



AALBORG UNIVERSITET

MASTER OF SCIENCE (MSC) IN TECHNOLOGY (ENVIRONMENTAL SCIENCE)

MASTER OF SCIENCE (MSC) IN TECHNOLOGY
AALBORG

MODULES INCLUDED IN THE CURRICULUM

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MENNESKESKABTE MILJØPÅVIRKNINGER

2018/2019

MODULETS INDHOLD, FORLØB OG PÆDAGOGIK

The aim is to qualify the student to understand, measure and model the effect of e.g. land use change or increased load of chemicals on natural and artificial ecosystems.

The project focuses on how land-use change and increased load of chemicals may affect selected ecosystems and suggest actions relating to remediation technologies and management to prevent and alleviate the ecosystem distresses caused by e.g. land-use change or chemicals.

The project could be comparison of organic vs. conventional farming. The effect of household chemicals and pesticides on urban recreational areas.

LÆRINGSMÅL

VIDEN

Students who have passed the module should be able to

- Explain how land use may affect natural ecosystems
- Explain how chemical loads may affect the ecosystem structure and how the effects can be mediated.
- Explain what administrative structures, including legislation can be used to handle these environmental problems

FÆRDIGHEDER

- Use ecological models to describe impact of chemicals on natural ecosystems
- Apply selected methods to measure load, degradation and fate of selected chemicals in ecosystems.

KOMPETENCER

- Use environmental management tools to solve and prevent environmental perturbations
- Disseminate a complete project

UNDERVISNINGSFORM

- Project work

OMFANG OG FORVENTET ARBEJDSINDSATS

450 hours

EKSAMEN

PRØVER

Prøvens navn	Human Impact on the Environment
Prøveform	Mundtlig pba. projekt
ECTS	15
Bedømmelsesform	7-trins-skala
Censur	Ekstern prøve

Vurderingskriterier	As stated in the Joint Programme Regulations
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FAKTA OM MODULET

Engelsk titel	Human Impact on the Environment
Modulkode	K-BIO-K1-53
Modultype	Projekt
Varighed	1 semester
Semester	Efterår
ECTS	15
Undervisningsprog	Dansk og engelsk
Tomplads	Ja
Undervisningssted	Campus Aalborg
Modulansvarlig	Per Møldrup
Censornorm	B

ORGANISATION

Studienævn	Studienævnet for Kemi, Miljø og Bioteknologi
Institut	Institut for Kemi og Biovidenskab
Fakultet	Det Ingeniør- og Naturvidenskabelige Fakultet

GLOBAL CHANGE BIOLOGY

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The aim is to qualify the student to understand how global changes affect biological systems.

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the how greenhouse gas emission is linked to climate change, and how climate changes affect greenhouse gas emissions
- Explain how climate changes can influence populations and community dynamics
- Explain how climate changes can influence populations and community dynamics
- Explain how a changing climate impact on agriculture and horticulture
- Describe for how climate historically has changed and impacted on life on earth
- Explain how populations adapt to changing thermal conditions through plastic and evolutionary responses
- Explain the role of evolution and phenotypic plasticity in relation to climate change
- Account for the factors that constraints evolutionary processes

SKILLS

- Apply predictive ecosystem models to estimate how ecosystems are affected by global changes and land use
- Discriminate between species invasion from gradual migration due to climate changes and random species invasion

COMPETENCES

- Describe and use strategies that can mitigate greenhouse emission

TYPE OF INSTRUCTION

- Lectures, supplemented with project work, workshops, presentation seminars, laboratory tests

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Global Change Biology
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations

FACTS ABOUT THE MODULE

Danish title	Klimapåvirkning af biologiske systemer
Module code	K-BIO-K1-13
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Torsten Nygård Kristensen

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

ENVIRONMENTAL SOIL SCIENCE AND GEOSTATISTICS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objective:

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- On fundamental soil physics.
- On soil texture and structure, physical and chemical phase distribution (solids, water, air), pore-size distribution, water retention, hydraulic conductivity, soil-water sorptivity, unsaturated zone water transport, gas diffusion and chemical transport, sorption and biodegradation.
- On the basic principle of 1D analytical and numerical water and contaminant transport modelling.
- On evaluating the uncertainty of measured data and model results.

SKILLS

- To measure soil hydraulic properties in the laboratory.
- To apply parameter models for water retention, hydraulic conductivity, gas diffusion, and chemical dispersion to measured data or as predictive tools.
- To program and apply analytical and simple numerical water and solute transport models to measured data or in risk assessment.
- To apply relevant geostatistical methods to measured data in the soil and groundwater zones.

COMPETENCES

- To perform preliminary risk assessment and evaluate the conditions for on-site or in-situ clean-up methods for contaminated soil sites.
- To structure and produce technical documentation of complex problems, methods and results.
- To communicate problems, findings and solutions graphical as well as oral to the relevant target audience.

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS project module, the workload is expected to be 150 hours for the student.

EXAM

EXAMS

Name of exam	Environmental Soil Science and Geostatistics
Type of exam	Written or oral exam Individual oral or written exam
ECTS	5
Assessment	Passed/Not Passed

Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations. http://www.engineering.aau.dk/digitalAssets/332/332984_faellesbestemmelser_230617.pdf

FACTS ABOUT THE MODULE

Danish title	Jordfysik og geostatistik
Module code	B-VM-K1-3
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Per Møldrup

ORGANISATION

Study Board	Study Board of Civil Engineering
Department	Department of Civil Engineering
Faculty	Faculty of Engineering and Science

EXPERIMENTAL HYDROLOGY

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objective:

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- On the groundwater system and its essential properties and parameters.
- On experimental methods for property and parameter estimation of the ground water zone.
- On uncertainty and limitations of the applied methods.

SKILLS

- To select, design and conduct suitable in-situ test for estimating saturated hydraulic properties.
- To select, design and conduct suitable laboratory test for estimating hydraulic saturated hydraulic properties.
- To analyse and evaluate test results and methods regarding suitability and reliability.
- To organise documentation and presentation of measured data.

COMPETENCES

- To describe, analyse, and evaluate a specific part of the groundwater system, regarding its composition and its properties through a planned investigation of the system.
- To structure and plan the project and the work in a group.
- To produce technical documentation of complex problems, methods and results in group cooperation.
- To communicate findings and solutions graphical as well as oral to the relevant target audience.

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS project module, the workload is expected to be 150 hours for the student.

EXAM

EXAMS

Name of exam	Experimental Hydrology
Type of exam	Written or oral exam Individual exam, written or oral based on presentation seminar and mini-project report.
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations. http://www.engineering.aau.dk/digitalAssets/332/332984_faellesbestemmelser_230617.pdf

FACTS ABOUT THE MODULE

Danish title	Eksperimentel hydrologi
Module code	B-VM-K1-2
Module type	Course
Duration	1 semester
Semester	Autumn
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Per Møldrup

ORGANISATION

Study Board	Study Board of Civil Engineering
Department	Department of Civil Engineering
Faculty	Faculty of Engineering and Science

ECOSYSTEM ANALYSIS

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To provide the student the tools to analyze environmental impacts and evaluate how the most important environmental impacts affect surrounding environments, on local as well as on global scales.

The project will focus on a natural environment where management aspects of the natural resources are an integral part of the ecosystem function.

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Account for the dominating factors that show important environmental impacts
- Explain the differences between different management strategies based on differences in organizational structures, the emergence of international organizations and interaction with the market

SKILLS

- Make load balances for chemical compounds and analyze the impact of these compounds on e.g. water or food resources
- Evaluate local and global effects of green-house gas emissions

COMPETENCES

- Function as environmental scientist or administrator in eras of changing climate and environments

TYPE OF INSTRUCTION

- Project

EXTENT AND EXPECTED WORKLOAD

450 hours

EXAM

EXAMS

Name of exam	Ecosystem Analysis
Type of exam	Oral exam based on a project
ECTS	15
Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	As stated in the Joint programme regulations

FACTS ABOUT THE MODULE

Danish title	Økosystemanalyse
Module code	K-BIO-K2-39
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	Danish and English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Niels Iversen
Time allocation for external examiners	B

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

CONSERVATION BIOLOGY

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To give the student a basic introduction to the discipline of conservation biology with a focus on current problems and potential solutions.

The course will comprise of lectures and exercises on the above-mentioned themes. For each theme the students will have the possibility to identify examples of threatened species and/or habitats and possible solutions to reduce, and in some cases eliminate, current threats to their conservation. These exercises will permit interested students to focus on issues of special importance to Denmark, and they will allow all students to present their findings to the rest of the group.

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Describe human-induced and environmental factors that influence species, populations, habitats and biodiversity including genetic variation
- Describe how ecosystems and food chains are connected, and how their conservation may be affected by the loss or decline of a population or habitat
- Explain how invasive alien species can influence local ecosystems and, over time, have profound implications for conservation

SKILLS

- Identify and describe the conservational value of different species and populations
- Identify “Keystone species”, where some species have an ecosystem role larger and more important than that suggested by their size and biomass
- Identify “Umbrella species”, where preservation of habitats and populations of sufficient size will contribute to conservation of many other species
- Use important tools for data collection and analyses concerning populations at risk, such as non-invasive genetic materials
- Assess potential solutions for conservation of species, populations and habitats at risk
- Use appropriate tools to collect data on species and populations in reference state as well as communities under environmental stress
- Use appropriate multivariate statistical analyses to assess biological communities and the environmental stressors affecting them

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Conservation Biology
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination

Criteria of assessment	As stated in the joint programme regulations
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FACTS ABOUT THE MODULE

Danish title	Bevaringsbiologi
Module code	K-BIO-K2-4
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Majken Pagter Møller

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

MARINE POLLUTION

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To provide fundamental insight into coastal marine waters including effects and prevention of natural and anthropogenic pollution

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain physical, chemical and microbial processes in marine systems
- Account for the most common types of marine pollution
- Account for the exchange of matter between aquatic and terrestrial environments
- Account for the processes: primary production, respiration and re-oxidation
- Describe important organic and inorganic pollutants and pollution effects in coastal marine waters

SKILLS

- Analyze microbial loops, food webs, and turnover of C, N, and S in aquatic environments and in sediments
- Distinguish between pollution impacts on individuals, populations, and communities
- Assess recreational and bathing water quality, and tools for fecal pollution source tracking

COMPETENCES

- Evaluate the occurrence of inorganic nutrients, man-made pollutants, disease-causing microorganisms, and metal pollution in marine waters
- Evaluate methods to prevent and alleviate anthropogenic pollution in coastal marine waters

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Marine Pollution
Type of exam	Written or oral exam
ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the joint programme regulations

FACTS ABOUT THE MODULE

Danish title	Forurening i marine områder
Module code	K-BIO-K2-6
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Niels Iversen , Peter Roslev

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

HYDRODYNAMICS AND TIME SERIES ANALYSIS OF ENVIRONMENTAL FLOWS

2018/2019

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Fundamental Hydraulics, Fundamental Statistics and Differential Equations.

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

Objective:

Students who complete the module:

LEARNING OBJECTIVES

KNOWLEDGE

- On advanced hydrodynamics.
- On numerical modelling of turbulent flows.
- On modelling of transport and mixing.
- On environmental flow in coastal zones and estuaries.
- On basic time series analysis.

SKILLS

- To perform a systematic analysis of the physics in the coastal zone and estuaries.
- To perform non-stationary time simulations with advanced hydrodynamic models.
- To analyse time series for persistence and harmonic elements.
- To analyse geophysical flows in the ocean and coastal zone.

COMPETENCES

- To evaluate and handle data that forms the basis of hydrodynamic and water quality modelling.
- To structure and produce technical documentation of complex problems, methods and results.
- To communicate problems, findings and results graphically as well as oral to the relevant target audience.

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

Since it is a 5 ECTS project module, the workload is expected to be 150 hours for the student.

EXAM

EXAMS

Name of exam	Hydrodynamics and Time Series Analysis of Environmental Flows
Type of exam	Written or oral exam Individual oral or written exam

ECTS	5
Assessment	7-point grading scale
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations. http://www.engineering.aau.dk/digitalAssets/332/332984_faellesbestemmelser_230617.pdf

FACTS ABOUT THE MODULE

Danish title	Hydrodynamik og tidsserieanalyse for miljøhydrauliske forhold
Module code	B-VM-K2-7
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Thomas Ruby Bentzen

ORGANISATION

Study Board	Study Board of Civil Engineering
Department	Department of Civil Engineering
Faculty	Faculty of Engineering and Science

GRUNDLÆGGENDE SPILDEVANDSRENSNING

2018/2019

FORUDSÆTNINGER/ANBEFALEDE FORUDSÆTNINGER FOR AT DELTAGE I MODULET

Kurset bygger på viden opnået gennem generel mikrobiologi og kemi på gymnasieniveau samt gennem kursusmodulet Afløbsteknik og hydraulik eller lignende.

MODULETS INDHOLD, FORLØB OG PÆDAGOGIK

LÆRINGSMÅL

VIDEN

- Skal have viden om grundlæggende og videregående spildevandsrensning
- Skal have viden om teorier bag fysiske, kemiske og biologiske renseprocesser
- Skal have viden om renseteknologier for fjernelse af kulstof, kvælstof og fosfor fra kommunalt spildevand

FÆRDIGHEDER

- Skal kunne karakterisere kommunalt spildevand
- Skal kunne karakterisere og kvantificere de væsentligste kemisk/biologisk/fysiske processer, der anvendes til rensning af kommunalt spildevand
- Skal kunne karakterisere og kvantificere de væsentligste fysiske separationsprocesser
- Skal kunne karakterisere de væsentligste processer ved anaerob udrådning af slam
- Skal kunne udføre skitse-design og grov-dimensionering af biologiske processtanke på kommunale renseanlæg
- Skal kunne udføre skitse-design og grov-dimensionering af forklaringstanke og efterklaringstanke
- Skal kunne udføre skitse-design og grov-dimensionering af rådnetanke
- Skal kunne supportere drift og optimering af kommunale renseanlæg for fjernelse af kvælstof og fosfor
- Skal kunne opstille modeller for biologiske processer i aktiv slam anlæg
- Skal kunne opstille modeller for omsætning i biofilm på fastfilm anlæg

KOMPETENCER

- Have evnen til at planlægge og designe kommunale renseanlæg
- Have evnen til at analysere funktionen af kommunale renseanlæg

UNDERVISNINGSFORM

Forelæsninger evt. suppleret med workshops, præsentationsseminarer, laboratorieforsøg m.m.

OMFANG OG FORVENTET ARBEJDSINDSAT

Kursusmodulets omfang er 5 ECTS svarende til 150 timers studieindsats.

EKSAMEN

PRØVER

Prøvens navn	Grundlæggende spildevandsrensning
Prøveform	Skriftlig eller mundtlig Individuel mundtlig eller skriftlig prøve. Prøveformen fastsættes ved semesterstart.
ECTS	5

Bedømmelsesform	7-trins-skala
Censur	Intern prøve
Vurderingskriterier	Er angivet i fællesbestemmelserne. http://www.engineering.aau.dk/digitalAssets/332/332984_faellesbestemmelser_230617.pdf

FAKTA OM MODULET

Engelsk titel	Fundamentals of Wastewater Treatment
Modulkode	B-VM-B6-7
Modultype	Kursus
Varighed	1 semester
Semester	Forår
ECTS	5
Undervisningssprog	Dansk
Undervisningssted	Campus Aalborg
Modulansvarlig	Jes Vollertsen

ORGANISATION

Studienævn	Studienævnet for Byggeri og Anlæg
Institut	Institut for Byggeri og Anlæg
Fakultet	Det Ingeniør- og Naturvidenskabelige Fakultet

DANISH BIOTOPES

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students completing the module acquire the following:

Knowledge:

- On the general geology of the Danish landscape and regional differences in soil characteristics, climate and the resulting biotypes
- On the characteristic Danish biotypes and the most unique nature sites in the Danish landscape
- On the Danish flora and its dependence on the environmental conditions
- On the most common Danish mammals, birds, reptiles and amphibians and their distribution in the Danish landscape
- On the most common Danish insects and other invertebrates
- On the floral and faunistic succession in the Danish landscape
- On the Environmental Protection Act and other laws and regulations focusing on the protection and management of the Danish nature
- On the most important environmental problems in Denmark, including eutrophication, habitat fragmentation, reduced biodiversity as well as conflicts on interests in Danish nature management (e.g. angling, cultivation, hunting, urban development)

SKILLS

- Capable of identifying biotypes based on the vegetation, fauna and geology
- Identify the level of protection of a given site based on existing laws and regulations

TYPE OF INSTRUCTION

- Excursions
- field work
- group work
- lectures.

EXAM

EXAMS

Name of exam	Danish Biotopes
Type of exam	Active participation and/or written assignment
ECTS	5
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	Stated in the Joint Programme Regulations.

FACTS ABOUT THE MODULE

Danish title	Danske naturtyper
Module code	K-BIO-K2-5
Module type	Course
Duration	1 semester
Semester	Spring
ECTS	5
Language of instruction	Danish
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Dan Bruhn

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

PROJECT WORK IN AN EXTERNAL ORGANISATION

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the scientific basis of the work carried out by the external organisation

SKILLS

- Master the scientific methods and general skills related to the project work in the external organisation
- Write a report following the standards of the field of study, use the correct terminology and document extensive use of relevant and original scientific literature, and communicate and discuss the project's foundation, problem and results in writing, graphically and verbally in a coherent way
- Critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and assess and discuss the problem of the project and results in relevant scientific contexts and social conditions
- Evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other socially relevant factors

COMPETENCES

- Participate in development, innovation, and research and use scientific methods to solve complex tasks
- Take professional responsibility to implement independent assignments and interdisciplinary collaborations
- Independently take responsibility for own professional development and specialization

TYPE OF INSTRUCTION

- Project work, supervised by an external supervisor in collaboration with an internal supervisor at Aalborg University
- Project work in an external organisation must be in areas of relevance to the competence profile of the program

EXTENT AND EXPECTED WORKLOAD

900 hours

EXAM

EXAMS

Name of exam	Project Work in an External Organisation
Type of exam	Oral exam based on a project
ECTS	30
Assessment	Passed/Not Passed
Type of grading	Internal examination
Criteria of assessment	As stated in the Joint Programme Regulations

FACTS ABOUT THE MODULE

Danish title	Projektarbejde i en ekstern organisation
Module code	K-BIO-K3-66
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Niels Iversen

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

MASTER'S THESIS IN ENVIRONMENTAL SCIENCE

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the scientific basis and scientific issues in environmental science
- Explain the highest international research within the thesis subject area

SKILLS

- Master the scientific methods and general skills related to the thesis subject area
- Write a project report following the standards of the field of study, use the correct terminology and document extensive use of relevant and original scientific literature, and communicate and discuss the project's research-based foundation, problem and results in writing, graphically and verbally in a coherent way
- Critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and assess and discuss the problem of the project and results in relevant scientific contexts and social conditions
- Evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other socially relevant factors

COMPETENCES

- Participate in and independently implement technological and scientific development and research, develop and implement experimental work and solve complex tasks using scientific methods
- Handle the planning, implementation and management of complex and unpredictable research and/or developmental tasks and take professional responsibility to implement independent academic assignments and interdisciplinary collaborations
- Independently take responsibility for own professional development and specialization

TYPE OF INSTRUCTION

Project work

A long Master's thesis of more than 30 ECTS must include work of experimental nature to an extent that corresponds to the thesis ECTS load

EXTENT AND EXPECTED WORKLOAD

900 hours

EXAM

EXAMS

Name of exam	Master's thesis in environmental science
Type of exam	Master's thesis/final project
ECTS	30
Assessment	7-point grading scale

Type of grading	External examination
Criteria of assessment	As stated in the Joint programme regulations

FACTS ABOUT THE MODULE

Danish title	Kandidatspeciale i miljøvidenskab
Module code	K-BIO-K4-72
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Niels Iversen
Time allocation for external examiners	D

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science

EXTENDED MASTER'S THESIS IN ENVIRONMENTAL SCIENCE

2018/2019

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the scientific basis and scientific issues in environmental science
- Explain the highest international research within the thesis subject area

SKILLS

- Master the scientific methods and general skills related to the thesis subject area
- Write a project report following the standards of the field of study, use the correct terminology and document extensive use of relevant and original scientific literature, and communicate and discuss the project's research-based foundation, problem and results in writing, graphically and verbally in a coherent way
- Critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and assess and discuss the problem of the project and results in relevant scientific contexts and social conditions
- Evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other socially relevant factors

COMPETENCES

- Participate in and independently implement technological and scientific development and research, develop and implement experimental work and solve complex tasks using scientific methods
- Handle the planning, implementation and management of complex and unpredictable research and/or developmental tasks and take professional responsibility to implement independent academic assignments and interdisciplinary collaborations
- Independently take responsibility for own professional development and specialization

TYPE OF INSTRUCTION

- Project work
- A long Master's thesis of more than 30 ECTS must include work of experimental nature to an extent that corresponds to the thesis ECTS load

EXTENT AND EXPECTED WORKLOAD

1800 hours

EXAM

EXAMS

Name of exam	Extended Master's Thesis in Environmental Science
Type of exam	Master's thesis/final project
ECTS	60

Assessment	7-point grading scale
Type of grading	External examination
Criteria of assessment	As stated in the Joint Programme Regulations

FACTS ABOUT THE MODULE

Danish title	Langt kandidatspeciale i miljøvidenskab
Module code	K-BIO-K3-54
Module type	Project
Duration	2 semesters
Semester	Autumn and Spring
ECTS	60
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Niels Iversen
Time allocation for external examiners	D

ORGANISATION

Study Board	Study Board of Biotechnology, Chemistry and Environmental Engineering
Department	Department of Chemistry and Bioscience
Faculty	Faculty of Engineering and Science