

FACULTY OF ELECTRICAL ENGINEERING, MECHANICAL ENGINEERING AND NAVAL ARCHITECTURE

DETAILED PROPOSAL OF THE STUDY PROGRAMME

GRADUATE UNIVERSITY STUDY NAVAL ARCHITECTURE

1.1. List of mandatory and elective courses

| | List of courses | | | | | | | | | |
|---------------|------------------|---|----------|---------|-----------|----------|----|------|--|--|
| Year of study | Year of study: 1 | | | | | | | | | |
| Semester: 1 | Semester: 1 | | | | | | | | | |
| STATUS | CODE | COURSE | | HOUR | S IN SEM | IESTER | | ECTS | | |
| | CODE | COURSE | L | S | AE | LE | CE | ECIS | | |
| | FESN01 | Marine engines | 30 | 0 | 30 | 0 | 0 | 6 | | |
| Mandatory | FESL10 | Finite element method | 30 | 0 | 15 | 0 | 15 | 5 | | |
| | FETN01 | Project management | 30 | 0 | 30 | 0 | 0 | 4 | | |
| e | FESN20 | Sailboats | 30 | 0 | 0 | 0 | 15 | 5 | | |
| Elective | L = lecture | , S = seminar, AE = auditory exercise, LE = lab | oratory, | CE = co | nstructiv | e exerci | se | | | |

| | List of courses | | | | | | | | | |
|---------------|------------------|---|----------|----------|-----------|----------|----|------|--|--|
| Year of study | Year of study: 2 | | | | | | | | | |
| Semester: 3 | Semester: 3 | | | | | | | | | |
| | CODE | COLUBSE | | ГСТС | | | | | | |
| STATUS | CODE | COURSE | | S | AE | LE | CE | ECTS | | |
| FESN23 | | Vibrations and vibration control | 30 | 0 | 0 | 30 | 0 | 5 | | |
| | L = lecture | , S = seminar, AE = auditory exercise, LE = lab | oratory, | CE = coi | nstructiv | e exerci | se | | | |

1.2. Course description

| NAME OF THE COURSI | E | Marine engine | <u>es</u> | | | | | |
|--|------------------------------|--|---|------------------------|-----------|----------------------|-------------------|-------------|
| Code | FESN01 | | Year of study | 1 | | | | |
| Course teacher | Gojmir | Radica | Credits (ECTS) | 6 | | | | |
| | Dario Bezmalinović | | | Р | S | AE | LE | CE |
| Associate teachers | Ivan To | | Type of instruction (number of hours) | 30 | 0 | 30 | 0 | 0 |
| Status of the course | Elective | 2 | Percentage of application of e-learning | 0 | | | | |
| | | | COURSE DESCRIPTION | | | | | |
| Course objectives | machii | tudents will gain knowledge about the basic principles of marine propulsion and auxiliary nachineries and devices, about the methods of their applications, basic knowledge about parameters calculations. | | | | | | |
| Course enrolment requirements and entry competences required for the course | | | | | | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | – An – Cri rec – Ch | tically discuss a quested applica | ciples of marine propulsion ar bout selection of main propul tion, energy demand and acco of propulsion system, fuel, oil, | sion engi ording to | ine and a | uxiliary d regula | machiner tion, | |
| | Conte | nt | | | | | L hours | AE hours |
| | Marine | e propulsion sys | stems development. Steam bo | ilers. | | | 2 | 2 |
| Course content broken down in detail | Marine | e steam turbine | S. | | | | 2 | 2 |
| by weekly class schedule (syllabus) | Marine gas turbines. | | | | | | | 2 |
| () , | Marine | e propulsion en | gines. | | | | 2 | 2 |
| | Engine | combustion. | | | | | 2 | 2 |
| | Scaver | nging and exhau | ist. | | | | 2 | 2 |

| | Turbochargers. | | | | | | 2 | 2 |
|--|--|-------------|--------------------|---------------------------|-------------------------|--|-----------------------|------|
| | Main parameter | rs of marir | ne engines | | | | 2 | 2 |
| | Application of m | narine eng | ine. Test bed ar | nd sea trial | | | 2 | 2 |
| | Fuel, oil, cooling | g systems. | | | | | 2 | 2 |
| | Marine auxiliary | engines, | pumps, compre | essors. | | | 2 | 2 |
| | Propeller system | ns. | | | | | 2 | 2 |
| | Diesel-electric p | ropulsion | . Combined pro | pulsion sys | stems | . IMO regulation. | 2 | 2 |
| Format of instruction | □ lectures □ seminars and □ exercises □ on line in enti □ partial e-learn □ field work | rety | is | ☐ multim☐ laborat☐ work w | iedia tory vith m | ssignments nentor roject (other) | | |
| Student responsibilities | Class attendanc | e. | 1 | | | | | |
| Screening student work (name the | Class attendance | 2 | Research | | | Practical trainin | g | |
| proportion of ECTS credits for each | Experimental work | | Report | | | Individual work | | 2,7 |
| activity so that the | Essay | | Seminar essay | / | | Lab exercises | | |
| total number of ECTS credits is equal to the | Tests | 0,2 | Oral exam | | | (Other) | | |
| ECTS value of the course) | Written exam | 0,1 | Project | | | (Other) | | |
| Grading and evaluating student work in class and at the final exam | Continuous asse | essment d | uring class. | | | | | |
| | | Tit | le | | | mber of copies n the library | Availabili other m | |
| evaluating student work in class and at | Radica G. Predav propulzijski susta | | edmeta Brodski | i | | | e-learr | ning |
| library and via other media) | Grljušić M. Pogo skripta, FESB, 20 | | orski sustavi. Int | erna | | 5 | | |
| | Šneller S, Parat ž Zagrebu, FSB, 19 | _ | roda II. Sveučiliš | šte u | | 5 | | |
| | | | | | | | | |

| Optional literature (at the time of submission of study programme proposal) | Harrington, R.L., "Marine Engineering", SNAME, N.J. USA, 1992. Haarlas, M., "Steam and Gas Turbines for Marine Propulsion", Naval Institute Press, Annapolis, Maryland, 1987. Parat, Ž., "Brodski motori s unutarnjim izgaranjem", Sveučilište u Zagrebu, FSB,2005. Ozretić, V., "Brodski pomoćni strojevi i uređaji", Split Ship Management, Split, 2004. |
|--|---|
| Quality assurance methods that ensure the acquisition of exit competences | The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture Department. |
| Other (as the proposer wishes to add) | Available in English language. |

| NAME OF THE COURSE | AME OF THE COURSE Finite Element Method | | | | | | | | |
|--|---|--|---|----|---|----|----|-------------|--|
| Code | FESL10 | | Year of study | 1 | | | | | |
| Course teacher | <u>Željan I</u> | <u>Lozina</u> | Credits (ECTS) | 5 | | | | | |
| | Damir S | Sedlar | Type of instruction (number | Р | S | ΑE | LE | CE | |
| Associate teachers | Ivan To | omac | of hours) | 30 | 0 | 15 | 0 | 15 | |
| Status of the course | Manda | tory | Percentage of application of e-learning | 0 | 0 | | | | |
| | - | | COURSE DESCRIPTION | | | | | | |
| Course objectives | impler | e course objective is to provide the necessary theoretical and practical background for FEM plementation in engineering practice and additionally support for advanced studies within e field of finite elements and structural mechanics. | | | | | | | |
| Course enrolment requirements and entry competences required for the course | None | None | | | | | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | UnUsUsAn | Students will be able to: - Understand the basic theory behind the finite element method a. Strong and weak formulation b. Virtual work and variation formulation c. Basics of the approximate solution of PDE - Use the finite element method for the solution of practical engineering problems - Use a commercial FE-package - Analyze more advanced topics within the field of finite elements and structural | | | | | | | |
| Course content broken down in detail | Conte | mechanics. L AE hours hours | | | | | | AE hours | |

| Function approximation concepts, approximation basis (1D). Strong formulation. Weak formulation. Correlation with virtual work (1D). FEM discretization. Weak formulation correlation with virtual work (1D). FEM discretization. Interpolation functions in FEM: mapping, isoparametric elements. (1D) 2 2 Potential problems in 2D and 3D: Laplace and Poisson equation. Gauss theorem. Green equation. Weak formulation for potential problems and FEM in 2D. Shape function and isoparametric elements in 2D. Theory of elasticity in 2D – overview. Virtual work formulation. Discretization of weak formulation and corresponding virtual work formulation. CST. Elasticity in 3D, Termo-elasticity. Axisymmetric problems. Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 Selected topics in FEM: Elastic stability 3 2 2 Selected topics in FEM: Elastic stability 3 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 Selected topics in FEM: Elastic stability 3 2 2 2 2 2 2 2 3 2 3 2 3 | by weekly class | Basic concepts, | 1D. Truss e | element. Direct | approach. | | | 2 | 2 | |
|--|-------------------------|--------------------|---------------------------------------|-------------------|---|--|----------------------|---------------|---------|--|
| formulation. Weak formulation. Use A formulation. Use A formulation. Use A formulation. Use A formulation in Interpolation functions in FEM: mapping, isoparametric elements. (1D) 2 2 2 Potential problems in 2D and 3D: Laplace and Poisson equation. 2 2 2 3 and FEM in 2D. Shape function and isoparametric elements in 2D. Theory of elasticity in 2D – overview. Virtual work formulation. 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 | schedule (syllabus) | Virtual work and | d problem | formulation (1 | D) Discretiz | atior | ۱. | 2 | 2 | |
| Mesak formulation. Correlation with virtual work (1D). FEM discretization. 2 2 2 2 2 2 2 2 2 2 2 | | Function approx | imation co | oncepts, approx | kimation ba | asis (| 1D). Strong | 2 | 1 | |
| Interpolation functions in FEM: mapping, isoparametric elements. (1D) 2 2 Potential problems in 2D and 3D: Laplace and Poisson equation. Gaus theorem, Green equation. Weak formulation for potential problems and FEM in 2D. Shape function and isoparametric elements in 2D. Theory of elasticity in 2D – overview. Virtual work formulation. Discretization of weak formulation and corresponding virtual work formulation, CST. Elasticity in 3D, Termo-elasticity, Axisymmetric problems. Selected topics in FEM: Dynamics Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Don fine in entirety Don fine in e | | formulation. | | | | | | 2 | 2 | |
| Potential problems in 2D and 3D: Laplace and Poisson equation. 2 2 2 2 3 3 3 4 3 4 4 4 4 4 | | Weak formulation | on. Correla | ition with virtu | al work (10 |). FE | M discretization. | 2 | 2 | |
| Gauss theorem. Green equation. Weak formulation for potential problems and FEM in 2D. Shape function and isoparametric elements in 2D. 2 2 2 2 2 2 2 2 2 | | Interpolation fu | nctions in | FEM: mapping, | isoparame | etric e | elements. (1D) | 2 | 2 | |
| and FEM in 2D. Shape function and isoparametric elements in 2D. Theory of elasticity in 2D – overview. Virtual work formulation. Discretization of weak formulation and corresponding virtual work formulation. Elasticity in 3D. Termo-elasticity. Axisymmetric problems. Selected topics in FEM: Dynamics Selected topics in FEM: Elastic stability | | Potential proble | ms in 2D a | nd 3D: Laplace | and Poisso | on ed | juation. | 2 | 2 | |
| Shape function and isoparametric elements in 2D. 2 2 2 2 2 2 2 2 2 | | Gauss theorem. | Green equ | uation. Weak fo | rmulation | for p | otential problem | s a | 2 | |
| Theory of elasticity in 2D – overview. Virtual work formulation. Discretization of weak formulation and corresponding virtual work formulation, CST. Elasticity in 3D, Termo-elasticity. Axisymmetric problems. Selected topics in FEM: Dynamics Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stabil | | and FEM in 2D. | | | | | | 2 | 2 | |
| Discretization of weak formulation and corresponding virtual work formulation, CST. Elasticity in 3D, Termo-elasticity. Axisymmetric problems. Selected topics in FEM: Dynamics Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Selected topics in FEM: Elastic stability Seminars and workshops Seminars and workshops Seminars and workshops Seminars and workshops Seminar stability | | Shape function a | and isopar | ametric elemei | nts in 2D. | | | 2 | 2 | |
| formulation, CST. Elasticity in 3D, Termo-elasticity. Axisymmetric problems. Selected topics in FEM: Dynamics Selected topics in FEM: Elastic stability Selectures Selected topics in FEM: Elastic stability Selectures Seminars and workshops Seminars and workshops Sometimes and the proportion of ECTs Soredits for each work (name the proportion of ECTs credits for each work (name the proportion of ECTs credits for each work (name the total number of ECTs credits is equal to the ECTs value of the course) Sessay Sominar essay Sominar essay Lab exercises Sometimes and at the final exam Required literature (available in the library and via other media) Required literature (at the time of submission of study programme proposal) Optional literature (at the time of submission of study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | Theory of elastic | city in 2D – | overview. Virt | ual work fo | rmu | lation. | 2 | 2 | |
| Formulation, CST. Elasticity in 3D, Termo-elasticity. Axisymmetric problems. 2 2 2 2 2 2 2 2 2 | | Discretization of | f weak forr | mulation and co | orrespondi | ng vi | rtual work | 2 | 2 | |
| Selected topics in FEM: Dynamics 2 2 2 2 2 2 2 2 2 | | | | | | | | | | |
| Selected topics in FEM: Elastic stability | | | | | | | | | 2 | |
| Format of instruction | | | · · · · · · · · · · · · · · · · · · · | | | | | | 2 | |
| Seminars and workshops Seminars and workshops Sexercises Individual assignments Individual assignments Individual project (other) | | Selected topics | in FEM: Ela | stic stability | | | | 2 | 2 | |
| Seminars and workshops Seminars and workshops Sexercises Individual assignments Individual assignments Individual project (other) | | | | 1 | | | | | | |
| Seminars and workshops multimedia laboratory work with mentor individual project (other) | | | | | ⊠ individı | Itimedia oratory rk with mentor ividual project (other) | | | | |
| Format of instruction on line in entirety partial e-learning ifield work individual project (other) work with mentor individual project (other) | | | workshops | 5 | | _ | | | | |
| Student responsibilities Glass attendance. Class attendance. | Format of instruction | | | | | | | | | |
| Student responsibilities Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course) Grading and evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Class attendance 2 Research 1 Practical training Project 1 Individual work 2 Lab exercises Clother) Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). **Title** Number of copies in the library other media* Z. Lozina: Introduction in finite element methods, responsibility via other media* **Title** Number of copies in the library other media* Availability via other media* **Title** Number of copies in the library other media* **Title** Number of copies in the library other media* **Title** Number of copies in the library other media* **Total Croatian* Optional literature (at the time of submission of study programme proposal)* **The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | | • | | □ work w | ith m | nentor | | | |
| Student responsibilities Class attendance Clas | | - | iirig | | □ individu | ıal pı | oject (other) | | | |
| Class and at the final exam Class and at the final exam (available in the library and via other media) Class alterior (available in the library and via other media) Class alterior (available in the library and via other media) Class alterior (available in the library and via of submission of study programme proposal) Class and at the time of submission of statdy programme proposal Class and at the time of submission of statdy programme proposal Class and at the time of submission of statdy programme proposal Class and at the time of submission of exit competences Class and at the time of submission of teachers. Feedback from students work and evaluation of teaching by the Head of Naval Architecture Class and at the time of submission of exit competences Class and at the time of submission of teaching by the Head of Naval Architecture Class and at the time of submission of teaching by the Head of Naval Architecture Class and at the time of submission of teachers are content. Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of exit competences Class and at the time of submission of teachers Class and at the time of submission of exit competences Content to the text and the time of submission of teachers Class and at the time of submission of teachers Class and at the time of submission of teachers Class and at the time of submission of teachers Class and at the time of submission of teachers Class and at the time of submission of teachers Class and at the time of sub | Student | | | | | | | | | |
| Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course) Grading and evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Class attendance 2 Research 1 Practical training Individual work 2 Lab exercises Lab exercises Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library Ž. Lozina: Introduction in finite element methods, FESB. (in Croatian) Project Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library Ž. Lozina: Introduction in finite element methods, FESB. (in Croatian) Optional literature (at the time of submission of study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | Class attendance | c. | | | | | | | |
| work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course) Grading and evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Activity so that the total number of ECTS credits is equal to the Experimental work and sexay. Seminar essay Seminar essay Lab exercises Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Title Number of copies in the library Z. Lozina: Introduction in finite element methods, FESB. (in Croatian) Optional literature (at the time of submission of study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | Screening student | Class | 2 | Dosoarch | 1 | | Dractical trainin | g | | |
| Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Required literature (available in the library and via other media) Z. Lozina: Introduction in finite element methods, FESB. (in Croatian) P. KJ. Bathe: Finite Element Procedures, Prentice Hall Inc., 1996. Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. | • | | 2 | Research | 1 | | Practical trainin | <u> </u> | | |
| Essay Seminar essay Lab exercises | | | | Report | | | Individual work | | 2 | |
| total number of ECTS credits is equal to the ECTS value of the course) Grading and evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Tests Oral exam 1 (Other) Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media ELD EXAM: Individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media E. Lozina: Introduction in finite element methods, FESB. (in Croatian) Project Number of copies in the library other media E. KJ. Bathe: Finite Element Procedures, Prentice Hall Inc., 1996. Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | = | | | | | | | | | |
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| Grading and evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Written exam Project Project Project Project Project Project Project Project (Other) Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library Other media Number of sopies in the library Other media E-learning E-learning FESB. (in Croatian) - KJ. Bathe: Finite Element Procedures, Prentice Hall Inc., 1996. - Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | - | Tests | | Oral exam | 1 | | (Other) | | | |
| evaluating student work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media Practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media Practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media Practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media Practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). | | Written exam | | Project | | | (Other) | | | |
| work in class and at the final exam Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Independent work and discussion about research related to the topic of the tasks). Number of copies in the library other media Availability via other media E-learning Availability via other media E-learning Availability via other media E-learning Title X. Lozina: Introduction in finite element methods, FESB. (in Croatian) E-learning FESB. (in Croatian) FESB. (in Croatian) Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | _ | Continuous asse | essment du | ıring class. Exaı | m: individu | al an | d group. Exam: th | ne theoretica | l and | |
| Required literature (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Title Title Number of copies in the library Other media E-learning Title Title Number of copies in the library Other media - KJ. Dathe: Finite Element methods, Prentice Hall Inc., 1996. - Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | _ | | | • | • | | | • | | |
| Required literature (available in the library and via other media) Description of study programme proposal) Cuality assurance methods that ensure the acquisition of exit competences Title Title Number of copies in the library Number of copies in the library Availability via other media E. Lozina: Introduction in finite element methods, FESB. (in Croatian) E. Lozina: Introduction in finite element methods, FESB. (in Croatian) E. Lozina: Introduction in finite element methods, FESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction in finite element methods, PESB. (in Croatian) E. Lozina: Introduction | | independent wo | ork and dis | cussion about i | esearch re | lated | I to the topic of th | ne tasks). | | |
| (available in the library and via other media) Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences Title in the library other media in the library other media e-learning e-learning FESB. (in Croatian) - KJ. Bathe: Finite Element Procedures, Prentice Hall Inc., 1996. - Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | | | | | Nu | mber of copies | Availabil | ity via | |
| Description of Study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. | · | | Titl | e | | i | n the library | other m | edia | |
| Optional literature (at the time of submission of study programme proposal) Quality assurance methods that ensure the acquisition of exit competences - KJ. Bathe: Finite Element Procedures, Prentice Hall Inc., 1996. - Thomas J.R. Hughes: The Finite Element Method, Dover Publications Inc., 2000. The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | Ž. Lozina: Introdu | uction in fi | nite element m | ethods, | | | e-learr | ning | |
| the time of submission of study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | media) | FESB. (in Croatia | n) | | | | | | | |
| submission of study programme proposal) The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Quality assurance methods that ensure the acquisition of exit competences The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | Optional literature (at | | | | | | | | | |
| programme proposal) Quality assurance methods that ensure the acquisition of exit competences The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | | | | | | | | | |
| Quality assurance methods that ensure the acquisition of exit competences The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | | – Thomas J.R. | Hughes: T | he Finite Eleme | ent Method | l, Do | ver Publications I | nc., 2000. | | |
| Quality assurance methods that ensure the acquisition of exit competences Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | programme proposar) | The annual anal | vsis of eya | mination effica | cv Studen | t surv | vev in order to ev | aluate teach | ers | |
| methods that ensure the acquisition of exit competences relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | Quality assurance | | | | | | | | | |
| competences Occasionally, observation and evaluation of teaching by the Head of Naval Architecture | methods that ensure | | | | Judaciilo | | an eady git | | | |
| competences | | | | | of teaching | g bv 1 | the Head of Nava | l Architectur | e | |
| Department. | competences | Department. | | | · | • | | | | |

| Other (as the | Available in English language. |
|--------------------|--------------------------------|
| proposer wishes to | |
| add) | |

| NAME OF THE COURSE | | Project manag | <u>gement</u> | | | | | | | |
|--|---|---|--|---------|----------|----------|----------------|-------------|--|--|
| Code | FETN01 | _ | Year of study | 1 | | | | | | |
| Course teacher | Ivica Ve | eža | Credits (ECTS) | 4 | | | | | | |
| Associate teachers | Marko | Mladineo | Type of instruction (number of hours) | P 30 | S 0 | AE 30 | LE 0 | CE 0 | | |
| Status of the course | Elective | 2 | Percentage of application of e- learning | | | | | | | |
| | | | COURSE DESCRIPTION | | | | | | | |
| Course objectives | – pla | nts learn to: in and manage able to calculat | projects e the profitability of the project and | return | on inve | estmen | t (ROI) | | | |
| Course enrolment requirements and entry competences required for the course | | | | | | | . , | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | AnForDe(WPlaPlaApsol | Students will be able to: Analyze the requirements of the customer (VOC) Formulate main objectives of project and rank them Develop the main activities of the project and the structure of the distribution of work - (Work Breakdown Structure) Plan time (to determine the critical path) Plan capacities (specify bottlenecks and balancing activities) Plan costs and risks Apply the acquired knowledge and skills from the contents of the completion of cases to solve a specific task Combine and apply their knowledge and skills in teamwork | | | | | | | | |
| | Conter | nt | | | | | L hour s | AE hours | | |
| | Introdu | uction and basic | terms | | | | 2 | 2 | | |
| | Term a | ınd definition o | f projects and project management | | | | 2 | 2 | | |
| Course content broken down in detail | Project industi | | gy, goals (examples - automotive and | shipb | uilding | | 2 | 2 | | |
| by weekly class | The strategy and project management. Multi project management. | | | | | | 2 | 2 | | |
| schedule (syllabus) | Basics of organization. Project organizational structure. | | | | | | 2 | 2 | | |
| | | | nitiation of projects, project selection project completion) | n, proj | ect plar | nning, | 2 | 2 | | |
| | Methods for project planning. | | | | | | 2 | 2 | | |
| | Quality | / management | planning, improvement and quality o | ontro |) | | 2 | 2 | | |
| | | 244, | | | | | | | | |

| | Cost manageme | nt. Contin | | 2 | 2 | | | | | |
|--|--|--|---|---|--|---|---|--|--|--|
| | Risk manageme | nt. | | | | 2 | 2 | | | |
| | Psycho-social co | mponent | of project mana | gement. Project | manager. | 2 | 2 | | | |
| | Teamwork. | | | | | 2 | 2 | | | |
| | Communication | and motiv | ation on the te | am. Methods for | enhancing | 2 | 2 | | | |
| | creativity. | | | | | | | | | |
| | | | | | | • | | | | |
| | | workshops | s | individual assi — | - | | | | | |
| | ⊠ exercises | • | | ☐ multimedia | | | | | | |
| Format of instruction | ☐ <i>on line</i> in enti | rety | | □ laboratory | | | | | | |
| | ☐ partial e-learn | ing | | ⊠ work with me | | | | | | |
| | ☐ field work | | | ☐ individual pro | ject (otner) | | | | | |
| Student | Class attendance | e. | | | | | | | | |
| responsibilities | | | | | | | | | | |
| Screening student | Class | 1 | Research | 0 | Practical trainin | ٥ | | | | |
| work (name the | attendance | 1 | Research | U | Fractical trailing | 5 | | | | |
| proportion of ECTS | Experimental | | Report | | Individual work | | 1,5 | | | |
| credits for each activity so that the | work | | - 1 | | | | ,- | | | |
| total number of ECTS | Essay | | Seminar essay | | Lab exercises | | | | | |
| credits is equal to the ECTS value of the | Tests | | Oral exam | 0 | (Other) | | | | | |
| course) | Written exam | | Project | 2,5 | (Other) | | | | | |
| Grading and evaluating student work in class and at the final exam | parallel on labor teams, with a m they how to creathe content of the activities of the activities of and balancing capace (ROI) and analyzevaluated (grade On the other hawritten colloquies AV - colloquies M - points to the | ratory exer inimum no ate and ma he project project an determine ity. And fir te risks. At e M). nd, studer um at the is Technique the project in percent | rcises how to de umber of two an anage their own and the main od structure of late the critical parally determine the colloquium ats have colloquiend of the semile of network place. | evelop their own and maximum num a projects. During bjectives. After to abor division (WB th; plan capacity of the costs, calculation and exam stude ium on Technique ester. | ges of the project project. The stude of three studes the course each of that, they develop and determine boate the profitabilit of the present their was pr | ents will we lents, in who team detent the main for each of titlenecks and yorks, whi | ork in hich rmines the and oject ch are | | | |
| | | | | | Number of | Availabili | ity via | | | |
| | | | Title | | copies in | other m | edia | | | |
| | | | | | the library | | | | | |
| Required literature (available in the | Veža, I., Bilić, B., projektima", FES | B, Split, 20 |)11. | | | e-learning | portal | | | |
| library and via other media) | Majstorović, V. P Mostaru, Mostar | - | ienadžment, Sv | eučilište u | 5 | | | | | |
| | Omazić, M.A. Pro 2005. | ojektni me | nadžment, Sine | rgija, Zagreb, | 5 | | | | | |
| | I | | | | | | | | | |
| | | | | | | | | | | |

| Optional literature (at the time of submission of study programme proposal) | A Guide to the Project Management Body of Knowledge. PMBOK Guide, Project Management Institute, Newtown Square, 2004. Wysocki RK, McGary R. Effective Project Management: Traditional, Adaptive, And Extreme. John Wiley & Sons, 2003. |
|--|---|
| Quality assurance methods that ensure the acquisition of exit competences | The annual analysis of examination efficiency. Student's survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated about the relevance of the course content. |
| Other (as the proposer wishes to add) | Available in English language. |

| NAME OF THE COURS | Ш | <u>Sailboats</u> | | | | | | |
|--|----------------------------|---|---|----|----------|----------|------------------|--------|
| Code | FESN20 |) | Year of study | 1 | | | | |
| Course teacher | Branko | <u>Blagojević</u> | Credits (ECTS) | 5 | | | | |
| Associate teachers | Klemer | nt Jadrešić | Type of instruction (number | Р | S | AE | LE | CE |
| | | | of hours) | 30 | 0 | 0 | 0 | 15 |
| Status of the course | Elective | e | Percentage of application of e-learning | 0 | | | | |
| | | | COURSE DESCRIPTION | | | | | |
| Course objectives | | Understanding fundamental principles of sailing. Understanding the process of sailboat design and performance assessment. | | | | | | |
| Course enrolment requirements and entry competences required for the course | | | | | | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | – Ex – De sp – Op | escribe various ecific software otimize sailing | amental concept of sailing. sources of hull resistance and e | | resistan | ce and s | peed usinį | g 2 |
| Course content broken down in detail | Conte | | | | | | lecture hours | hours |

| by weekly class schedule (syllabus) | The fundamental concept of sailing. Overview of parameters influencing sailboat performanc | | | | | | | | |
|---|--|-------------|-------------------|---|--------------------|---|----|--|--|
| | Sailboat hull form. | | | | | | | | |
| | Forces and moments. Loads. | | | | | | | | |
| Format of instruction Student responsibilities Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS | Stability. | | | | | 2 | | | |
| | Design methods | 2 | | | | | | | |
| | Hull materials. S | tructural o | lesign. | | | 2 | | | |
| | Hydrdodynamic | s: visocus | resistance, frict | ion resistance, | wave resisitance. | 2 | | | |
| | Roughness, add | 2 | | | | | | | |
| | Seakeeping. | | | | | | | | |
| | Sails. Aerodynamic forces. | | | | | | | | |
| | Masts. | | | | | | | | |
| | Interaction of masts and sails in weak and strong winds. | | | | | | | | |
| | Assessment of performance. VPP programs. | | | | | | | | |
| | Field work on a sailboat. | | | | | | | | |
| | Visit to shipyard | 2 | | | | | | | |
| | | | | | | | | | |
| | Work on the project with assistance (in the lab/classroom). | | | | | | 15 | | |
| Format of instruction | □ lectures □ seminars and □ exercises □ on line in enti □ partial e-learn ☑ field work | rety | 5 | ☐ individual as ☐ multimedia ☐ laboratory ☐ work with m ☑ individual pr | nentor | | | | |
| | Class attendanc | e. Finished | project task. | | | | | | |
| work (name the | Class attendance | 1 | Research | | Practical training | | | | |
| | Experimental work | | Report | | Individual work | | 1 | | |
| credits for each | Essay | | Seminar essay | | Lab exercises | | | | |
| activity so that the total number of ECTS | Tests | | Oral exam | 1 | | | | | |
| credits is equal to the | Written exam | | Project | 2 | (Other) | | | | |

| ECTS value of the course) | | | | | | | | | |
|--|---|------------|-----|--|--|------------------------------|------------------------------|--|--|
| Grading and evaluating student work in class and at the final exam | Continuous assessment is carried out during lectures, seminars and through consultations with regard to resolving project issues. The project task, preliminary sailboat design, is submitted in digital form. Examination: oral presentation of the project. | | | | | | | | |
| Required literature (available in the library and via other media) | Title | | | | | ber of copies the library | Availability via other media | | |
| | Hamlin C. Preliminary Design of Boats and Ships. Cornell Maritime Press, 1989. | | | | | 1 | | | |
| | Larsson L, Eliasson ER. Principles of Yacht Design. Adlard Coles Nautical, 2000. ISBN 0-7136-5181-4. | | | | | 2 | | | |
| | | | | | | | | | |
| Optional literature (at the time of submission of study programme proposal) | Fossati F. Aero-hydrodynamics and the Performance of Sailing Yachts: The Science Behind Sailing Yachts and Their Design. Adlard Coles Nautical, 2009. ISBN-10: 1408113384. Doane CJ. The Modern Cruising Sailboat: A Complete Guide to Its Design, Construction and Outfitting. McGraw-Hill, 2009. ISBN 978-0-07-147810-6. Estes C.W. 3D modeling for the Marine industry. Spectre P.H. 100 boats design reviewed. | | | | | | | | |
| Quality assurance methods that ensure the acquisition of exit competences | The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture Department. | | | | | | | | |
| Other (as the proposer wishes to add) | Available in Engl | ish langua | ge. | | | | | | |

| NAME OF THE COURSE | | Vibrations and | d vibration control | | | | | | | |
|---|---|---|---------------------------|---|-------------------------|-----------|---------|--------------|-------------|--|
| Code | FESN23 | 3 | Year of study | | 2 | | | | | |
| Course teacher | <u>Željan l</u> | <u>-ozina</u> | Credits (ECTS) | | 5 | | | | | |
| | Damir S | Sedlar | Type of instructio | n (number | Р | S | ΑE | LE | CE | |
| Associate teachers | Ivan To | | of hours) | ii (iiuiiibei | 30 | 0 | 30 | 0 | 0 | |
| Status of the course | Elective | | Percentage of app | olication of | 0 | U | 30 | 0 | | |
| | | | e-learning COURSE DESCRI | DTION | | | | | | |
| | Develo | n understandin | g basics of electron | | cyctamo | as well a | s canac | ity for mo | delling | |
| Course objectives | | • | = | | 3y3terris | as wen a | 3 capac | ity for filo | aciiiig | |
| Course enrolment | None | nd implementation of electromechanical systems. | | | | | | | | |
| requirements and entry competences required for the course | | | | | | | | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | Students will be able to: - explain basics and apply basic signal processing - Explain and apply sensors of position, displacement, velocity acceleration and force. - Explain basics and practically implement electro mechanic actuators and motors. - analyze electromechanical system with negative loopback - implement model of electromechanical system in time and frequency domain as well as in state space - perform simple identification of the system - perform measurement using software for measurement (LabVIEW) - analyze and apply simple control system (PID controller) | | | | | | | | | |
| | Content | | | | | | | L hours | AE hours | |
| | Signal processing basics. | | | | | | 2 | 2 | | |
| | Sensors od position, displacement, velocity, acceleration and force (LVDTs, encoders, velometers, accelerometers, eddy current sensors and switches, | | | | | | 2 | 2 | | |
| Course content | Electrodynamic actuators and motors and control of actuators and motors. | | | | | | | 2 | 2 | |
| broken down in detail | Model | of electromech | anical system in tir | ne. | | | | 2 | 2 | |
| by weekly class | Analyt | ical mechanics a | approach. | | | | | 2 | 2 | |
| schedule (syllabus) | Lagrange equations. | | | | | | | 2 | 2 | |
| | Concept of direct, indirect and inverse analysis. | | | | | | | 2 | 2 | |
| | State space. | | | | | | | 2 | 2 | |
| | Systems with negative loopback. Analysis of accuracy and stability. | | | | | | | 2 | 2 | |
| | System Identification. | | | | | | | 2 | 2 | |
| | Frequency domain analysis. | | | | | | 2 | 2 | | |
| | Conce | ot of direct indir | rect and inverse an | alysis. | | | | 2 | 2 | |
| | Analys | is of selected sy | rstem. | | | | | 2 | 2 | |
| Format of instruction | ⊠ exer □ on li | inars and works cises <i>ne</i> in entirety ial e-learning | hops | ☑ individu☐ multime☐ laborate☐ work w☐ individu | edia ory ith ment | or | | | | |
| | ☐ field work ☐ individual project (other) | | | | | | | | | |

| Student responsibilities | Class attendance | 9. | | | | | | | |
|--|---|------------|---------------|---|--|---|---------|--------|--|
| Screening student work (name the | Class attendance | 2 | Research | 1 | | Practical training | | | |
| proportion of ECTS credits for each | Experimental work | | Report | | | Individual work | | 2 | |
| activity so that the total number of ECTS | Essay | | Seminar essay | | | Lab exercises | | | |
| credits is equal to the | Tests | | Oral exam | 1 | | (Other) | | | |
| ECTS value of the course) | Written exam | | Project | | | (Other) | | | |
| Grading and evaluating student work in class and at the final exam | Continuous assessment during class. Exam: individual and group. Exam: the theoretical and practical (application software). Examination: oral (presentation of tasks assigned for independent work and discussion about research related to the topic of the tasks). | | | | | | | ll and | |
| Required literature | Title | | | | | Number of copies Availabi in the library other i | | - | |
| (available in the | Handouts | | | | | | e-learr | ning | |
| library and via other | e-learning portal | | | | | | | | |
| media) | | | | | | | | | |
| Optional literature (at the time of submission of study programme proposal) | S. Cetinkunt: Mechatronics, John Wiley and Sons, 2007. | | | | | | | | |
| Quality assurance methods that ensure the acquisition of exit competences | The annual analysis of examination efficacy. Student survey in order to evaluate teachers. Self-evaluation of teachers. Feedback from students who have already graduated from the relevance of the course content. Occasionally, observation and evaluation of teaching by the Head of Naval Architecture Department. | | | | | | | | |
| Other (as the proposer wishes to add) | Available in Engl | ish langua | ige. | | | | | | |