AALBORG UNIVERSITET

CIVILINGENIØR, CAND.POLYT. I KEMI, 2017, VERSION 2 2018

CIVILINGENIØR
AALBORG

MODULER SOM INDGÅR I STUDIEORDNINGEN

INDHOLDSFORTEGNELSE

MATERIALETEKNOLOGI

2020/2021

MODULETS INDHOLD, FORLØB OG PÆDAGOGIK

OMFANG OG FORVENTET ARBEJDSINDSATS

450 hours

EKSAMEN

PRØVER

Prøvens navn	Materialeteknologi
Prøveform	Mundtlig pba. projekt
ECTS	15
Bedømmelsesform	7-trins-skala
Censur	Intern prøve
Vurderingskriterier	Vurderingskriterierne er angivet i Universitetets eksamensordning

FAKTA OM MODULET

Engelsk titel	Materials Technology
Modulkode	K-KEM-K1-48
Modultype	Projekt
Varighed	1 semester
Semester	Efterår
ECTS	15
Undervisningssprog	Dansk og engelsk
Tomplads	Ja
Undervisningssted	Campus Aalborg
Modulansvarlig	Yuanzheng Yue

ORGANISATION

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

MATERIALS CHEMISTRY

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Inorganic Chemistry and Physical Chemistry

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The purposes of the course are to introduce both fundamental chemical principles of materials and nano-materials, and main methods for developing, optimizing, post-treating and characterizing materials regarding different physical and chemical performances.

The focus will be placed on the relation between chemical composition, structure and properties. The course will introduce the current status of materials and nano-materials technologies.

Materials chemistry focuses on the fundamental principles and applications of both conventional and advanced inorganic materials. The course is divided into the following two parts.

1. General inorganic materials chemistry and characterization of inorganic materials (e.g., glass chemistry, ceramic chemistry, metal chemistry, cement industry)

2. Chemistry of organic and inorganic nano-materials (e.g., thin films, nano-crystals and –particles, nanotubes, mesoporous materials, nano wires, etc.).

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- explain the fundamental principles of materials chemistry and how it relates to practical use
- explain different application areas of materials and ways to optimize the production process of materials

SKILLS

- prepare, synthesize and modify materials to reach target properties using theoretical and practical knowledge in materials chemistry
- design, synthesize, and produce nanostructured materials with given properties.
- characterize conventional materials and nano-materials

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Materials Chemistry
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	Materialekemi
Module code	K-KEM-K1-20
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	Yuanzheng Yue, Morten Mattrup Smedskjær

ORGANISATION

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

PROCESSING OF MATERIALS

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Materials Chemistry, Unit Operations, Modelling of heterogeneous processes

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The purpose is to introduce students to knowledge about materials manufacturing, post-treatment and the impact of the manufacture conditions on the structure and properties of materials. To introduce students to the analysis of large-scale industrial systems as well as methods and principles of environmental evaluation. To enable students in chemical engineering to collaborate with mechanical engineeres

The courses cover the introduction to e.g.:

- Application areas and development tendencies of plastics
- Chemical performances of materials
- Manufacturing technology of polymers
- Manufacturing technology of ceramics, cements and glasses
- Environmental analysis and management
- Industrial processes by visiting relevant industries

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- clarify the relationship among chemical composition, structure, properties and manufacturing

SKILLS

- conduct calculations of manufacture parameters and mechanical, physical and chemical properties
- apply materials manufacturing technologies and their engineering applications
- predict certain properties of materials based on their manufacturing parameters
- design manufacturing and post-treatment processes that can improve physical and chemical performances of materials
- carry out analysis of large-scale production processes

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Processing of Materials

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	Materialeforarbejdning
Module code	K-KEM-K1-19
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	Yuanzheng Yue, Morten Mattrup Smedskjær

ORGANISATION

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

PHYSICAL CHEMISTRY OF MATERIALS

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to knowledge obtained in Physical Chemistry and Analytical Chemistry

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

- Materials thermodynamics
- Chemical reaction kinetics and dynamics in materials
- Phase equilibrium in materials
- Order and disorder in solid
- Experimental methods for collecting thermodynamic and kinetic data of materials, e.g., viscometric and calorimetric methods
- General electrochemistry
- Analytical electrochemistry
- Application of electrochemistry in materials science
- Description of electron-ion conductor junction as electrochemical electrode
- Electrolytes and their properties, redox reactions, conductivity and determination
- Links between electrochemical potentials, thermodynamic parameters and concentrations
- Electrochemical methods: Impedance spectroscopy, voltammetry, and other analytical methods and its instrumentation
- Type of electrodes, electrode kinetics and electrode related effects
- Description of the different type of batteries, accumulators and fuel cells

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- understand and apply the link between electrochemistry and thermodynamics
- explain and utilize phase diagram of materials
- clarify mechanisms behind the phase transitions

SKILLS

- solve physical chemical problems in the fields of materials science and chemical processes
- collect and evaluate physical-chemical data by doing experiments such as the viscometric and calorimetric measurements
- apply different types of electron-ion conductor junction to understand their electrodynamic, thermodynamic and kinetic backgrounds
- apply different analytical methods based on electrochemical reactions
- apply the knowledge about chemistry, technology and economy of electrochemical processes in materials industry
- design the processes in batteries, accumulators and fuel cells

COMPETENCES

- design experimental routes for synthesis and treatment of new materials based on physical chemistry and electrochemical principles

TYPE OF INSTRUCTION

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

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Physical Chemistry of Materials
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	Materialers fysiske kemi
Module code	K-KEM-K1-21
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	Yuanzheng Yue, Jens Muff

ORGANISATION

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

INDUSTRIAL APPLICATION OF MACROMOLECULES

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Organic Chemistry, Physical Chemistry, Unit Operations

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To give the students an extensive knowledge and competences in molecular applications of natural and synthetic macromolecules, principles of their production and characterisation of polymers from molecular architecture to properties in relation to their industrial use.

Projects will deal with industrial problems related to the chemistry and application of macromolecules. Projects could cover macromolecule synthesis, modification and/or characterization as well as applications of macromolecules.

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Understand and account for the chemical properties of selected natural and synthetic macromolecules on molecular and macroscopic level
- Relate the chemical properties to the production of natural and synthetic macromolecules

SKILLS

- Select relevant techniques for the characterization of macromolecules and the study of their applications
- Synthesize, modify and characterize macromolecules with selected physical and chemical functionalities
- Apply separation principles for manufacturing, purification and characterization of macromolecules

COMPETENCES

- Analyze and solve problems related to industrial use of macromolecules, implementing knowledge of molecular ans macroscopic properties of macromolecules

EXTENT AND EXPECTED WORKLOAD

450 hours

EXAM

EXAMS

Name of exam	Industrial Application of Macromolecules
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	Industriel anvendelse af makromolekyler
Module code	K-KEM-K2-48
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	Donghong Yu

ORGANISATION

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

POLYMER CHEMISTRY

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Fundamental Organic Chemistry, Experimental Organic Chemistry

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To introduce the students majoring in chemistry or engineering a broad knowledge of polymer chemistry, such as principles of polymerization, polymer morphologies, polymer properties and so on. Meanwhile, some basic experimental techniques will be included in the lab course.

- Basic Principles: Molecular weight and polymer solutions
- Chemical Structure and Polymer Properties
- Polymer Morphology
- Step-reaction and ring opening polymerization and its lab course
- Free radical polymerization and its lab course
- Ionic Polymerization and its lab course
- Vinyl polymerization with complex coordination catalysts
- Characterization of polymers, Polyethers, -sulfides, and related polymers, Polyamides and related polymers. Heterocyclic polymers. Miscellaneous organic polymers, Inorganic and partially inorganic polymers. Natural Polymers.
- Recent developments in the frontier research for novel polymerization technique of new materials
- Basic experimental techniques will be included in laboratory exercises

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Account for different categories of polymers and their use in selected applications
- Characterize and categorize polymers
- Explain different polymerization and modificaion principles

SKILLS

- Design synthetic routes of functional monomers
- Perform polymerization under various conditions
- Modify polymer surfaces

COMPETENCES

- Characterize macromolecules: from chemical structure to molecular weights and distributions

TYPE OF INSTRUCTION

The program is based on a combination of academic, problem-oriented and interdisciplinary approaches and organized based on the following work and evaluation methods that combine skills and reflection:

- Lectures
- Workshop exercises (individually and in groups)
- Project work and exercises in labs
- Teacher feedback

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Polymer Chemistry
Type of exam	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	Polymerkemi
Module code	K-KEM-K2-19
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	Donghong Yu
Time allocation for external examiners	F

ORGANISATION

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

SUPRAMOLECULAR CHEMISTRY

2020/2021

PREREQUISITE/RECOMMENDED PREREQUISITE FOR PARTICIPATION IN THE MODULE

The module adds to the knowledge obtained in Organic Chemistry and Physical Chemistry

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

To introduce the students to supramolecular chemistry with focus on the physical chemistry of molecular interactions.

The course includes lectures and theoretical assignments, including

- The basic concepts of supramolecular chemistry
- Intermolecular forces and equilibrium considerations
- Thermodynamics and solvent effects
- Cation-and anion-specific ligands
- The supramolecular chemistry of biological systems
- The self-organization of molecules
- Self-assembly of macromolecules and polymers
- Experimental assessment and computational modelling of molecular interactions

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the principles of design of artificial ligands
- Relate similarities and differences of intra- and intermolecular forces of large molecules and aggregates
- Describe the thermodynamics of molecular interactions and account for the importance of solvents and additives on the strength of molecular interactions

SKILLS

- Apply theories and methods for analysis of molecular interactions
- Apply experimental and computational models in the study of molecular interactions

COMPETENCES

- Predict the molecular interactions of macromolecules and their implications on macroscopic behaviour

TYPE OF INSTRUCTION

The program is based on a combination of academic, problem-oriented and interdisciplinary approaches and organized based on the following work and evaluation methods that combine skills and reflection:

- Lectures
- Workshop exercises (individually and in groups)
- Project work and exercises in labs
- Teacher feedback

EXTENT AND EXPECTED WORKLOAD

150 timer

EXAM

EXAMS

Name of exam	Supramolecular Chemistry
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	Supramolekylær kemi
Module code	K-KEM-K2-22
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	Kim Lambertsen Larsen
Time allocation for external examiners	F

ORGANISATION

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

CARBOHYDRATE CHEMISTRY

2020/2021

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain and show in depth understanding of the structure and chemical properties of mono- and disaccharides as well as oligo- and polysaccharides
- Demonstrate knowledge of industrially important carbohydrates including hydrocolloids and their gelation properties
- Explain essential aspects of glycobiology
- Demonstrate in depth knowledge of the substrate specificity, regio- and anomeric selectivity as well as the function and catalytic mechanisms of carbohydrate active enzymes
- Demonstrate knowledge of the enzymology related to degradation and modification of plant based biomass including starch, cellulose and pectin

SKILLS

- Apply and suggest methods of carbohydrate synthesis and modifications to solve problems in industrial processes and applications
- Apply knowledge to evaluate structure in relation to functional properties of carbohydrates
- Carry out calculations on basic carbohydrate chemical concepts
- Perform theoretical analyses of chemical and physical methods in carbohydrate chemistry
- Suggest relevant chemical and enzyme catalysts for chemical reactions in carbohydrate chemistry

TYPE OF INSTRUCTION

- Lectures
- Theoretical exercises

EXTENT AND EXPECTED WORKLOAD

150 hours

EXAM

EXAMS

Name of exam	Carbohydrate Chemistry
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	Kulhydratkemi
Module code	K-BT-K2-9
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	Lars Haastrup Pedersen, Kim Lambertsen Larsen

ORGANISATION

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

PROJECT-ORIENTED STUDY IN AN EXTERNAL ORGANISATION

2020/2021

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 asses 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-Oriented Study in an External Organisation
Type of exam	Oral exam based on a project
ECTS	30
Assessment	Passed/Not Passed
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	Projektorienteret forløb i en ekstern organisation
Module code	K-KEM-K3-64
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	Kim Lambertsen Larsen
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

MASTER'S THESIS IN CHEMISTRY

2020/2021

CONTENT, PROGRESS AND PEDAGOGY OF THE MODULE

The master thesis can be conducted as a long master thesis. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS

LEARNING OBJECTIVES

KNOWLEDGE

Students who have passed the module should be able to

- Explain the scientific basis and scientific issues in chemistry and chemical engineering
- 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 asses 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 extend that corresponds to the thesis ECTS load

EXTENT AND EXPECTED WORKLOAD

900 hours

EXAM

EXAMS

Name of exam	Master's thesis in Chemistry

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 i kemi
Module code	K-KEM-K4-70
Module type	Project
Duration	1 semester
Semester	Spring
ECTS	30
Language of instruction	English
Location of the lecture	Campus Aalborg
Responsible for the module	Kim Lambertsen Larsen
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 CHEMISTRY

2020/2021

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 chemistry and chemical engineering
- 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 asses 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 extend that corresponds to the thesis ECTS load

EXTENT AND EXPECTED WORKLOAD

1800 hours

EXAM

EXAMS

Name of exam	Extended Master's Thesis in Chemistry
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

ADDITIONAL INFORMATION

The master thesis can be conducted as a long master thesis. If choosing to do a long master thesis, it has to include experimental work and has to be approved by the study board. The amount of experimental work must reflect the allotted ECTS.

FACTS ABOUT THE MODULE

Danish title	Langt kandidatspeciale i kemi
Module code	K-KEM-K3-65
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	Kim Lambertsen Larsen
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