AALBORG UNIVERSITET

STUDIEORDNING FOR KANDIDATUDDANNELSEN (CAND.POLYT.) I DESIGN OG ANALYSE AF KONSTRUKTIONER, 2020

CIVILINGENIØR
ESBJERG

MODULER SOM INDGÅR I STUDIEORDNINGEN

INDHOLDSFORTEGNELSE

STRUCTURAL ANALYSIS OF LOAD-BEARING STRUCTURES

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained in the courses Structural Mechanics and Dynamics, Analysis and design of offshore structures, Fluid and Water Wave Dynamics or similar.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Know fundamental theories and methods for analysis of structures subject to static loads.
- Understand the behaviour of structures subject to static loading regarding their deformation and stresses.
- Understand the solution procedure in Finite Element Analysis of linear elastic static problems.
- Understand methodology for design of experiments and test series and for reduction of ambiguity of experimental results, and for comparability with model predictions.
- Understand elementary and advanced quantification tools, and their application to validation between model and experiment data.
- Have a basic knowledge and understanding of experimental work, including test planning, test conduction, different types of test equipment, modelling of uncertainties and comparison of model and test results using statistical methods.

SKILLS

Students who complete the module:

- Use the correct terminology for structural analysis and design.
- Be able to apply analytical solution methods based on continuum mechanics for selected static problems.
- Be able to develop and implement a Finite Element software code for analysis of a selected simple structure subject to static loading.
- Be able to use a commercial Finite Element code for analysing a given static structural problem.
- Be able to plan and set up a test for determining basic material properties.
- Be able to plan and set up a test for finding the stresses and stiffness of a given structure.
- Be able to perform a probabilistic study of the experimental data in order to quantify the influence of individual parameters and the level of confidence.
- Be able to critical examine a model (analytical or numerical) for comparison with an appropriate experimental study.

COMPETENCES

Students who complete the module:

- Be able to select appropriate analysis methods for a given structural problem, including analytical, numerical and experimental analysis methods.
- Be able to compare results obtained from different analysis methods and be able to judge the quality of the results.
- Be able to undertake experiment planning and execution for refinement and validation (or rejection) of model-based predictions of phenomena within Structural and Offshore Engineering.
- Be able to quantify errors associated with different types of analysis and evaluate the methods regarding assumptions and simplifications.
- Must be able to communicate the results of the project work in a project report.
- Must be able to contribute successfully to teamwork within the problem area and make a common presentation of the result of the project work.

LEARNING OBJECTIVES FOR PROBLEM BASED LEARNING

- Must be able to apply problem solving
- Must be able to use problem identification
- Must be able to apply objectives (cooperation agreement)
- Must be able to use contextual involvement (user involvement)
- Must be able to analyse teamwork/team composition
- Must have knowledge of process analysis
- Must be able to use problem formulation
- Must be able to assess meetings/scheduling of meetings
- Must be able to analyse time planning
- Must be able to apply problem analysis
- Must be able to analyse personal competencies and wishes
- Must be able to assess problem solving
- Must be able to apply project management
- Must be able to apply impact assessment

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The project module is 10 ECTS which is corresponding to 300 hours of study.

EXAM

EXAMS

Name of exam	Structural Analysis of Load-Bearing Structures
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project rapport.
ECTS	10
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Spændings/tøjnings analyse af bærende konstruktioner
Module code	B-DA-K1-2
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	10
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment

Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

INTRODUCTION TO PROBLEM BASED LEARNING WITHIN STRUCTURAL AND OFFSHORE ENGINEERING

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about Problem Based Learning (PBL).
- Must have knowledge about the Aalborg model approach to PBL.
- Must have knowledge about various techniques for planning and management of the group-based project work.
- Must have a basic fundamental knowledge about analytical, numerical and experimental work for estimating the response of a simple structural part (deformations and/or stresses and strains).
- Have a basic knowledge about uncertainties and limitations of different types of modelling and testing when analyzing a simple structural part.

SKILLS

Students who complete the module:

- Must be able to plan and manage a problem-based and project-organized study project carried out by a project group.
- Must be able to communicate project results and processes in a coherent, structured and understandable manner, both in writing, verbally and graphically.
- Must be able to analyze and evaluate own study efforts and learning in relation to a problem-based group work with a view to continued professional development.
- Must be able to analyze and evaluate collective learning processes for joint knowledge development and exchange of experience.
- Be able to perform analytical, numerical and experimental analysis in order to obtain the response of a simple structural part.
- Be able to compare results and reflect upon assumptions and uncertainties.

COMPETENCES

Students who complete the module:

- Must be able to engage in, reflect on and optimize own participation in a group-based project.
- Must be able to consciously reflect on and develop own learning.
- Must be able to engage in, reflect on and optimize collective learning processes in relation to analyzing a simple structural part.

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The project module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Introduction to Problem Based Learning within Structural and Offshore Engineering
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project rapport.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Introduktion til problembaseret læring inden for konstruktioner til Offshore anvendelser
Module code	B-DA-K1-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

STRUCTURAL MECHANICS AND DYNAMICS

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Understand how kinematics of different structural elements are related to general continuum mechanics.
- Understand fundamental properties of structural systems with emphasis on their impact on the dynamic response.
- Know fundamental theories and methods for analysis of dynamic structural response.
- Have an understanding of the solution procedure in Finite Element Analysis of linear elastic dynamic problems.
- Have a basic knowledge and understanding of experimental work related to dynamic testing of structures.

SKILLS

Students who complete the module:

- Use correct terminology for structural dynamic analysis.
- Based on general continuum mechanics, be able to formulate a model for a given structural problem, and based on the assumed kinematics, to establish a finite element formulation with the aid of the principle of virtual work.
- Be able to analyse the dynamic response of single-degree-of-freedom systems.
- Be able to analyse the dynamic response of multi-degree-of-freedom systems.
- Be able to analyse the dynamic response of structures in time domain and frequency domain.
- Be able to conduct modal analysis of structures.
- Develop and implement a Finite Element software code for dynamic analysis of a multi-degree-of-freedom system.
- Be able to use a commercial Finite Element code for analysing the dynamic response of a given structure.
- Be able to plan and set up a test for determining dynamic structural response.

COMPETENCES

Students who complete the module:

- Be able to analyse the dynamic response of an engineering structure.
- Be able to select appropriate analysis methods for the analysis of dynamic structural response.
- Be able to compare results obtained from different analysis methods and be able to judge the quality of the results.
- Be able to quantify errors associated with different types of analysis and evaluate the methods regarding assumptions and simplifications.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Structural Mechanics and Dynamics

Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Strukturel Mekanik og Dynamik
Module code	B-DA-K1-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

MODELLING AND ANALYSIS OF OFFSHORE STRUCTURES

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Understand fundamental properties of structures and materials in engineering with emphasis on their structural response.
- Understand fundamental theories and methods for analysis of structural material behaviour, including elasticity and plasticity.
- Understand the difference between linear and non-linear structural behaviour in relation to large displacements and plasticity.
- Understand fundamental continuum mechanics theories for solids, plates and beams.
- Have a basic knowledge and understanding of experimental work related to calibration of material models.

SKILLS

Students who complete the module:

- Use correct terminology regarding the behaviour and modelling of structures and materials.
- Be able to set up the static, kinematic and constitutive relations for solving a structural problem.
- Be able to apply the principle of virtual work in solving structural problems.
- Be able to apply elastic and standard plastic material models for simulating structural material behaviour.
- Be able to understand different types of non-linear structural behaviour.
- Be able to understand the limitations in different structural models.

COMPETENCES

Students who complete the module:

- Be able to analyse the behaviour of structures and materials.
- Be able to select and apply appropriate material models for the analysis of structural behaviour under different load conditions.
- Be able to compare results obtained by different constitutive models and be able to judge the quality of the results.
- Be able to compare results obtained by different structural models and be able to judge the quality of the results.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Modelling and Analysis of Offshore Structures

Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Modellering og analyse af Offshorekonstruktioner
Module code	B-DA-K1-4
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

FLUID AND WATER WAVE DYNAMICS

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about fluid kinematics.
- Must have knowledge about stresses in fluids, equation of motion, constitutive models and Navier-Stokes equations.
- Must have knowledge about ideal fluids and potential flows, including application of potential theory to simple problems for example circular cylinder and calculation of hydrodynamic mass.
- Must have knowledge and understanding of Reynolds averaging and turbulence models.
- Must be able to describe turbulent and laminar boundary layers including understanding of momentum equation for boundary layers.
- Must be able to describe wind generated waves.
- Must understand the application of potential theory to linear surface waves on a horizontal bed, including description and linearisation of boundary conditions, solving Laplace equation and the dispersion equation.
- Kinematic and dynamic description of linear surface waves, including particle velocities and accelerations, pressure field, particle paths, wave energy, energy flux and group velocity.
- Description of waves in shallow water, i.e. shoaling, refraction, diffraction and wave breaking.
- Statistical description of waves in time and frequency domain.

SKILLS

Students who complete the module:

- Must be able to describe assumptions and limitations of mathematical models for different types of flows.
- Must be able to apply analytical and semi-empirical methods for mathematical description of fluid dynamic problems.
- Must be able to calculate of kinematics and dynamics of regular linear waves on deep and shallow water.
- Must be able to analyse irregular waves in time and frequency domain.

COMPETENCES

Students who complete the module:

- Must be able to apply proper terminology in oral, written and graphical communication and documentation within fluid and water wave dynamics.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Fluid and Water Wave Dynamics
Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Strømningslære og bølgehydraulik
Module code	B-DA-K1-5
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

THE EXCITATION AND ANCHORING OF OFFSHORE STRUCTURES

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge corresponding to the 1st semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about design rules for offshore structures including methods for deterministic and probabilistic assessment of loads on offshore structures.
- Must have knowledge about analytical, numerical and experimental methods for investigation of offshore structures including installation and anchoring.

SKILLS

Students who complete the module:

- Must be able to perform an offshore site assessment and a design basis.
- Must be able to apply advanced numerical and experimental methods for analysis and assessment of loads and the corresponding structural response.
- Must be able to compare and evaluate limitations and uncertainties related to simple and advanced methods for estimation of environmental load as well the bearing capacity and deformations of the support structure.
- Must be able to evaluate the safety by application of probabilistic methods for assessment of loads and bearing capacity of offshore structures.

COMPETENCES

Students who complete the module:

- Must be able to apply proper terminology in oral, written and graphical communication and documentation of problems and solutions within offshore structures.
- Must have an overview of design aspects related to offshore structures.
- Must be able to communicate the results of the project work in a project report.
- Must be able to contribute successfully to teamwork within the problem area and make a common presentation of the result of the project work.

LEARNING OBJECTIVES FOR PROBLEM BASED LEARNING

- Must be able to assess problemsolving
- Must be able to assess teamwork/team composition
- Must be able to understand and explain what process analysis is
- Must be able to assess impact assessment

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The project module is 15 ECTS which is corresponding to 450 hours of study.

EXAM

PREREQUISITE FOR ENROLLMENT FOR THE EXAM

- An approved PBL competency profile is a prerequisite for participation in the project exam.

EXAMS

Name of exam	The Excitation and Anchoring of Offshore Structures
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project rapport.
ECTS	15
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Belastning på offshore konstruktioner og deres forankring
Module code	B-DA-K2-1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde
Time allocation for external examiners	B

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

ENVIRONMENTAL LOADS, INSTALLATION AND ANCHORING OF OFFSHORE STRUCTURES

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained in Fluid and Water Wave Dynamics or similar.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about non-linear waves, including 2nd and 5th order and stream function theory.
- Must have knowledge about methods for extreme climate analysis.
- Must have knowledge about currents and water level variations in the coastal zone.
- Must have knowledge about environmental loads on offshore structures including ice, wave, current and wind loads.
- Must have knowledge about scour and scour protection.
- Must have knowledge of different installation methods for offshore structures.
- Must have knowledge of environmental loads during transportation/installation of offshore structures.
- Must have knowledge about different method to support offshore structures, e.g. by anchoring or pile foundations.

SKILLS

Students who complete the module:

- Must be able to calculate design wave height from wave observations.
- Must be able to make a conceptual calculation of characteristic wave loads for offshore structures.
- Must be able to make a conceptual calculation of characteristic load scenario during installation of offshore structures.
- Must be able to make a conceptual analysis of the influence from the stiffness of the support on the structural response.

COMPETENCES

Students who complete the module:

- Must be able to apply proper terminology in oral, written and graphical communication and documentation within environmental loads, Installation and anchoring/foundation of offshore structures.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Environmental loads, Installation and anchoring of offshore structures
Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Bølgelaster, installation og forankring af offshorekonstruktioner
Module code	B-DA-K2-2
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

RISK AND RELIABILITY IN ENGINEERING

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained in Probability theory and statistics or similar.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Understand the concepts risk, uncertainty, reliability and safety.
- Know statistical methods for modeling physical, model, statistical and measurement uncertainties.
- Know methods for assessment of reliability of structural systems using probabilistic methods.
- Know methods for systems reliability for non-structural components and its applications in engineering.

SKILLS

Students who complete the module:

- Be able to model physical, statistical, model and measurement uncertainties.
- Be able to use failure rates and hazard functions to model failures in systems reliability for non-structural components.
- Be able to model uncertainties for loads and strengths.
- Be able to estimate the reliability by FORM/SORM methods (reliability index method) and by simulation.
- Be able to model system behavior and estimate the reliability of series and parallel systems.
- Understand basic concepts of stochastic processes and time-variant reliability methods.
- Be able to estimate characteristic and design values for strength parameters and load bearing capacities, and for environmental loads and load effects using test data and measurements.
- Be able to calibrate partial safety factors and load combination factors.
- Be able to apply Bayesian statistical methods.
- Be able to apply risk and reliability methods for probabilistic design of engineering structures such as buildings, bridges, offshore structures, costal structures, wind turbines etc.
- Use correct professional terminology.

COMPETENCES

Students who complete the module:

- Be able to participate in a dialogue on modelling of uncertainties, risk analysis and assessment of reliability of structural and non-structural components and systems.
- Be able to model, calculate and communicate risk analysis, modelling of uncertainties and assessment of reliabilities for engineering problems

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Risk and Reliability in Engineering
Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Risiko og sikkerhed af konstruktioner
Module code	B-DA-K2-3
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

ADVANCED STRUCTURAL ANALYSIS OF OFFSHORE STRUCTURES

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge corresponding to the 1st semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Should have basic knowledge about non-linear effects in structural response, i.e. influence of large displacements, plasticity or other non-linear material behavior and dynamic effects.
- Should have knowledge about advanced structural analysis and its applications in offshore structures.
- Should have knowledge about non-linear behavior of thin-walled structures i.e. buckling and postbuckling behavior and influence of geometric imperfections.
- Should have knowledge of modelling joints in structures linear as well as non-linear.
- Should have knowledge about non-linear Finite Element analysis of thin-walled structures.

SKILLS

Students who complete the module:

- Should be able to formulate a mechanical/mathematical model for offshore structures behaving non-linearly.
- Should be able to formulate geometrically non-linear models for thin-walled structures involving buckling, postbuckling and imperfection sensitivity.
- Should be able to estimate the stability load for simplified thin-walled structures based on analytical models.
- Should be able to formulate mechanical/mathematical models for joints in structures e.g. flexible joints in frame structures.
- Should have sufficient background to choose an appropriate numerical model i.e. type of element and type of non-linear solution algorithm.
- Should be able to analyze a structure/structural component by a non-linear Finite Element code e.g. push-over analysis of offshore platforms.
- Should be able to verify the numerical results from Finite Element calculations by analytical models or other simplified models.
- Should be able to interpret the results from a non-linear Finite Element calculation.

COMPETENCES

Students who complete the module:

- Should be able to participate in non-linear analysis of offshore structures and participate in a dialog on structural modifications in order to improve the structural response.
- Should be able to model and analyze thin-walled structures with geometric non-linear behavior and participate in a dialog of non-linear analysis of other structures.

TYPE OF INSTRUCTION

Lectures, etc. supplemented with project work, workshops, presentation seminars, lab tests.

EXTENT AND EXPECTED WORKLOAD

The module is 5 ECTS which is corresponding to 150 hours of study.

EXAM

EXAMS

Name of exam	Advanced Structural Analysis of Offshore Structures
Type of exam	Written or oral exam Individual oral or written exam. Exam format is decided on by start of semester.
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Avancerede konstruktionsanalyser af Offshorekonstruktioner
Module code	B-DA-K2-4
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

ANALYSIS AND SOLUTION OF ADVANCED STRUCTURAL OFFSHORE PROBLEMS

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge corresponding to the 1st and 2nd semester.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about analytical, numerical and experimental methods for investigation of the chosen problem.

SKILLS

Students who complete the module:

- Must be able to apply advanced analytical and/or numerical and/or experimental methods for analysis and assessment of the chosen problem.
- Must be able to compare and evaluate limitations and uncertainties related to the methods used for solving the chosen problem.

COMPETENCES

Students who complete the module:

- Must be able to apply proper terminology in oral, written and graphical communication and documentation of problems and solutions within the chosen field.
- Must be able to communicate the results of the project work in a project report.
- Must be able to contribute successfully to teamwork within the problem area and make a common presentation of the result of the project work.

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The project module is 30 ECTS which is corresponding to 900 hours of study.

EXAM

EXAMS

Name of exam	Analysis and Solution of Advanced Structural Offshore Problems
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project rapport.
ECTS	30

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Analyse og beregning af avancerede problemer indenfor offshorekonstruktioner
Module code	B-DA-K3-1
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science

PROJECT-ORIENTED STUDY IN AN EXTERNAL ORGANISATION

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge gained on the 1st and 2nd semester modules or similar.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Must have knowledge about analytical, numerical and/or experimental methods for investigation of advanced problems within the company's field.

SKILLS

Students who complete the module:

- Must be able to apply advanced analytical, numerical and/or experimental methods for analysis and assessment of advanced problems within the company's field.
- Must be able to compare and evaluate limitations and uncertainties related to the methods used for solving advanced problems within the company's field.

COMPETENCES

Students who complete the module:

- Must be able to apply proper terminology in oral, written and graphical communication and documentation of problems and solutions within the company's field.
- Must be able to communicate the results of the project work in a project report.

TYPE OF INSTRUCTION

Project-oriented study in an external organisation and project work. The study board must approve on the content of the project work before the project-oriented study is commenced.

EXTENT AND EXPECTED WORKLOAD

The project module is 30 ECTS which is corresponding to 900 hours of study.

EXAM

EXAMS

Name of exam	Project-oriented Study in an External Organisation
Type of exam	Oral exam based on a project Individual oral exam based on presentation seminar and project rapport.
ECTS	30

Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb i en virksomhed
Module code	B-DA-K3-2
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
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MASTER'S THESIS

2022/2023

RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module builds on knowledge corresponding to the completion of the first three semesters of the master programme.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module:

- Have knowledge and comprehension within the field of the specialization at the highest international level.
- Be able to critically evaluate knowledge and identify new scientific problems within the field of the specialization.
- Have understanding of implications within the related research area including research ethics.

SKILLS

Students who complete the module:

- Independently explain choice of scientific theoretical and/or experimental methods.
- During the project and when finalising it make an independent and critical estimation of the chosen theories and methods as well as the analyses, results and conclusions.
- Be able to apply a wide range of engineering methods in research and development in the field of specialization.
- Be able to communicate relevant scientific and professional aspects of project work in a clear and systematic way both to specialists and the public.

COMPETENCES

Students who complete the module:

- Be able to work independently with a project on a specific problem within the field of the specialization at the highest international level.
- Independently be able to define and analyse scientific problems and based on that make and state the reasons for the decisions made.
- Be competent to solve new and complicated technical problems by the use of advanced mathematics, scientific and technological knowledge.
- Be able to evaluate the progress of the project independently and select and include additional literature, experiments or data when needed in order to maintain a scientific basis for the project.
- Be able to control complex and unexpected working situations and be able to develop new solutions.
- Must be able to communicate the results of the project work in a project report.

TYPE OF INSTRUCTION

Project work with supervision supplemented with instructions, workshops, presentation seminars, lab tests, etc.

EXTENT AND EXPECTED WORKLOAD

The project module is 30 ECTS which is corresponding to 900 hours of study.

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Oral exam based on a project Oral exam based on presentation seminar and project rapport.
ECTS	30
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale
Module code	B-DA-K4-1
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Esbjerg
Responsible for the module	Lars Damkilde
Time allocation for external examiners	D

ORGANISATION

Study Board	Study Board of Built Environment
Department	Department of the Built Environment
Faculty	The Faculty of Engineering and Science