

The Curriculum for Master of Science in Engineering (Chemistry)

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Academic Study Board of the Faculty of Engineering

Programme titles:

- Civilingeniør i kemi
- Master of Science in Engineering (Chemistry)

ECTS value: 120

Cities: Odense

Semesters: Autumn, Spring

Effective date: 01-09-2019

Applicable for students enrolled: 01-09-2018

Version: Approved - active

▼ § 1 - Description of the Programme

▼ § 1.1 - Applicable for students enrolled

01-09-2018

▼ § 1.2 - Aim of Programme, including any professional profile and specialisations

The purpose of the Master's programme is to

- extend students' professional knowledge and competences and increase their theoretical and methodical qualifications and level of independent work beyond the level attained at the bachelor level.
- provide students with the opportunity for in-depth academic study via the use of advanced elements of the disciplines and methods of the academic area, including training in scientific work and methodology to develop the student's competences to perform more specialised vocational functions and participate in scientific development work, and
- to qualify the student for further education, including PhD programmes, cf. the Danish Ministerial Order on the PhD Programme at Universities.

The Master's programme is an independent, complete educational programme, which extends the competence and insights acquired by the student during the bachelor programme.

The Master's programme aims to qualify the student to solve complex technical problems, design and implement complex technological products and systems in a social context. The contents of the Master's programme aim to provide the student with advanced professional competences within the chosen discipline of engineering and options for further specialisation.

The Master's programme is a full-time programme which is rated at 120 ECTS points, corresponding to the work of a full-time student for 22 months; for programmes starting in the spring semester, however, the duration is 24 months. The programme consists of constituent course elements related to the programme's specific professional competences and identity, elective courses and a Master's thesis.

Graduates with a bachelor degree that includes knowledge and competences similar to those acquired via a bachelor programme in technical science or engineering are entitled to use the Danish title of civilingeniør, cand.polyt., followed by the title of the specific programme. The English version of the title is Master of Science (MSc) in Engineering - followed by the title of the specific programme.

▼ § 1.3 - Didactic and pedagogical basis

The Engineering Education Model of the University of Southern Denmark

The Bachelor and Master programmes within the scientific area of engineering are research-based full-degree programmes which qualify the students to independently perform vocational functions on the basis of knowledge and methodical skills within their professional area.

All programmes at the University of Southern Denmark are structured in accordance with the university's leading principles for programmes. For engineering programmes, the principles are put into practice in the educational concept 'The Engineering Education Model of the University of Southern Denmark' or, in Danish, 'Den Syddanske Model for Ingeniøruddannelser', in the following referred to by its official abbreviation, DSMI.

By offering and implementing engineering programmes based on DSMI, the university ensures that engineers who have recently graduated from the university have a high professional standard, based on their mastery of a range of core skills which are in high demand on the labour market as well as in the research community.

A summary of the main points of the education concept is shown below - the complete description of DSMI is available in electronic form at the Faculty's website.

Content and Competences

- Professional skills are at the centre of the educational activities, and all engineering programmes at the University of Southern Denmark are therefore rooted in research and development environments of a high international standard. Research and development-based tuition is provided at all programme levels to accommodate both the needs of fundamental research and the requirements of practical applied science in close collaboration with business and industry.
- The programmes aim to foster modern, dyed-in-the-wool engineers. The learning and evaluation environment is therefore based on activating tuition and active learning that stimulates students to think and work in a problem-focused, project-oriented and cross-disciplinary manner. Assignments are accomplished both in teams and independently, and the focus is on innovation and reflection.
- The programmes are designed to mature students to perform assignments in an international context. During the course of their studies, students experience an environment characterised by international teachers and researchers and fellow students from many countries. The programme framework is organised in such a way as to provide good opportunities to study abroad and students enrolled on study programmes offered in Danish, will be required to attend courses conducted in English.
- Bachelors from the University of Southern Denmark will have worked in project groups across language and cultural differences.
- To enhance the graduates' labour market value immediately after graduation, the study programmes incorporate a high level of business relevance. Collaboration with private organisations guarantees that the students' professional competences are put to regular use in a concrete, contemporary context.
- In the course of their studies, Bachelors from the University of Southern Denmark will have performed project work in collaboration with external organisations.
- All students are encouraged to think and practise entrepreneurship via a learning and evaluation environment designed to stimulate student enterprise, creativity and responsibility.
- Corporate and business understanding are integral elements of the teaching of the Bachelor programmes at the University of Southern Denmark.
- Bachelors from the University of Southern Denmark have participated in interdisciplinary collaboration projects organised on the basis of a principle of 'experts in teams'. This means that the student collaborates with students from other engineering disciplines or other study programmes on the solution of a complex, interdisciplinary problem in close collaboration with an external organisation.

Structure and Learning Environment

In overall terms, the interplay between programme structure, skills acquisition and the learning and evaluation environment of the engineering programmes at the University of Southern Denmark may be described as follows:

- In the practical planning of the programme content, significant emphasis has been placed on ensuring that the forms of tuition and examination are both relevant and contemporary and support students' acquisition of core skills. In doing so, efforts are made to provide a highly dynamic study environment, where each individual student is expected to play an active role and assume responsibility for his or her own learning. The student will 'learn to learn' so that he or she will later be able to quickly embrace new and complex problems, just as the student will be encouraged throughout the programme to practise both independent and co-operative thinking.
- In order to strengthen both the professional contemplation and application of acquired skills as well as the individual's continued motivation for developing professionally and personally on a labour market characterised by rapid change, the educational concept deliberately seeks to integrate both specific technical and broader general engineering skills.
- With DSMI, the University of Southern Denmark offers an attractive and relevant study programme with good immediate work prospects. The keywords are activating tuition and active learning put into practice through project-oriented collaboration and problem-based learning. The purpose is to foster dyed-in-the-wool engineers with a high level of professional skills and the optimum basis for continued personal and professional development.

▼ § 2 - Enrollment

▼ § 2.1 - Legal claim for admission

Following degree has automatic claim for admission:

- BSc in Engineering (Chemistry and Biotechnology) - University of Southern Denmark

▼ § 2.2 - Qualifying degrees

The university has assessed that the below degrees qualify for admission. The list is not exhaustive:

- BEng in Chemical Engineering - University of Southern Denmark (provided module X-REA1 Design of Ideal Reactors is passed)
- BSc in Chemical Engineering - Aalborg University
- BSc in Engineering (Chemistry and Technology) - DTU (excluding the academic profile in Biotechnology and biorefining)
- BEng in Biotechnology (previously Bioprocess Technology) - Aarhus University

▼ § 2.3 - Entry requirements

2.4.1 To be considered for admission applicants must have a relevant bachelor of science degree, bachelor of science in engineering degree, or bachelor of engineering degree.

For a degree to be relevant it must be in the subject area of chemistry or biotechnology and cover the below criteria:

Subject knowledge and extent:

- Chemical engineering (10 ECTS)
- Reactor design (5 ECTS)
- Process and product design (5 ECTS)
- General and analytical chemistry, organic and inorganic chemistry (20 ECTS)
- Biotechnology, incl. Technical microbiology (10 ECTS)
- Laboratory practice (10 ECTS)
- Physical chemistry (5 ECTS)
- Mathematic and physical models (15 ECTS)
- Statistics (5 ECTS)

Admission with a foreign degree

Applicants with a bachelor degree from a foreign university who meet the above requirements are eligible for admission subject to an academic assessment and comparison of whether the applicant's academic qualifications correspond to those of qualifying Danish degree.

English language skills

Native English-speaking applicants or applicants with a bachelor degree taught exclusively in English do not have to provide evidence of their English language skills.

Non-native English speaking applicants from a country within the European Union or the EEA are not required to pass an IELTS or a TOEFL test, if they can demonstrate knowledge of English corresponding with English at B level, as a minimum.

Applicants from a country outside the European Union or the EEA, however, must pass an IELTS or a TOEFL test with a minimum result of 6.5 in the IELTS test or a minimum result of 88 in the TOEFL test. For further details, please refer to the University website.

2.3.2 As a rule, the applicant must apply for admission to a Master's programme at the University of Southern Denmark within five years after completing the Bachelor programme.

▼ § 2.4 - Supplementary courses

2.4.1 Should the applicant's degree fail to meet the entry requirements, it is possible to acquire the necessary skills through supplementary courses offered at the University of Southern Denmark. The extent of supplementary courses cannot exceed 5 ECTS points.

2.4.2 Supplementary courses have to be taken after admission to the programme. The supplementary activities must be passed within the examination period of the ordinary examination and students will have only two examination attempts.

▼ § 3 - Detailed programme specific information

▼ § 3 - Programme title and profiles

▼ Biotechnology and biorefining

Name

Biotechnology and biorefining

Competence profile

Learning objectives for the programmes are determined on the basis of the legislation and other regulation applicable to the area. Furthermore, emphasis is on the job functions that newly graduated engineers are expected to perform, and on the requirements regarding their personal and professional development after completion of the programmes.

A wide range of non-chemical engineering competences are required of newly graduated engineers, as described in the general provisions of the curriculum.

Graduates in chemical engineering are expected to have acquired the following:

Knowledge and understanding

- Specific technical knowledge within the academic profiles of the programme, rooted in advanced research with an international perspective.
- Ability to understand and describe scientific problems based on their own or others' research-based knowledge, and to formulate working hypotheses for scientific work.

Based on this knowledge, graduates must be able to solve complex technical problems and design and implement complex technological products and systems in a social context. Graduates in chemical engineering are expected to have the following:

Skills

- Ability to use the methods and tools associated with the specific disciplines of the programme's academic profiles in relation to the job profile for the programme as described in §1.
- Ability to communicate and discuss knowledge and results of scientific work with peers as well as others with different knowledge and expertise.
- Ability to develop, design, plan, modify, and optimise chemical and biotechnical process engineering plants and products based on chemical engineering principles, bioengineering principles, resource optimisation and environmental aspects.
- Ability to develop analytical methods for use in research and development.

Competences

- Ability to accomplish research and development tasks within the core technical competences of the programme: Biotechnology and biorefining, Functional materials, Chemical engineering or Eco-efficient Engineering.
- Ability to head the establishment and management of analytical laboratories and quality and risk management systems.
- Ability to head the development and implementation of quality and risk management systems.
- Ability to accomplish counselling and consultancy tasks within the core technical competences of the programme: Biotechnology and biorefining, Functional materials, Chemical engineering or Eco-efficient Engineering.
- Ability to initiate and contribute to technical and interdisciplinary collaboration, and to assume independent responsibility for own tasks.
- Ability to plan and pursue own professional and personal development.

The above competences are based partly on the general engineering competences acquired under the DSMI educational concept, and partly on an academic foundation of competences within a range of technical, scientific and social disciplines described in the following under subject columns.

Professional competence

Graduates in Master of Science in Engineering (Chemistry) are trained to perform a variety of important job functions. Typical fields of work include:

- Design, planning and commissioning of new processes, as well as development, optimisation and operation of existing plants, such as plants in chemical and biochemical production, environmental upgrading, food production, pharmaceutical production, etc.
- Research related to the development of products and processes where chemical or biotechnological aspects play a significant role, such as products and/or processes of chemical production, biorefining, energy conversion, food processing or handling of residual and waste products from industry and agriculture.
- Research related to the development and optimisation of processes of chemical synthesis and their associated catalysts.
- Research within the development of new materials with specific functional properties.
- Counselling and consultancy in private and public organisations working within the areas of chemistry, environment and biosystems.

Project-oriented course

0.0.1 On the third semester of the Master's programme, students may choose to follow the Curriculum with the prescribed number of elective courses or to perform the 'In-company Project' period rated at 15 ECTS points. However, there may be deviations in some programmes.

0.0.2 The contract for the 'In-company Project' must be approved by the Academic Study Board before the period begins.

0.0.3 Students undertaking the 'In-company Project' cannot write a thesis of 40 ECTS points.

0.0.4 Participation in the 'In-company Project' may not lead to an extension of the student's study period.

0.0.5 Detailed provisions regarding the 'In-Company Project' can be found in the course description.

Internationalisation

Student Exchange Abroad

0.1.1 The 6th Semester of the Master's programme has been adapted to give the programme an international aspect in the form of a student exchange abroad.

0.1.2 The 6th semester can be taken as a pre-approved student exchange at one of the partner universities that SDU has agreements with or as an individually arranged student exchange. It is a requirement that the academic content of the courses taken and passed whilst studying abroad corresponds to the academic content of the 6th semester of the applicable study programme. Alternatively, the 3rd semester can be taken by participation in the educational activities of the 6th semester of the applicable Master's programme.

Programme structure

Explanatory comments to programme structure

- 1) Students are encouraged to complete the 3rd semester at a foreign university. Please note that the courses must be approved by the Academic Study Board of the Faculty of Engineering.
- 2) If the master's thesis is experimental, the student may choose to spend 10 ECTS elective courses on the 3rd semester on the thesis work. The master's thesis will then be extended to 40 ECTS.

Semester 4	<u>Master's Thesis - 30 ECTS</u> <u>T210044101</u> (30 ects)				
30 ECTS					
Semester 3	<u>Methods in Science</u> <u>T210029101</u> (5 ects)	<u>Advanced Natural Product Chemistry</u> <u>T210041101</u> (10 ects)	(5 ects)	<u>▲</u> (5 ects)	(5 ects)
30 ECTS					
▲					
Semester 2	<u>Risk Management in Chemical and Biochemical Engineering</u> <u>T210036101</u> (5 ects)	<u>Technical Microbiology</u> <u>T210037101</u> (10 ects)	<u>Biorefinery Technology</u> <u>T210001101</u> (5 ects)	(5 ects)	(5 ects)
30 ECTS					
Semester 1	<u>Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers</u> <u>T210030101</u> (5 ects)	<u>Applied Physical Chemistry</u> <u>T210031101</u> (5 ects)	<u>Multivariate Data Analysis and Chemometrics</u> <u>T210032101</u> (5 ects)	<u>Business Economics and Management</u> <u>T220020101</u> (5 ects)	<u>Protein Technology</u> <u>T210033101</u> (5 ects)
30 ECTS					(5 ects)

□ = Elective

■ = Profile courses

3) Students may choose to spend 15 ECTS elective courses on the 3rd semester on an In-company Project. Similarly, a student on a 4+4 PhD programme may use 15 ECTS electives on 3rd semester together with the 30 ECTS on 4th semester on a 45 ECTS master thesis.

Cities

Odense

Language

English

▼ Functional materials

Name

Functional materials

Competence profile

Learning objectives for the programmes are determined on the basis of the legislation and other regulation applicable to the area. Furthermore, emphasis is on the job functions that newly graduated engineers are expected to perform, and on the requirements regarding their personal and professional development after completion of the programmes.

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Graduates in chemical engineering are expected to have acquired the following:

Knowledge and understanding

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- Ability to understand and describe scientific problems based on their own or others' research-based knowledge, and to formulate working hypotheses for scientific work.

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Skills

- Ability to use the methods and tools associated with the specific disciplines of the programme's academic profiles in relation to the job profile for the programme as described in §1.
- Ability to communicate and discuss knowledge and results of scientific work with peers as well as others with different knowledge and expertise.
- Ability to develop, design, plan, modify, and optimise chemical and biotechnical process engineering plants and products based on chemical engineering principles, bioengineering principles, resource optimisation and environmental aspects.
- Ability to develop analytical methods for use in research and development.

Competences

- Ability to accomplish research and development tasks within the core technical competences of the programme: Biotechnology and biorefining, Functional materials, Chemical engineering or Eco-efficient Engineering.
- Ability to head the establishment and management of analytical laboratories and quality and risk management systems.
- Ability to head the development and implementation of quality and risk management systems.
- Ability to accomplish counselling and consultancy tasks within the core technical competences of the programme: Biotechnology and biorefining, Functional materials, Chemical engineering or Eco-efficient Engineering.
- Ability to initiate and contribute to technical and interdisciplinary collaboration, and to assume independent responsibility for own tasks.
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- Research related to the development of products and processes where chemical or biotechnological aspects play a significant role, such as products and/or processes of chemical production, biorefining, energy conversion, food processing or handling of residual and waste products from industry and agriculture.
- Research related to the development and optimisation of processes of chemical synthesis and their associated catalysts.
- Research within the development of new materials with specific functional properties.
- Counselling and consultancy in private and public organisations working within the areas of chemistry, environment and biosystems.

Project-oriented course

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Programme structure

Explanatory comments to programme structure

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- 2) If the master's thesis is experimental, the student may choose to spend 10 ECTS elective courses on the 3rd semester on the thesis work. The master's thesis will then be extended to 40 ECTS.
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Cities

Odense

Language

English

Semester 4	<u>Master's Thesis - 30 ECTS</u> <u>T210044101</u> (30 ects)					
30 ECTS						
Semester 3	<u>Methods in Science</u> <u>T210029101</u> (5 ects)	<u>KE801: Inorganic Chemistry B</u> <u>N540011101</u> (5 ects)	<u>Materials Characterization II</u> <u>T210022101</u> (5 ects)	▲ (5 ects)	(5 ects)	(5 ects)
30 ECTS						
▲						
Semester 2	<u>Risk Management in Chemical and Biochemical Engineering</u> <u>T210036101</u> (5 ects)	<u>KE830: Characterization of Materials</u> <u>N540036101</u> (5 ects)	<u>Preparative Solid State Chemistry</u> <u>T210038101</u> (5 ects)	<u>Chemical Metallurgy</u> <u>T210004101</u> (5 ects)	(5 ects)	(5 ects)
30 ECTS						
Semester 1	<u>Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers</u> <u>T210030101</u> (5 ects)	<u>Applied Physical Chemistry</u> <u>T210031101</u> (5 ects)	<u>Multivariate Data Analysis and Chemometrics</u> <u>T210032101</u> (5 ects)	<u>Business Economics and Management</u> <u>T220020101</u> (5 ects)	<u>Basic Solid State Chemistry</u> <u>T210034101</u> (5 ects)	(5 ects)
30 ECTS						
	 = Elective = Profile courses					

▼ Chemical engineering

Name
Chemical engineering

Competence profile
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Graduates in chemical engineering are expected to have acquired the following:

Knowledge and understanding

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Skills

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Competences

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- Ability to head the development and implementation of quality and risk management systems.
- Ability to accomplish counselling and consultancy tasks within the core technical competences of the programme: Biotechnology and biorefining, Functional materials, Chemical engineering or Eco-efficient Engineering.
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Project-oriented course

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Programme structure

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Cities

Odense

Language

English

▼ Eco-efficient Engineering

Name
Eco-efficient Engineering

Competence profile
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30 ECTS						
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30 ECTS						
▲						
Semester 2	Risk Management in Chemical and Biochemical Engineering <u>T210036101</u> (5 erts)	Crystallization and Processing of Pharmaceuticals <u>T210002101</u> (5 erts)	Modelling and simulation of non-ideal reactors <u>T210039101</u> (5 erts)	Industrial Separation Technology <u>T210040101</u> (5 erts)	(5 erts)	(5 erts)
30 ECTS						
Semester 1	Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers <u>T210030101</u> (5 erts)	Applied Physical Chemistry <u>T210031101</u> (5 erts)	Multivariate Data Analysis and Chemometrics <u>T210032101</u> (5 erts)	Heterogeneous Catalysis <u>T210035101</u> (5 erts)	Industrial Membrane Technology <u>T210017101</u> (5 erts)	(5 erts)
30 ECTS						

= Elective

= Profile courses

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- Research within the development of new materials with specific functional properties.
- Counselling and consultancy in private and public organisations working within the areas of chemistry, environment and biosystems.

Project-oriented course

0.0.1 On the third semester of the Master's programme, students may choose to follow the Curriculum with the prescribed number of elective courses or to perform the 'In-company Project' period rated at 15 ECTS points. However, there may be deviations in some programmes.

0.0.2 The contract for the 'In-company Project' must be approved by the Academic Study Board before the period begins.

0.0.3 Students undertaking the 'In-company Project' cannot write a thesis of 40 ECTS points.

0.0.4 Participation in the 'In-company Project' may not lead to an extension of the student's study period.

0.0.5 Detailed provisions regarding the 'In-Company Project' can be found in the course description.

Internationalisation

Student Exchange Abroad

0.1.1 The 6th Semester of the Master's programme has been adapted to give the programme an international aspect in the form of a student exchange abroad.

0.1.2 The 6th semester can be taken as a pre-approved student exchange at one of the partner universities that SDU has agreements with or as an individually arranged student exchange. It is a requirement that the academic content of the courses taken and passed whilst studying abroad corresponds to the academic content of the 6th semester of the applicable study programme. Alternatively, the 3rd semester can be taken by participation in the educational activities of the 6th semester of the applicable Master's programme.

Programme structure

Explanatory comments to programme structure

- 1) Students are encouraged to complete the 3rd semester at a foreign university. Please note that the courses must be approved by the Academic Study Board of the Faculty of Engineering.
- 2) If the master's thesis is experimental, the student may choose to spend 10 ECTS elective courses on the 3rd semester on the thesis work. The master's thesis will then be extended to 40 ECTS.
- 3) Students may choose to spend 15 ECTS elective courses on 3rd semester on an In-company Project. Similarly, a student on a 4+4 PhD programme may use 15 ECTS electives on 3rd semester together with the 30 ECTS on 4th semester on a 45 ECTS master thesis.

Cities

Odense

Language

English

▼ § 3.1 - The structure of the programme

Subject columns

The technical competences of graduates in chemical engineering are attributable mainly to the following subject columns, which apply to both the bachelor and master levels of the programme. The bachelor level comprises the following eight subject columns:

- Chemical Engineering
- General, inorganic and organic chemistry
- Biotechnology
- Physical chemistry and materials
- Environment and project management
- Mathematic and physical models
- IT and experimental methodology
- Personal and learning competences

Semester 4	Master's Thesis - 30 ECTS T210044101 (30 erts)					
30 ECTS						
Semester 3	Methods in Science T210029101 (5 erts)	Business Economics and Management T220020101 (5 erts)	▲ (5 erts)	(5 erts)	(5 erts)	(5 erts)
30 ECTS						
▲						
Semester 2	Risk Management in Chemical and Biochemical Engineering T210036101 (5 erts)	Material Flow Analysis T220008101 (10 erts)		Waste Management - from Waste to Resources T220007101 (10 erts)		(5 erts)
30 ECTS						
Semester 1	Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers T210030101 (5 erts)	Applied Physical Chemistry T210031101 (5 erts)	Multivariate Data Analysis and Chemometrics T210032101 (5 erts)	System Analysis - Life Cycle Assessment T220005101 (10 erts)		(5 erts)
30 ECTS						
	 = Elective = Profile courses					

Academic profiles

The master level of the programme consists of constituent courses and academic profile courses. In combination, the constituent courses provide the common technical foundation for graduates in chemical engineering.

At the master level, the following four academic profiles are offered:

- Biotechnology and biorefining
- Functional materials
- Chemical engineering
- Eco-efficient Engineering

Common constituent courses

PURPOSE

The common constituent courses serve a two-fold purpose: The first is to provide the students with a set of advanced tools within numerical methods, chemometrics and scientific working methods in general. These tools will enable the students, based on physical/chemical data, to solve complex technical problems within their chosen academic profile, and to implement complex technical solution to the problem. The second is to provide the students with the required tools to implement solutions in a financially sound manner and with the least possible production and environmental risk for the surrounding society.

The objectives and content of the common constituent modules allow students with different academic backgrounds (bachelor degrees) to acquire the learning objectives of the master programme.

SUBJECTS

Numerical methods

- Numerical methods in linear algebra
- Iterative procedures for solving sets of algebraic equations
- Statistical methods for parameter estimation
- Data filtering and processing methods
- Numerical methods for solving ordinary and partial differential equation systems
- Fundamental structured programming exemplified by using MatLab

Chemometrics

- Multivariate data analysis
- Multiple linear regression (MLR)
- Principal component analysis (PCA)
- Partial least squares regression (PLSR)
- Data modelling and model validation
- Model optimisation and determination of significant parameters
- Experimental test designs

Physical chemistry

- Statistical thermodynamics
- Thermodynamics of mixtures
- Thermodynamic properties of macromolecules

Scientific methodology

- Working hypotheses for research assignments
- Scientific integrity and ethics
- Critical literature searches and source criticism
- Preparation of scientific reviews in article form
- Preparation of working documents: Method descriptions, testing and time schedules
- Use of GLP in connection with record-keeping and scientific documentation

Risk assessment

- Applicable Danish and EU legislation and standards relating to chemical and biochemical production and food production
- Methods for identifying hazards related to production facilities
- Creation of event trees for identified accident scenarios
- Development of fault/failure trees for production facilities and processes
- Calculation of probabilities for identified accident scenarios
- Emissions calculations
- HAZOP analyses of production facilities and laboratories
- Risk and safety management and its integration into the general enterprise management

Finances

- Business management and finances
- Creation of a business plan
- Methods for comparing and assessing investment proposals
- Methods for comparing and assessing funding options
- Activity, capacity and cash flow budgeting
- Analysis of profitability, earnings capacity, capital adjustment and solvency based on annual reports

Academic profile: Biotechnology and biorefining

PURPOSE

The academic profile must ensure that graduates in biotechnology and biorefining are able to develop and produce technological and system engineering solutions within the biotechnical and environmental area. More specifically, the competences may be used in connection with biotechnological and microbial production, in the processing of vegetable raw materials to make foods and feedstuffs, in pharmaceutical production, in energy production and in the accomplishment of environmental assignments. The academic profile aims for a high level of international research-based knowledge in protein technology and bio-refining technology, technical microbiology and natural product chemistry as well as enabling the graduate to apply and further develop the scientific methods within these areas.

In combination with the competences acquired at the bachelor level, the academic profile ensures that the graduate based on the profession's scientific foundation and practice is able to:

- Develop methods and processes for biotechnological and microbial production, including production of foods, natural medicines and bioenergy

- Develop processes and technologies for energy conversion to ensure optimum utilisation of various types of biomass
- Participate actively in research to develop new products and technologies within biotechnological production, energy conversion and environmental upgrading
- Develop and apply models for developing and managing process plants for biotechnological production, energy conversion and environmental upgrading
- Advise authorities and enterprises on the production of bioenergy and other technologies for environmental upgrading

STRUCTURE OF THE ACADEMIC PROFILE

In addition to the 30 ECTS worth of constituent courses, the academic profile Biotechnology and Biorefining consists of 30 ECTS in profile courses defining the academic profile, elective courses totalling 30 ECTS, and a 30 ECTS Master's Thesis.

If the student decides to complete a 40 ECTS Master's Thesis instead, work on the Thesis will start in the 3rd semester, replacing 10 ECTS worth of elective courses.

SUBJECTS

Protein chemistry

- Protein synthesis and protein folding
- Links between the structure and function of proteins
- Recombinant DNA technology and analysis of genes and proteins
- Chromatographic and biochemical methods for the purification, identification, quantification and characterization of proteins
- Industrial enzymes and pharmaceutical proteins

Technical microbiology

- Mathematical models for microbial growth and product formation
- Batch, fed-batch, continuous, multi-stage, recirculating and immobilised systems
- Metabolism and product formation
- Purification of microbial products
- Regulatory mechanisms and genetic modification
- Reactor engineering: Design, agitation and aeration, sterilisation, measurement and regulation
- Fermentation on the laboratory scale: Establishment of fermentors with data collection and control, experimental measurements for characterisation of growth and product formation, calculations using computer-based models.

Biorefining technology

- Theoretical characterisation of plant and biomass material
- Selection and evaluation of process technologies for biorefining
- Simulation of biorefining processes, including the development of mass and energy balances and kinetic considerations
- Identification of potentially high-value products from and/or energy potential for different biomass
- Assessment and evaluation of the financial aspects of selected biorefining processes

Advanced natural product chemistry

- Biosynthesis of secondary metabolites from plants, micro-organisms and aquatic organisms.
- Bioactivity of secondary metabolites
- Cell-based and biochemical assays
- Isolation, characterisation and quantification of secondary metabolites by means of chromatographic and spectroscopic techniques.

PROGRESSION

The academic progression in the programme is ensured via the constituent courses and profile courses.

The biotechnical progression in the academic profile consists mainly of the courses in protein technology, technical microbiology, advanced natural product chemistry and biorefining technology. The course in protein technology, together with the biotechnology competences acquired at the bachelor level, provides the basis for the courses in technical microbiology and advanced natural product chemistry. The course in advanced natural product chemistry is also supported by the bachelor level courses in general and organic chemistry. The course in biorefining technology is also supported by the competences in separation processes and biotechnology acquired at the bachelor level.

The constituent courses in numerical methods and multivariate data analysis provide the basis for modelling, analysis and calculation assignments in the courses in technical microbiology and biorefining technology as well as in the Master's Thesis.

Together with the courses in scientific working methods and finances, the biotechnical progression forms the basis for the final Master's Thesis.

If completion of the Thesis includes practical laboratory work, it will often be appropriate for the student to use the opportunity to write a 40 ECTS points thesis.

During the third semester it is possible to choose an in-company project (15 ECTS) or to complete the entire semester at a foreign university.

Academic profile: Functional materials

PURPOSE

The academic profile aims to ensure that graduates in engineering who have completed a programme in materials chemistry are able to develop and deliver solutions to complex problems of material technology within the chemical, petrochemical, energy technology and materials technology industries, as well as to implement these solutions. The academic profile aims to provide a high level of international research-based knowledge within the area of classic solid state chemistry and metallurgy, technical electrochemistry and energy conversion, as well as enabling the graduate to apply and further develop the scientific methods within these areas.

In combination with the competences acquired at the bachelor level, the academic profile ensures that with a basis in the profession's scientific foundation and practice, the Master of Science in Chemical Engineering is able to:

- Design, synthesise and characterise materials with specific catalytic, electrocatalytic, ion-conducting, dielectric, magnetic or optical properties.
- Make optimum selections of materials, based on chemical, financial and technological criteria.
- Develop components or devices such as sensors or catalytic reactors (including fuel cells and batteries) that use these materials.
- Design and implement relevant characterisation and testing methods for these components and devices.
- Contribute to develop models for and make model calculations of these devices and, if required, provide the necessary input parameters.
- Contribute to integrating the devices in large technical or chemical engineering plants, and manage operation of these.

STRUCTURE OF THE ACADEMIC PROFILE

In addition to the 30 ECTS worth of constituent courses, the academic profile Functional materials consists of 30 ECTS in profile courses defining the academic profile, elective courses totalling 30 ECTS and a 30 ECTS Master's Thesis. If the student decides to complete a 40 ECTS Master's Thesis instead, work on the Thesis will start in the 3rd semester, replacing 10 ECTS worth of elective courses.

SUBJECTS

Material chemistry

- Selected technologically important structural types with electric, dielectric, magnetic or optical properties
- Selected synthesis methods for the above compounds
- Phase equilibrium
- Defects chemistry

Chemical metallurgy

- Financially significant minerals and ores
- Chemical aspects of extractive recovery of Cu, Ni, Zn, Pb, Sn, Al and Fe as well as a metal of choice for independent studies

Characterisation of solids

- Powder X-ray diffraction
- Electron microscopy
- UV-VIS absorption spectroscopy
- Electrochemical methods
- Thermal characterisation
- Particle size distribution
- Solid-state NMR
- Element analysis by ICP
- Particle size

PROGRESSION

The academic progression in the programme is ensured via the constituent courses and profile courses.

Together with the profile courses in Inorganic chemistry and Materials chemistry, the constituent course in Physical chemistry provides a solid chemical engineering foundation for the more application-oriented subjects in Synthetic solid state chemistry and Materials characterisation. Together with the introductory courses in chemistry, the bachelor level courses in materials science provide the required qualifications for understanding the specialised chemistry subjects of the academic profile. The common constituent courses' content of mathematics, statistics, risk assessment and finance, combined with the bachelor level's chemical engineering courses, provide the students with the required qualifications to develop, model and implement products and processes involving solids with specific chemical and physical properties. Along with the academic profile's other theoretical and practical courses, the constituent course in Scientific working methods provides the basis for the final Master's Thesis.

If completion of the Thesis includes practical laboratory work, it will often be appropriate for the student to use the opportunity to write a 40 ECTS points Thesis.

Academic profile: Chemical Engineering

PURPOSE

The academic profile aims to ensure that graduates in engineering who have completed a chemical engineering programme are able to develop and deliver technical solutions to complex production problems within the chemical, pharmaceutical, petrochemical and biochemical industries, as well as to implement these solutions. The academic profile aims to provide a high international level of research-based knowledge within the area of classic separation methods, membrane technology and reactor engineering, as well as enabling the graduate to apply and further develop the scientific methods within these areas.

In combination with the competences acquired at the bachelor level, the academic profile ensures that with a basis in the profession's scientific foundation and practice, the Master of Science in Chemical Engineering is able to:

- design new plants and sub-plants for use in the chemical, biochemical and pharmaceutical industries.
- develop new processing equipment for the chemical, biochemical and pharmaceutical industries.
- manage the operation of production facilities within the chemical, biochemical and pharmaceutical industries.
- participate actively in research and development within the chemical, biochemical and pharmaceutical industries.
- develop new models based on chemical, biochemical, physical and mathematical principles for the design of new processes and processing equipment.

STRUCTURE OF THE ACADEMIC PROFILE

In addition to the 30 ECTS worth of constituent courses, the academic profile Chemical engineering consists of 25 ECTS in profile courses defining the academic profile, elective courses totalling 35 ECTS and a 30 ECTS Master's Thesis. If the student decides to complete a 40 ECTS Master's Thesis instead, work on the Thesis will start in the 3rd semester, replacing 10 ECTS worth of elective courses.

SUBJECTS

Separation engineering

- Selection and characterisation of membranes for separating fluids, gasses and micro-particles
- Description, modelling and simulation of mass and energy transport across membranes
- Design, modelling and simulation of membrane modules
- Design, modelling and simulation of entire membrane plants
- Modelling, simulation and design of plants for non-stationary separation methods, e.g. chromatography, adsorption and ion exchange
- Modelling, simulation and design of multi-component distillation plants
- Optimisation and simulation of multi-column distillation plants

Catalysis

- Heterogeneous catalysis
- Methods for examining the surface properties of solids
- Methods for describing reaction mechanisms and reaction kinetics
- Methods for estimating reaction rates
- Experimental methods for determining reaction rates
- The impact of internal and external mass and heat transport on reaction rates in heterogeneous catalysis.

Crystallisation

- Principles and mechanisms for crystallisation of pharmaceutical products
- Thermal dynamics of solid state phases (amorphous, polymorphous, salts) for pharmaceutical products
- Principles and mechanisms for phase transformation between solid state phases
- Methods of analysis for identifying pure solids and mixtures of solids

Reactor engineering

- Methods for developing models for quantitative description of conversion and heat generation in chemical and biochemical reactors
- Modelling of fixed and fluid bed reactors
- Modelling of multi-phase reactors
- Modelling of membrane reactors
- Designing and solving reactor models in MatLab.

PROGRESSION

The academic progression in the programme is ensured via the constituent courses and profile courses.

The constituent courses in numerical methods and modelling and statistics provide the mathematical basis for the profile courses in reactor science and separation processes. Similarly, the courses in Physical chemistry and Heterogeneous catalysis combined with the competences acquired at the bachelor level provide the basis for the course in Reactor science. In addition to these technical elements, the course in Separation processes is supported by the course in Membrane technology and Crystallisation. This academic chemical engineering progression, combined with the constituent courses in Scientific working methods, Finances and Risk assessment, form the basis for the Master's Thesis.

If completion of the Thesis includes practical laboratory work, it will often be appropriate for the student to use the opportunity to write a 40 ECTS points Thesis.

During the third semester it is possible to choose an in-company project (15 ECTS) or to complete the entire semester at a foreign university.

Academic profile: Eco-efficient Engineering

PURPOSE

The academic profile aims to ensure that graduates in eco-efficient technology are able to develop solutions to issues related to chemical engineering and environmental engineering within the chemical, pharmaceutical and biochemical industries, as well as contribute to the planning, problem solving and counselling in the public sector. The academic profile aims to provide a high international level of research-based knowledge within the area of systems and material flow analysis, waste management, as well as enabling the graduate to apply and further develop the scientific methods within these areas.

Combined with the competences acquired as bachelor students the academic profile aims to ensure that graduates, based on the profession's scientific foundations and practice, can:

- Analyse and assess environmental problems and apply research based methods to develop solutions.
- Develop processes and technologies for chemical engineering and biotechnological production with focus on environmental and energy efficiency, incl. water treatment technologies.
- Apply systems analysis, including plan and carry out an LCA
- Develop and apply decision models for waste management and recycling.

STRUCTURE OF THE ACADEMIC PROFILE

In addition to the 30 ECTS worth of constituent courses, the academic profile Eco-efficient Engineering consists of 30 ECTS profile courses, which define the academic profile, 30 ECTS elective courses and a 30 ECTS Master's Thesis.

If the student decides to complete a 40 ECTS Master's Thesis instead, work on the Thesis will start in the 3rd semester, replacing 10 ECTS worth of elective courses.

SUBJECTS

Systems analysis

- Life cycle analysis (LCA) of products and systems using advanced methods
- Setting objectives and scope and locate data for systems analysis
- Identifying future energy supply scenarios

Material flow analysis

- Socio-economic metabolism related to basic human activities
- Steady state and dynamic material flow analysis
- Analysis, evaluation and design of the anthropogenic metabolism on various scales

Waste

- Systems and hierarchy for waste management
- Innovative methods for waste treatment
- Application of LCA for analysis of waste management and treatment

PROGRESSION

The academic progression in the programme is ensured via the constituent courses and the profile courses.

The constituent courses in numerical methods and multivariate data analysis enable graduates to solve mathematical problems and analyse complex data. The profile courses in systems analysis and waste management allow graduates to, based on the master and bachelor courses in chemistry and chemical engineering, solve problems in environmental technology and to carry out life cycle analyses on systems and products. The course in Material flow analysis contributes to develop a systematic approach in solving complex problems. The academic progression in environmental technology and systems analysis, together with the constituent courses in scientific methods, risk analysis and economy, form the basis for the Master's Thesis.

If completion of the Thesis includes practical laboratory work, it will often be appropriate for the student to use the opportunity to write a 40 ECTS points Thesis.

During the third semester it is possible to choose an in-company project (15 ECTS) or to complete the entire semester at a foreign university.

▼ § 3.1.1 - Connection between entry requirements and the first year

The master programme in Chemistry builds on the knowledge gained in the bachelor of science or bachelor of engineering programme. The application-oriented background from the previous education is expanded with an increased theoretical foundation. Scientific methods are being used to formulate, analyze and solve scientific issues in chemistry.

▼ § 4 - Course Descriptions

▼ § 4 - Compulsory courses

Profile divided course descriptions

Biotechnology and biorefining

Functional materials

Chemical engineering

Eco-efficient Engineering

Course descriptions in the curriculum

▼ Basic Solid State Chemistry

▼ Course ID

T210034101

▼ Course Title

Basic Solid State Chemistry

▼ ECTS value

5

▼ Internal Course Code

XC-MS1

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Industrial Membrane Technology

▼ Course ID

T210017101

▼ Course Title

Industrial Membrane Technology

▼ ECTS value

5

▼ Internal Course Code

XC-MEM1

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers

▼ Course ID

T210030101

▼ Course Title

Advanced Numerical Methods and Modelling for Chemical and Biochemical Engineers

▼ ECTS value

5

▼ Internal Course Code

XC-ANUM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Applied Physical Chemistry

▼ Course ID

T210031101

▼ Course Title

Applied Physical Chemistry

▼ ECTS value

5

▼ Internal Course Code

XC-FYK1

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Business Economics and Management

▼ Course ID

T220020101

▼ **Course Title**

Business Economics and Management

▼ **ECTS value**

5

▼ **Internal Course Code**

EM-BEM

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Multivariate Data Analysis and Chemometrics**

▼ **Course ID**

T210032101

▼ **Course Title**

Multivariate Data Analysis and Chemometrics

▼ **ECTS value**

5

▼ **Internal Course Code**

K-MDA

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **System Analysis - Life Cycle Assessment**

▼ **Course ID**

T220005101

▼ **Course Title**

System Analysis - Life Cycle Assessment

▼ **ECTS value**

10

▼ **Internal Course Code**

EM-LCA1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Heterogeneous Catalysis**

▼ **Course ID**

T210035101

▼ **Course Title**

Heterogeneous Catalysis

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-CAT1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Protein Technology**

▼ **Course ID**

T210033101

▼ **Course Title**

Protein Technology

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-PRO1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Preparative Solid State Chemistry**

▼ **Course ID**

T210038101

▼ **Course Title**

Preparative Solid State Chemistry

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-MSC2

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **KE830: Karakterisering af materialer**

▼ **STADS ID (UVA)**

N540036101

▼ **Course title**

KE830: Characterization of Materials

▼ **ECTS value**

5

▼ **Internal Course Code**

KE830

▼ **Responsible study board**

Study Board of Science

▼ **Chemical Metallurgy**

▼ **Course ID**

T210004101

▼ **Course Title**

Chemical Metallurgy

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-MSM3

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Technical Microbiology**

▼ **Course ID**

T210037101

▼ **Course Title**

Technical Microbiology

▼ **ECTS value**

10

▼ **Internal Course Code**

XC-TM1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Risk Management in Chemical and Biochemical Engineering**

▼ **Course ID**

T210036101

▼ **Course Title**

Risk Management in Chemical and Biochemical Engineering

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-RIS1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Biorefinery Technology**

▼ **Course ID**

T210001101

▼ **Course Title**

Biorefinery Technology

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-BRT

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Modelling and simulation of non-ideal reactors**

▼ **Course ID**

T210039101

▼ **Course Title**

Modelling and simulation of non-ideal reactors

▼ **ECTS value**

5

▼ **Internal Course Code**

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Industrial Separation Technology**

▼ **Course ID**

T210040101

▼ **Course Title**

Industrial Separation Technology

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-SEP2

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Crystallization and Processing of Pharmaceuticals**

▼ **Course ID**

T210002101

▼ **Course Title**

Crystallization and Processing of Pharmaceuticals

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-CRY1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Waste Management - from Waste to Resources**

▼ **Course ID**

T220007101

▼ **Course Title**

Waste Management - from Waste to Resources

▼ **ECTS value**

10

▼ **Internal Course Code**

EM-WAM1

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Material Flow Analysis**

▼ **Course ID**

T220008101

▼ **Course Title**

Material Flow Analysis

▼ **ECTS value**

10

▼ **Internal Course Code**

EM-MFA

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Methods in Science**

▼ **Course ID**

T210029101

▼ **Course Title**

Methods in Science

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-VIM

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Advanced Natural Product Chemistry**

▼ **Course ID**

T210041101

▼ **Course Title**

Advanced Natural Product Chemistry

▼ **ECTS value**

10

▼ **Internal Course Code**

XC-BIO3

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Master's Thesis - 40 ECTS**

▼ **Course ID**

T210047101

▼ **Course Title**

Master's Thesis - 40 ECTS

▼ **ECTS value**

40

▼ **Internal Course Code**

XC-SP40

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **In-company Project**

▼ **Course ID**

T210043101

▼ **Course Title**

In-company Project

▼ **ECTS value**

15

▼ **Internal Course Code**

X-VF

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **KE801: Uorganisk kemi B**

▼ **STADS ID (UVA)**

N540011101

▼ **Course title**

KE801: Inorganic Chemistry B

▼ **ECTS value**

5

▼ **Internal Course Code**

KE801

▼ **Responsible study board**

Study Board of Science

▼ **Materials Characterization II**

▼ **Course ID**

T210022101

▼ **Course Title**

Materials Characterization II

▼ **ECTS value**

5

▼ **Internal Course Code**

XC-MS4

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Master's Thesis - 30 ECTS**

▼ **Course ID**

T210044101

▼ **Course Title**

Master's Thesis - 30 ECTS

▼ **ECTS value**

30

▼ **Internal Course Code**

XC-SP30

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **§ 5 - Examination provisions**

▼ **§ 5.1 - Programme passing requirements**

5.1.1 An examination is considered to be passed and a course is considered to be approved when the student has attained the assessment 'passed', 'approved' or the grade of 2 or higher.

5.1.2 An examination examination is either graded in accordance with the 7-point grading scale, or is assessed as 'Passed / Failed' (Bestået / ikke-bestået) or 'Approved / Non-approved' (Godkendt / Ikke-godkendt). The Master's thesis is always graded in accordance with the 7-point grading scale.

5.1.3 The 'Passed/failed' and 'approved/non-approved' forms of assessment can account for no more than one-third of the programme's total number of ECTS points. This does not apply to credit transfers from previous examinations.

5.1.4 When the basis for assessing a study activity is 'tuition attendance' - this assessment is made by a teacher based on criteria students are informed of at the beginning of the course. The condition for awarding the assessment 'approved' is that the student must have achieved the objectives established for the course to such an extent that it would result in the assessment 'Approved' or a grade of 02 at minimum at an examination.

5.1.5 The basis for assessment in connection with tuition attendance may be one or more of the following:

- attendance at lectures and exercises
- completed laboratory work, portfolios and reports and completed assignments or other practical or theoretical work
- participation in guiding internal examinations
- participation in seminars.

5.1.6 The student must be notified whether or not his/her participation in the course activities has been approved before the end of the semester.

5.1.7 The study programme has been successfully completed when the student has attained:

- the grade of 2 or higher in all examinations graded in accordance with the 7-point grading scale
- the assessment 'passed' in all examinations assessed as either 'Passed' or 'Failed'
- the assessment 'Approved' in all examinations assessed as either 'Approved' or 'Non-approved'.

▼ § 5.2 - Special exams

Examinations Abroad

5.2.1 The Academic Study Board can grant dispensation to take examinations at a Danish representation or other site abroad, when there are exceptional circumstances that prevent the student from taking the examination(s) in Denmark. The examination can be set up as a video conference or by using other technical aids.

5.2.2 The student is responsible for all practical arrangements related to the examination.

5.2.3 All costs linked to holding the examination, cancellation of the examination due to illness (if applicable) and problems with connecting to the system, etc., for which SDU cannot be held liable, shall be paid by the student.

▼ § 5.2.1 - Start of study exam

5.2.1.1 Students enrolled on a Master's programme starting from the study start in February 2020 must take and pass a study start examination in order to continue on their programme. The purpose of the study start examination is to verify that students have commenced their programme.

5.2.1.2 The content and evaluation form of the study start test are described in the course description.

▼ § 5.3 - Spelling and writing skills

5.3.1 The assessment of the Master's thesis and other major written assignments must also, in addition to the technical content, address the student's spelling and language proficiency, regardless of the language in which the project is written.

5.3.2 The projects must be written in a concise and easily understandable language. The wording of the written presentations or the Master's thesis may have a positive or negative impact on the overall grade. Additional information on the language requirements is provided in the course descriptions.

5.3.3 The Academic Study Board may grant dispensation from the above spelling and wording requirements for students who can document that they suffer from a relevant, specific impairment (such as dyslexia).

▼ § 5.4 - Internal or external exams

5.4.1 Examinations are either external or internal. External examinations are assessed by the teacher(s) and one or more external examiners appointed by the Danish Agency for Science and Higher Education. Internal examinations are assessed by one or more teachers appointed by the university.

5.4.2 At least one-third of the programme's total number of ECTS points must be documented by external assessment. This includes the most important components of the programme, including the Master's thesis, but does not apply to credits transferred from other examinations.

▼ § 5.5 - Exam language

5.5.1 For study programmes offered in Danish, examinations will be conducted in Danish, unless part of the purpose of an examination is to document the student's foreign language proficiency. Examinations may be taken in Swedish or Norwegian instead of Danish, unless the purpose of the examination is to document the student's proficiency in Danish.

5.5.2 For study programmes or individual courses offered in English or other foreign language, examinations will be conducted in that language, unless part of the purpose of an examination is to document the student's proficiency in a different language. The same applies if a course has been taught in a foreign language. The Academic Study Board may grant dispensation from this rule.

5.5.3 In addition, circumstances permitting, the Academic Study Board may allow students wishing to take an examination in a foreign language, to do so. This, however, does not apply to examinations which require presentations to be given in Danish. The Academic Study Board may grant dispensation from this rule.

▼ § 5.6 - Forms of assessment

Purpose

5.7.1 The purpose of the examination is to assess whether and to which extent the student's qualifications match the learning objectives laid down in the Danish Ministerial Order on Bachelor and Master's (Candidatus) Programmes at Universities (the University Programme Order, Uddannelsesbekendtgørelsen), the Curriculum and the respective semester planning. The final examination provides the basis for issuing a diploma.

Examination forms

5.7.2 The programme includes a variety of examination forms to reflect the content and working methods of the tuition provided. The examination forms must accommodate the purpose of the individual course/course element, and may include:

- oral, written and practical examinations, project-oriented courses and combinations of the different forms of examination.

5.7.3 Any requirements on mandatory attendance or completion of written assignments, etc., during the study period which must be met in order for the student to be allowed to take an examination at the end of the course or course element are specified in the relevant course description.

5.7.4 All written campus-based examinations must be completed using a computer in accordance with the University of Southern Denmark's rule set for written examinations.

Assessment of Group Assignments

5.7.5 Projects are normally completed by groups of students. As a rule, these groups consist of six students. The Head of Programme may allow a group to consist of fewer or more students, based on an individual professional assessment. However, these provisions do not apply to the Master's thesis.

Sound and/or Image Recordings

5.7.6 The use of sound and image recordings during an examination is not allowed, unless such recordings are part of the examination procedure. If so, such recordings will be made by the university.

Examination Aids

5.7.7 The use of examination aids is specified in the individual semester plans.

▼ § 5.7 - Irregularities at exams

Disciplinary Action

5.8.1 Disciplinary action will be taken against a student who:

- unlawfully seeks or offers help with the completion of an examination paper, or
- brings non-allowed examination aids to an examination, or
- passes the work of another off as his/her own, or
- cites his/her own previously evaluated work without adding proper references, or
- is otherwise found guilty of cheating at the examination

cf. Rules regarding Disciplinary Measures for Students at the University of Southern Denmark.

5.8.2 Disciplinary action may also be taken against a student who acts in an interruptive manner during an examination.

Errors and Defects in an Examination

5.8.3 If a student discovers errors or defects in an examination, the student must contact the evaluators (for oral examinations) or the invigilators (for written examinations).

5.8.4 In case of aggravated errors or defects, or where this must be considered the most appropriate way to remedy the error or defect, the university may cancel the examination and make arrangements to conduct an extraordinary examination. Re-examination due to cancellation of the original examination may result in a lower mark.

5.8.5 The university may offer an extraordinary examination in connection with other errors or defects. The offer must apply to all students whose examinations are affected by the error or defect in question. A student who has taken the extraordinary examination may choose to retain the original assessment given.

▼ § 5.8 - Special examination conditions

5.9.1 Students with physical or mental impairments, a native language other than Danish or similar difficulties may apply to the Academic Study Board to be granted special examination conditions. The Academic Study Board will accommodate the request if this is found necessary in order to place such students on an equal footing with others during the examination. It is a condition that the alteration does not imply a change of the level of examination.

5.9.2 The application deadline for special examination conditions is 1 September for the winter examination term and 1 February for the summer examination term. In case of chronic impairments, the Academic Study Board may approve special examination conditions for the rest of the Master's programme.

5.9.3 The diploma will not include any information on special examination conditions.

▼ § 5.9 - Ordinary exams

5.10.1 Ordinary examinations will be held immediately at the end of the course leading up to the examination.

5.10.2 The student must be prepared to sit examinations throughout the examination period, but not in July. This also applies in situations when a planned examination is moved due to *force majeure*.

▼ § 5.10 - Reexams

Reexams and Make-up Exams

5.11.1 Students who did not pass the ordinary examination and students who have been prevented from attending the examination due to illness or other unforeseen circumstances, can register for a re-examination.

5.11.2 Make-up examinations are held at the same time as re-examinations.

5.11.3 Re-examinations will be held during the same examination term as the ordinary examination. The examination period for the autumn semester is 2 January - 28/29 February and for the spring semester 1 June - 31 August. In some cases, exams can also be held in December and May. Examinations are not held in July, unless warranted by special circumstances.

5.11.4 The student shall register for a re-examination within eight days after publication of the results of the ordinary examination. Students who have been absent from the ordinary examination, shall register for a re-examination within 8 days from the date the ordinary examination was held.

5.11.5 Students cannot withdraw from registration for re-examination and it will count as a failed examination attempt if the student does not take the examination unless the Academic Study Board has granted dispensation from this rule due to extraordinary circumstances.

5.11.6 Re-examination may take a different form of examination or assessment than the ordinary examination. Students will be notified of any change in the form of examination or assessment before the examination. The form of examination for the Master Thesis, however, cannot be changed.

Consequences for not having passed an exam by 2nd attempt

5.11.7 If the student does not attend or pass the ordinary examination and the relevant re-exam, the student can register to take the examination the next time the ordinary examination is held. The student must comply with the registration period.

5.11.8 If the student failed an examination on the second attempt, the student must participate in the course and re-submit all assignments prior to the next ordinary examination, unless the course is no longer offered.

▼ § 5.11 - Exam attempts

5.12.1 A passed examination cannot be retaken.

5.12.2 A student has three attempts to pass an examination. If warranted by extraordinary circumstances, the Academic Study Board may grant additional examination attempts. The question of academic ability cannot be considered in assessing whether or not such extraordinary circumstances exist. Supplementary courses in connection with Master's programmes constitute an exception to this rule as the student has only two (2) examination attempts where supplementary activities are concerned.

5.12.3 A student whose tuition attendance is to be assessed for the second time may demand an examination instead. Tuition attendance associated with practical exercises, however, cannot be replaced by an examination.

▼ § 5.12 - Requirements for exams

Failure to Meet Examination Requirements

5.13.1 If students do not meet examination requirements, this will be regarded as one examination attempt unless the Academic Study Board grants dispensation from this rule due to extraordinary circumstances.

Absence from Examination Activities

5.13.2 If the student is absent from an examination, this leads to the student losing an examination attempt. If the evaluation a course is based on an overall evaluation of two or more examination activities, absence from one or more activities leads to the student being registered as absent from the entire examination. The Academic Study Board can grant dispensation from this rule, if there are extraordinary circumstances.

Participation in Group Assignments

5.13.2 The student is required to participate actively in group assignments. For this reason, the work will be supervised by the academic supervisor. If a student fails to meet the requirement on active participation, the relevant programme co-ordinator, following the academic supervisor's or the Head of Programme's recommendation, may decide that the student be excluded from the group. The applicable criteria for assessing whether the group assignment work has been performed satisfactorily will be laid down for the assignment at the start of the supervision

▼ § 5.13 - Group exams

5.15.1 Examinations are arranged as individual or group examinations.

5.15.2 The basis for assessment is always individual, and individual grades are given.

5.15.3 The course description specifies the maximum number of students who can participate in a group examination. It will not be possible to choose an individual examination instead of a group examination, the examination in Master's Thesis being an exception from this rule.

▼ § 6 - Credit transfer

▼ § 6.1 - Transfer of credit

6.1 The student must apply for credit transfer for course elements passed from all previous study programmes at Master's level immediately after enrolling in the programme in question at the Faculty of Engineering.

▼ § 6.2 - Transfer of credit

6.2.1 Students who wish to take course elements from a different course or at another institute of higher education in Denmark or abroad as part of their study programme can apply to the Academic Study Board for pre-approved credit transfers for planned course elements.

6.2.2. Students who wish to take on student exchange abroad for at least a semester, must have passed courses corresponding to at least 30 ECTS points on the respective Master's study programme. Furthermore, the student exchange may not lead to an extension of the student's study period.

6.2.3 The Academic Study Board must have pre-approved credits for courses offered in the autumn semester and which form part of the student's pool of electives no later than at the Study Board's meeting in August. Likewise the Academic Study Board must have pre-approved credits for courses offered in the spring semester and which form part of the student's pool of electives no later than at the Study Board's meeting in January.

6.2.4 The Academic Study Board must have pre-approved credits for courses offered in the autumn semester and which are to replace constituent courses in the curriculum no later than at the Study Board's meeting in April. Likewise, The Academic Study Board must have preapproved credit transfer for courses offered in the spring semester and which are to replace constituent subjects in the curriculum no later than at the Study Board's meeting in November.

6.2.5 A decision of pre-approval of credit transfer puts the student under the obligation of sending documentation for passed study activities to the Academic Study Board.

6.2.6 Students must re-apply for pre-approved credit transfers if they cannot attend one or more of the course elements for which they have obtained pre-approved credit transfers.

▼ § 6.3 - Credit

6.3.1 Based on an academic assessment, the Academic Study Board may allow credit transfers for courses passed in a previous higher education programme in Denmark or abroad.

6.3.2 In order for a student to be entitled to a Danish diploma and a Danish title, no more than two-thirds of the Master's programme can be completed abroad.

6.3.3 It will not be possible to transfer credits from a Master's thesis forming the basis of a title under a different Master's programme.

6.3.4 The possibilities of credit transfers will always depend on the Academic Study Board's assessment of the level of equivalence between the relevant programme components.

6.3.5 Previously passed programme components can only entitle credit transfers if they are at Master's level.

6.3.6 Course elements whose contents coincide in part or in full with the contents of constituent course elements of the study programme in question or with any already passed course elements cannot be approved as elective courses or entitle to credit transfers to the study programme. Elective courses include all course elements which have been approved by the Academic Study Board and which are not mandatory for the programme in which the student is enrolled.

6.3.7 Credit transfers are only given upon production of an original, official transcript of records (hard copy) showing the passed study activities.

6.3.8 Credit transfer with grades is possible only when the previously passed study activity was graded in accordance with the 7-point grading scale, and when there is equivalence between the previously passed study activity and the study activity being substituted. Such equivalence must exist both in terms of the technical contents and in terms of the scope of the activity, as measured in ECTS points.

▼ § 7 - Provisions on the organisation of the programme

▼ § 7.1 - Enrollment and Unenrollment from teaching and exams

Course and exam registration

7.1.1 Registration for tuition and examinations shall be conducted in compliance with SDU's rules on registering for courses and examinations.

7.1.2 The prerequisite for participating in tuition and examinations during each semester is that the student registers for the semester's activities within the deadlines.

7.1.2.1 Registration for tuition and examination takes place electronically on Student Services Online at <https://sso.sdu.dk>.

7.1.2.2 The registration periods are May for tuition during the autumn semester and December for tuition during the spring semester. The registration period is published on the website and is sent by e-mail to students' SDU e-mail addresses. It is the student's responsibility to keep abreast of the time limits for registration.

7.1.3 Registration for a course (obligatory or elective) involves automatic registration for tuition and the associated ordinary examination and a second examination attempt (re-examination), if applicable. Registration for both compulsory and elective courses is binding. However, electives can be changed. See 7.1.4

7.1.3.1 If the student registers for courses additional to the 30 new ECTS points per semester, this registration will also be binding and cannot be cancelled.

7.1.4 Students may swap electives within the first two weeks of the start of each semester, provided they have not used examination attempts in the electives in question.

7.1.5 The student must register for tuition and examination when the subject is offered for the final time.

7.1.6 It is the responsibility of students to check their registrations at the start of the semester.

7.1.7 The university is not obliged to let a student attend courses beyond the level required to complete the study programme.

Course and Exam Withdrawal

7.1.8 Withdrawal is not permitted and absence from an examination will be considered a failed examination attempt, unless the Academic Study Board grants dispensation for withdrawal from one or more courses. The student must apply for withdrawal before the exam in the course in question is held.

▼ § 7.2 - Deadline for programme completion

Maximum Study Period

7.3.1 A student must have completed the Master's programme within two-and-a-half years of commencing the programme in compliance with SDU's Rules on Completion Times for Bachelor, Profession Bachelor or Master's Programmes. These periods do not include any periods of granted leave.

7.3.2 If warranted by special circumstances or the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board may grant dispensation from the rules on the maximum study period.

▼ § 7.3 - Study activity

7.4.1 **Minimum Pass Grade Requirement:** A student must pass at least one ECTS qualifying examination during a coherent period of at least one year. Should this requirement not be fulfilled, the student's enrolment will be cancelled.

7.4.2 If warranted by special circumstances, the Academic Study Board can grant dispensation from the minimum pass grade requirement.

7.4.3 **Activity requirement:** See SDU's rules on student activity.

7.4.4 If warranted by special circumstances or the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board can grant dispensation from SDU's rules on student activity.

▼ § 7.4 - Master's thesis

7.6.1 The Master's thesis accounts for 30 ECTS or 40 ECTS points and is a major independent written assignment which is included in the final year of a Master's programme. For students admitted on the 4+4 Ph.D programme, the thesis constitutes 45 ECTS points.

7.6.2 The thesis may be written individually or jointly by two students. The relevant Head of Programme may permit joint completion of a Master's Thesis project by up to three students.

7.6.3 The thesis must document the student's competences in using scientific theory and methodology in the work with a clearly defined academic subject. The subject of the thesis must be agreed with an academic supervisor.

7.6.4 A 30 ECTS thesis must be completed in the course of four months, whereas a 40 ECTS thesis must be completed in the course of two full semesters. As a rule, the starting date and deadline for submission of the thesis are the first workday in September, and the month of January, respectively, for theses to be completed in the autumn semester, and the first workday in February, and the month of June, respectively for theses to be completed in the spring semester. In extraordinary circumstances, the Academic Study Board may grant dispensation from the above dates/deadlines.

7.6.5 The Contract for the Master's thesis must be approved by the academic supervisor, the Head of Programme and the director of studies. A Contract for the Master's Thesis project approved by all the instances mentioned above, may be amended only if dispensation to do so has been granted by the Academic Study Board. Title changes, which do not lead to a delay in the submission date, are approved by the academic supervisor.

7.6.6 The deadline for submission of the thesis is binding. If the student fails to submit the thesis report within the set deadline, the student loses one examination attempt and the student must enter into a supplementary contract within two weeks of the original submission date. The deadline will be extended by three months from this date, and the formulation of the assignment will be extended by additional deliverables corresponding to three months' work within the original subject area. The deadline can be extended by a further three months, subject to the same conditions. Every time a deadline for submission is exceeded, this will be registered as a used examination attempt.

7.6.7 A Master's thesis contract which has been approved by the Head of Studies cannot be cancelled. If a student does not pass his or her thesis examination, the student is under obligation to enter into a supplementary contract within two weeks of the original examination date. The supplementary contract means that the student shall extend the formulation of the assignment by additional deliverables corresponding to three months' work within the original subject area. The student is given three months to prepare the thesis after which a new examination will be held.

7.6.8 In situations when it has not been possible to carry out lab experiments or when collaboration with a company fails, a company goes bankrupt or there are serious problems with empirical data or method selections, etc., the Academic Study Board can decide that the student shall write a new thesis with a new topic and deadline corresponding to the scope of the thesis. See 7.6.4.

7.6.9 The Master's thesis must include an abstract in a foreign language. The course description specifies which language the abstract must be written in. If the thesis is written in a foreign language, the abstract may be written in Danish. The abstract forms part of the assessment of the thesis.

7.6.10 The specific provisions on the Master's thesis are laid down in the course description.

▼ § 7.5 - Change of profile

7.9.1 The Academic Study Board may grant dispensation to change of profile/specialisation. Students are not permitted to extend their total standard study period if they change profile/specialisation course.

▼ § 7.6 - The Master's Degree part of the 4+4 PhD programme

7.10.1 Prior to the enrolment on the PhD programme, the student must be enrolled under a Master of Engineering study programme at the University of Southern Denmark and have passed 60 ECTS (the first two semesters) of the Master's programme. The remaining 60 ECTS consist of:

- constituent (obligatory) courses on the 3rd semester of the relevant Master's study programme corresponding to 15 ECTS points
- Master's Thesis on 45 ECTS points (see 7.6 for further information about the Thesis).

7.10.2 The student must have completed the Master's programme within three years of commencing the Master's programme.

▼ § 7.7 - Individual activities

Individual Study Activities

7.11.1 Students may in agreement with a supervisor apply to the Academic Study Board for an individual study activity.

7.11.2 Individual study activities shall include a description of the learning outcomes in terms of knowledge, skills, competencies and assessment method.

7.11.3 An individual study activity may not be used to reduce the scope of the study programme and it may not overlap with the contents of the Master's Thesis.

7.11.4 As a general rule, the extent of an individual study activity may not exceed 5 ECTS points. The Academic Study Board can, under special circumstances, make an exception to this rule.

7.11.5 Individual study activities completed in the autumn semester and which do not form part of the curriculum and which are to be included in the student's pool of electives, must have been approved by the Academic Study Board no later than at the Study Board's meeting in August. Likewise, individual study activities completed in the spring semester and which do not form part of the curriculum and which are to be included in the student's pool of electives, must have been approved by the Academic Study Board no later than at the Study Board's meeting in January.

7.11.6 Individual study activities completed in the autumn semester and which do not form part of the curriculum and which are to be included in the student's constituent courses must have been approved by the Academic Study Board no later than at the Study Board's meeting in April. Likewise, individual study activities completed in the spring semester and which do not form part of the curriculum and which are to be included in the student's constituent courses must have been approved by the Academic Study Board no later than at the Study Board's meeting in November. As a general rule, individual study activities can only substitute obligatory courses in situations, where the obligatory course in question no longer is offered, the student has not used examination attempts in the course in question, and it is not possible to take an equivalent course (pre-approval of credit transfer).

▼ § 7.8 - Limitation on the number of entries

7.13.1 The university may introduce restrictions on the choice of modules and on the choice of subjects for the project assignments. The university applies academic criteria as selection criteria if there is a limited number of places on a subject. If setting academic criteria is not possible, the university may use a draw as a selection criterion.

▼ § 8 - Exemptions and complaints procedures

▼ § 8.1 - Dispensation from University regulations

8.1.1 When warranted by extraordinary circumstances, the Academic Study Board may grant dispensations from those rules of the Curriculum which have been laid down exclusively by the institution. In certain situations, where the student is elite athlete, entrepreneur or a chairman for an organisation under the Danish Youth Council (DUF), the Academic Study Board may grant a dispensation from the curriculum or the rules of SDU. The Academic Study Board may, apart from when deciding upon extra examination attempts, consider the academic ability of the student in question.

8.1.2 Any application for dispensation from the rules of the Curriculum must be made in writing, must be reasoned, and must be accompanied by relevant documentation. Costs related to acquiring such documentation shall be borne by the student. The Academic Study Board must have received the complete application no later than eight days prior to the meeting during which the application is to be processed.

▼ § 8.2 - Complaints over exams

8.2.1 The student is entitled to complain about an examination or other evaluation that is a constituent part of the examination. Complaints may

- be procedural (i.e. concerning whether the matter has been handled in accordance with applicable law and general principles of administrative law), or
- relate to the basis of examination,
- relate to the examination procedure and/or
- relate to the assessment of the examination

and must be submitted by the student to the university no later than 14 days after publication of the examination result. The complaint must be in writing. The complaint must be addressed to the Faculty of Engineering's Secretariat and sent to tek@tek.sdu.dk.

8.2.2 The university will decide on the complaint based on the assessors' professional opinion and the complainant's comments on the result. The decision may offer a reassessment or a re-examination, or may find against the complainant. A re-assessment or re-examination could result in a lower grade. Complaints cannot be made about examination basis, examination procedures or assessment related to the study start examination.

▼ § 8.3 - Complaints over University decisions

Appeals regarding procedural matters

8.3.1 The student is entitled to file a procedural appeal (i.e. concerning whether the matter has been handled in accordance with applicable law and general principles of administrative law) against the university's decisions, including decisions made by the Academic Study Board. Procedural appeals may be submitted to the Danish Agency for Science and Higher Education.

8.3.2 The appeal must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing. The appeal must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

Complaints about credit transfers and pre-approved credit transfers

Academic issues

8.3.3 Complaints about academic issues (ie. whether the qualifications the student has/would acquire can substitute parts of the study programme in question) in connection with the refusal or partial refusal of

- pre-approved credit transfers for Danish or foreign course elements, and
- credit transfers for Danish and foreign course elements that have been passed

can be submitted to a credit transfer Appeals board in accordance with the rules on Appeals boards for decisions regarding credit transfers for university programmes (the ministerial order on credit transfer appeals boards). The complaint must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing and include an explanation of the reasons for the appeal. The complaint must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

Judicial issues

8.3.4 Complaints about judicial issues (ie. whether the case has been processed in agreement with existing laws and general principles of administrative law) in connection with the refusal or partial refusal of

- pre-approved credit transfers for Danish or foreign course elements, and
- credit transfers for Danish and foreign course elements that have been passed

can be submitted to the Vice-Chancellor's Secretariat in accordance with the rules on Appeals boards for decisions regarding credit transfers for university programmes (the ministerial order on credit transfer appeals boards). The complaint must be submitted to the University no later than 14 days after the student has been notified of the contested decision. The complaint must be in writing and include an explanation of the reasons for the appeal. The complaint must be addressed to the secretariat of the Academic Study Board at the Faculty of Engineering and sent to studienaevn@tek.sdu.dk.

▼ § 9 - The affiliation of the programme

▼ § 9 - Transitions

9.1 The rules concerning maximum period of study, which were valid at the time of admission and enrolment, apply on students admitted and enrolled on a Master's study programme before 1 September 2015. I.e. these students must have completed the study programme within 3 years from the commencement of studies.

9.2 The rules concerning the study start examination and SDU's activity requirement do not apply on students admitted and enrolled on the Master's study programme before 1 September 2015.

9.3 Transitional Curriculum Arrangements (programme specific)

Upon effective date of the curriculum, earlier curricula will be phased out and the affected courses will be taught and examined for the last time concurrently with the phasing out of the curriculum. For details please refer to the individual course descriptions.

Students enrolled on earlier curricula will continue on their current curriculum and will not be affected by these changes unless they are behind in their studies and have yet to pass courses that are no longer offered or for some other reason apply for change of curriculum.

Students enrolled on earlier curricula who do not follow the prescribed course of study will not be offered special teaching. Thus, students who have yet to pass courses that are no longer offered must replace those courses with courses from the new curriculum. This is only possible by written application to the Academic Study Board of the Faculty of Engineering and the application must be enclosed a study plan made in consultation with the programme administrator. Alternatively, students can apply to the study board for change of curriculum.

Leave of absence and re-enrolment: In cases of re-enrolment the faculty will decide whether the student is enrolled on this curriculum or will continue on his/her original curriculum. At the end of a leave of absence the student will be enrolled on his/her original curriculum unless the student applies for a change of curriculum.

When students change curriculum, courses passed will be credit transferred to compulsory courses in the new curriculum according to the below. There will be no transfer of or changes in the number of ECTS credits. This also applies when the credits on an earlier curriculum differs from the credits on the courses to which it is credit transferred. Only courses completed and passed in their entirety can be transferred.

Below courses from previous curricula

- 2011-2016: XC-FYK1-U2 (5 ECTS)

Replaces and is identical with below courses from this curricula

- XC-FYK1-U3 (5 ECTS)

▼ § 9.1 - Legal basis

This Curriculum was prepared on the basis of the authority granted by the provisions of:

- Danish Constitutional Act no. 778 of 7 August 2019 concerning the Danish Act on Universities (Universitetsloven)
- Danish Ministerial Order no. 106 of 12 February 2018 on Admission and Enrolment on Master's Programmes at Universities and Institutions in Architecture and Art within the area of Ministry of Higher Education and Science, as amended by the Ministerial Orders no. 257 of 19 March 2019, no. 639 of 25 June 2019 and no. 891 of 26 August 2019 (Kandidatadgangsbekendtgørelsen)
- Danish Ministerial Order no. 1328 of 15 November June 2016 on bachelor and master's programmes (candidatus) at universities as amended by the Ministerial orders no. 902 of 27 June 2017, no. 258 of 19 March 2019 and no. 876 of 26. August 2019 (Uddannelsesbekendtgørelsen)
- Danish Ministerial Order no. 1062 of 30 June 2016 on University Examinations and Grading as amended by the Ministerial orders no 1503 of 28 November 2017, no 1080 of 28 August 2018 and no.

878 af 26 August 2019 (Eksamensbekendtgørelsen)

- Danish Ministerial Order no. 114 of 3 February 2015 on the Grading Scale and Other Forms of Assessment under the Danish Ministry of Higher Education and Science (Karakterbekendtgørelsen)
- Danish Ministerial Order no 1517 of 16 December 2013 on Credit Transfer Appeals Boards, as amended by the Ministerial order no. 880 of 26 August 2019 (Meritankenævnsmkendtgørelsen)
- Danish Ministerial Order no 597 of 8 March 2015 om Talent Initiatives on Higher Education within the area of Ministry of Higher Education and Science, as amended by the Ministerial order no. 892 af 26 August 2019 (Talentbekendtgørelsen)

▼ § 9.2 - Academic Study Board

Academic Study Board of the Faculty of Engineering

▼ § 9.4 - Effective date

01-09-2019

▼ § 9.5 - Date of Study Board Approval

01-02-2021

▼ § 9.6 - Date of Deans Approval

06-09-2019