AALBORG UNIVERSITET

STUDIEORDNING FOR KANDIDATUDDANNELSEN I MILJØVIDENSKAB, 2022

CAND.TECH.
AALBORG

MODULER SOM INDGÅR I STUDIEORDNINGEN

INDHOLDSFORTEGNELSE

SUSTAINABILITY IN THE ENVIRONMENT

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- demonstate basic understanding of sustainable land use
- explain how land uses affect natural ecosystems
- explain how chemical loads affect ecosystem structures and how these effects are mediated
- explain what administrative structures, including legislation are used to handle environmental problems

SKILLS

- identify the processes that are important for the analysis and understanding of sustainability of the environment
- use ecological models to describe impact of chemicals and nutrients on natural ecosystems
- carry out experimental and theoretical investigations to find solutions to environmental problems
- apply selected methods to measure load, degradation and fate of selected chemicals in ecosystems
- write an electronic project report following the standards of the field of study, include relevant original scientific literature, use the correct terminology, and communicate the research-based foundation and problem and results in writing, graphically and orally in a professionally reasoned and coherent way
- use relevant software to present, analyze and visualize theories, hypotheses and data in writing as well as orally
- assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and asses the problem of the project and results in relevant scientific and social contexts

COMPETENCES

- use environmental management tools to solve and prevent environmental perturbations
- handle the planning, implementation and management of complex and unpredictable research and/or developmental tasks and take professional responsibility to implement academic assignments and interdisciplinary collaborations
- take responsibility for own professional development and specialization

TYPE OF INSTRUCTION

Project work

EXTENT AND EXPECTED WORKLOAD

450 hours

EXAM

EXAMS

Name of exam	Sustainability in the Environment
Type of exam	Oral exam based on a project
ECTS	15
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	Klimaforandringer og bæredygtighed
Module code	K-BIO-K1-54
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	15
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Iversen

ORGANISATION

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

ENVIRONMENTAL SOIL SCIENCE AND GEOSTATISTICS 2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF 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	The criteria of assessment are stated in the Examination Policies and Procedures

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
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg
Responsible for the module	Møldrup

ORGANISATION

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

ECOSYSTEM MODELLING

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students that have passed the module should be able to

- describe where and how ecological modeling is used

SKILLS

- model and simulate environmental changes
- use models to quantify relations between perturbations and effect on an ecosystem
- use models to evaluate the effect of ecological instruments on the environment
- analyze model output in relations to conservation and management of ecosystems

COMPETENCES

- evaluate the usefulness of ecological modeling to describe relations between perturbations and ecological effects
- evaluate the strength and weakness of different ecological models

TYPE OF INSTRUCTION

- Lectures and theoretical exercises

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Ecosystem modelling
Type of exam	Written or oral exam
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	Økosystemmodellering
Module code	K-BIO-K1-60
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	Ørsted

ORGANISATION

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

EXPERIMENTAL HYDROLOGY

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF 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 Written or oral exam based on presentation seminar and mini-project report.
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	Eksperimentel hydrologi

Module code	B-VM-K1-2
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	Møldrup

ORGANISATION

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

CLIMATE CHANGE AND ECOSYSTEM ANALYSIS

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- acccount for the basic impact of climate change on natural ecosystems
- account for the dominating climatic factors, which affects the environment and ecosystems at local as well at global scale

SKILLS

- carry out 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
- evaluate the environmental impact of climate change on ecosystems
- write an electronic project report following the standards of the field of study, include relevant original scientific literature, use the correct terminology, and communicate the research-based foundation and problem and results in writing, graphically and orally in a professionally reasoned and coherent way
- use relevant software to present, analyze and visualize theories, hypotheses and data in writing as well as orally
- assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and asses the problem of the project and results in relevant scientific and social contexts

COMPETENCES

- handle the planning, implementation and management of complex and unpredictable research and/or developmental tasks and take professional responsibility to implement academic assignments and interdisciplinary collaborations
- take responsibility for own professional development and specialization

TYPE OF INSTRUCTION

Project work

EXTENT AND EXPECTED WORKLOAD

450 hours

EXAM

EXAMS

Name of exam	Climate Change and Ecosystem Analysis
Type of exam	Oral exam based on a project
ECTS	15
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	Klimaforandringer og bæredygtighed
Module code	K-BIO-K2-58
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	15
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Bruhn

ORGANISATION

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

MARINE POLLUTION

2022/2023

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 antropogenic pollution in coastal marine waters

TYPE OF INSTRUCTION

- Lectures
- Workshops
- Excercises (individually and in groups)

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	The criteria of assessment are stated in the Examination Policies and Procedures

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	Iversen, Roslev

ORGANISATION

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

GLOBAL CHANGE BIOLOGY

2022/2023

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	The criteria of assessment are stated in the Examination Policies and Procedures

FACTS ABOUT THE MODULE

Danish title	Klimapåvirkning af biologiske systemer
Module code	K-BIO-K1-13
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

ORGANISATION

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

PROJECT-ORIENTED STUDY IN AN EXTERNAL ORGANISATION

2022/2023

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 an electronic 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 and problem and results in writing, graphically and verbally in a professionally reasoned and coherent way
- use relevant software to present, analyze and visualize theories, hypotheses and data in writing as well as orally
- critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and asses and discuss the problem of the project and results in relevant scientific and social contexts
- evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other societal 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, supervised by an external supervisor in collaboration with an internal supervisor at Aalborg University

EXTENT AND EXPECTED WORKLOAD

900 hours

EXAM

EXAMS

Name of exam	Project-Oriented Study in an External Organisation
Type of exam	Oral exam based on a project
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

ADDITIONAL INFORMATION

Project work in an external organisation must be in areas of relevance to the competence profile of the program

FACTS ABOUT THE MODULE

Danish title	Projektorienteret forløb i en virksomhed
Module code	K-BIO-K3-66A
Module type	Project
Duration	1 semester
Semester	Autumn
ECTS	30
Language of instruction	English
Empty-place Scheme	Yes
Location of the lecture	Campus Aalborg, Campus Esbjerg
Responsible for the module	Pedersen

ORGANISATION

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

MASTER'S THESIS

2022/2023

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 within the competence profile of the education
- 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 an electronic 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 and problem and results in writing, graphically and verbally in a professionally reasoned and coherent way
- use relevant software to present, analyze and visualize theories, hypotheses and data in writing as well as orally
- critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and asses and discuss the problem of the project and results in relevant scientific and social contexts
- evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other societal 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 and has to be approved by the Head of Studies. The amount of experimental work must reflect the allotted ECTS.

EXTENT AND EXPECTED WORKLOAD

1800 hours

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
ECTS	60

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	K-KMB-K4-4A
Module type	Project
Duration	2 semesters
Semester	Autumn
ECTS	60
Language of instruction	English
Responsible for the module	Pedersen
Time allocation for external examiners	D

ORGANISATION

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

MASTER'S THESIS

2022/2023

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 within the competence profile of the education
- 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 an electronic 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 and problem and results in writing, graphically and verbally in a professionally reasoned and coherent way
- use relevant software to present, analyze and visualize theories, hypotheses and data in writing as well as orally
- critically assess and select relevant original scientific literature and current scientific methods, models and other tools used in the project and asses and discuss the problem of the project and results in relevant scientific and social contexts
- evaluate the potential of the project for further development, assessing and incorporating relevant economic, ethical, environmental and other societal 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

EXTENT AND EXPECTED WORKLOAD

900 hours

EXAM

EXAMS

Name of exam	Master's Thesis
Type of exam	Master's thesis/final project
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	K-KMB-K4-5A
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Responsible for the module	Pedersen
Time allocation for external examiners	D

ORGANISATION

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

LIMNOLOGY

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- describe key components of freshwater ecosystems
- describe relevant theory for physical, chemical and biological processes in freshwater ecosystems
- describe the dominant anthropogenic types of pollution affecting freshwater ecosystems
- differentiate between major types of streams, rivers, wetlands and lakes
- explain lake and river ecosystem dependence on light, temperature, nutrients and organic matter
- describe primary production, vegetation, plankton, respiration and re-oxidation in freshwater ecosystems
- describe important organic and inorganic pollutants and pollution effects in freshwater ecosystems
- describe effects of global change on freshwater ecosystems
- account for running waters, wetlands and lake restoration methods

SKILLS

- evaluate ecology quality of freshwater systems using biological indices
- determine the significance of hydraulic conditions on chemical and biological dynamics in lakes and rivers
- analyze oxygen dynamics in freshwater environments
- analyze impacts of pollution on biotic communities

COMPETENCES

- evaluate the quality of freshwater ecosystems in relation to nutrient dynamics and organic matter cycling
- evaluate how to prevent and alleviate anthropogenic perturbations in freshwater ecosystems

TYPE OF INSTRUCTION

- Lectures

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Limnologi
Type of exam	Written or oral exam
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	Limnologi
Module code	K-BIO-B6-16A
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 Madsen

ORGANISATION

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

DANSKE NATURTYPER – EVALUERING OG FORVALTNING

2022/2023

MODULETS INDHOLD, FORLØB OG PÆDAGOGIK

LÆRINGSMÅL

VIDEN

Studerende, der gennemfører modulet, skal kunne

- Redegøre for terrestriske danske naturtyper, herunder karakteristiske plantearter, økofysiologi, status og trusler

FÆRDIGHEDER

- nøgle danske naturtyper
- udarbejde naturtilstandsvurderinger
- udføre vegetative planteartsbestemmelse

UNDERVISNINGSFORM

Forelæsninger

Øvelser

Gruppebaserede projektopgaver

Artikelfremlæggelser

Fremlæggelse af projektopgaver

OMFANG OG FORVENTET ARBEJDSINDSATS

150 timer

EKSAMEN

PRØVER

Prøvens navn	Danske Naturtyper – evaluering og forvaltning
Prøveform	Aktiv deltagelse/løbende evaluering I forbindelse med reeksamener vil eksamensformen være skriftlig rapport.
ECTS	5
Bedømmelsesform	Bestået/ikke bestået
Censur	Intern prøve
Vurderingskriterier	Vurderingskriterierne er angivet i Universitetets eksamensordning

YDERLIGERE INFORMATIONER

Kendskabet til de forskellige naturtyper, der findes, er essentielt for biologen, miljøingenøren og geografen der arbejder i det danske landskab med natur- eller ressourceforvaltning. Viden om de vigtigste planteindikatorarter er et vigtigt redskab og det at bestemme/nøgle naturtyper via plantearter og vurdere kvaliteten af naturtypen er essentielt på kurset. Koblingen mellem naturtyper og de vigtigste EU direktiver på naturområdet samt Naturlovgivning giver den studerende mulighed for at inddrage viden fra kurset i et forvaltningsorienteret projekt.

Det antages, at den studerende allerede har eller via selvstudier vil opnå viden om flg. emner (evt. gennem andre kursusmoduler)

- Naturtyper med vandløb eller sø, de karakteristiske arter af vandplanter i vandløb og søer og deres relationer til (a)biotiske faktorer (limnologi)
- Hydrologi i jord, sø og vandløb (limnologi)
- EU-direktiver
- Basis-botanik og forståelse af terrestriske planters tilpasninger til miljøet (botanik og plantefysiologi)
- Marine naturtyper (marinbiologi)

FAKTA OM MODULET

Engelsk titel	Danish Biotopes – evaluation and management
Modulkode	K-BIO-K2-7
Modultype	Kursus
Varighed	1 semester
Semester	Forår
ECTS	5
Undervisningssprog	Dansk og engelsk
Tomplads	Ja
Undervisningssted	Campus Aalborg
Modulansvarlig	Bruhn

ORGANISATION

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

BASIC BIOLOGICAL AND CHEMICAL WASTE WATER TREATMENT

2022/2023

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who complete the module must be able to

- account for advanced wastewater treatment
- describe theories behind physical, chemical and biological purification processes
- account for treatment technologies for the removal of carbon, nitrogen and phosphorus from municipal wastewater
- recognize the most important functional bacterial groups in wastewater treatment plants

SKILLS

- characterize municipal wastewater
- characterize and quantify the most important chemical / biological / physical processes used for the treatment of municipal wastewater
- characterize and quantify the main physical separation processes
- characterize the main processes of anaerobic sludge digestion
- perform sketch design and rough-dimensioning of settling tanks, clarifiers, and biological process tanks at municipal treatment plants
- perform sketch design and rough-dimensioning of digesters
- support the operation and optimization of municipal treatment plants for the removal of nitrogen and phosphorus
- set up models for biological processes in activated sludge plants
- set up models for conversion into biofilm on fixed film plants
- set up models for conversion into biofilm on fixed film plants
- characterize the microbiological composition via DNA-based methods

COMPETENCES

- analyze the function of municipal wastewater treatment plants
- use microbiological information for process optimization and trouble-shooting

TYPE OF INSTRUCTION

- Lectures
- Exercises

EXTENT AND EXPECTED WORKLOAD

150 working hours

EXAM

EXAMS

Name of exam	Basic Biological and Chemical Waste Water Treatment
Type of exam	Written or oral exam

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	Grundlæggende biologisk og kemisk spildevandsrensning
Module code	K-BIO-B6-53
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	Nielsen, Vollertsen

ORGANISATION

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