Chapter 9
The programme specific part of the curriculum for

MASTER OF SCIENCE (MSc) IN ENGINEERING (OPERATIONS MANAGEMENT)

CIVILINGENIØR, CAND. POLYT. I OPERATIONS MANAGEMENT

Curriculum 2016, Version 1.2

Applicable to students admitted February 2016 onwards

The Curriculum is divided into general provisions (Chapters 1-8), a programme-specific section (Chapter 9), and descriptions of the programme's individual course modules. Students should familiarise themselves with all three parts in order to get a complete overview of the provisions regulating the programme.

Article 1 Job Profile

Master of Science in Engineering (Operations Management) is a graduate engineering program, which combines classical disciplines such as operations analysis, quality management, manufacturing systems and information 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 graduate students can specialize within the profiles **Global Supply Chain Development** or **Manufacturing Technology.**

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

- Jobs in the area of planning, procurement, distribution and managing global manufacturing processes 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.

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 (sociotechnical systems)
- Operations Managers
- Quality and Maintenance engineers

Article 2 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 Engineering (Operations Management) will have knowledge, skills and competencies within the following more specific domains:

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 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 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.

Qualifications matrix

GRADUATES SPECIALISED IN MANUFACTURING TECHNOLOGY WILL HAVE ACQUIRED …	OM-MSP (1st sem)	OM-OAQ (1st sem)	PDCMPD (1st sem)	PDCKM (1st sem)	OM-OMM (1st sem)	OM-AU1 (1st sem)	OM-IT (2nd sem)	OM-MST (2nd sem)	OM-AAM (2nd sem)	OM-AU2 (2nd sem)	OM-PRO (2nd sem)	OM-SU (3rd sem)	OM-IO (3rd sem)	OM-RGR (3rd sem)	OM-SP (4th sem)
RESEARCH BASED KNOWLEDGE OF															
Has highly specialized knowledge of forefront operations management philosophies, systems, and technologies.	X							X	X						X
Has a highly specialized knowledge of automation technologies in relation to operations management.						X		X	X	X	X			X	X
THE FOLLOWING SKILLS (ON A SCIENTIFIC BASIS)															
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		X		X	X						X		X		X

different fields.														
Is able to manage innovation in corporation between product development and manufacturing management in order to create competitive advantage.			X									X		X
Is able to analyse and plan the company´s manufacturing processes according to system behaviours.	X	X									X			X
Align the automation level in accordance to the specific competitive environment.						X			X	X					X
Is able to analyse and specify manufacturing technologies in a complex and dynamic environment.							X	X	X	X			X	X
Can manage implementation and set-up of automated solutions.				X		X			X	X					X
Can modify and reconfigure existing technological solutions.			X			X	X		X	X					X
THE FOLLOWING COMPETENCES (ACADEMIC AND INTERDISCIPLINARY)														
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.	X						X	X	X		X			X
Can manage a company´s manufacturing processes in relation to allocation of the best technologies.			X			X	X	X	X	X	X		X		X

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

GRADUATES SPECIALISED IN GLOBAL SUPPLY CHAIN DEVELOPMENT WILL HAVE ACQUIRED …	OM-MSP (1st sem)	OM-OAQ (1st sem)	PDCMPD (1st sem)	PDCKM (1st sem)	OM-OMM (1st sem)	OM-SCD (1st sem)	OM-IT (2nd sem)	OM-MST (2nd sem)	OM-AAM (2nd sem)	PDCSCS (2nd sem)	OM-PRO (2nd sem)	OM-SU (3rd sem)	OM-IO (3rd sem)	OM-SGS (3rd sem)	OM-SP (4th sem)
RESEARCH BASED KNOWLEDGE OF															
Has highly specialized knowledge of forefront operations management philosophies, systems, and technologies.	X							X	X						X
Has a highly specialized knowledge of designing						X				X	X			X	X

and managing supply chains in a global context.														
THE FOLLOWING SKILLS (ON A SCIENTIFIC BASIS)														
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.		X		X	X						X				X
Is able to manage innovation in corporation between product development and manufacturing management in order to create competitive advantage.			X			X							X		X
Is able to analyse and plan the company´s supply chain processes according to system behaviours.	X	X										X			X
Align the automation level in accordance to the specific competitive environment.									X						
Is able to design the whole value chain, from assessing market needs to launching the product onto the market.			X	X		X				X	X				X
Is able to design different sourcing strategies throughout the entire product life cycle and in different markets.				X		X					X			X	
Can set up design criteria for and develop the global supply chain network as well as manage the network supplies.						X								X	X

THE FOLLOWING COMPETENCES (ACADEMIC AND INTERDISCIPLINARY)															
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.	X						X	X	X		X				X
Can manage a company´s supply chain processes in relation to allocation of the best technologies.			X				X	X	X	X	X				X
Can manage and transform complex supply chain development projects at a strategic, tactical and operational level.	X		X	X							X				X
Can manage and transform market and product knowledge to design focused supply chain solutions based on the global conditions.				X		X				X	X				X
Develop sourcing strategies supporting the corporate strategy.						X				X	X			X	
Develop total supply chain cost models.						X					X				X

Article 3 Academic Progression

During first semester the students will learn the fundamentals within Operations Management. These fundamental skills, knowledge and competences are then expanded in the second semester, where the knowledge, skills and competences are further enhanced by utilizing advanced technologies. In the third semester, students will have multiple options to further progress their specialization with the list of elective courses and they will be introduced to the concepts of sustainability and innovation in the context of Operations Management. Finally, forth semester is the thesis, where students will complete their academic progression.

Article 4 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.

Semester	Themes
4	Thesis
3	Specialization
2	Operations Technology
1	Operations Fundamentals

Article 5 Structure and Modules

Master of Science in Operations Management specialised in **Global Supply Chain Development**

<table>
<tr><th>Semester</th><th colspan="30">Modules</th></tr>
<tr><td>4 semester</td><td colspan="30">Master's Thesis
OM-SP30 / OM-SP40</td></tr>
<tr><td>3 semester</td><td colspan="5">Sustainability
OM-SU</td><td colspan="5">From Innovation to Operation
OM-IO</td><td colspan="5">Strategic Global Sourcing
OM-SGS</td><td colspan="20">Electives*:
In-company Period (15 ECTS)
Master's Thesis (10 ECTS) + 5 ECTS electives
15 ECTS electives in e.g. Seminar, Advanced Quality Management, Rapid Globalized Response Manufacturing or Supply Chain Modelling and Decision Making</td></tr>
<tr><td>2 semester</td><td colspan="5">Information Technology
OM-IT</td><td colspan="5">Manufacturing and Support Technologies
OM-MST</td><td colspan="5">Advanced and Automated Manufacturing Processes
OM-AAM</td><td colspan="5">Supply Chain Simulation
PDCSCS</td><td colspan="15">Project
OM-PRO</td></tr>
<tr><td>1 semester</td><td colspan="5">Manufacturing Systems and Philosophies
OM-MSP</td><td colspan="5">Operations Analysis and Quality Management
OM-OAQ</td><td colspan="5">Modularization and platform design
PDCMPD</td><td colspan="5">Knowledge Management
PDCKM</td><td colspan="5">Operations Management Methods
OM-OMM</td><td colspan="5">Supply Chain Design
OM-SCD</td></tr>
<tr><td>ECTS</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr>
</table>

* The student may choose to spend 15 ECTS elective courses on an In-company Period (OM-INCO).

If the master's thesis is of an experimental nature, the student may choose to spend 10 ECTS of the 3rd semester's elective courses on the thesis work. The master's thesis will then be extended to 40 ECTS. If the student is enrolled on the 4+4 PhD programme the student may spend 15 ECTS of the 3rd semester's elective courses on the thesis work. The master's thesis will then be extended to 45 ECTS (ITI-SP45).

The student may choose one or more of the elective courses in Advanced Quality Management, Rapid Globalized Response Manufacturing, Supply Chain Modelling and Decision Making (each will be 5 ECTS) or a seminar of 10 ECTS.

Master of Science in Operations Management specialised in **Manufacturing Technology**

<table>
<tr><th>Semester</th><th colspan="30">Modules</th></tr>
<tr><td>4 semester</td><td colspan="30">Master's Thesis
OM-SP30 / OM-SP40</td></tr>
<tr><td>3 semester</td><td colspan="5">Sustainability
OM-SU</td><td colspan="5">From Innovation to Operation
OM-IO</td><td colspan="5">Rapid Globalized Response Manufacturing
OM-RGR</td><td colspan="20">Electives*:
In-company Period (15 ECTS)
Master's Thesis (10 ECTS) + 5 ECTS electives
15 ECTS electives in e.g. Seminar, Advanced Quality Management, Strategic Global Sourcing, Supply Chain Design or Supply Chain Modelling and Decision Making</td></tr>
<tr><td>2 semester</td><td colspan="5">Information Technology
OM-IT</td><td colspan="5">Manufacturing and Support Technologies
OM-MST</td><td colspan="5">Advanced and Automated Manufacturing Processes
OM-AAM</td><td colspan="5">Automation 2
OM-AU2</td><td colspan="25">Project
OM-PRO</td></tr>
<tr><td>1 semester</td><td colspan="5">Manufacturing Systems and Philosophies
OM-MSP</td><td colspan="5">Operations Analysis and Quality Management
OM-OAQ</td><td colspan="5">Modularization and platform design
PDCMPD</td><td colspan="5">Knowledge Management
PDCKM</td><td colspan="5">Operations Management Methods
OM-OMM</td><td colspan="10">Automation 1
OM-AU1</td></tr>
<tr><td>ECTS</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr>
</table>

* The student may choose to spend 15 ECTS elective courses on an In-company Period (OM-VF).

If the master's thesis is of an experimental nature, the student may choose to spend 10 ECTS of the 3rd semester's elective courses on the thesis work. The master's thesis will then be extended to 40 ECTS. If the student is enrolled on the 4+4 PhD programme the student may spend 15 ECTS of the 3rd semester's elective courses on the thesis work. The master's thesis will then be extended to 45 ECTS (ITI-SP45).

The student may choose one or more of the elective courses in Advanced Quality Management, Strategic Global Sourcing, Supply Chain Design or Supply Chain Modelling and Decision Making (each will be 5 ECTS) or a seminar of 10 ECTS.

Article 6 Description of the First Semester

Semester theme: Operations Fundamentals

VALUE ARGUMENT

This semester will be the first semester for students at a master level. Student shall at a master level become able to manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches. Therefore the course "operations management methods" is planned in a way that students will learn how different scientific methods from the field of operations management can be used in complex and changing environments of operations management.

To manage complex manufacturing and complex operations call for a range of knowledge, skills and competences. Students will therefore at this semester learn about different manufacturing systems and different philosophies. These systems and philosophies originate from different parts of the world and all have their own historical background. Students will therefore learn how to utilize different manufacturing strategies in different contexts.

To keep the planet sustainable and to keep a sustainable environment within manufacturing and operations management it is important to be able to analyse systems, to develop and to design systems systematically to deliver a high quality. Students will learn about these subjects particularly in the course of "operations analysis" and "quality management" and in the "modularization and platform design" course.

Modern manufacturing will most often include automated manufacturing facilities. Students will therefore learn the basics of automation in the "automation1" course.

One thing is to manage technology and operations, however, the most difficult will often be to manage knowledge while knowledge is not only explicit but often tacit and therefore difficult or impossible to express to others. At the "knowledge management" course students will therefore learn how to manage knowledge both on the individual level and on the organizational level.

All courses will at the master level be based on research. However the relation to practice in the industry will play an important role throughout the semester.

LEARNING OBJECTIVES for the 1st semester are the following

KNOWLEDGE

- Be able to understand different manufacturing systems and philosophies
- To be able to understand operations analysis and quality management
- Understand how modularity and platform design can be used within operations management
- Understand how knowledge can be managed within operations management
- Understand how different scientific methods can be used within operations management
- Understand how automation can be used within manufacturing and operations management.

SKILLS

- Become able to choose between and to utilize different manufacturing systems and philosophies
- Become able to use operations analysis and quality management within operations management
- Become able to develop different modularity and to design a platform to be used within operations management
- Become able to manage tacit and explicit knowledge within operations management
- Become able to select and to use between different scientific methods within operations management
- Become able to programme and operated simple automated systems within manufacturing and operations management.

COMPETENCES

- Analyse and systematize operational data to make decisions within a complex manufacturing environment

Modules
The 1st semester contains the following modules:

Core modules:
OM-MSP – Manufacturing Systems and Philosophies (5 ECTS)
OM-OAQ – Operations Analysis and Quality Management (5 ECTS)
PDCMPD – Modularization and Platform Design (5 ECTS)
PDCKM – Knowledge Management (5 ECTS)
OM-OMM – Operations Management Methods (5 ECTS)

Manufacturing Technology profile specific modules:
OM-AU1 – Automation 1 (5 ECTS)

Global Supply Chain Development profile specific modules:
OM-SCD – Supply Chain Design (5 ECTS)

Article 7 Description of the Second Semester

Semester theme: Operations Technology

VALUE ARGUMENT

On this semester, students will learn about up to date and best practice production technologies from theory and practice.

For production businesses it is very important to be able to design and apply the optimal production technology to obtain competitive advantage. It is important to be able to link production strategy with the right production systems and technologies. Currently many new technologies are becoming available, that may give new opportunities, but on the other hand makes decisions and designs much more complex. This semester students will get deep insight in available production technologies, get specific skills in how to apply and integrate technologies and competences in specifying and designing innovative solutions to industrial companies.

In the course of Advanced and Automated Manufacturing processes the students will get insight in state of the art material and manufacturing processes. This will be studied from literature as well as through practical cases from industrial partners.

Manufacturing and support technologies will focus at the facility management plus the internal material and information flow. This will involve handling, transportation, planning, releasing and execution of the operations.

Information technology will give an understanding of the automation pyramid and integration from ERP through MES to the shop floor. Focus will be at the digitalized factory, internet of things. This is linked to Industry 4.0 and the big wave taking place in ICT right now.

At this semester the courses are applied in an industrial project, where research is performed in companies. In groups industrial companies are analysed, where the students reflect and argue positively about the system designs and selected technologies. Secondly the students challenge existing technologies in the companies by pointing at operational improvements.

LEARNING OBJECTIVES for the 2nd semester are the following

KNOWLEDGE

- Be able to understand the use of selected materials and manufacturing processes.
- Understand the computer integrated digital factory

SKILLS

- Perform systematic and structured material, process and machine selection
- Define appropriate level of automation and specify integration in the digital factory

COMPETENCES

- Design and develop sustainable manufacturing solutions for specific components and products

Modules

The 2nd semester contains the following modules:

Core modules:
OM-IT – Information Technology (5 ECTS)
OM-MST – Manufacturing and Support Technologies (5 ECTS)
OM-AAM – Advanced and Automated Manufacturing Processes (5 ECTS)
OM-PRO – Project (10 ECTS)

Manufacturing Technology profile specific modules:
OM-AU2 – Automation 2 (5 ECTS)

Global Supply Chain Development profile specific modules:
PDCSCS – Supply Chain Simulation (5 ECTS)

Article 8 Description of the Third Semester

Semester theme: Specialization

VALUE ARGUMENT
On third semester the student will continue to develop the competencies within the chosen profile on basis of mandatory courses, profile specific courses as well as on elective courses and modules.
The overall theme of the semester is specialization and will further position the Operations Management field in relation to surrounding topics as well as a global perspective.

The fields of Operation Management, Manufacturing and Technology are often measured against their ability to be sustainable and innovative. On third semester a dedicated course cover this area. The course Sustainability will focus on product-life-cycle and CO_2 footprint in relation to manufacturing, technology and management, and the choices made in this relation. Sustainability has impact on both the internal and external environment and covers products, production and choices related to technologies, materials and processes.

Understanding the innovation process and the crossover to operations is central to manage the time-to-marked. The course "From Innovation to Operation" will give students the understanding of how innovative efforts in companies can be managed and feed into current operations, and are aligned with competencies and capabilities of the organization and the needs and wants of the customers and markets.

The global perspective will be the main topic in both of the profile specific courses. Rapid Globalized Response Manufacturing and Strategic Global Sourcing, will enable the students to understand and analyse the complexity of global networks of both manufacturing and suppliers.

Besides the mandatory courses on the third semester the students has great influence of the design of their own profile as half of the semester equal to 15 ECTS are dedicated to elective courses. This enables the students to customize their semester through either three separate elective courses, or as an In-company period. The In-company period can serve either as an academy period or as a pre-study for the master thesis on 4th semester.

LEARNING OBJECTIVES for the 3nd semester are the following

KNOWLEDGE

Students will:

- Understand the innovation process in relation to both market and production
- Understand the sustainability in relation to both manufacturing, technology and supply chain
- Understand the elements in either a global supply chain or manufacturing network

SKILLS

Students will be able to:

- describe an innovative process
- apply a global perspective in relation to both manufacturing, technology management and supply chain

- incorporate obtained knowledge from elective courses to the field of OM

COMPETENCES

The students will be able to:

- Integrate a holistic and strategic approach concerning sustainability and innovation in relation to management of manufacturing, technology and supply chains.
- Apply expert knowledge in complex decision process in the field of OM, manufacturing, technology and supply chain

MODULES
The third semester contains the following modules:

Constituent modules, 10 ECTS, are:
OM-SU – Sustainability (5 ECTS)
OM-IO – From Innovation to Operation (5 ECTS)

Constituent profile related courses, 5 ECTS, are:
OM-RGR – Rapid Globalized Manufacturing, for manufacturing technology (5 ECTS)
OM-SGS – Strategic Global Sourcing, for Global Supply Chain Development (5 ECTS)

Elective modules, 15 ECTS, include:
OM-INCO – In-company Period (15 ECTS)
OM-SP40 – Master's Thesis (10 ECTS)
OM-SOM – Seminar in Operations Management (10 ECTS)
OM-SCMDM – Supply Chain Modelling and Decision Making (5 ECTS)
OM-AQM – Advanced Quality Management (5 ECTS)
OM-SGS – Strategic Global Sourcing, for Manufacturing Technology
OM-SCD – Supply Chain Design, for Manufacturing Technology
OM-RGR – Rapid Globalized Response Manufacturing, for Global Supply Chain Design

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

As an option this semester may be taken abroad at universities that can supply similar learnings at the same professional and academic level.

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.

Article 9 Description of the Fourth Semester

The fourth 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** and to employ the developed skills of evaluating cases on a scientific basis to real-world problems in an autonomous way with supervision.

The student will be able to analyse a practical problem or situation within a certain framework and to apply solution strategies to it in order to create competitive companies. This includes the evaluation of advantages and disadvantages of theories, methods, and tools to the practical case.

The framework of the master thesis encompasses the following characteristics:

- The thesis is defined within a predetermined time period of six months
- The subject is defined together with the supervisor where emphasis is on practical relevance of the addressed problem
- It will be accompanied by an oral discussion with the external examiner and supervisor, where the student presents the topic, the work plan, the outcomes, conclusions, and outlook. 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 ETCS to the overall grade.

MODULES
The forth semester contains the following modules:

OM-SP30 – Master Thesis
OM-SP40 – Master Thesis (for students who choose to spend 10 ECTS of the 3th semester elective courses on the thesis work)
ITI-SP45 – 4+4 Master Thesis (restricted to students enrolled on the 4+4 PhD programme)

Article 10 Qualifying Degrees for Admission

10.1 Qualifying degrees

Based on 10.2 – 10.4 the university has assessed that the below degrees qualify for admission to Master of Science in Engineering (Operations Management). The list is not exhaustive.

- 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 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

10.2 Level and content of qualifying degrees

Qualifying bachelor degree where the level and content of the scientific and technical courses correspond to a Danish bachelor of science in engineering or bachelor of engineering degree in the subject area of the MSc in Engineering (Operations Management) programme.

10.3 Academic content of qualifying degree

MSc in Engineering (Operations Management) admits applicants with a bachelor degree in accordance with article 10.2 provided that the degree covers:

Subject knowledge	**Extent**
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

10.4 Additional courses

Should the applicant's degree fail to meet the requirements mentioned in 10.1 - 10.3, it is possible to acquire the necessary skills through additional courses. The extent of additional courses cannot exceed 15 ECTS.

Additional courses can be completed in a period of up to one year prior to semester start and six months after semester start. Thus additional courses can be completed before admission to the programme as well as during the first semester of the programme. The supplementary activities must be passed within the examination period of the ordinary examination and students will have only two examination attempts. Additional courses before admission may not exceed 15 ECTS. Additional courses after admission may not exceed 5 ECTS.

10.5 Admission with a foreign degree

Applicants with a bachelor degree or professional bachelor degree from a foreign university who meet the requirements of 10.2 and 10.3 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.

10.6 Possible exemptions

Applicants whose bachelor degree or professional bachelor degree fails to meet the terms stated in 10.1 – 10.5 are not eligible for admission.

Applicants who do not hold a bachelor degree or a professional bachelor degree but who have the academic qualifications equivalent thereto are eligible for admission should their qualifications, based on an academic assessment and comparison, correspond to those of a qualifying Danish degree.

Article 11 External Examiners and the Academic Study Board

The programme belongs under the Academic Study Board of the Faculty of Engineering and the national corps of external examiners for engineering programmes.

Article 12 Entry into Force and Amendments

1. Curriculum 2016 approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 19 November 2015.

2. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 28 January 2016 (Version 1.0).

3. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 24 October 2016 (Version 1.1).

4. Amendments approved by the Academic Study Board of the Faculty of Engineering and the Director of Studies on behalf of the Dean of the Faculty of Engineering 18 November 2016 (Version 1.2).