificial Intelligence in Maritime Operations, Rafael Y. Shardt et al.,</td><td colspan="2"></td><td>YES</td></tr>
</table>

	Springer, 2022, (Machine learning, autonomous ships, traffic prediction, optimization)		
	Modeling and Simulation for Maritime Traffic Henrik Andersson & Per-Olof Larsson, Springer, 2020, (Vessel traffic simulation, risk modeling, port efficiency analysis)		YES
Additional literature	1. Maritime Transport: The Evolution of International Marine Policy and Shipping 2. Michael Roe, Routledge, 2013, (Global maritime governance, strategic and infrastructural modeling) 3. Internet: IMO (autonomous ships), Google Scholar		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">MODELING AND SIMULATION OF SHIP PROPULSION PLANTS</td></tr>
<tr><td>Code</td><td>PFD006</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Tenured Full Prof. Nikola Račić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">• deepening knowledge of modelling using examples of mathematical and simulation models of ship propulsion systems,
• creating simulation models of ship propulsion system elements,
• preparing for research, development and optimization of ship propulsion systems.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in Mechanical Engineering, Naval Architecture, Naval Engineering</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. independently search and analyse scientific literature in the field of modelling and simulation of ship propulsion system elements,
2. apply appropriate mathematical, physical and scientific principles in the research and development of new ideas in the research area,
3. write and present a review paper on technological solutions investigated on the developed model.
4. critically assess the characteristics of new technologies for collecting relevant parameters of technical systems for optimizing their operation,
5. propose a solution for optimal system operation,
6. evaluate new methods, tools and instruments in the field of modelling and simulation of ship propulsion systems.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">1. Goals and tasks of mathematical modelling and simulation of processes in ship propulsion systems,
2. Mathematical models of thermodynamic processes in ship propulsion engines (slow-speed DM, medium-speed DM, Gas turbine, Steam turbine,
3. Modelling of diesel-electric propulsion plant,
4. Propulsor modelling,</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">5. Return line modelling,
6. Modelling of water jet propulsion system,
7. Creation (coding) of models in the Matlab – SIMULINK programming language,
8. Testing the validity of the model,
9. Application of simulation models for analysing operating parameters under various external influences, and research into improving the control system,
10. Analysis of waste heat in different operating modes, and research into the possibilities of cogeneration;</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☒ laboratory
☒ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATION</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1,5</td><td>Research</td><td>1,5</td><td>Practical work</td><td>1,5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>1,5</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">Active participation in all forms of teaching; lectures, consultations, literature search, independent work on modelling the given problem.
The grade is determined as the mean value:
• evaluation of the quality of the written review paper,
• evaluation of its oral presentation, and
• evaluation of the results of the simulation of the given problem.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="4">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Martelli M.: Marine Propulsion Simulation, De Gruyter, Warsaw, 2014.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Heywood John B.: Internal Combustion Engine Fundamentals, McGraw-Hill, Singapore, 2002.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Weber J.: Optimization Methods for the Mixture Formation and Combustion process in Diesel Engines, CUVILLIER</td><td></td><td colspan="2"></td></tr>
</table>

Required literature (available in the library and through other media)	VERLAG, Gottingen, 2008.		
	Xiros N.: *Robust Control of Diesel Ship Propulsion*, Springer-Verlag London Limited, 2002.		
Additional literature	1. Račić, N.: Simulacija rada brodskog propulzijskog sustava sa sporohodnim dizelskim motorom u otežanim uvjetima, PhD Thesis (in Croatian), University of Rijeka 2008. 2. Radica, G., Antonić, R., Račić, N.: Engine Working Cycle Analysis for Diagnostic and Optimisation Purposes, Brodogradnja, Zagreb, 4 (2009), 378-387. 3. Medica, V., Račić, N., Radica, G.: Performance Simulation of Marine Slow-Speed Diesel Propulsion Engine With Turbocharger Under Aggravated Conditions, Strojarstvo, Zagreb, 51 (2009), 199-212. 4. Abusoglu, A., Kanoglu, M.: First and second law analysis of diesel engine powered cogeneration systems, Energy Conversion and Menagement 49 (2008) p. 2026-2031. 5. Martinić-Cezar, Siniša; Jurić, Zdeslav; Assani, Nur; Račić, Nikola: Controlling Engine Load Distribution in LNG Ship Propulsion Systems to Optimize Gas Emissions and Fuel Consumption // Energies (Basel), 18 (2025), 3; 485-506. doi: 10.3390/en18030485 6. Jelić, Maro; Mrzljak, Vedran; Radica, Gojmir; Račić, Nikola: An alternative and hybrid propulsion for merchant ships: current state and perspective // Energy sources. Part A-recovery utilization and environmental effects, 43 (2021), 1963354, 33. doi: 10.1080/15567036.2021.1963354 7. Muše, Ante; Jurić, Zdeslav; Račić, Nikola; Radica, Gojmir: Modelling, performance improvement and emission reduction of large two-stroke diesel engine using multi-zone combustion model // Journal of thermal analysis and calorimetry, 141 (2020), 1; 337-350. doi: 10.1007/s10973-020-09321-7		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">ENERGY EFFICIENCY OF SHIP POWER PLANTS</td></tr>
<tr><td>Code</td><td>PFD007</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Asst. Prof. Zdeslav Jurić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Analysing ship systems and devices from the aspect of increasing their exergy efficiency. Direct thinking towards the use of renewable energy sources and the use and design of systems (with a higher overall efficiency) to reduce the use of fossil fuels and environmental pollution caused by their use. Responsible use of energy in everyday life.
Select relevant parameters when assessing system efficiency with respect to the second law of thermodynamics (exergy/entropy analysis). Determine the interaction of individual systems and devices and evaluate and propose measures to increase the energy efficiency of the ship's energy system.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate studies in a technical field, mechanical engineering, naval engineering, naval architecture or related studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. Independently search and analyse scientific literature in the field of energy aspects of a ship or vessel.
2. Select relevant parameters for assessing energy efficiency,
3. assess energy efficiency,
4. confirm or reject and rank measures to increase energy efficiency and
5. recommend measures to increase the energy efficiency of ship energy devices and systems</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures
1. Energy efficiency of the system with respect to the First and Second Laws of Thermodynamics: advantages, disadvantages and differences. Irreversibility and losses.
2. Specific features of ship energy systems with respect to stationary energy systems. Use of fossil and renewable energy sources.</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">3. Renewable energy sources, use and possibilities of their use on vessels.
4. Working power and losses. Selection of the system boundary. Thermal validity.
5. Energy sources and consumers on vessels: exergy analysis of a selected ship device.
6. Energy sources and consumers on vessels: exergy analysis of a selected ship system.
7. Example: calculation of the thermal validity of a process.
8. Operating modes of ship energy devices and systems (in navigation, at berth and at anchor).
9. Measures to increase the exergy efficiency of ship systems.
10. Impact of energy efficiency measures on navigation safety.

Seminars
1. Energy efficiency assessment of selected shipboard machinery.
2. Energy efficiency study of selected shipboard machinery.
3. Energy efficiency analysis of selected shipboard machinery.
4. Energy efficiency evaluation of selected shipboard machinery.
5. Energy efficiency review of selected shipboard machinery.</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td>1</td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student is required to attend lectures, seminars and exercises, and to participate independently and defend the seminar paper. The postgraduate student is assessed orally.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td>Required literature (available in the</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
</table>

library and through other media)	Bošnjaković F., Nauka o toplini I, Tehnička knjiga, Zagreb		
	Bošnjaković F., Nauka o toplini II, Tehnička knjiga, Zagreb		
	Bošnjaković F., Nauka o toplini III, Tehnička knjiga, Zagreb		
Supplemental literature	1. Bejan A., Advanced Engineering Thermodynamics, 3rd edition, John Wiley & Sons, Inc., 2006 2. Baldi, F., Coraddu, A., & Mondejar, M. E. (Eds.) (2022). Sustainable Energy Systems on Ships: Novel Technologies for Low Carbon Shipping. Elsevier. https://doi.org/10.1016/C2020-0-01975-4 3. Menon, A. Energy Efficiency in Shipping for Environmental Sustainability; Routledge: New York, 2024; ISBN 9781032702568., https://doi.org/10.1201/9781032702568		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">MATHEMATICAL METHODS IN MARITIME STUDIES</td></tr>
<tr><td>Code</td><td>PFD009</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Full Prof. Tatjana Stanivuk, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>12</td><td>10</td><td>8</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">To introduce postgraduate students to the most important mathematical methods applicable in maritime affairs, and to provide them with the basic knowledge so that they can independently apply them in the research part of their postgraduate thesis.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">The postgraduate student will be able to:
1. Respond to the research problem set, i.e. design your own research,
2. Independently select, use and apply a specific mathematical method in the research part of the paper,
3. Synthesize the mastered mathematical methods applicable in the field of maritime affairs,
4. Determine an adequate mathematical method and report on your research in the form of a scientific paper,
5. Publish the results of the research,
6. Implement mathematical knowledge and mathematical methods in maritime transport in a way that opens the way to some new knowledge and techniques,
7. Critically consider the possibility of using a new mathematical method and its applicability in maritime affairs.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures:
1. Graph theory and applications in maritime (2 hours)
2. Theory of linear programming (2 hours)
3. Transport and distribution problems (2 hours)
4. Different modifications of the transport problem (2 hours)
5. Transport network (2 hours)
6. Theory of strategic games (2 hours)</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">Exercises:
1. Geometric solving of linear programming problems (2 hours)
2. Numerical solution of a linear problem (2 hours)
3. Linear transport models (2 hours)
4. Fractured linear programming (2 hours)

Seminars:
1. Elements of input-output analysis on maritime models (2 hours)
2. Optimal production program in maritime (2 hours)
3. Linear transport models (2 hours)
4. Fractional linear programming on maritime cases (2 hours)
5. Game model on maritime cases (2 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☒ multimedia
☐ laboratory
☒ mentorship work
☒ consultation</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>0,875</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>2</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>0,125</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td>1</td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">Attendance at classes, regular consultations, preparation of a seminar paper based on recent literature in the field of postgraduate work with special emphasis on the mathematical methods used. The assessment of the postgraduate candidate is oral. The postgraduate candidate's work during classes, the seminar paper, and the quality and originality of the independent research plan are evaluated.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="3">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Diestel, R. (2025). Graph Theory (6th ed.). Springer.</td><td></td><td colspan="2">YES - Springer</td></tr>
<tr><td colspan="3">González-Díaz, J., García-Jurado, I., & Fiestras-Janeiro, M.G. (2023). An Introductory Course on Mathematical Game Theory (2nd ed.). American</td><td></td><td colspan="2">YWS – AMS, Scribd</td></tr>
</table>

	Mathematical Society.		
	Markhorst, B., van der Mei, R., Roodbergen, K.J., & van Asperen, E. (2023). Future-proof ship pipe routing: Navigating the energy transition.		YES – Scientific Reports
	Martin-Iradi, B., Pacino, D., & Ropke, S. (2020). The multi-port berth allocation problem with speed optimization: Exact methods and a cooperative game analysis.		YES – Scientific Reports
	Song, R., Sun, H., & He, Y. (2024). Enhancing global maritime traffic network forecasting with gravity-inspired deep learning models.		YES – Scientific Reports
	Surís-Regueiro, J.C., Santiago, J.L., & Varela-Lafuente, M.M. (2021). Estimating economic impacts linked to Marine Spatial Planning with input-output techniques. Marine Policy, 128, 104455.		YES – Science Direct, Cetmar
	Zhang, Y., Chang, Y., Wang, C., & Lau, A.K.H. (2022). Life-cycle energy and environmental emissions of cargo ships: A hybrid input–output and life cycle assessment approach. Journal of Industrial Ecology, 26(4), 1034–1049.		YES – Research Gate, Wiley Online Library
Supplemental literature	1. Ducruet, C., Berli, J., Spiliopoulos, G., & Zissis, D. (2021). Maritime Network Analysis: Connectivity and Spatial Distribution. In Guide to Maritime Informatics (pp. 299–317). Springer. 2. Farrelly, C. M., Mutombo, F. K., & Giske, M. (2023). Modern Graph Theory Algorithms with Python: Harness the power of graph algorithms and real-world network applications using Python. Packt Publishing. 3. Imrecke, M., Klos, F., Mergenthaler, W., Nowak, M., & Wueschner, J. (2021). Maritime just-in-time navigation with quantum algorithms. 4. Kim, J., Kim, M., Ju, J., Hwang, Y., Lee, W., & Park, H. (2025). Adaptive sparsified graph learning framework for vessel behavior anomalies. 5. Shiri, F., Wang, T., Pan, S., Chang, X., Li, Y.-F., Haffari, R., Nguyen, V., & Yu, S. (2023). Toward the automated construction of probabilistic knowledge graphs for the maritime domain. 6. Wnorowski, J., & Łebkowski, A. (2024). The concept of determining a ship's route based on the capability plot and Dijkstra's algorithm—Finding the ship's route between anchorages. Applied Sciences, 14(23), 11205. 7. Alqurashi, F. S., Trichili, A., Saeed, N., Ooi, B. S., & Alouini, M.-S. (2022). Maritime communications: A survey on enabling technologies, opportunities, and challenges.		

OTHER	
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.
Other (according to the proposer's opinion)	

<table>
<tr><td>SUBJECT</td><td colspan="5">MODELLING AND OPTIMIZATION OF MARITIME TRAFFIC SYSTEMS</td></tr>
<tr><td>Code</td><td>PFD010</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Full Prof. Anita Gudelj, Ph.D.
Assoc. Prof. Ivan Pavić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>25</td><td>0</td><td>5</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The course provides adequate basic knowledge in the field of modelling and optimization of maritime systems. PhD students will be trained to analyse, model, and optimize maritime transport systems and develop control algorithms that increase the utilization and efficiency of system resources, using the theory of discrete event systems and genetic algorithms.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in the field of technical sciences</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Present the type of discrete systems used for modelling maritime traffic,
2. Sketch a model of a maritime traffic system. using finite automata and Petri nets,
3. Apply an algorithm for examining conflict and deadlock states in the resulting model,
4. Synthesize a traffic system control model without deadlock states,
5. Critically evaluate published original scientific results of other authors in the field of Petri net integration and genetic algorithms,
6. Mathematically model the problem of job scheduling optimization in a relevant maritime system and argue for it,
7. Develop a software solution for integrating Petri nets and genetic algorithms for job scheduling optimization and critically evaluate it,
8. Write and publish an original scientific paper in an internationally peer-reviewed journal as an author or co-author,</td></tr>
</table>

<table>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="6">Lectures
1. System division (3 hours),
2. Discrete event traffic systems, examples in maritime (3 hours)
3. Automaton theory, Petri nets (3 hours),
4. Conflict, deadlock and infinite waiting prevention. (3 hours)
5. Stability analysis of traffic systems in terms of resource constraints (3 hours),
6. Optimization of maritime system job scheduling (3 hours)
7. Genetic algorithm method (2 hours)
8. Implementation of genetic algorithm for jo,b scheduling (2 hours),
9. Petri net and genetic algorithm integration model for job scheduling (4 hours),
10. Application of the model to maritime systems (4 hours).

Exercises
1. Model the maritime system (2 hours),
2. Analyse the state of conflicts and congestion (1 hour),
3. Develop an algorithm for optimal traffic management (2 hours).

Seminars
1. Modelling and optimization of a maritime transport system – Case Study</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>0,875</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>3</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1,125</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student is required to attend lectures, seminars and exercises, and to participate independently and defend the seminar paper. The postgraduate student is assessed orally.</td></tr>
</table>

LITERATURE			
	Title	**Number of copies in the library**	**Availability through other media**
Required literature (available in the library and through other media)	Reisig, W.: Understanding Petri Nets: Modeling Techniques,Analysis Methods, Case Studies Springer, 2013.	1	
	Golub, M. "Genetski algoritmi", Fakultet elektrotehnike i računarstva, Zavod za elektroniku, mikroelektroniku, računalne i inteligentne sustave, 2002.		http://www.zemris.fer.hr/~golub/ga/ga.html
	Kezić, D.: Sprječavanje potpunog zastoja u sustavima s diskretnim događajima primjenom Petrijevih mreža, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet elektrotehnike i računarstva, Zagreb, 2004.	1	
	Gudelj A: Optimalizacija sustava s diskretnim događajima primjenom Petrijevih mreža i genetskih algoritama, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet organizacije i informatike, Varaždin, 2010.	1	
	David, R., Alla H., *Discrete, Continuous, and Hybrid Petri Nets,* Springer, Berlin Heidelberg New York, 2010.	1	
Supplemental literature			
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="3">ENERGY EFFICIENCY IN MARITIME TRAFFIC</td><td colspan="4"></td></tr>
<tr><td>Code</td><td>PFD011</td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Arkadiusz Adamczyk, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>5</td><td>5</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="4">20 %</td></tr>
<tr><td colspan="7">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="6">To introduce the latest legal aspects of IMO conventions on improving energy efficiency in maritime transport, using design and operational measures that reduce fossil fuel consumption.
To raise awareness of the opportunities and physical limitations of renewable energy sources and their application in the maritime sector, including clean infrastructure both at sea and on land.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="6">Completed graduate university studies in a technical field.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="6">1. Ability to acquire and apply up-to-date knowledge of renewable energy, with a particular focus on maritime energy.
2. Ability to develop new concepts and projects that implement technologies to improve energy efficiency in maritime transport.
3. Ability to form critical opinions through the analysis, evaluation, and synthesis of new and complex ideas related to energy efficiency.
4. Ability to publish research results based on acquired knowledge and analysis.
5. Ability to promote technological innovation in energy efficiency within the maritime industry.
6. Improved general and professional skills necessary for a future career in the maritime sector.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="6">1. Legal framework for energy efficiency in the maritime sector (2 hours)
2. Improving the Energy Efficiency Index (EEI) for ships (8 hours)
3. Hybrid energy sources (2 hours)
4. Impact of development policies, regulations, and incentives promoting energy efficiency in shipping, ports, and terminals (4 hours)</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">5. Application of renewable energy sources in ports and terminals, with comparison to land-based applications (2 hours)
6. Corporate environmental responsibility, with an emphasis on energy efficiency in ports (4 hours)
7. Utilization of offshore wind energy (2 hours)
8. Energy management on ships, in ports, and in terminals (2 hours)
9. Simulation models for onboard and shore-based installations (4 hours)

Seminars
1. Development of an onboard simulation model (4 hours)
2. Development of a shore-based installations (4 hours)

Exercises
1. Optimization of the onboard simulation model (4 hours)
2. Optimization of the shore-based simulation model (3 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td>1</td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate candidate is required to attend lectures, seminars and exercises, participate independently and defend a seminar paper, write an independent scientific research paper and present it. The postgraduate candidate is assessed orally.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="2">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Krčum, M.; Gudelj, A.; Krčum, P.: The Renewable Energy on Ship: Simulation and Optimization, International</td><td></td><td colspan="2"></td></tr>
</table>

	Conference on Traffic and Transport Engineering - Belgrade, November 29-30, 2012., p.p.11-20/ Ph. D Olja Čokorilo, editor (lecture international, peer-review, published, scientific)		
	Florentinus A., Hamelinck C., Van den Bos A., Winkel R., & Cuijpers M. (2011). Potential of biofuels for shipping. Ecofys 2011 by order of: European Maritime Safety Agency (EMSA)		
	Marine Environment Protection Committee (MEPC), 56th session: 9-13 July 2007., 6. International Bunkering Industry Association		
	P.E. Hřjlund Nielsen. (2011). OBATE: An upgraded alcohol fuel for efficient & clean Diesel engine application. Marine Days. Goteborg, Sweden		
Supplemental literature	1. Odense Steel Shipyard Ltd Ørndrup Nielsen B., (2009). Green Ship of the Future Concept study 2. Nielsen C.K., & Schack C. (2012) Vessel emission study: Comparison of various abatement technologies to meet emission levels for ECA's. 9th annual Green Ship Technology 3. www.cepal.org/transporte		
OSTALO			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">ADVANCED ALGORITHMS IN TRAFFIC MONITORING SYSTEMS</td></tr>
<tr><td>Code</td><td>PFD012</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Full Prof. Igor Vujović, Ph.D.
Assoc. Prof. Petar Matić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3">10</td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The aim of the course is to create and apply theoretical knowledge from advanced algorithms that are needed at different levels of thinking, realization, design and development of surveillance systems used in traffic technology. The course enables the postgraduate student to take on ethical and social responsibility related to surveillance systems and provides tools for research and development of applications or parts of applications that surveillance systems consist of.
The course covers wavelet and multiresolution signal processing and analysis techniques, statistical quality measures, application of algorithms in software tools for image processing and analysis. Image processing and analysis systems in the visible and infrared range. Algorithms for low, medium and high-level image analysis. It also explores differences in traffic surveillance with respect to the type (land, railway, maritime, river, air) and the impact of different weather conditions on the performance of computer vision algorithms, image fusion and others.
Applications in prevention and monitoring of environmental incidents, prevention of criminal and terrorist activities, improvement of work methods and organization, monitoring of the movement of goods, intelligent alarm systems. Management of search and rescue drones. Clustering and identification of vessels from surveillance sensors in the water area.
Application of UNM to surveillance systems in traffic regulation.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate study in PEIT/PFST, FESB or a related study.</td></tr>
<tr><td>Expected learning outcomes at the</td><td colspan="5">1. Creation, research and validation of signal processing and analysis algorithms for traffic surveillance applications.</td></tr>
</table>

course level (4-10 learning outcomes)	2. Critically evaluate quality measures and selection of measures for performance evaluation of algorithms and modules for signal processing and analysis within surveillance applications. 3. Analysis and critical judgment of statistical criteria for assessing the safety and surveillance of the movement of people and goods in traffic systems, ports, warehouses and on roads (land, air and water). 4. Predict, using mathematical tools, a time-frequency analysis algorithm for use in surveillance applications
The content of the course is elaborated in detail according to the timetable classes	**Lectures** 1. Overview of traffic control systems and their components. (1 hour) 2. Overview of satellite and remote sensors in traffic. Locally placed sensors. Applications in coastal surveillance and sea rescue. (1 hour) 3. Signal processing as a basic algorithm for analysing surveillance systems. Modern algorithms in signal processing and analysis. (1 hour) 4. Time-frequency signal analysis. Algorithms in wavelet transformation: continuous, discrete and complex. Definitions of quality measures for evaluating the effectiveness of algorithms. (2 hours) 5. Wavelet transformation at the so-called low-level processing and the so-called high-level processing. Algorithm with an adapted wavelet and its application. (4 hours) 6. Algorithms in signal processing and analysis in 2D and 3D space. (1 hour) 7. Integral transformations derived from wavelets: EMD, curvelets, contourlets, edgelets, ridgelets, bandelets, shapelets, and the application of the advanced algorithms in the so-called low-level processing. (2 hours) 8. Stochastic signals and the impact of interference and various types of noise on traffic surveillance systems through standard defined quality measures. Compensation of the above impacts. Impact of weather conditions on sensors in surveillance applications. (2 hours) 9. The role of automated scouts in surveillance, and search and rescue in the water area (vessels, aircraft). (2 hours) 10. Clustering and identification of vessels from surveillance sensors in the water area. (1 hour) 11. Identification and counting of vessels outside the AIS system. (1 hour) 12. Connection of VTS technology and sensor fusion with surveillance tasks in maritime traffic. (2 hours)

<table>
<tr><td></td><td colspan="6">Seminar
1. Research and development of algorithms for traffic control systems.</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☒ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>2</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student works independently, with the guidance of the teacher, on research in the field of the course. He/she must publish a scientific paper in a relevant scientific journal. At the end, he/she takes an oral exam.
The grade is determined as the average value:
• evaluation of the quality of the written review paper,
• evaluation of its oral presentation, and
• evaluation of the results of the simulation of the given problem.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="4">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3"></td><td></td><td colspan="2"></td></tr>
<tr><td>Supplemental literature</td><td colspan="6">1. Articles in relevant scientific databases.
2. Burri, R.D., Nalamalapu, S.R., Prashanthi, M., Sathwik, B. (2025). An IoT Based Real Time Traffic Monitoring System. In: Mohanty, S.N., Satpathy, S., Cheng, X., Pani, S.K. (eds) Explainable IoT Applications: A Demystification. Information Systems Engineering and Management, vol 21. Springer, Cham. https://doi.org/10.1007/978-3-031-74885-1_10</td></tr>
</table>

	3. Fouzi Harrou, Abdelhafid Zeroual, Mohamad Mazen Hittawe, Ying Sun, Road Traffic Modeling and Management, Elsevier, **2022**,ISBN 9780128234327, https://doi.org/10.1016/B978-0-12-823432-7.00002-1. 4. Vidakovic, Brani: „Statistical Modeling by Wavelets“, *John Wiley & Sons, inc., 1999.* Donoho, David L., Johnstone, Iain M.: „Adapting to Uknown Smoothness via Wavelet Shrinkage“, *Department of Statistics, Stanford University, 1994.* 5. Strang, G.; Nquyen, T.: Wavelets and Filter Banks, *Wellesley – Cambridge Press, MA (USA), 1997.* 6. Mallat, S.: A Wavelet Tour of Signal Processing, 3rd *Edition, ACADEMIC PRESS,2008*.
OTHER	
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.
Other (according to the proposer's opinion)	

<table>
<tr><td>SUBJECT</td><td colspan="5">SUSTAINABLE MARITIME TRANSPORT:
ENVIRONMENTAL AND ECOLOGICAL PERSPECTIVES</td></tr>
<tr><td>Code</td><td>PFD013</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Tenured Full Prof. Merica Slišković, Ph.D.
Assoc. Prof. Nikola Mandić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2">Asst. Prof. Helena Ukić Boljat, Ph.D.</td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">After successfully completing the course, postgraduates will be able to:
1. Independently search and analyse scientific literature in the field of maritime transport sustainability,
2. Critically assess the sustainability characteristics of the maritime transport system – ecological principles,
3. Propose optimal solutions that meet sustainability,
4. Write and present a review paper in the above field.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed university graduate studies.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Analyse and compare the concepts of ecology, environmental protection and sustainability.
2. Scientifically analyse marine systems (structure of the marine ecosystem, their function...).
3. Connect key elements of the marine ecosystem into a functional whole.
4. Analyse key threats to the sustainability of the marine environment from maritime transport.
5. Critically assess the impact of maritime transport on the marine environment.
6. Analysis of criteria for selecting policies aimed at protecting the marine environment, and comparison and synthesis of current practice.
7. Analysis and synthesis of EU policy - legal bases, strategies, policies, etc.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable</td><td colspan="5">Lectures
1. Structure and function of the marine ecosystem (2 hours)
2. Marine ecosystem as a functional unit (1 hour)
3. Main threats to the marine environment (2 hours)</td></tr>
</table>

<table>
<tr><td>classes</td><td colspan="6">4. Impact of maritime transport on the marine environment (3 hours)
5. Changes in the marine ecosystem caused by maritime transport (3 hours)
6. Sustainable development goals and maritime transport, sustainability in maritime transport (2 hours)
7. Legal framework for the protection of the (marine) environment (2 hours)
8. Strategies and policies for environmental protection and maritime transport, Protection of the marine environment - international organizations, legal regulations and policies for the 21st century (3 hours)
9. Examples of good practice and green certificates (2 hours)

Seminar
1. Sustainable maritime transport system from the perspective of ecology and environmental protection (10 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>2</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student is required to attend lectures, seminars and exercises, and independently prepare and present a seminar paper. The postgraduate student's activity, independence in research, preparation and presentation of the seminar paper are assessed.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td>Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td></td><td colspan="3">Bidoglio, G., editor(s), Thiede, J., Betti, M., Dowell, M., Martinsohn, J., Aksens, D., Bathmann, U., Boero, F., Boxshall, G.,</td><td></td><td colspan="2">YES (e-book) https://publications.jrc.ec</td></tr>
</table>

	Cury, P., Emmerson, R., Estrada, M., Fine, M., Grigelis, A., Herman, P., Hendl, G., Kuparinen, J., Prasil, J., Serrao Santos, R., Soomere, T. and Synolakis, C., Marine sustainability in an age of changing oceans and seas , EUROPEAN COMMISSION, DG Joint Research Centre; EASAC, 2015, ISBN 978-92-79-46139-2,978-92-79-46138-5, doi:10.2760/787712,10.2760/224776, JRC97977.		.europa.eu/repository/handle/JRC97977
	IMO (2016): A concept of a sustainable maritime transportation system		YES (e-book) https://sdgs.un.org/sites/default/files/publications/1163CONCEPT%20OF%20%20SUSTAINABLE%20MARITIME%20TRANSPORT%20SYSTEM.pdf
	European Maritime Transport Environmental Report 2025		YES (e-book) https://www.emsa.europa.eu/emter.htm
Supplemental literature	1. Nanda VP, Pring G (2013): International Environmental Law and Policy for the 21st Century, Martinus Nijhof Publishers		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">SYNTHESIS OF CONTROL SYSTEMS IN HIGH-RISK SEA AREAS</td></tr>
<tr><td>Code</td><td>PFD015</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Rino Bošnjak, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>25</td><td>0</td><td>5</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The course provides adequate basic knowledge in the field of innovative technologies in maritime affairs. Modern technologies in maritime areas with increased collision risk are considered. Postgraduate students will be trained to analyse, model and simulate maritime traffic systems where the risk of collision is increased, using nautical simulators in combination with the theory of discrete event systems.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in the field of technical sciences.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Present the applications of new technologies in maritime transport.
2. Apply and demonstrate a formal method within a surveillance system.
3. Define types of crossing models according to priorities (P) and ship importance (W).
4. Define terms and types of networks used to synthesize a surveillance system in areas of increased collision risk.
5. Present the functioning of a crossing supervisor.
6. Develop an algorithm for a sector supervisor in an area of increased collision risk.
7. Develop an appropriate type of Petri net based on a case study.
8. As an author or co-author, write and successfully publish an original scientific paper in an internationally peer-reviewed journal.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures
1. Application of new technologies in maritime transport. (3)
2. Discrete event traffic systems - examples in maritime transport. (3)
3. Theory of supervisory control in maritime transport (ports and canals). (3)
4. Development of a formal method with application in supervisory systems. (3)</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">5. Application of mathematical methods in specific sea passages with the aim of preventing collisions and collision situations. (3)
6. Crossing models and synthesis of the supervisory system. (2)
7. Basic concepts and types of Petri nets used for the synthesis of the supervisory system. (2)
8. Synthesis of crossing supervisors in maritime transport. (2)
9. Synthesis of Petri nets on a case study in maritime transport. (2)
10. Types of nets used in crossing supervisors in specific sea passages and approaches to ports. (2)

Exercises
1. Visual object net, Matlab ver. 2016. (2 hours)
2. NTPRO 5000 Transas simulator. (2 hours)
3. Collision simulation on the example of the Dover Strait. (1 hour)

Seminar
1. Modelling a maritime transport system with increased collision risk – Case Study</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>0,875</td><td>Research</td><td></td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>3</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1,125</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The postgraduate student is required to attend lectures, seminars and exercises, and to participate independently and defend the seminar paper. The postgraduate student is assessed orally.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="2">Required literature (available in the library and through</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Bošnjak, R.: Sinteza sustava upravljanja</td><td>1</td><td colspan="2"></td></tr>
</table>

other media)	plovidbom u e – Navigaciji, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb 2017.		
	Kezić, D.: Sprječavanje potpunog zastoja u sustavima s diskretnim događajima primjenom Petrijevih mreža, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet elektrotehnike i računarstva, Zagreb, 2004.	1	
	Vidan, P.: Model povećanja sigurnosti plovidbe na unutarnjim plovnim putovima, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet prometnih znanosti, Zagreb 2010.	1	
	Gudelj A: Optimalizacija sustava s diskretnim događajima primjenom Petrijevih mreža i genetskih algoritama, Doktorska disertacija, Sveučilište u Zagrebu, Fakultet organizacije i informatike, Varaždin, 2010.	1	
	David, R., Alla H., *Discrete, Continuous, and Hybrid Petri Nets,* Springer, Berlin Heidelberg New York, 2010.	1	
	Weintrit, A. (2011). ''Navigational Systems and Simulator'', Gdynia Maritime University, Gdynia, Poland, p. 55-63.		
Supplement literature	1. Porathe, T.; Lützhöft, M.; Praetorius, G. (In press). Communicating intended routes in ECDIS, Evaluating technological change, Journal of Accident Analysis and Prevention, Elseviers (available online from January 2013). 2. Lützhöft, M., Porathe, T., Jenvald, J. & Dahman, J. (2010). *System Simulations for Safety*. In O. Turans, J. Bos, J. Stark & J. L. Colwell (Eds.) *Proceedings of the International Conference on Human Performance at Sea*, p. 3. Glasgow: University of Strathclyde. 3. Yuqing W.; Xinqiang C.; Visual Navigation Systems for Maritime Smart Ships (2023): Surveys visual-tech applications (camera + AI) for beacon and obstacle identification, and AIS–vision fusion 4. Riberio C., Aline P., Oliveria D. (2023); AIS-based maritime anomaly traffic detection: A review 2023 5. Zardoua et al. (2022) – *"Role and Integration of Image Processing Systems in Maritime Target Tracking"* (ArXiv): Reviews AIS, radar, and camera fusion for enhanced situational awareness 6. Bošnjak, Kezić & Vidan (2020) – *"Collision prevention in Singapore Strait by using Timed Petri Net"* (Transport, 35(3):273–282) – Applies timed Petri nets to zone-based anti-collision supervision in		

	high-density traffic routes (Singapore Strait), synthesizing crossing limits via P-invariants and simulation 7. Bošnjak, Kezić, Belamarić, Krile (2021) – ''Modelling of VTS supervisor by algorithm based on Petri net: case study of Dover incident" (Transport, 36(4):305–316, 2021) – Applied hybrid-Petri-net formalism to build a VTS supervisor using ARPA/radar data. Monitors vessels sector-by-sector, triggers alarms based on temporal or course deviations
OTHER	
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.
Other (according to the proposer's opinion)	

<table>
<tr><td>SUBJECT</td><td colspan="5">METHODOLOGY OF DESIGNING NAVAL OPERATIONS</td></tr>
<tr><td>Code</td><td>PFD016</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Ivica Pavić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">• Study of theoretical approaches to operational design,
• Analysis of the practical application of operational design in naval operations,
• Determination of complementarity and interdependence between operational design and operational planning and execution of campaigns and major operations,
• Linking the doctrine and practice of operational art in the function of developing elements of operational design.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in Nautical or Naval Studies</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">After successfully completing the course, postgraduate students will be able to:
1. independently search and analyse scientific literature in the field of operational design,
2. apply appropriate doctrinal principles in the research, development and practical application of operational design in modern maritime operations,
3. write and present scientific work in the interdisciplinary field of military-defence and security-intelligence sciences and arts.
4. use and critically evaluate methods for determining elements of operational design and the impact and characteristics of new technologies on determining these elements.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">1. Theoretical approaches to operational design,
2. Analysis of the classic approach to operational design,
3. Development of the operational idea through elements of the classical approach to operational design,
4. Analysis of the theoretical foundations of the effects-based operational design approach,
5. Identification of elements of operational planning, determination and action on hubs and links of the system, and</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">development of main activities within the planning of operations based on effects,
6. Analysis of theoretical foundations of system operational design,
7. Determining relationships between entities and influencing relationships and connections within complex adaptive systems through discourses of system operational design,
8. Examination and analysis of the application of operational design in maritime operations and the impact on operational planning and implementation of operations.</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☒ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1,5</td><td>Research</td><td>1,5</td><td>Practical work</td><td>1,5</td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>1,5</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td></td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">The grade is determined as the mean value:
• evaluation of the quality of the written scientific paper and
• evaluation of the presentation of the scientific paper.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="4">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">*Planner's Handbook for Operational Design*, Joint Chiefs of Staff, Joint Staff, J-7, Joint and Coalition Warfighting, Suffolk, Virginia, 2011.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Naveh, Shimon: *In Pursuit of Military Excellence: The Evolution of Operational Theory*, London, Frank Cass, 1997.</td><td></td><td colspan="2"></td></tr>
<tr><td colspan="3">Sorrells, William T., et. al.: *Systemic Operational Design: An introduction,*</td><td></td><td colspan="2"></td></tr>
</table>

	School of Advanced Military Studies United States Army Command and General Staff College, Fort Leavenworth, Kansas, 2005.		
	Vego, Milan: *Joint Operational Warfare – Theory and Practice*, Naval War College, Newport, Rhode Island, 2007.		
	Warden, John A. III: *The Air Campaign: Planning for Combat*, Washington, DC: National Defense University Press, 1988.		
Supplemental literature	1. Banach, S. J., Ryan, A.: *The Art of Design, A Design Methodology*, Military Review, 2009US Army Combined Arms Center, Fort Leavenworth, Kansas, 2009. 2. Dalton, L. C.: *Systemic Operational Design: Epistemiological Bumpf or the Way Ahead for Operational Design? A monograph.* School of Advanced Military Studies, US Army Command and General Staff College, Fort Leavenworth, Kansas, 2006. 3. Kober, A.: *The Israeli Defense Forces in the Second Lebanon War: Why the Poor Performance?*, The Journal of Strategic Studies, Vol. 31. No. 1, London, New York, 2008. 4. McGlade, P. E.: *Effect-Based Approach to Operations Versus Systemic Operational Design: Is there a Difference?*. Graduate Research Project, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, 2006. 5. Pavić, I.: *Izraelski pristup operativnom dizajnu u kampanji protiv Hezbollaha 2006.*, Diplomski rad, Zapovjedno-stožerna škola ''Blago Zadro'', Hrvatsko vojno učilište, Zagreb, 2010. 6. Vego, M.: *A Case against Systemic Operational Design*, Joint Forces Quarterly, Issue 53, National Defense University Press, Washington DC, 2009. 7. Vego, M.: *Systems versus Classical Approach to Warfare*, Joint Forces Quarterly, Issue 52, National Defense University Press, Washington DC, 2009. 8. Vego, M.: *Effect-Based Operations: A Critique*, Joint Forces Quarterly, Issue 41, National Defense University Press, Washington DC, 2006.		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">VESSEL ROUTING AND TRAFFIC PLANNING</td></tr>
<tr><td>Code</td><td>PFD017</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Full Prof. Zvonimir Lušić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>15</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Apply scientific methods in solving complex problems of organization and supervision of maritime navigation and improvement of safety measures at sea.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate study in Maritime Studies or another major that includes at least the contents of STCW II/2.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Application of quantitative and qualitative methods in ship collision and grounding assessments.
2. Independently analyse ship navigation flows, determine movement distributions and ship traffic structure, and present research results.
3. Critically assess elements of maritime international and national legal regulations, especially in regulation of maritime navigation, protection of human life at sea, protection of property and prevention of pollution of the marine environment.
4. Analyse the usability of complex navigation and communication systems and devices in maritime navigation monitoring systems, and the possibilities of their improvement.
5. Develop models for optimizing maritime travel and navigation, and systems for improving maritime safety in general.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">1. Spatial movement of ships and characteristics of the navigation flow (direction, speed, traffic volume, density, traffic structure, distribution).
2. Statistical processing of data on ship movement (AIS, radar, optical systems).
3. Models for assessing ship collisions.
4. Models for assessing ship groundings
5. Principles governing navigation – internation.al and national regulations.
6. VTS systems; establishment, organization, examples,</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">contribution to safety.
7. Technical support for ships in navigation.
8. Ship detection systems, communication and remote-control capabilities.
9. Traffic management in ports and on approach routes.
10. Maritime characteristics of ships.
11. Principles of ship voyage planning and its optimization, models for optimizing maritime voyages.
12. Time management of ships.
13. Navigation management in special circumstances; war zones, areas of pirate attacks, interruption of communication and navigation systems; navigation management of special ships and objects at sea.
14. Management of autonomous vessels.
15. Final discussion.</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☒ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>0,375</td><td>Research</td><td>5</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>0,375</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1,25</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">Attendance at classes, research, preparation of a seminar paper.
The student is required to attend lectures, assign independent tasks/research, prepare, present and defend a seminar paper.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="3">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Bowditch, N.: The American Practical Navigator, DMAHTC, Maryland, 2021.</td><td></td><td colspan="2">YES</td></tr>
<tr><td colspan="3">Čorić, M.; Mandžuka, S.; Gudelj, A.; Lušić, Z.: Quantitative Ship Collision Frequency</td><td></td><td colspan="2">YES</td></tr>
</table>

	Estimation Models: A Review, Journal of Marine Science and Engineering (2077-1312), Vol 9(5), 2021; 1-8.		
	Galić, S.; Lušić, Z.; Mladenović, S.; Gudelj, A.: A Chronological Overview of Scientific Research on Ship Grounding Frequency Estimation Models, Journal of marine science and engineering, 10 (2022), 2; 207, 19.		YES
	IALA Risk management tools (IWRAP, PAWSA, SIRA, Simulation, IRMAS), 2025.		YES
	VTS manual, IALA, 2025.		YES
	Kytariolou, A.; Themelis, N.: Ship routing optimisation based on forecasted weather dana and considering safety criteria, The Journal of Navigation (2023), 1–22.		YES
Supplement literature	1. Kristiansen, S.: Maritime Transportation: Safety Management and Risk Analysis, Elsevier-Butterworth-Heinemann, 2005. 2. Haugen, S.; Kristiansen, S.: Maritime Transportation: Safety Management and Risk Analysis 2nd Edition, Routledge, 2023. 3. VTS Manual, IALA, 2016. 4. Maber, M.H.: Risk and safety in Civil Engineering, Swiss Federal Institute of tehnology, Zurich, 2007. 5. Zec, D.: Planiranje pomorske plovidbe, Pomorski fakultet u Rijeci, Rijeka, 1997. 6. Autonomous and remotely operated ships, Class guideline, DNV, 2018.		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="2">LOGISTICS AND SUSTAINABLE TRANSPORTATION</td><td colspan="4"></td></tr>
<tr><td>Code</td><td>PFD020</td><td>Year of study</td><td colspan="4">1</td></tr>
<tr><td>Course holder/s</td><td>Assoc. Prof. Luka Vukić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="4">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>30</td><td>30</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="4">10%</td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The general objective of the course is to point out the existing models (theoretical and practical) of sustainability of the transport system and to define the role and significance of logistics for the entire system, as well as its position and importance in the transport services market. At the same time, the objective is to point out the relationships and importance of determining the direction of development of each individual transport modality, which refers to investments in infrastructure and superstructure, but also the use of modern transport technologies necessary for further development, in accordance with real needs in the context of optimizing the logistics chain. Special attention will be paid to the analysis and determination of the balance between the economic, ecological and social elements of transport sustainability, with the aim of reducing the negative impact of transport on the environment and society while optimizing costs and maximizing the economic benefits of activities in various segments of the logistics chain. Also, the advantages and disadvantages of integrating sustainability principles in the logistics chain will be considered, such as reducing congestion and emissions, reducing operating costs, improving safety, increasing the productivity of transport infrastructure, reducing consumption and introducing alternative energy sources, and acquiring knowledge about the functionality of sustainable transport development. The course also aims to highlight the importance of the impact of technological measures and political initiatives in achieving a comprehensive and compatible sustainability initiative that is supported by transport and economic policy. In addition to the above thematic units, the role of logistics in the entire transport chain will be determined, as well as the use of qualitative and quantitative methods and models in determining optimal and sustainable transport services.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the</td><td colspan="5"></td></tr>
</table>

course	
Expected learning outcomes at the course level (4-10 learning outcomes)	1. Assess and validate, in theoretical and practical terms, the fundamental concepts of logistics and sustainable transport, with a focus on transport management and transport models, intermodal transport, tools for assessing sustainability impacts (e.g. external cost calculation or life cycle assessment), methods for evaluating and optimizing transport (e.g. multi-criteria analysis, social cost-benefit analysis) and other complementary areas 2. Critically assesses proposed solutions and plans for sustainable transport, based on technological measures and political initiatives to reduce the negative impact of the transport sector on the environment and society. 3. Valorise and assess the competitiveness of transport routes (road, rail, maritime and other) as a segment of the logistics chain in transport, with the optimization of the examined parameters in the entire logistics and distribution chain. 4. Systematize and argue general and specific factors of sustainability of various transport modalities in the logistics system, considering the planning of the phases of the transport process, determining specific conditions for cargo transport based on the specific nature of the cargo, the use of information technologies to reduce transport costs and increase process efficiency, and increase the safety of the transported object. 5. Present a systematic understanding, ability to design, implement and adapt the research process, thereby contributing to the expansion of knowledge about logistics and sustainable transport, which the student confirms by publishing his results in recognized publications.
The content of the course is elaborated in detail according to the timetable classes	1. Basic laws and factors of sustainability of transportation in the logistics chain of service provision 2. Indicators of sustainable development in transport, analysis of the ecological, social and economic characteristics of the structure of sustainable development, the tendency to reduce the negative impact of transport on the environment and society based on the implementation of technological measures and political initiatives in proportion to cost optimization and increasing the efficiency of logistics operations (e.g. infrastructure requirements of different transport modalities, intermodal transport as an element of sustainability, internal and external costs of transport activities, etc.) 3. Valorisation of segments (regarding the subject of research) of the logistics-distribution chain with the aim of increasing competitiveness, considering demands and needs of users in a dynamic and competitive environment of providing transport services 4. Case study modelling using logistic and analytical optimization

<table>
<tr><td></td><td colspan="6">methods (e.g. multi-criteria method, DEA, AHP, LCA, etc.) in the context of valorising the logistics system in transport (on a specific example) and solving problems in transport and traffic.</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1,5</td><td>Research</td><td>1,125</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>1,625</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>0,75</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">Attendance at classes (lectures or consultative classes), research and preparation of seminars related to the conducted research, presentation of research, oral exam.
In addition to attending classes, seminars and workshops, students' obligations are based on independent tasks related to the application of acquired knowledge in the subject area within the scope of postgraduate interests, and writing, publishing or presenting their research to the scientific and professional community.
The student is required to attend lectures, determine independent tasks/research, prepare, present and defend a seminar paper.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="4">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">Cinar, D., Gakis, K., Pardalos, P.M. (2017). Sustainable Logistics and Transportation: Optimization Models and Algorithms, Springer.</td><td>1</td><td colspan="2"></td></tr>
<tr><td colspan="3">McKinnon, A., Browne, M., Whiteing, A., Piecyk, M. (2015). Green Logistics: Improving the Environmental Sustainability of Logistics (Third Edition Edition). Kogan Page.</td><td></td><td colspan="2">1</td></tr>
<tr><td colspan="3">Zelenika, R. (2005). Logistički sustavi. Ekonomski fakultet u Rijeci.</td><td>5</td><td colspan="2"></td></tr>
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	Poletan Jugović, T. (2015). Robni tokovi. Pomorski fakultet Sveučilišta u Rijeci.	1	
	Baričević, H., Vilke, S. (2016). Logistika i sigurnost kopnenog prometa. Pomorski fakultet Sveučilišta u Rijeci.	1	
Supplement literature	1. Faulin, J., Grasman, S., Juan, A., Hirsch, P. (2018). Sustainable Transportation and Smart Logistics: Decision-Making Models and Solutions. 1st Edition, Elsevier. 2. Fahimnia, B., Bell, M., Hensher, D., Sarkis, J. (2015). Green Logistics and Transportation: A Sustainable Supply Chain Perspective, Springer. 3. Zeimpekis, V., Aktas, E., Bourlakis, M., Minis, I. (2018). Sustainable Freight Transport Theory, Models, and Case Studies, Springer. 4. Kramberger, T., Potočan, V., Ipavec, V.M. (2016). Sustainable Logistics and Strategic Transportation Planning, IGI Global. 5. Golinska, P., Hajdul, M. (2012). Sustainable Transport: New Trends and Business Practices, Springer. 6. van Nunen, J., Huijbregts, P., Rietveld, P. (2011). Transitions Towards Sustainable Mobility New Solutions and Approaches for Sustainable Transport Systems, Springer.		
OTHER			
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.		
Other (according to the proposer's opinion)			

<table>
<tr><td>SUBJECT</td><td colspan="5">SELECTED CHAPTERS FROM HYDROGRAPHY</td></tr>
<tr><td>Code</td><td>PFD025</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Asst. Prof. Ivana Golub Medvešek, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>15</td><td>15</td><td>0</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3"></td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">Advanced knowledge is acquired about contemporary scientific and technical aspects of hydrography, which include optimization of hydrographic data collection, processing and presentation, and improvement of their accessibility and applicability. Skills are developed for evaluating existing methodologies and for formulating new hypotheses, goals and conceptual models in the field of applied hydrography.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in a technical field.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Independently search, select and analyse current scientific literature in the field of hydrography and formulate a hypothesis and synthesize hydrographic data.
2. Apply interdisciplinary knowledge from technical sciences in the evaluation and modelling of systems and processes in hydrography, with the aim of improving the methodology and generating new knowledge
3. Design, disseminate and present the acquired knowledge through a scientific review article aimed at analysing technological solutions and applications in improving the availability of hydrographic information.
4. Critically assess modern technologies and methods for collecting and analysing hydrographic data, with regard to their accuracy, reliability and suitability for specific applications in maritime affairs.
5. Propose a hypothesis and, using scientific methodology, theoretically develop innovative solutions in the field of hydrography, with an emphasis on survey optimization, spatial data processing and support for safe navigation.</td></tr>
</table>

<table>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="6">Lectures
1. Introduction to applied hydrography: theoretical and methodological framework and interdisciplinary context of contemporary research (2 hours)
2. Overview of contemporary technologies for measurement processes of bathymetric and spatial data collection: acoustic and optical methods, satellite altimetry (3 hours)
3. Methodological approaches to the evaluation of measurement accuracy and reliability in accordance with international standards (IHO S-44, CATZOC) (2 hours)
4. Data presentation: ENC, DTM, geoinformation tools, visualization (3 hours)
5. Structure and functionality of information systems for hydrographic applications and navigation support (2 hours)
6. Research methodology and application of hydrographic data: from literature analysis to operational context (3 hours)

Seminars
1. Analytical overview of methods for collecting, validating and integrating hydrographic data in the context of complex systems (3 hours)
2. Criterion analysis of modern technologies and measurement instruments applied in different operational scenarios (3 hours)
3. Concepts of structuring and disseminating hydrographic information within cartographic and information systems (3 hours)
4. Evaluation of research approaches and research strategies in scientific and professional literature (3 hours)
5. Academic discussion, methodological review and presentation of student research contributions (3 hours))</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☐ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="4">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>2</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
</table>

course credit value):	Written exam		Project			
Grading and evaluating student work during classes and at the final exam	The postgraduate candidate is required to attend lectures and write two seminar papers or publish one scientific article. The postgraduate candidate is graded after the presentation of the research results from the seminar papers or published scientific article. (The postgraduate candidate is not required to list the subject teacher as a co-author in the scientific article.)					

LITERATURE

	Title	Number of copies in the library	Availability through other media
Required literature (available in the library and through other media)	National Oceanic and Atmospheric Administration (NOAA), Office of Coast Survey. (2025). Hydrographic Survey Specifications and Deliverables (Version 2025.0.00). Silver Spring, MD: NOAA. Retrieved from https://nauticalcharts.noaa.gov/publications/docs/standards-and-requirements/specs-hydro-surveys.pdf		x
	International Hydrographic Organization. (2024). IHO S-102: Bathymetric Surface Product Specification (Edition 3.0.0). Monaco: International Hydrographic Bureau. Retrieved from https://iho.int/uploads/user/pubs/standards/s-102/S-102_Ed_3.0.0_2024_EN.pdf		x
	International Hydrographic Organization. (2022). IHO S-44: Standards for Hydrographic Surveys (6th Edition). Monaco: International Hydrographic Bureau. Retrieved from https://iho.int/uploads/user/pubs/standards/s-44/S-44_Ed_6.0.0_2022_EN.pdf		
DSupplement literatureopunska literatura	1. Lv, Z., Herman, J., Brewer, E., Nunez, K., & Runfola, D. (2025). BathyFormer: A Transformer-Based Deep Learning Method to Map Nearshore Bathymetry with High-Resolution Multispectral Satellite Imagery. Remote Sensing, 17(7), 1195. 2. Najar, M. A., Benshila, R., Bennioui, Y. E., Thoumyre, G., Almar, R., Bergsma, E. W. J., Delvit, J.-M., & Wilson, D. G. (2022). Coastal Bathymetry Estimation from Sentinel-2 Satellite Imagery: Comparing Deep Learning and Physics-Based Approaches. Remote Sensing, 14(5), 1196. https://doi.org/10.3390/rs14051196		

OTHER

Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.
Other (according to the proposer's opinion)	

<table>
<tr><td>SUBJECT</td><td colspan="5">GREEN TECHNOLOGY SOLUTIONS</td></tr>
<tr><td>Code</td><td>PFD026</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Tenured Full Prof. Gorana Jelić Mrčelić, Ph.D.
Assoc. Prof. Tina Perić, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>20</td><td>10</td><td></td><td></td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3">30%</td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The green transition of the maritime sector requires significant changes within the sector, including action against climate change and the fight for environmental and biodiversity conservation at all levels, with the most effective way being to strengthen human capacities through education.
The aim of the course is to encourage students to acquire the skills and knowledge necessary for a deep understanding, interpretation, critical evaluation and creation of new knowledge in the field of the green transition of the maritime industry, which includes various (green) strategies, principles, instruments, measures, methods and technological solutions with the aim of their effective application, improvement and development of new environmentally friendly solutions.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university studies in STEM fields.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Critically evaluate the impact of the maritime industry on the marine environment.
2. Critically evaluate various green strategies, methods and existing technological solutions.
3. Independently search, analyse and critically evaluate scientific literature, and by synthesizing the knowledge obtained, write and defend a scientific paper in the chosen field.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="5">Lectures
1. Environmental sustainability of the maritime industry - identification and analysis of harmful practices and impacts of the maritime industry on the marine environment. (2 hours)
2. Improving the environmental sustainability of the maritime industry - identification and analysis of international, regional,</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">European and national legal framework (regulations), strategies, principles, measures, methods and instruments for preventing/reducing the harmful impacts of the maritime industry on the marine environment. (8 hours)
3. Identification and analysis of trends, opportunities and challenges of (innovative) methodologies and technologies for preventing/reducing the harmful impacts of the maritime industry on the marine environment and its green transition. (10 hours)

Seminar
1. From the field of green innovative technological solutions in the maritime industry created according to the needs of an individual student in agreement with the student and his mentor. (10 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☐ exercises
☐ complete online
☒ mixed e-learning
☐ fieldwork</td><td colspan="3">☐ independent tasks
☐ multimedia
☐ laboratory
☒ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>1</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td>1</td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student work during classes and at the final exam</td><td colspan="6">Active participation in all forms of teaching, as well as independent literature search, analysis and synthesis of the collected knowledge, and preparation of a scientific paper. The grade is determined based on the quality of the written scientific research paper (different categories: paper published in a WoS/SCOPUS Q1/Q2 journal; paper published in a WoS/SCOPUS Q3/Q4 journal; paper published in a collection of papers; paper not published) and its oral defence.</td></tr>
<tr><td colspan="7">LITERATURE</td></tr>
<tr><td rowspan="2">Required literature (available in the library and through other media)</td><td colspan="3">Title</td><td>Number of copies in the library</td><td colspan="2">Availability through other media</td></tr>
<tr><td colspan="3">European Environment Agency EEA/European Maritime Safety Agency</td><td></td><td colspan="2">✓</td></tr>
</table>

	EMSA. (2025). European Maritime Transport Environmental Report 2025, Publications Office of the European Union, pp 190 https://www.emsa.europa.eu/emter.html		
	European Environment Agency EEA. (2023). Transport and environment report 2022 Digitalization in the mobility system: challenges and opportunities Publications Office of the European Union, pp 218 https://www.eea.europa.eu/publications/transport-and-environment-report-2022		✓
	European Commission: Directorate-General for Maritime Affairs and Fisheries, Deloitte Consulting B.V and Ramboll Management Consulting. (2023). Good practices for sustainable cruise tourism – Final report, Publications Office of the European Union, 141 pp https://data.europa.eu/doi/10.2771/20333		✓
	European Sea Ports Organisation ESPO. (2016). The Code of good practices for cruise and ferry ports, ESPO Publications https://www.espo.be/publications/code-of-good-practices-for-cruise-and-ferry-ports		✓
	Lloyd's Register of Shipping. (2023). Global Maritime Trends 2050 https://impact.economist.com/ocean/global-maritime-trends-2050/		✓
Supplemental literature	1. European Commission (2024). The EU Blue Economy Report 2024. Publications Office of the European Union. Luxembourg, pp, European Commission: Directorate-General for Maritime Affairs and Fisheries, Borriello, A., Calvo Santos, A., Codina López, L., Feyen, L. et al. (2024) The EU blue economy report 2024, Publications Office of the European Union, pp 51 https://data.europa.eu/doi/10.2771/186064 2. Salomon, M., Markus T. (2018). Handbook on Marine Environment Protection Science, Impacts and Sustainable Management, Springer International Publishing, pp 1001 https://link.springer.com/book/10.1007/978-3-319-60156-4 3. Ko B.-W., Song D.-W. (2021). New Maritime Business: Uncertainty, Sustainability, Technology and Big Data, World Maritime University, Malmö, Sweden, Springer Cham. 213 pp. https://link.springer.com/book/10.1007/978-3-030-78957-2		

4. International Maritime Organisation IMO – free e-publications https://imo-epublications.org/content/topics?utm_source=ePublications&utm_medium=browse+by&utm_campaign=topics
5. International Chamber of Shipping ICS publications https://www.ics-shipping.org/publications/?select-publication-types%5B%5D=policy-publication&hidden-current-page=1#listing
6. EMSA publications https://www.emsa.europa.eu/publications.html
7. DNV Maritime Forecast to 2050 – Energy Transition outlook edition 2024 https://www.isesassociation.com/wp-content/uploads/2024/08/DNV_Maritime_Forecast_2050_2024-final-3.pdf
8. DNV Assessment of selected alternative fuels and technologies (2018) https://sustainableworldports.org/wp-content/uploads/DNV-GL_2018_Assessment-of-selected-alternative-fuels-and-tech-report.pdf
9. World Maritime University WMU publications https://www.wmu.se/publicationsZhang, Z., Song, C., Zhang, J., Chen, Z., Liu, M., Aziz, F., ... & Yap, P. S. (2024). Digitalization and innovation in green ports: A review of current issues, contributions and the way forward in promoting sustainable ports and maritime logistics. Science of the Total Environment, 912, 169075
10. Xiao, G., Wang, Y., Wu, R., Li, J., & Cai, Z. (2024). Sustainable maritime transport: A review of intelligent shipping technology and green port construction applications. Journal of Marine Science and Engineering, 12(10), 1728.
11. Vidović T., Šimunović J., Radica G., & Penga Ž. (2023) Systematic Overview of Newly Available Technologies in the Green Maritime Sector. Energies, 16(2), 641. https://doi.org/10.3390/en16020641
12. Chuah, L. F., Mokhtar, K., Bakar, A. A., Othman, M. R., Osman, N. H., Bokhari, A., ... & Hasan, M. (2022) Marine environment and maritime safety assessment using Port State Control database. Chemosphere, 304, 135245.
13. Mba, J. U. (2025). Advancing maritime operations sustainable practices and enhanced safety protocols for global shipping. World Journal of Advanced Research and Reviews, 25(1), 152-173.
14. Tremblay, D., Villeneuve, C., & Faubert, P. (2025). Alignment of the 2030 Agenda to the port industry. Sustainable Development, 33(1), 69-83.
15. Lin, C. Y., Dai, G. L., Wang, S., & Fu, X. M. (2022). The evolution of green port research: a knowledge mapping analysis. Sustainability, 14(19), 11857.
16. Puig M., Azarkamand S., Wooldridge C., Selén V., Darbra R.M. (2022) Insights on the environmental management system of the European port sector, Science of The Total Environment, 806 (2), 150550, https://doi.org/10.1016/j.scitotenv.2021.150550

	17. Attanasio, G., Battistella, C., & Chizzolini, E. (2025) Efficient, secure and green future scenarios: An application of foresight methodologies on seaports digitalisation. Research in Transportation Business & Management, 61, 101411. 18. Mahmud, K. K., Chowdhury, M. M. H., & Shaheen, M. M. A. (2024). Green port management practices for sustainable port operations: a multi method study of Asian ports. Maritime Policy & Management, 51(8), 1902-1937 19. Braidotti, L., & Mazzarino, M. (2022). A study on ports' emissions in the Adriatic Sea. In International Conference on Computational Science and Its Applications, pp. 98-108. Cham: Springer International Publishing 20. Plan Bleu. (2022). Guidelines for the sustainability of cruises and recreational boating in the Mediterranean region, Interreg MED Blue Growth Community project. 64 pp https://planbleu.org/en/publications/guidelines-for-the-sustainability-of-cruising-and-recreational-boating-in-the-mediterranean-region/
OSTALO	
Quality assurance methods that ensure the acquisition of established learning outcomes	In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.
Other (according to the proposer's opinion)	

<table>
<tr><td>SUBJECT</td><td colspan="5">SUSTAINABLE DEVELOPMENT OF MARITIME PASSENGER TRANSPORT</td></tr>
<tr><td>Code</td><td>PFD027</td><td>Year of study</td><td colspan="3">1</td></tr>
<tr><td>Course holder/s</td><td>Asst. Prof. Antonija Mišura, Ph.D.</td><td>Credit value (ECTS)</td><td colspan="3">5</td></tr>
<tr><td rowspan="2">Collaborators</td><td rowspan="2"></td><td rowspan="2">Teaching method (number of hours per semester)</td><td>L</td><td>S</td><td>E</td><td>F</td></tr>
<tr><td>10</td><td>10</td><td>10</td><td>0</td></tr>
<tr><td>Subject status</td><td>Elective</td><td>Percentage of e-learning implemented</td><td colspan="3">10 %</td></tr>
<tr><td colspan="6">SUBJECT DESCRIPTION</td></tr>
<tr><td>Course objectives</td><td colspan="5">The main objective of the course is to provide comprehensive knowledge for understanding the principles and techniques of sustainable development of maritime passenger transport.
The aim is to train students to:
• independent research and analysis of relevant scientific literature in the field of maritime transport sustainability with an emphasis on maritime passenger transport,
• critical assessment of the characteristics of maritime passenger transport sustainability from an ecological, economic and social perspective,
• proposing optimal and creative solutions for the purpose of ensuring the long-term sustainability of maritime passenger transport,
• the possibility of creating research in the field of maritime passenger transport and publishing the results of the research in recognized publications.
The aim of the course is also to point out the importance of the influence of technological measures and transport and maritime policies on the sustainable development of maritime passenger transport.</td></tr>
<tr><td>Course enrolment requirements and entry competencies required for the course</td><td colspan="5">Completed graduate university study in accordance with the Regulations on the Completed graduate university study in accordance with the Regulations on the Postgraduate Study of Maritime Technology.</td></tr>
<tr><td>Expected learning outcomes at the course level (4-10 learning outcomes)</td><td colspan="5">1. Analyse the concept of sustainability in maritime passenger transport.
2. Evaluate, evaluate and compare, in theoretical and practical terms, the basic concepts of maritime passenger transport.
3. Connect the aspects of ecological, economic and social long-term sustainability of maritime passenger transport.
4. Evaluate quantitative and qualitative indicators for achieving</td></tr>
</table>

<table>
<tr><td></td><td colspan="6">sustainable and optimal development of maritime passenger transport.
5. Analyse the criteria for selecting policies with the aim of creating preconditions for the long-term sustainability of maritime passenger transport and compare with current practices.
6. Analyse and synthesize the legal and regulatory framework for the sustainable development of maritime passenger transport.</td></tr>
<tr><td>The content of the course is elaborated in detail according to the timetable classes</td><td colspan="6">Lectures
1. The role of maritime passenger transport in shipping and transport (2 hours)
2. Structure of maritime passenger transport (1 hour)
3. Impact of maritime passenger transport on the environment (2 hours)
4. Maritime passenger transport from the aspect of social sustainability (1 hour)
5. Possibilities of optimizing maritime passenger transport from the economic aspect (2 hours)
6. Legal and regulatory frameworks of maritime passenger transport (2 hours)

Exercise
1. Examples of practice/case studies (10 hours)

Seminar paper
1. Sustainable development of maritime passenger traffic from the ecological, economic and social aspects (10 hours)</td></tr>
<tr><td>Types of teaching:</td><td colspan="3">☒ lectures
☒ seminars and workshops
☒ exercises
☐ complete online
☒ mixed e-learning
☐ fieldwork</td><td colspan="3">☒ independent tasks
☐ multimedia
☐ laboratory
☐ mentorship work
☐ (other – write in)</td></tr>
<tr><td colspan="7">STUDENT OBLIGATIONS</td></tr>
<tr><td rowspan="5">Monitoring student work (enter the share in ECTS points for each activity so that the total number of ECTS points corresponds to the course credit value):</td><td>Attending classes</td><td>1</td><td>Research</td><td>2</td><td>Practical work</td><td></td></tr>
<tr><td>Experimental work</td><td></td><td>Report</td><td></td><td></td><td></td></tr>
<tr><td>Essays</td><td></td><td>Seminar paper</td><td>1</td><td></td><td></td></tr>
<tr><td>Colloquia</td><td></td><td>Oral exam</td><td>1</td><td></td><td></td></tr>
<tr><td>Written exam</td><td></td><td>Project</td><td></td><td></td><td></td></tr>
<tr><td>Grading and evaluating student</td><td colspan="6">The postgraduate student is required to attend classes and prepare and present a seminar paper based on independent assignments/research.</td></tr>
</table>

<table>
<tr><td>work during classes and at the final exam</td><td colspan="3"></td></tr>
<tr><td colspan="4">LITERATURE</td></tr>
<tr><td rowspan="8">Required literature (available in the library and through other media)</td><td>Title</td><td>Number of copies in the library</td><td>Availability through other media</td></tr>
<tr><td>Notteboom, T.; Pallis, A.; Rodrigue, JP., 2022, Port Economics, Management and Policy, New York, Routledge. (selected chapters)</td><td></td><td>eBook</td></tr>
<tr><td>Tapaninen, U., 2020, Maritime Transport: Shipping Logistics and Operations, Kogan Page</td><td></td><td>eBook</td></tr>
<tr><td>Orosa, J. A., 2023, Sustainability in Maritime Transport: Advances, Solutions and Pending Tasks, Applied Sciences.</td><td></td><td>eBook</td></tr>
<tr><td>Soares, C.G.; Dejhalla, R.; Pavletić, D., 2015, Towards Green Marine Technology and Transport, Taylor & Francis Group</td><td></td><td>eBook</td></tr>
<tr><td>Eftestøl, E.J.; Bask, A.; Huemer, M., 2024, Towards a Zero-Emissions and Digitalized Transport Sector: Law, Regulation, and Logistics, Edward Elgar Publishing</td><td></td><td>eBook</td></tr>
<tr><td>Lee, P.T.; Yang, Z., 2018, Multi-Criteria Decision Making in Maritime Studies and Logistics: Applications and Cases (International Series in Operations Research & Management Science, 260), Springer</td><td></td><td>eBook</td></tr>
<tr><td>Supplemental literature</td><td colspan="3">1. Review of Maritime Transport, UNCTAD
2. Nocera, S., Pesenti, R., Rudan, I., Žuškin, S., 2022. Priorities for the Sustainability of Maritime and Coastal Passenger Transport in Europe, Venezia Edizioni Ca’ Foscari - Venice University Press, Vol. 29</td></tr>
<tr><td colspan="4">OSTALO</td></tr>
<tr><td>Quality assurance methods that ensure the acquisition of established learning outcomes</td><td colspan="3">In accordance with Chapter 2.16 of the Study Programme for the Postgraduate University Study Technologies in Maritime Affairs, 2015.</td></tr>
<tr><td>Other (according to the proposer's opinion)</td><td colspan="3"></td></tr>
</table>

2.12. List of lecturers and associates by subject

Subject	Teachers and associates
Scientific Research Methodology	Dragan Poljak, Hrvoje Dodig
Scientific Projects Organization and Bibliometrics	Joško Šoda, Merica Slišković
Expert Systems in Maritime Affairs	Hrvoje Dodig
Intelligent Transportation Systems in Maritime Studies	Pero Vidan, Mate Barić
Modelling and Simulation of Ship Propulsion Plants	Nikola Račić
Energy Efficiency of Ship Power Plants	Zdeslav Jurić
Mathematical Methods in Maritime Studies	Tatjana Stanivuk
Modelling and Optimization of Maritime Traffic Systems	Anita Gudelj, Ivan Pavić
Energy Efficiency in Maritime Traffic	Arkadiusz Adamczyk
Advanced Algorithms in Traffic Monitoring Systems	Igor Vujović, Petar Matić
Sustainable Maritime Transport: Environmental and Ecological Perspectives	Merica Slišković, Nikola Mandić, Helena Ukić Boljat
Synthesis of Control Systems on High-Risk Sea Areas	Rino Bošnjak
Methodology of Designing Naval Operations	Ivica Pavić
Vessel Routing and Traffic Planning	Zvonimir Lušić
Logistics and Sustainable Transportation	Luka Vukić
Selected Chapters from Hydrography	Ivana Golub Medvešek
Green Technology Solutions	Gorana Jelić Mrčelić, Tina Perić
Sustainable Development of Maritime Passenger Transport	Antonija Mišura

2.13. Lecturers' data

COURSE HOLDER	
Title, name and surname	Tenured Full Prof. Dragan Poljak, Ph.D.
Subject taught in the proposed study programme	Scientific Research Methodology
GENERAL INFORMATION	
Address	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, R. Boškovića 32, HR- 21000 Split
Telephone	021 305 698, 091 4 306 698
E-mail address	dpoljak@fesb.hr
Personal website	
Year of birth	1965
Identification number from the Register of Scientists	MBZ:180803
Scientific and teaching title and date of last appointment	Full professor, tenured, January 18, 2010.
Area and field of appointment to a scientific-teaching position	Technical sciences, electrical engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, R. Boškovića 32, HR- 21000 Split
Date of employment	1992.
Job title (professor, researcher, associate, etc.)	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, R. Boškovića 32, HR- 21000 Split
Field of work	Technical and natural sciences
Function	Head of the Department of Electromagnetic Compatibility and Numerical Methods in Electrical Engineering
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Technical Sciences
Institution	University of Split, Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, R. Boškovića 32, HR- 21000 Split

Place	Split
Date	1996
INFORMATION ABOUT TRAINING	
Year	
Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	French (3)
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Lectures at the postgraduate study programme at PFST (2019-2021) in the course: *Scientific Research Methodology*

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Hrvoje Dodig, Ph.D.
Subject taught in the proposed study programme	Expert Systems in Maritime Affairs
GENERAL INFORMATION	
Address	Podglavica 8
Telephone	098 1909 426
E-mail address	hdodig@pfst.hr
Personal website	-
Year of birth	14.11.1972.
Identification number from the Register of Scientists	358544
Scientific and teaching title and date of last appointment	Associate Professor, 1.8.2023.
Area and field of appointment to a scientific-teaching position	Technical Sciences, Electrical Engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	1.12.2016.
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Teaching, science
Function	President of the Council for Disciplinary Responsibility of Employees
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	PhD – Doctor of Science
Institution	University of Wales, UK
Place	Southampton, UK
Date	10.1.2012.
INFORMATION ABOUT TRAINING	
Year	2005-2012

Institution	Wessex Institute of Technology
Place	Southampton, UK
Field of study	Applied mathematics, electrical engineering
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Scientific Engineering, Maritime Electrical and Information Technologies, undergraduate study

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Joško Šoda, Ph.D.
Subject taught in the proposed study programme	Scientific Projects Organization and Bibliometrics
GENERAL INFORMATION	
Address	Liveja II 28, 21223, Okrug Gornji
Telephone	
E-mail address	jsoda@pfst.hr
Personal website	
Year of birth	1974
Identification number from the Register of Scientists	248935
Scientific and teaching title and date of last appointment	Associate Professor/06.2020
Area and field of appointment to a scientific-teaching position	Technical sciences, electrical engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies, University of Split
Date of employment	1.10.2012
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Technical sciences, electrical engineering, marine automation (Institute for marine electrotechnical and IT technologies)
Function	teacher
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Technical Sciences
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, University of Split
Place	Split
Date	06.2010
INFORMATION ABOUT TRAINING	

Year	2022, 2023, 2024, 2025
Institution	The Institute of Electrical and Electronics Engineers
Place	Web seminars (IEEE Authorship Seminar for Authors on Open Access)
Field of study	Bibliometrics
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4-5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Organization of scientific projects and bibliometrics (co-presenter), PFST, postgraduate study. Selected chapters in time-frequency analysis (co-presenter), FESB, postgraduate study.

COURSE HOLDER	
Title, name and surname	Tenured Full Prof. Merica Slišković, Ph.D.
Subject taught in the proposed study programme	Organization of scientific projects and bibliometrics. Sustainable maritime transport system from the aspect of ecology and environmental protection.
GENERAL INFORMATION	
Address	Cesta mira 18b, Split
Telephone	021/619474
E-mail address	merica@pfst.hr
Personal website	
Year of birth	1973
Identification number from the Register of Scientists	252443
Scientific and teaching title and date of last appointment	Full professor, tenured, March 26, 2025.
Area and field of appointment to a scientific-teaching position	Biotechnical sciences, agriculture, ecology and environmental protection
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	01.11.1998
Job title (professor, researcher, associate, etc.)	Tenured professor
Field of work	Ecology and environmental protection
Function	Director of the Centre for Projects and Development
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Zagreb, Faculty of Agriculture
Place	Zagreb
Date	February 23, 2007
INFORMATION ABOUT TRAINING	
Year	2024

	2016 2005 and 2012 2007
Institution	International Maritime Law Institution - online Lloyds Maritime Academy, London - online Universitat Politecnica de Catalunya – online CARNet - onsite
Place	Malta - online United Kingdom - online Spain – online Zagreb
Field of study	Course on the Protection of the Marine Environment and Ocean Governance Marine Pollution Prevention and Management Course Modelling of ecological systems and Management of renewable resources; Advanced Course in System Dynamics E-learning Tutoring Academy (SRCE)
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Marine Ecology, Undergraduate Study. Marine and Marine Environment Protection, Undergraduate Study.

COURSE HOLDER	
Title, name and surname	Tenured Full Prof. Pero Vidan, Ph.D.
Subject taught in the proposed study programme	Intelligent Transportation Systems in Maritime Studies
GENERAL INFORMATION	
Address	Varica 18, 21432 Stomorska
Telephone	0913807004
E-mail address	pvidan@pfst.hr
Personal website	https://www.linkedin.com/in/oeri-vidan-0353b398/
Year of birth	1976
Identification number from the Register of Scientists	288482
Scientific and teaching title and date of last appointment	Full professor, tenured, October 2024
Area and field of appointment to a scientific-teaching position	Technical sciences, traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	01.03.2006
Job title (professor, researcher, associate, etc.)	Tenured professor
Field of work	Institute of Maritime Studies (Navigation)
Function	/
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Transport Sciences, University of Zagreb
Place	Zagreb
Date	10.07.2010
INFORMATION ABOUT TRAINING	

Year	
Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	German (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Norwegian (2)
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Mate Barić, Ph.D.
Subject taught in the proposed study programme	Intelligent Transportation Systems in Maritime
GENERAL INFORMATION	
Address	Mihovila Pavlinovića 1, 23000 Zadar
Telephone	0995982800
E-mail address	Mbaric@unizd.hr
Personal website	
Year of birth	1987
Identification number from the Register of Scientists	340452
Scientific and teaching title and date of last appointment	October 1, 2022
Area and field of appointment to a scientific-teaching position	Technical sciences, traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Zadar
Date of employment	01.07.2017
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	
Function	Deputy Head
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies, University of Rijeka
Place	Rijeka
Date	30.11.2017
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Graduate study Maritime Organization: Analysis of navigation safety in restricted waterways Risk management in maritime affairs Multicultural communication and negotiation in maritime affairs

COURSE HOLDER	
Title, name and surname	Tenured Full Prof. Nikola Račić, Ph.D.
Subject taught in the proposed study programme	Modelling and Simulation of Ship Propulsion Plants
GENERAL INFORMATION	
Address	Vrbanj 435, 21462 Vrbanj
Telephone	021 619 390
E-mail address	nracic@pfst.hr
Personal website	
Year of birth	1968
Identification number from the Register of Scientists	188444
Scientific and teaching title and date of last appointment	Full professor, tenured, November 3, 2023
Area and field of appointment to a scientific-teaching position	Technical sciences – field of mechanical engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	
Job title (professor, researcher, associate, etc.)	Tenured professor
Field of work	Teaching, science, institutional contribution, at the Department of Marine Engineering
Function	Assistant Dean
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Full professor, permanent appointment
Institution	Faculty of Maritime Studies in Split
Place	Split
Date	November 3, 2023.
INFORMATION ABOUT TRAINING	

Year	
Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	MODELING AND SIMULATION OF INTERNAL COMBUSTION ENGINE PROCESSES, POSTGRADUATE STUDY IN MECHANICAL ENGINEERING FESB – Split

COURSE HOLDER	
Title, name and surname	Asst. Prof. Zdeslav Jurić, Ph.D.
Subject taught in the proposed study programme	Energy Efficiency of Ship Power Plants
GENERAL INFORMATION	
Address	Iločka 5
Telephone	+385 (0)91 380-7002
E-mail address	zjuric@pfst.hr
Personal website	
Year of birth	1974
Identification number from the Register of Scientists	276782
Scientific and teaching title and date of last appointment	Assistant Professor, March 2021
Area and field of appointment to a scientific-teaching position	Technical sciences, mechanical engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	January 4, 2002
Job title (professor, researcher, associate, etc.)	assistant professor
Field of work	Energy efficiency of ship systems
Function	Head of the Department of Marine Engineering
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture
Place	Split
Date	February 1, 2011
INFORMATION ABOUT TRAINING	

Year	2011
Institution	University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture
Place	Zagreb
Field of study	Energy efficiency measures on ships
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Thermodynamics I, graduate study Marine Systems and Processes. Thermodynamics II, graduate study Marine Systems and Processes. Thermodynamics and Heat Transfer, undergraduate study Marine Engineering. Marine Refrigeration and Air Conditioning Devices, undergraduate study Marine Engineering. Marine Refrigeration and Air Conditioning Devices, graduate study Marine Engineering. Heat and Mass Transfer, graduate study Marine Engineering.

COURSE HOLDER	
Title, name and surname	Full Prof. Tatjana Stanivuk, Ph.D.
Subject taught in the proposed study programme	Mathematical Methods in Maritime Studies
GENERAL INFORMATION	
Address	Ruđera Boškovića 37, 21000 Split
Telephone	+385(0)913807013
E-mail address	tstanivu@pfst.hr
Personal website	
Year of birth	1970
Identification number from the Register of Scientists	324390
Scientific and teaching title and date of last appointment	Full Professor, June 27, 2023
Area and field of appointment to a scientific-teaching position	Field of Technical Sciences, Traffic and Transport Technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	September 1, 2007
Job title (professor, researcher, associate, etc.)	Full professor
Field of work	Scientific and educational
Function	Holder of all mathematics courses
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Split, Faculty of Economics
Place	Split
Date	June 8, 2012
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English 4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	French (2)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Applied Mathematics in Navigation, Mathematics 1, Mathematics 2 and Mathematics 3 in undergraduate studies at the Faculty of Maritime Studies, University of Split. Mathematics 4, Applied Mathematics and Operations Research in graduate studies at the Faculty of Maritime Studies, University of Split. Mathematics in undergraduate studies at the Department of Marine Studies, University of Split. Mathematics 1, Mathematics 2 and Mathematics 3 in undergraduate studies in Military Maritime Studies, University of Split. Introduction of new teaching content within the above subjects as well as new subjects (e.g. Applied Mathematics in Navigation and Applied Mathematics).

COURSE HOLDER	
Title, name and surname	Full Prof. Anita Gudelj, Ph.D.
Subject taught in the proposed study programme	Modelling and Optimization of Maritime Traffic Systems
GENERAL INFORMATION	
Address	Velebitska 58, Split
Telephone	0915729920
E-mail address	agudelj@pfst.hr
Personal website	
Year of birth	1970
Identification number from the Register of Scientists	278411
Scientific and teaching title and date of last appointment	Full professor
Area and field of appointment to a scientific-teaching position	Social sciences, field of informatics and communication sciences
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	10.11.1997
Job title (professor, researcher, associate, etc.)	Full professor
Field of work	Information systems
Function	Full professor
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Zagreb, Faculty of Organization and Informatics, Varaždin
Place	Varaždin
Date	02.12.2010
INFORMATION ABOUT TRAINING	

Year	
Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Undergraduate and graduate studies in Maritime electrotechnical and IT technology

COURSE HOLDER	
Title, name and surname	Asst. Prof. Ivan Pavić, PhD
Subject taught in the proposed study programme	Modelling and Optimization of Maritime Traffic Systems
GENERAL INFORMATION	
Address	Solinska 9
Telephone	0915962497
E-mail address	ipavic@pfst.hr
Personal website	
Year of birth	10.12.1988
Identification number from the Register of Scientists	354301
Scientific and teaching title and date of last appointment	Assistant professor, 10.05.2023
Area and field of appointment to a scientific-teaching position	Technical Sciences, Traffic and Transport Technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies
Date of employment	01.04.2016
Job title (professor, researcher, associate, etc.)	Assistant professor
Field of work	Technical sciences
Function	Assistant professor
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies
Place	Split
Date	30.09.2022
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Undergraduate study of Maritime Electrical and Information Technology

COURSE HOLDER	
Title, name and surname	Asst. Prof. Arkadiusz Adamczyk, Ph.D.
Subject taught in the proposed study programme	Energy Efficiency in Maritime Traffic
GENERAL INFORMATION	
Address	Ul. Pogodna 8, 84-100 Darzlubie
Telephone	+48 508935323
E-mail address	a.adamczyk@amw.gdynia.pl
Personal website	
Year of birth	1979
Identification number from the Register of Scientists	0000-0001-6492-4411
Scientific and teaching title and date of last appointment	Assistant Professor
Area and field of appointment to a scientific-teaching position	Electrical engineering, renewable energy, power management, alternative energy sources
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Polish Naval Academy
Date of employment	2017
Job title (professor, researcher, associate, etc.)	Commander (N), Assistant Professor
Field of work	Electrical engineering
Function	scientist
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	PhD
Institution	Gdynia Maritime University
Place	Gdynia
Date	2018
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Polish
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	

COURSE HOLDER	
Title, name and surname	Full Prof. Igor Vujović, Ph.D.
Subject taught in the proposed study programme	Advanced Algorithms in Traffic Monitoring Systems
GENERAL INFORMATION	
Address	Ruđera Boškovića 37
Telephone	021/619399
E-mail address	ivujovic@pfst.hr
Personal website	ivujovic.pfst.hr
Year of birth	1972
Identification number from the Register of Scientists	260951
Scientific and teaching title and date of last appointment	26.6.2023
Area and field of appointment to a scientific-teaching position	Technical Sciences / Electrical Engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	17.7.2001
Job title (professor, researcher, associate, etc.)	Full professor
Field of work	Signal processing and analysis, video and image processing and analysis, electrotechnical materials, new electrotechnical technologies
Function	Head of the PEIT Institute, Editor-in-Chief of the scientific journal ToMS
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Ph.D.
Institution	FESB
Place	Split
Date	19.10.2011

INFORMATION ABOUT TRAINING	
Year	2025
Institution	Clarivate
Place	On-line
Field of study	Navigating the AI Revolution: Preparing Research for the Future of AI
Year	2024
Institution	IEEE
Place	On-line
Field of study	IEEE Authorship and Open Access Symposium: Tips and Best Practices to Get Published from IEEE Editors
Year	2024
Institution	Faculty of Humanities and Social Sciences, University of Zagreb
Place	Split
Field of study	Application of teaching methods and assessment methods aligned with learning outcomes
Year	2018
Institution	On-line
Place	Mathworks
Field of study	MATLAB Onramp, MATLAB Deep Learning Onramp
Year	2015
Institution	Split
Place	School of Humanities and Social Sciences
Field of study	Towards New Frontiers of Peer Review
Year	2012
Institution	On-line (London-New York-Beijing)
Place	CrossRef
Field of study	CrossRef Cited-by Linking Webinar
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)

Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	German (2)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Teaches classes: - Since the beginning of studies in this course (PhD). - PhD, FESB: Selected chapters of time-frequency analysis - Signal processing and analysis (since the introduction of the course, PEIT) - Digital signal processing (Department of Professional Studies, three years of implementation). He has published a number of articles in the subject area.

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Petar Matić, Ph.D.
Subject taught in the proposed study programme	Advanced Algorithms in Traffic Monitoring Systems
GENERAL INFORMATI	
Address	Ruđera Boškovića 37
Telephone	021/619399
E-mail address	pmatic@pfst.hr
Personal website	/
Year of birth	1981
Identification number from the Register of Scientists	291716
Scientific and teaching title and date of last appointment	13.04.2023
Area and field of appointment to a scientific-teaching position	Technical Sciences / Electrical engineering
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	2006
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Electrical engineering, automation
Function	/
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	FESB
Place	Split
Date	12.12.2014.
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Teaching since the beginning of his studies in this course (postgraduate studies).

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Nikola Mandić, PhD
Subject taught in the proposed study programme	Sustainable Maritime Transport: Environmental and Ecological Perspectives
GENERAL INFORMATION	
Address	Split, Ruđera Boškovića 37
Telephone	021/619-483
E-mail address	nmandic@pfst.hr
Personal website	/
Year of birth	1985
Identification number from the Register of Scientists	301594
Scientific and teaching title and date of last appointment	Associate Professor, 03.02.2022
Area and field of appointment to a scientific-teaching position	Interdisciplinary field of science, elective fields: law and traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	01.01.2008
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Maritime administrative law, Maritime contract law, Maritime agencies and shipping
Function	Vice Dean for Education
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Mostar, Faculty of Law
Place	Mostar, Bosnia and Herzegovina,
Date	20.03.2015
INFORMATION ABOUT TRAINING	

Year	2025
Institution	International Maritime Organization - International Maritime Law Institute
Place	Malta
Field of study	Port law
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Maritime Public Law and Maritime Property Law; undergraduate and graduate studies in Maritime Nautical Science, Maritime Management and Maritime Yacht and Marina Technologies – University of Split, Faculty of Maritime Studies. Legislative Framework for Maritime and Seaport Management; postgraduate study in Maritime Studies – University of Rijeka, Faculty of Maritime Studies.

COURSE HOLDER	
Title, name and surname	Asst. Prof. Helena Ukić Boljat, Ph.D.
Subject taught in the proposed study programme	Sustainable Maritime Transport: Environmental and Ecological Perspectives
GENERAL INFORMATION	
Address	Pujanke 1, Split
Telephone	021/619414
E-mail address	hukic@pfst.hr
Personal website	
Year of birth	1989
Identification number from the Register of Scientists	362030
Scientific and teaching title and date of last appointment	Assistant Professor, 22.05.2025
Area and field of appointment to a scientific-teaching position	Technical sciences, Traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	02.01.2025
Job title (professor, researcher, associate, etc.)	Senior Assistant at the Department for Maritime Technology Management
Field of work	Teaching process, conducting research-scientific work, ensuring and improving quality standards in the organization
Function	Director of the Quality Centre
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Rijeka, Faculty of Maritime Studies
Place	Rijeka
Date	05.11.2024
INFORMATION ABOUT TRAINING	

Year	2024 2024 2024 2016 2015
Institution	Sedam IT, Carnet International Maritime Law Institute - online Faculty of Philosophy, University of Split UHY Consulting Regional Development Agency of Split-Dalmatia County
Place	Split, Faculty of Economics Malta - online Split, Faculty of Maritime Studies Split, UHY Consulting Split, Regional Development Agency Spain – online Zagreb
Field of study	2024: Creating digital educational content in a DOS authoring tool interactive video lessons. 2024: IMLI Course on the Protection of Marine Environment and Ocean Governance. 2024: Programme: Contemporary teaching strategies and methods in higher education. 2016: EU project manager certificate (UHY Consulting). 2015: EU School (Regional Development Agency of Split-Dalmatia County).
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	German (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	

SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Ecology and Marine Environmental Protection, undergraduate study

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Rino Bošnjak, Ph.D.
Subject taught in the proposed study programme	Synthesis of Control Systems in High-risk Sea Areas
GENERAL INFORMATION	
Address	141 brigade 20, Split
Telephone	098/363 968
E-mail address	rino.bosnjak@pfst.hr
Personal website	
Year of birth	1975
Identification number from the Register of Scientists	
Scientific and teaching title and date of last appointment	Associate professor, 01.03.2023
Area and field of appointment to a scientific-teaching position	Technical sciences, Traffic and transport technology, River and water transport
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	01.04.2011
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Navigation, safety and autonomous ships
Function	Vice Dean for Business
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Transport and Communications in Zagreb
Place	Zagreb
Date	27.04.2017
INFORMATION ABOUT TRAINING	
Year	

Institution	Member of IEB IAMU, Various workshops, training by Transas and Wartsila. Tokyo IAMU, USA MITAGS, Faculty of Transport and Communications in Zagreb, Faculty of Maritime Studies in Split, Erasmus.
Place	Boston
Field of study	Field of navigation, autonomous ships
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	French (2)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Course Safety at Sea – Nautical Studies (undergraduate), Course Electronic Navigation – Nautical Studies (undergraduate), Course Ergonomics of Navigation Subsystems (graduate)

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Ivica Pavić, Ph.D.
Subject taught in the proposed study programme	Methodology of Designing Naval Operations
GENERAL INFORMATION	
Address	Ruđera Boškovića 37 21000 Split
Telephone	
E-mail address	ipavic71@pfst.hr
Personal website	
Year of birth	1971
Identification number from the Register of Scientists	307130
Scientific and teaching title and date of last appointment	Associate Professor, 03.07.2022
Area and field of appointment to a scientific-teaching position	Technical sciences, traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	03.07.2017
Job title (professor, researcher, associate, etc.)	Associate professor
Field of work	Maritime safety
Function	Teacher
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies in Rijeka
Place	Rijeka
Date	01.06.2012
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	

COURSE HOLDER	
Title, name and surname	Full Prof. Zvonimir Lušić, Ph.D.
Subject taught in the proposed study programme	Vessel Routing and Traffic Planning
GENERAL INFORMATION	
Address	Vinkovačka 13, Trogir
Telephone	385 21 619434
E-mail address	zlusic@pfst.hr
Personal website	/
Year of birth	1971
Identification number from the Register of Scientists	288482
Scientific and teaching title and date of last appointment	Full professor 23.02.2022
Area and field of appointment to a scientific-teaching position	Field of technical sciences, field of traffic and transport technologies, branch of maritime and river transport
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies, University of Split
Date of employment	05.01.2005
Job title (professor, researcher, associate, etc.)	Full professor
Field of work	Maritime navigation
Function	Head of the Department of Nautical Sciences
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies in Rijeka
Place	Rijeka
Date	19.07.2010
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Navigation I, II, III, IV (Nautical Sciences, two-year and four-year university). Maritime Navigation Systems and Processes I, II, III, IV, (Maritime Systems and Processes, four-year university). Navigation I and II (Yacht and Marina Management, two-year). Terrestrial Navigation (Nautical Sciences/Maritime Management/Maritime Technologies of Yachts and Marinas/Maritime Systems and Processes, undergraduate). Astronomical Navigation (Nautical Sciences/Maritime Management/Maritime Technologies of Yachts and Marinas/Maritime Systems and Processes, undergraduate and graduate). Fundamentals of Navigation (Marine Engineering, undergraduate). Elements of Navigation (Maritime Management/Maritime Technologies of Yachts and Marinas, undergraduate). Knowledge of Ship and Navigation (undergraduate study of Maritime Management, department of Marine Studies), Management of Navigation and Control Systems (graduate study of Nautical Sciences).

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Luka Vukić, Ph.D.
Subject taught in the proposed study programme	Logistics and Sustainable Transportation
GENERAL INFORMATION	
Address	Papandopulova 29, 21000 Split
Telephone	021619408
E-mail address	lvukic@pfst.hr
Personal website	
Year of birth	
Identification number from the Register of Scientists	354292
Scientific and teaching title and date of last appointment	Associate Professor; March 20, 2025
Area and field of appointment to a scientific-teaching position	Technical sciences; traffic and transport technology
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies, University of Split
Date of employment	
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Technical sciences
Function	Vice-Dean for Development and International Cooperation
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies, University of Rijeka
Place	Rijeka, Croatia
Date	May 30, 2019
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	German (2)
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Transport Geography (Flow of Goods) – undergraduate university study programme Maritime Management. Port Logistics – undergraduate university study programme Maritime Management. Integrated and Multimodal Transport – graduate university study programme Maritime Management. Port Operations – graduate university study programme Maritime Management.

COURSE HOLDER	
Title, name and surname	Asst. Prof. Ivana Golub Medvešek, Ph.D.
Subject taught in the proposed study programme	Selected Chapters from Hydrography
GENERAL INFORMATION	
Address	Put Štalija 2
Telephone	
E-mail address	igolub@pfst.hr
Personal website	
Year of birth	1983
Identification number from the Register of Scientists	304590
Scientific and teaching title and date of last appointment	Assistant Professor, December 8, 2021
Area and field of appointment to a scientific-teaching position	Technical sciences; traffic technology and transport
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies, University of Split
Date of employment	01.04.2008
Job title (professor, researcher, associate, etc.)	Assistant Professor
Field of work	Technical sciences
Function	Head of undergraduate study
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	Faculty of Maritime Studies
Place	Split
Date	July 16, 2021
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Maritime radio systems - university undergraduate study Maritime Electrical and Information Technology. Navigational electronic systems and devices - university undergraduate study Maritime Electrical and Information Technology. Navigational integrated systems - university graduate study Maritime Electrical and Information Technology.

COURSE HOLDER	
Title, name and surname	Tenured Full Prof. Gorana Jelić Mrčelić, Ph.D.
Subject taught in the proposed study programme	Green Technology Solutions
GENERAL INFORMATION	
Address	Vukovarska 57, Split
Telephone	0913806998
E-mail address	gjelic@pfst.hr
Personal website	/
Year of birth	1973
Identification number from the Register of Scientists	1252566
Scientific and teaching title and date of last appointment	Full professor, tenured, 26.03.2025
Area and field of appointment to a scientific-teaching position	Field of biotechnical sciences, field of agriculture, branch of ecology and environmental protection
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	01.06.1996
Job title (professor, researcher, associate, etc.)	Tenured professor
Field of work	Marine environment protection
Function	Head of the Department of Maritime Management
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Zagreb, Faculty of Agriculture, postgraduate study Fisheries
Place	Zagreb
Date	26.11.2004
INFORMATION ABOUT TRAINING	

Year	1. 2025 2. 2025 3. 2022 4. 2022 5. 2020 6. 2020 7. 2019 8. 2007
Institution	1. Kiel University 2. University of Split 3. SEA EU Alliance of Universities 4. SEA EU Alliance of Universities 5. PFST Training Centre 6. University of Split 7. WIT Wessex Institute of Technology 8. CARNet (SRCE)
Place	1. Kiel, Germany 2. Split 3. On-line 4. Brest, France 5. Split 6. Split 7. Southampton, UK 8. Zagreb
Field of study	1. Joined hybrid course on Ocean Sustainability in MSc Marine Geosciences CAU - co-teaching. 2. Workshop Challenges in guiding and mentoring postgraduate students in postgraduate studies from topic submission to thesis defence (Prof. Dragan Poljak, PhD., FESB). 3. MOOC (Massive Open Online Course) Modul on Sustainability - Marine Environment Management. 4. Research cruise on R/V Oceanograf 5. Training course Marine environmental awareness. 6. Responsible Research Workshop (Prof. Ana Marušić, Ph.D., MEFST). 7. Computer Assisted Oil Spill Environmental Assessment in Land and Water Course. 8. E-learning Tutoring Academy.
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5	English (5)

(excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	French (2)
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Course leader: • Environmental Impact Studies, postgraduate university study programme in Applied Marine Sciences, University of Split/University of Dubrovnik. • Environmental Impact Assessment, postgraduate university study programme in Maritime Studies, Faculty of Maritime Studies, University of Rijeka. • Ballast Water Management, postgraduate university study programme in Maritime Studies, Faculty of Maritime Studies, University of Rijeka. • Green Technologies in Maritime Studies, graduate university study programme in Maritime Management, Faculty of Maritime Studies, University of Split. • Pollution Removal Technology, graduate university study programme in Nautical Studies and Maritime Management, Faculty of Maritime Studies, University of Split. • Ship Maintenance, undergraduate university study programme in Nautical Studies, Faculty of Maritime Studies, University of Split. • Terotechnology, undergraduate university study programme in Nautical Studies, Faculty of Maritime Studies, University of Split. Protection of the sea and marine environment, undergraduate university study Nautical Studies and Maritime Management, Faculty of Maritime Studies, University of Split.

COURSE HOLDER	
Title, name and surname	Assoc. Prof. Tina Perić, Ph.D.
Subject taught in the proposed study programme	Green Technology Solutions
GENERAL INFORMATION	
Address	Sarajevska 46 E, 21000 Split
Telephone	098/9927310
E-mail address	tperic@pfst.hr
Personal website	
Year of birth	1984
Identification number from the Register of Scientists	315735
Scientific and teaching title and date of last appointment	Associate Professor, 23.12.2022
Area and field of appointment to a scientific-teaching position	Technical sciences, traffic technology and transportation
DATA ON CURRENT EMPLOYMENT	
Institution of employment	Faculty of Maritime Studies in Split
Date of employment	01.06.2009
Job title (professor, researcher, associate, etc.)	Associate Professor
Field of work	Department of Marine Engineering, Department of Marine Machinery, Devices and Equipment
Function	Vice Dean for Science
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Rijeka, Faculty of Maritime Studies
Place	Rijeka
Date	9.11.2016
INFORMATION ABOUT TRAINING	

Year	2019
Institution	Ashurst, Southampton, UK
Place	Wessex Institute
Field of study	Short Course on Computer Assisted Oil Spill Environmental Assessments in Land and Water
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (5)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	Sustainable maritime transport system from the aspect of ecology and environmental protection, postgraduate study Technologies in Maritime Affairs.

COURSE HOLDER	
Title, name and surname	Asst. Prof. Antonija Mišura, Ph.D.
Subject taught in the proposed study programme	Sustainable Development of Maritime Passenger Transport
GENERAL INFORMATION	
Address	Put Žnjana 39, Split
Telephone	
E-mail address	amisura@pfst.hr
Personal website	
Year of birth	1976
Identification number from the Register of Scientists	370751
Scientific and teaching title and date of last appointment	Assistant Professor, 28.02.2024
Area and field of appointment to a scientific-teaching position	Technical Sciences, Traffic Technology and Transportation
DATA ON CURRENT EMPLOYMENT	
Institution of employment	University of Split, Faculty of Maritime Studies
Date of employment	01.10.2018
Job title (professor, researcher, associate, etc.)	Assistant professor
Field of work	Maritime passenger transport, logistics and maritime management
Function	Head of the Maritime Management study programme
EDUCATIONAL INFORMATION – Highest degree achieved	
Title	Doctor of Science
Institution	University of Rijeka, Faculty of Maritime Studies
Place	Rijeka
Date	27.06.2023
INFORMATION ABOUT TRAINING	
Year	

Institution	
Place	
Field of study	
NATIVE LANGUAGE AND FOREIGN LANGUAGES	
Native language	Croatian
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	English (4)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	Italian (3)
Foreign language and language proficiency on a scale from 2 (sufficient) to 5 (excellent)	
SUBJECT COMPETENCES	
Previous experience in teaching similar courses (state the name of the course, the study programme in which it was/is being taught, and the level of the study programme)	• Intelligent Transport Systems, Maritime Management, Graduate Studies. • Logistics Systems in Transport, Maritime Management/Maritime Technologies of Yachts and Marinas, Undergraduate Studies. • Maritime Tourism, Maritime Management/Maritime Technologies of Yachts and Marinas, Undergraduate Studies.

2.14. Optimal number of students

Considering the human and spatial capabilities, it is considered that the successful implementation of the curriculum of the University Postgraduate Study Programme in Maritime Technology can be carried out with a maximum of 15 students, and the optimal number of students for which the cost estimate has been made is 5 to 10 students per academic year.

2.15. Estimated study costs per postgraduate student

Postgraduate students elected to the associate title of assistant and employed at the Faculty do not bear the regular cost of study (hereinafter: tuition fee). It is subsidized by available funds from the state budget. If funds from the state budget do not cover their study costs, the difference is borne by the Faculty.

Postgraduate students elected to the associate title of assistant and employed at another higher education institution or scientific institution pay tuition, other study costs and material costs of the postgraduate thesis themselves or are paid by the institution that sends them to study.

Postgraduate students who are not elected to the associate title of assistant pay tuition, other study costs and material costs of the postgraduate thesis themselves or are paid by the legal entity that sends them to study.

Tuition fees, fees for postgraduate students who are foreign citizens and other study costs, as well as the method and deadlines for payment, are determined by special decisions of the Faculty Council. Tuition fees are spent for designated purposes, i.e. 67.0% for the postgraduate student's scientific research work (scientific equipment) and for other tasks (33.0%).

The cost of tuition fees is set by the Faculty Council. The costs of the printed postgraduate thesis and any translation are paid by the postgraduate candidate.

The registration fee covers the cost of studying related to:

- research,
- dissemination of scientific research results,
- organization of a public discussion,
- thesis defence, and
- administrative costs.

2.16. Method of monitoring the quality and success of the study programme implementation

The quality and success of the performance are continuously monitored by the head of the postgraduate study, who reports to the Postgraduate Study Council. The Postgraduate Study Council reports on its work to the Faculty Council. The quality of the postgraduate study is systematically monitored by the Faculty Quality Council.

<table>
<tr><td colspan="2">According to the European standards and guidelines for internal quality assurance in higher education institutions (according to the "Standards and Guidelines for Quality Assurance in the European Higher Education Area"), on the basis of which the University of Split determines quality management procedures, the proponent of a study programme is obliged to draw up a plan of quality assurance procedures for the study programme.</td></tr>
<tr><td colspan="2">Documentation on which the component's quality assurance system is based:</td></tr>
<tr><td colspan="2">• Regulations on the University Quality Improvement System</td></tr>
<tr><td colspan="2">• Handbook on the Faculty's Quality Assurance System</td></tr>
<tr><td colspan="2">• Regulations on Studying at the University of Split</td></tr>
<tr><td colspan="2">• Regulations on the Faculty's Postgraduate Studies</td></tr>
<tr><td colspan="2">Description of procedures used to evaluate the quality of study programme implementation:</td></tr>
<tr><td colspan="2">• for each procedure, it is necessary to describe the method (most often a survey for postgraduate students or teachers, a self-evaluation questionnaire), specify the performers (compiler, university office), the method of processing the results and informing, and the implementation timeline
• if it is described in an attached document, specify the name of the document and the article.</td></tr>
<tr><td>Evaluation of the work of teachers and associates</td><td>• Postgraduate evaluation of teaching quality and teaching work through a survey.
• The survey is organized and conducted by the University Quality Centre.
• The survey is conducted every semester.
• The aggregate results of the survey are presented to the Postgraduate Study Council.
All procedures are carried out according to the Regulations on the organization and role of the quality management system of the University of Split and the Faculty of Maritime Studies in Split, according to the Regulations on the procedure for evaluating the quality of teachers and teaching by students of the University of Split, and according to the Regulations on the system for improving the quality of components.</td></tr>
<tr><td>Monitoring assessment and its alignment with expected learning outcomes</td><td>The Postgraduate Studies Council monitors the alignment of assessments with learning outcomes.</td></tr>
</table>

Evaluating the availability of resources (spatial, human, information) for the learning and teaching process	• Postgraduate evaluation of the work of administrative and professional services and infrastructure for learning and student life through an electronic survey. • The evaluation is carried out through an online questionnaire that postgraduate students complete in all years of study, except the final ones. • The survey is organized by the Centre for Quality Improvement of the University of Split. • The processing of the survey results is carried out electronically at the University. • The survey is carried out every year. • The survey results are presented at the Faculty Council of the Faculty of Maritime Studies in Split.
Availability and evaluation of support for postgraduate students (mentoring, tutoring, advising)	• Postgraduate students have administrative and professional services available to support their work • The Faculty Council, upon the proposal of the Postgraduate Study Council, appoints a mentor who is a teacher of the postgraduate study. The mentor assists the postgraduate student with advice during the postgraduate study, especially in the selection of subjects and the preparation of the thesis. After each academic year, the mentor submits a report on the postgraduate students' work to the Postgraduate Study Council. The postgraduate student is obligated to submit a report on his/her work to the mentor once a year.
Monitoring of passing rates by subject and for the study as a whole	• Analysis of pass rates by subjects and studies is conducted once a year • Analysis of pass rates by studies is conducted by the University in cooperation with the Council • Results of both analyses are presented at meetings of the Faculty Council
Participants' satisfaction with the programme as a whole	• Evaluation of the work of administrative and professional services and the infrastructure for learning and student life through an electronic survey is carried out by the participants • The evaluation is carried out through an online questionnaire that the participants-postgraduate students fill in after completing their studies

	• The survey is organized by the Centre for Quality Improvement of the University of Split. The processing of the survey results is carried out on a computer at the University. • The survey results are presented at the meetings of the Faculty Council.
Procedures for obtaining feedback from external stakeholders (alumni, employers, labour market and other relevant organizations)	• Once a month, a member of the Board meets with the alumni presidents • Once a year, roundtables and workshops are organized with employers and other stakeholders
Other evaluation procedures carried out by the proposer	• Internal periodic assessment of the quality system is carried out once a year • Self-assessment is carried out every five (5) years
Description of the procedures for informing external stakeholders about the study programme (postgraduate students, employers, alumni)	• Website: www.pfst.hr • Media presentation

3. ORGANIZATION OF THE POSTGRADUATE STUDY

The study organization is shown in Figure 1.

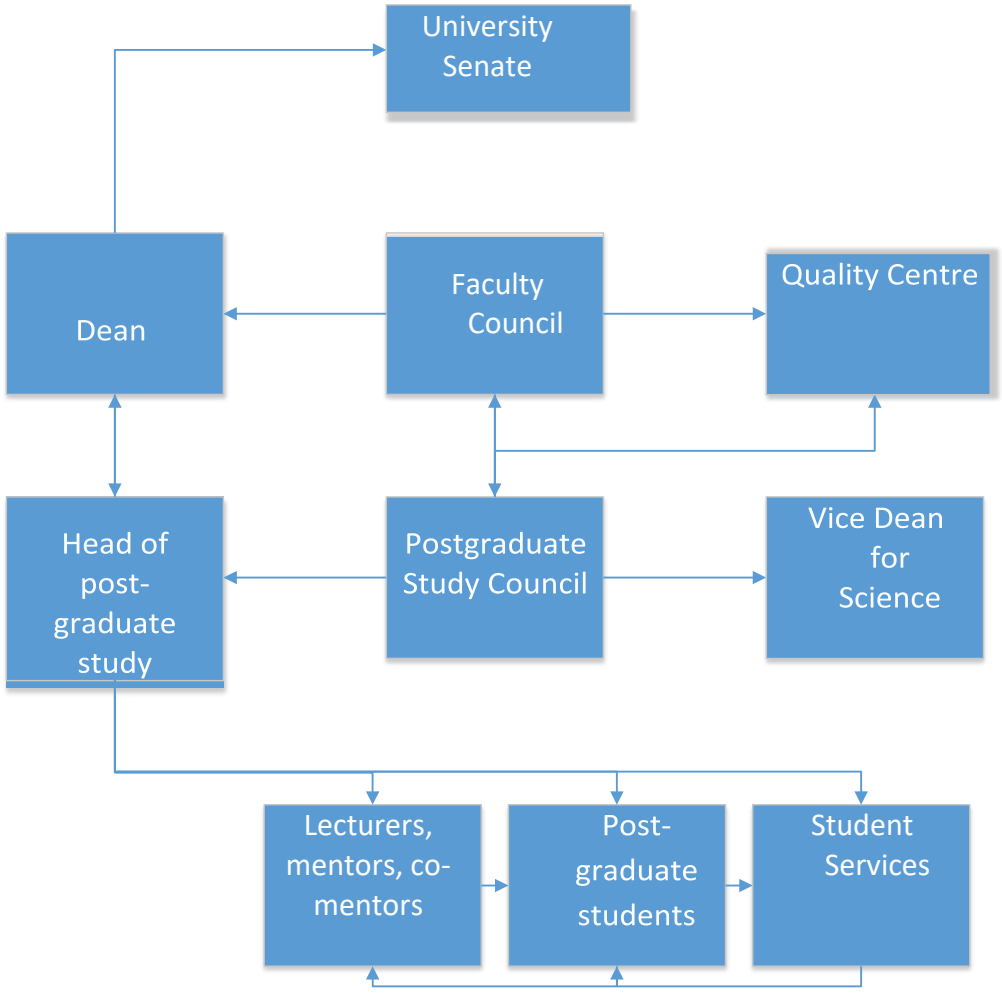

Figure 1. Organization of the postgraduate study programme

The implementation of the Study is supervised by the competent authorities:

- Dean,
- Faculty Council,
- Postgraduate Study Council,
- Head of Postgraduate Study,
- Student Services.

The Faculty Council performs the following tasks within the postgraduate study programme:

- announces the competition for admission,
- appoints the head of the study,
- appoints members of the Postgraduate Study Council,
- approves the mentor and possible co-mentor of the postgraduate thesis,

- appoints expert councils for accepting the topic, evaluating and defending the postgraduate thesis,
- considers and adopts the reports of the Postgraduate Study Council,
- considers and decides on the cost of the Study,
- makes decisions on suspending postgraduate students' postgraduate obligations,
- proposes amendments to the study programme,
- resolves teaching, organizational, financial, technical and other issues related to the successful conduct of the postgraduate study.

The Faculty Council appoints the Postgraduate Study Council (hereinafter referred to as the Council) as its permanent working body.

The Council consists of 5 members, the chairman of which is the Head of the Study.
The Council performs the following tasks:

- prepares proposals for regulations and other regulations on studies,
- conducts the tender process and enrols postgraduate students in the study programme,
- resolves students' requests upon authorization of the dean,
- performs other tasks related to the organization and implementation of the Studies,
- prepares materials for the sessions of the Faculty Council within its jurisdiction
- and other tasks prescribed by the Ordinance on Postgraduate Studies and tasks whose purpose is to improve the quality of the Studies.

The Head of the Postgraduate Study Programme (hereinafter: the Head) is the President of the Postgraduate Programme Council.
The Head is appointed by the Faculty Council upon the proposal of the Dean and his/her mandate coincides with the Dean's mandate. The Head performs tasks related to the organization and implementation of the study programme and reports thereon to the Postgraduate Study Programme Council and the Faculty Council.

The Student Service manages:

- records of registered postgraduate candidates for the enrolment process, including the results of the process,
- personal records of enrolled students,
- records of issued certificates of completion of the Study and acquired academic degrees and titles,
- archives application forms for passed exams,
- ensures other conditions for the administrative operations of the Study.

The Council for the defence of the postgraduate thesis topic appoints a mentor, and their decision is confirmed by the Faculty Council. The mentor may be a faculty member elected to a scientific-teaching position or to a titular scientific-teaching title in a technical scientific field. If the mentor is not a faculty member, the co-mentor must be a faculty member. A mentor

who is not an employee of the Faculty must sign a mentoring agreement with the Faculty. An individual faculty member may simultaneously participate in a maximum of three mentoring and/or co-mentoring of postgraduate candidates at the Study. The mentor may be a professor emeritus. The mentor and co-mentor who took over the mentoring before retirement may bring that mentoring to an end. The mentor assists the postgraduate candidate in selecting courses from the study programme, directs him/her to literature and the application of appropriate scientific-research methods, assists the postgraduate candidate in preparing the postgraduate thesis, monitors the quality of his/her work, and encourages and assists in the preparation of scientific papers. The mentor is obliged to submit a report on the postgraduate candidate's work to the Supervisor once a year. The mentor/commentator can submit a reasoned request for termination of mentoring/commentary to the Faculty Council, which can release him/her from mentoring/commentary.

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