

The Curriculum for Master of Science in Engineering (Operations Management)

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Academic Study Board of the Faculty of Engineering

Programme titles:

- Civilingeniør i Operations Management
- Master of Science in Engineering (Operations Management)

ECTS value: 120

Cities: Odense

Semesters: Spring

Effective date: 01-09-2020

Applicable for students enrolled: 01-02-2020

Version: Approved - active

▼ § 1 - Description of the Programme

▼ § 1.1 - Applicable for students enrolled

01-02-2020

▼ § 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 - Qualifying degrees

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

Following degrees qualify for admission to all profiles:

- BEng in Global Management and Manufacturing - University of Southern Denmark
- BEng in Global Management and Manufacturing - University of Aarhus
- BEng in Manufacturing Engineering and Management - University of Southern Denmark
- BEng in Manufacturing Engineering and Management - DTU
- BEng in Machine and Production - AAU
- BSc in Global Business (Globale Forretningssystemer) - AAU
- BSc in Engineering (PDI) - University of Southern Denmark provided they meet the below requirements:

Admitted to the bachelor programme up to and including September 2014.

Completed one operations management module from Global Management and Manufacturing* or Manufacturing Engineering and Management**

Final bachelor project written within the field of operations management, supported by a supervisor from Operations Management

- BSc in Innovation and Business – University of Southern Denmark providing

Final BSc project written within the field of operations management, supported by a OM supervisor

*Supply Chain Management 3

**Operations Management 3, ERP, Automation

▼ § 2.2 - Entry requirements

2.2.1 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 Operations management, e.g. production engineering, mechanical engineering, engineering management or robotics engineering, and cover the below criteria:

- Logistics and distribution management 5 ECTS
- Inventory and materials management 5 ECTS
- Quality management 5 ECTS
- Supply Chain Management 5 ECTS
- Materials and manufacturing processes 5 ECTS

The admission criteria will be changed from February 2021 to:

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 operations management, e.g. production engineering, mechanical engineering, engineering management or robotics engineering, and cover 4 out of the 6 criteria below:

- Materials Science (5 ECTS)
- Quality Management (5 ECTS)
- Production Technology (5 ECTS)
- Inventory Management (5 ECTS)
- Supply Chain Management (5 ECTS)
- Industrial Engineering / Engineering Management (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

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. The course must be passed with a grade equivalent to a minimum of 3.0 on the Danish grading scale.

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 details, please refer to the University website.

2.2.2 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.

▼ § 2.3 - 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

▼ Global Supply Chain Development 2020

Name

Global Supply Chain Development 2020

Competence profile

The competence profile for Master of Science in Engineering (Operations Management) (OM) is based on the Danish Qualification Framework, and the study program is structured in accordance with the education concept 'The Engineering Education Model of the University of Southern Denmark (DSMI).

The OM graduates are qualified to identify, understand and solve complex problems within the field of engineering, based on a scientific grounding. The OM graduates possess research-based knowledge of theories and methods, which enable them to identify, understand, discuss and reflect on scientific problems within the areas of manufacturing systems and processes, technologies and information systems and the impact on generating agile and sustainable operations.

The OM graduates have skills based on a scientific grounding, enabling them to evaluate and choose from different scientific theories, methods and tools and will therefore be able to apply existing models to analyzing and solving problems or setting up new models within Manufacturing Systems, Technology Management or Global Supply Chain Design.

The OM graduates possess competencies enabling them to professionally and in a cross-functional context participate in or lead projects. The graduates will also be able to communicate the results to colleagues as well as to non-specialists. These common competencies are acquired thanks to the problem and project oriented structure of the study program, which trains the students to reflect on their own role and at the same time to be able to take independent responsibility for own learning, personal development and specialization.

The Master of Science in Operations Management will have the following general qualifications:

Knowledge:

- Has highly specialized knowledge of forefront operations management philosophies, systems, and technologies.

Skills:

- Has specialized problem-solving skills required in research and innovation in order to develop and implement new solutions within operations management and is able to integrate knowledge from different fields.
- Is able to manage innovation in corporation between product development and manufacturing management in order to create competitive advantage.
- Is able to analyse and plan the company's manufacturing processes according to system behaviours.
- Align the automation level in accordance to the specific competitive environment.

Competences:

- Can select and transform the most appropriate manufacturing system including supporting and help functions within a complex and unpredictable manufacturing context where new strategies are required.
- Can manage a company's supply chain and manufacturing processes in relation to allocation of the best Technologies.

The Master of Science in Operations Management specialised in Global Supply Chain Development will have the following additional qualifications:

Knowledge:

- Has a highly specialized knowledge of designing and managing supply chains in a global context.

Skills:

- Is able to design the whole value chain, from assessing market needs to launching the product onto the market.
- Is able to design different sourcing strategies throughout the entire product life cycle and in different markets.
- Can set up design criteria for and develop the global supply chain network as well as manage the network supplies.
- Analyse and understand system behaviour in order to choose the optimal manufacturing and supply chain philosophy

Competences:

- Can manage and transform complex supply chain development projects at a strategic, tactical and operational level.
- Can manage and transform market and product knowledge to design focused supply chain solutions based on the global conditions.
- Develop sourcing strategies supporting the corporate strategy.
- Develop total supply chain cost models

The relationship between the overall competency goals of the programme and the learning objectives of the individual courses appears in the qualification matrix (annex 1).

Professional competence

Master of Science in Engineering (Operations Management) is a graduate engineering program, which combines classical disciplines such as operations analysis, quality management, manufacturing systems, information systems and operations support technology with advanced automation and supply chain management. A strong engineering background with real integration of key operations management disciplines facilitating a holistic view of the business linking up to an assessment of how to utilize automation and the supply chain to develop the future agile and sustainable corporations.

The study program has a strong global focus and is carried out in an international study environment.

Operations Management graduates are qualified to obtain jobs within:

- All areas within operations in manufacturing and service companies, consulting, public sector and hospitals
- Academia as PhD students and further career within the university as a researcher.

The profile Global Supply Chain Development more specifically qualifies graduates to:

- Jobs in the area of planning, procurement, distribution and managing global manufacturing pro-cesses in distributed global supply chains
- Jobs as global supply chain managers
- Jobs as strategic production planners
- Identify the global business opportunities and utilize these to optimize the supply chain
- Plan and carry out sourcing activities in a global and intercultural context.

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

Semester 4	<u>Master's Thesis - 30 ECTS</u> <u>T090023101</u> (30 ects)					<u>Study Start</u> (MSc in Engineering) T700043101
30 ECTS						
Semester 3	<u>Knowledge Management for Engineers</u> <u>T090035101</u> (5 ects)	<u>From Innovation to Operations - Organisation Processes and Management</u> <u>T090018101</u> (5 ects)	<u>Strategic Global Sourcing</u> <u>T090026101</u> (5 ects)	Elective courses or In-company Period (15 ects)		
30 ECTS						
⬆						
Semester 2	<u>Advanced Quality Management</u> <u>T090000101</u> (5 ects)	<u>Advanced Materials and Manufacturing Technologies</u> <u>T090017101</u> (5 ects)	<u>Project</u> <u>T090021101</u> (10 ects)	<u>Supply Chain Simulation</u> <u>T090022101</u> (5 ects)	<u>Data Science</u> <u>T090029101</u> (5 ects)	
30 ECTS						
Semester 1	<u>Operations Management: Systems and Methods</u> <u>T090025101</u> (10 ects)	<u>Modularization and Platform Design</u> <u>T080013101</u> (5 ects)	<u>Sustainability</u> <u>T090024101</u> (5 ects)	<u>Operations Analysis</u> <u>T090001101</u> (5 ects)	<u>Supply Chain Decisions</u> <u>T090027101</u> (5 ects)	
30 ECTS						

= Elective
 = Profile courses

Explanatory comments to programme structure

1. Students must pass a study start test within the first two weeks of studies in order to continue on their programme. The purpose of the test is to verify that the students have started their studies.
2. 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.
3. Students may choose one or more elective courses (each will be 5 ECTS).
If the master's thesis is of an experimental nature, students 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. Similarly, a student on a 4+4 PhD programme may use 15 ECTS electives on third semester together with the 30 ECTS on fourth semester on a 45 ECTS master's thesis (ITI-SP45). Finally, students may choose to spend 15 ECTS elective courses on an In-company Project (OM-INCO).

Cities

Odense

Language

English

▼ **Manufacturing Technology 2020**

Name

Manufacturing Technology 2020

Competence profile

The competence profile for Master of Science in Engineering (Operations Management) (OM) is based on the Danish Qualification Framework, and the study program is structured in accordance with the education concept 'The Engineering Education Model of the University of Southern Denmark (DSMI).

The OM graduates are qualified to identify, understand and solve complex problems within the field of engineering, based on a scientific grounding. The OM graduates possess research-based knowledge of theories and methods, which enable them to identify, understand, discuss and reflect on scientific problems within the areas of manufacturing systems and processes, technologies and information systems and the impact on generating agile and sustainable operations.

The OM graduates have skills based on a scientific grounding, enabling them to evaluate and choose from different scientific theories, methods and tools and will therefore be able to apply existing models to analyzing and solving problems or setting up new models within Manufacturing Systems, Technology Management or Global Supply Chain Design.

The OM graduates possess competencies enabling them to professionally and in a cross-functional context participate in or lead projects. The graduates will also be able to communicate the results to colleagues as well as to non-specialists. These common competencies are acquired thanks to the problem and project oriented structure of the study program, which trains the students to reflect on their own role and at the same time to be able to take independent responsibility for own learning, personal development and specialization.

The Master of Science in Operations Management will have the following general qualifications:

Knowledge:

- Has highly specialized knowledge of forefront operations management philosophies, systems, and technologies.

Skills:

- Has specialized problem-solving skills required in research and innovation in order to develop and implement new solutions within operations management and is able to integrate knowledge from different fields.
- Is able to manage innovation in corporation between product development and manufacturing management in order to create competitive advantages.
- Is able to analyse and plan the company's manufacturing processes according to system behaviours.
- Align the automation level in accordance to the specific competitive environment.

Competences:

- Can select and transform the most appropriate manufacturing system including supporting and help functions within a complex and unpredictable manufacturing context where new strategies are required.
- Can manage a company's supply chain and manufacturing processes in relation to allocation of the best technologies.

The Master of Science in Operations Management specialised in Manufacturing Technology will have the following additional qualifications:

Knowledge:

- Has a highly specialized knowledge of automation technologies in relation to operations management.

Skills:

- Is able to analyse and specify manufacturing technologies in a complex and dynamic environment.
- Can manage implementation and set-up of automated solutions.
- Can modify and reconfigure existing technological solutions.

Competences:

- Can manage and complete complex manufacturing development projects at strategic, tactical and operational level.
- Can combine new technologies with competent staff to achieve high productivity, flexibility and agility in manufacturing companies.
- Can organise the implementation and operation of automation processes.
- Can decide and organise relocation of manufacturing facilities and necessary knowledge to another location.
- Establish a foundation for decision of manufacturing setup, technology, and automation level in a global manufacturing network

The relationship between the overall competency goals of the programme and the learning objectives of the individual courses appears in the qualification matrix (annex 1).

Professional competence

Master of Science in Engineering (Operations Management) is a graduate engineering program, which combines classical disciplines such as operations analysis, quality management, manufacturing systems, information systems and operations support technology with advanced automation and supply chain management. A strong engineering background with real integration of key operations management disciplines facilitating a holistic view of the business linking up to an assessment of how to utilize automation and the supply chain to develop the future agile and sustainable corporations.

The study program has a strong global focus and is carried out in an international study environment.

Operations Management graduates are qualified to obtain jobs within:

- All areas within operations in manufacturing and service companies, consulting, public sector and hospitals.
- Academia as ph. d. students and further career within the university as a researcher.

The profile Manufacturing Technology more specifically qualifies graduates to:

- Jobs in the area of manufacturing engineering
- Research new technologies and create innovative sustainable manufacturing businesses
- Design, specify and implement automation solution
- Operations Managers
- Quality and Maintenance engineers

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.

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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 must pass a study start test within the first two weeks of studies in order to continue on their programme. The purpose of the test is to verify that the students have started their studies.
2. 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.
3. Students may choose one or more elective courses (each will be 5 ECTS).
If the master's thesis is of an experimental nature, students 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. Similarly, a student on a 4+4 PhD programme may use 15 ECTS electives on third semester together with the 30 ECTS on fourth semester on a 45 ECTS master's thesis (ITI-SP45). Finally, students may choose to spend 15 ECTS elective courses on an In-company Project (OM-INCO).

Cities

Odense

Language

English

Semester 4 30 ECTS	<u>Master's Thesis - 30 ECTS</u> <u>T090023101</u> (30 ects)				
Semester 3 30 ECTS ↑	<u>Knowledge Management for Engineers</u> <u>T090035101</u> (5 ects)	<u>From Innovation to Operations - Organisation Processes and Management</u> <u>T090018101</u> (5 ects)	<u>Technology 3</u> <u>T090012101</u> (5 ects)	Electives or In-company Periods (15 ects)	
Semester 2 30 ECTS	<u>Advanced Quality Management</u> <u>T090000101</u> (5 ects)	<u>Advanced Materials and Manufacturing Technologies</u> <u>T090017101</u> (5 ects)	<u>Project</u> <u>T090021101</u> (10 ects)	<u>Industrial Adaptable Automation</u> <u>T090020101</u> (5 ects)	<u>Data Science</u> <u>T090029101</u> (5 ects)
Semester 1 30 ECTS	<u>Operations Management: Systems and Methods</u> <u>T090025101</u> (10 ects)		<u>Modularization and Platform Design</u> <u>T080013101</u> (5 ects)	<u>Sustainability</u> <u>T090024101</u> (5 ects)	<u>Operations Analysis</u> <u>T090001101</u> (5 ects)

Study Start
(MSc in Engineering)
T700043101

= Elective
 = Profile courses

▼ § 3.1 - The structure of the programme

Operations Management and SDG's

This M.Sc. education in Operations Management enables you to support the UN Sustainable Development Goals by

- developing sustainable supply chain practices in operations and procurement incl. supplier development
- improving processes to e.g. reduce scrap, material usage, energy consumption
- implementing new innovative technologies to e.g. improve working conditions, product quality and lifetime
- creating platforms for developing and sharing best practices for sustainable operations
- evaluating and design product and production platforms to e.g. reduce material usage, improve recyclability and repairability
- mathematically optimizing operations and supply chain performance to improve sustainability by e.g. reducing transportation emissions

Structure and Context

The graduate students can specialize within the profiles Global Supply Chain Development or Manufacturing Technology.

The themes of the semesters are the same for both profiles.

- 1st semester: Operations Fundamentals
- 2nd semester: Operations Improvement
- 3rd semester: Specialization
- 4th semester: Thesis

Description of the First Semester

SEMESTER THEME: Operations Fundamentals

VALUE ARGUMENT

In a rapidly changing and highly competitive world of production the student must have fundamental skills to support the acquisition and development of knowledge and insight. The student must also learn how to study at a masters level. The first semester is dedicated to subjects that will enable the student to analyse complex production and supply chain situation for appropriate decision making. A rigorous approach to methodology is necessary for studying, organizing and developing knowledge within operations management. Modularization and platform design is a foundation for both analysis and design of flexible solutions in automation and supply chain management.

The industry in general has increased attention and awareness for sustainable operations and minimizing the footprint on the planet. Students must therefore learn how to manage with sustainability in mind and also learn specific methods for sustainable operations.

In the specialization courses the student learns quantitative analysis as the basis for supply chain decisions or the fundamentals for industrial automation e.g. instrumentation, programming and digital simulation.

LEARNING OBJECTIVES

KNOWLEDGE

- Basic mathematical tools for analysis and optimization incl. modelling
- Methodology in Operations Management
- Definitions of sustainability

SKILLS

- Solve simple decision problems using mathematical optimization
- Choose and design a research protocol

COMPETENCES

- Apply relevant OM research methodology
- Analyse and apply methods for management and optimization of sustainable operations

MODULES

The 1st semester contains the following modules:

Core modules:

- OM-OA - Operations Analysis (5 ECTS)
- PDCMPD - Modularization and Platform Design (5 ECTS)
- OM-SU - Sustainability (5 ECTS)
- OM-SM - Operations management: systems and methods (10 ECTS)

Manufacturing Technology profile specific modules:

- OM-AU1 - Foundation of Automation and Handling (5 ECTS)

Global Supply Chain Development profile specific modules:

- OM-SCD - Supply Chain Decision (5 ECTS)

Description of the Second Semester

SEMESTER THEME: Operations Improvement

VALUE ARGUMENT

Continuous improvement is an important capability of any company. Therefore, students must learn methods for analyzing processes and data to find ways of optimizing operations. Improvement can be

in the form of process or quality improvement using advanced statistics and methods for analyzing process behavior and zooming in on the relevant cause of the problem and implementing generic solutions for improved processes. More and more data is generated and stored giving room for application of modern methods for data analysis by means of artificial intelligence. Examples could be neural networks, data mining or machine learning. Students must learn how to navigate the landscape of artificial intelligence, identify possibilities for application and apply basic algorithms for testing purposes. Finally, improvement could be more stepwise in the form of new and advanced processes or materials that can be used as leverage for the company's competitiveness.

In the specialization the students learn how to design a flexible and reconfigurable production setup that is aligned with strategic objectives or how to simulate supply chain functionality, model validation and decision making based on simulation.

LEARNING OBJECTIVES

KNOWLEDGE

The student will:

- Advanced methods for quality and process improvement
- Methods for designing and analyzing experiments
- Basic knowledge of applicable AI methods in Operations Management

SKILLS

The students have skills to

- Program and verify AI algorithms
- Analyse a production process and identify the dominant cause of variation

COMPETENCES

The students have competence to:

- Choose appropriate technologies and materials that increases competitiveness
- Integrate a systematic and efficient approach to process improvement in a company
- Choose, design and implement basic AI in Operations Management

MODULES

Core modules:

OM-DS - Data Science (5 ECTS)

OM-AQU - Advanced Quality Management (5 ECTS)

OM-AMMT - Advanced Materials and Manufacturing Technologies (5 ECTS)

OM-PRO - Project (10 ECTS)

Manufacturing Technology profile specific modules:

OM-IAA - Industrial Adaptable Automation (5 ECTS)

Global Supply Chain Development profile specific modules:

OM-SCS - Supply Chain Simulation (5 ECTS)

Description of the Third Semester

SEMESTER THEME: Specialization

VALUE ARGUMENT

Technology without strategic alignment or lack of appropriate organization and structure does not add value. Knowledge plays a major role for the successful application of technology and knowledge management is therefore essential for the successful application of technology. Students will learn how knowledge is defined, how knowledge is created or acquired, retained and transferred within and between organizations. Development cycles are continuously shortened, so students will learn the basics of innovation to create a better interface between innovation and operations.

In the specialization courses the student learns the details about strategic sourcing and how to setup a strategic sourcing process and the steps involved or they learn strategic technology management among others technology assessment and road mapping, software development and identification of disruptive technologies.

On the third semester there is the possibility of elective courses. Two courses are highlighted here: in-company period and seminar in operations management.

In the in-company period the student will solve a practical problem in a company using relevant tools from operations management with an academic approach. This simply means that the student must follow an appropriate methodology for solving the problem. Ideally the student will treat the generic problem instead of the specific problem, adapt the generic solution to the specific situation and thereby have a solution that can be applied at a later point in their work life.

The seminar in operations management is an opportunity for the student to dive into the specifics and details of a subject of own interest. The study could be of a more theoretical nature involving the detailed study of a large volume of literature or of a more experimental nature involving the exploration or application of e.g. technologies.

LEARNING OBJECTIVES

KNOWLEDGE

Students will:

- Types of innovation
- Definitions of knowledge

SKILLS

Students will be able to:

- Analyze the interactions between individual knowledge and knowledge on a group/organizational level

COMPETENCES

The students will be able to:

- Application of relevant tools, techniques and methods for a relevant problem
- Design and implement a knowledge management system

MODULES

The third semester contains the following modules:

Constituent modules, 10 ECTS, are:

OM-KM - Knowledge Management (5 ECTS)

OM-IO - From Innovation to operations (5 ECTS)

Manufacturing Technology profile specific modules:

OM-AU3 - Technology 3 (5 ECTS)

Global Supply Chain Development profile specific modules:

OM-SGS - Strategic Global Sourcing (5 ECTS)

Elective modules, 15 ECTS

OM-SOM - Seminar in Operations Management (10 ECTS)

OM-INCO - In-company period (15 ECTS)

It will also be possible for student to follow courses from other master programs, as PDI, Social Science and others, as long as they can be approved. The selection of elective courses will be developed continuously.

CONTEXT

The constituent modules will align the student to the main objectives of the OM master program. The electives will give an opportunity to supply with further basic competencies supporting the chosen profile.

STUDY ABROAD

It is possible to spend third semester at a university abroad, provided the courses are approved by the Academic Study Board of the Faculty of Engineering.

Description of the Fourth Semester

The last semester is dedicated to the final thesis where the student demonstrates his/her capability of applying the knowledge and state-of-the-art concepts studied in the master's program within the specialization of Global Supply Chain Development or Manufacturing Technology.

The student must base the thesis on a theoretical or practical problem or situation and develop a solution that is based on the rigorous application of appropriate academic methodology. The thesis should consider practical implications of the problem and solution.

The framework of the master thesis has the following characteristics:

- The thesis is defined within a predetermined period of one year
- The subject is defined with the supervisor

The thesis is evaluated by the supervisor and an external supervisor based on the written report and an oral presentation. The oral discussion serves to give the student further possibility to present him-/herself and to finalize his grade

The master thesis is the final examination achievement of the master's program which requires that the student has completed the master's program with the minimum required ECTS. The thesis itself contributes with 30 ECTS to the overall grade.

MODULES

The forth semester contains the following module:

OM-SP30 – Master Thesis

OM-SP40 – Master Thesis (If the master's thesis is of an experimental nature, students 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)

ITI-SP45 – 4+4 Master Thesis (restricted to students enrolled on the 4+4 PhD programme)

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

During the first year the requirements relate to the courses in the following way.

The course "Advanced Quality Management" builds on a basic understanding of quality management. The specialization courses and the mandatory common course all build on or use knowledge of the remaining requirements e.g. OM-DS uses an understanding of Supply Chain Management and Distribution and Logistics, OM-OA applies more advanced models for inventory and materials management, distribution and logistics, OM-AMMT extends the knowledge of manufacturing technology and to some extent also supply chain management.

▼ § 4 - Course Descriptions

▼ § 4 - Compulsory courses

Profile divided course descriptions

Global Supply Chain Development 2020

Manufacturing Technology 2020

Course descriptions in the curriculum

▼ Modularization and Platform Design

▼ Course ID

T080013101

▼ Course Title

Modularization and Platform Design

▼ ECTS value

5

▼ Internal Course Code

PDCMPD

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Foundation of Automation

▼ Course ID

T090005101

▼ Course Title

Foundation of Automation

▼ ECTS value

5

▼ Internal Course Code

OM-AU1

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ Operations Management: Systems and Methods

▼ Course ID

T090025101

▼ Course Title

Operations Management: Systems and Methods

▼ ECTS value

10

▼ Internal Course Code

OM-SM

▼ Responsible study board

Academic Study Board of the Faculty of Engineering

▼ **Sustainability**

▼ **Course ID**

T090024101

▼ **Course Title**

Sustainability

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-SU

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Operations Analysis**

▼ **Course ID**

T090001101

▼ **Course Title**

Operations Analysis

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-OA

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Supply Chain Decisions**

▼ **Course ID**

T090027101

▼ **Course Title**

Supply Chain Decisions

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-SCD

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Industrial Adaptable Automation**

▼ **Course ID**

T090020101

▼ **Course Title**

Industrial Adaptable Automation

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-IAA

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Data Science**

▼ **Course ID**

T090029101

▼ **Course Title**

Data Science

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-DS

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Supply Chain Simulation**

▼ **Course ID**

T090022101

▼ **Course Title**

Supply Chain Simulation

▼ **ECTS value**

5

▼ **Internal Course Code**

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Advanced Quality Management**

▼ **Course ID**

T090000101

▼ **Course Title**

Advanced Quality Management

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-AQU

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Advanced Materials and Manufacturing Technologies**

▼ **Course ID**

T090017101

▼ **Course Title**

Advanced Materials and Manufacturing Technologies

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-AMMT

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Project**

▼ **Course ID**

T090021101

▼ **Course Title**

Project

▼ **ECTS value**

10

▼ **Internal Course Code**

OM-PRO

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **From Innovation to Operations - Organisation Processes and Management**

▼ **Course ID**

T090018101

▼ **Course Title**

From Innovation to Operations - Organisation Processes and Management

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-IO

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Knowledge Management for Engineers**

▼ **Course ID**

T090035101

▼ **Course Title**

Knowledge Management for Engineers

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-KM

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Strategic Global Sourcing**

▼ **Course ID**

T090026101

▼ **Course Title**

Strategic Global Sourcing

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-SGS

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **In-company Project**

▼ **Course ID**

T090006101

▼ **Course Title**

In-company Project

▼ **ECTS value**

15

▼ **Internal Course Code**

OM-INCO

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Technology 3**

▼ **Course ID**

T090012101

▼ **Course Title**

Technology 3

▼ **ECTS value**

5

▼ **Internal Course Code**

OM-AU3

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Master's Thesis - 30 ECTS**

▼ **Course ID**

T090023101

▼ **Course Title**

Master's Thesis - 30 ECTS

▼ **ECTS value**

30

▼ **Internal Course Code**

OM-SP30

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Studiestartsprøve (civilingeniør)**

▼ **Course ID**

T700043101

▼ **Course Title**

Study Start (MSc in Engineering)

▼ **ECTS value**

0

▼ **Internal Course Code**

TEK-KAST

▼ **Responsible study board**

Academic Study Board of the Faculty of Engineering

▼ **Studiestartsprøve (civilingeniør)**

▼ **Course ID**

T700043101

▼ **Course Title**

Study Start (MSc in Engineering)

▼ **ECTS value**

0

▼ **Internal Course Code**

TEK-KAST

▼ **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

5.2.0.1 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.

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

5.2.0.3 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

5.6.1 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

5.6.2 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.

5.6.3 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.

5.6.4 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

5.6.5 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

5.6.6 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

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

▼ § 5.7 - Irregularities at exams

Disciplinary Action

5.7.1 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.

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

Errors and Defects in an Examination

5.7.3 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).

5.7.4 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.

5.7.5 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

5.8.1 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.

5.8.2 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.

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

▼ § 5.9 - Ordinary exams

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

5.9.2 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

5.10.1 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.

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

5.10.3 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.

5.10.4 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.

5.10.5 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.

5.10.6 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

5.10.7 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.

5.10.8 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

5.11.1 A passed examination cannot be retaken.

5.11.2 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.

5.11.3 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

5.12.1 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

5.12.2 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

5.12.2 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

5.13.1 Examinations are arranged as individual or group examinations.

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

5.13.3 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 one Master's programme to 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

7.2.1 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.

7.2.2 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

7.3.1 **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.

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

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

7.3.4 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

7.4.1 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.

7.4.2 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.

7.4.3 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.

7.4.4 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.

7.4.5 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.

7.4.6 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.

7.4.7 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.

7.4.8 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.

7.4.9 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.

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

▼ § 7.5 - Change of profile

7.5.1 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

7.6.1 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).

7.6.2 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

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

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

7.7.3 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.

7.7.4 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.

7.7.5 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.

7.7.6 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

7.8.1 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 appelas 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 appelas 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:

- 2016-2017: OM-MSP-U1 (5 ECTS)
- 2016-2017: OM-OMM (5 ECTS)

Replaces below courses from this curriculum:

- 2018: OM-SM-U1 (10 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. 23 of 9 January 2020 on Admission and Enrolment on Bachelor and Master's Programmes (candidatus) at Universities (Adgangs bekendtgørelsen)

- Danish Ministerial Order no. 20 of 9 January 2020 on bachelor and master's programmes (candidatus) at universities (Uddannelsesbekendtgørelsen)
- Danish Ministerial Order no. 22 of 9 January 2020 on University Examinations and Grading (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 (Meritankenævnsbekendtgørelsen)
- Danish Ministerial Order no 597 of 8 March 2015 on 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**

01-09-2020

▼ **§ 9.5 - Date of Study Board Approval**

21-12-2020

▼ **§ 9.6 - Date of Deans Approval**

22-04-2020