

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 2018, Version 1.2

Applicable to students admitted February 2018 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, 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 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
- 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-OA (1st sem)	PDCCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-AU1 (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMMT (2nd sem)	OMIAA (2nd sem)	OM-PRO (2nd sem)	PDCKM (3rd sem)	OM_ISST (3rd sem)	OM-AUT3 (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		X		X	X				X		X				X

GRADUATES SPECIALISED IN MANUFACTURING TECHNOLOGY WILL HAVE ACQUIRED ...	OM-MSP (1st sem)	OM-OA (1st sem)	PDCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-AU1 (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMMT (2nd sem)	OMIAA (2nd sem)	OM-PRO (2nd sem)	PDCKM (3rd sem)	OM_ISST (3rd sem)	OM-AUT3 (3rd sem)	OM-SP (4th sem)
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.			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	X
Can modify and reconfigure existing technological solutions.			X			X			X	X			X	X	X
THE FOLLOWING COMPETENCES (ACADEMIC AND INTERDISCIPLINARY)															
Can select and transform the most appropriate manufacturing system including supporting and	X						X		X		X		X	X	X

GRADUATES SPECIALISED IN MANUFACTURING TECHNOLOGY WILL HAVE ACQUIRED ...	OM-MSP (1st sem)	OM-OA (1st sem)	PDCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-AU1 (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMMT (2nd sem)	OMIAA (2nd sem)	OM-PRO (2nd sem)	PDCKM (3rd sem)	OM_ISST (3rd sem)	OM-AUT3 (3rd sem)	OM-SP (4th sem)
help functions within a complex and unpredictable manufacturing context where new strategies are required.															
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	X	X
Can organise the implementation and operation of automation processes.						X				X	X			X	X
Can decide and organise relocation of manufacturing facilities and necessary knowledge to another location.												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	

GRADUATES SPECIALISED IN GLOBAL SUPPLY CHAIN DEVELOPMENT WILL HAVE ACQUIRED ...	OM-MSP (1st sem)	OM-OA (1st sem)	PDCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-SCD (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMMT (2nd sem)	OM-SGS (3rd sem)	OM-PRO (2nd sem)	OM-RGR (3rd sem)	OM-Isst (3rd sem)	OM-SCS (2nd 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		X
Has a highly specialized knowledge of designing and managing supply chains in a global context.						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 different fields.		X		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						

GRADUATES SPECIALISED IN GLOBAL SUPPLY CHAIN DEVELOPMENT WILL HAVE ACQUIRED ...	OM-MSP (1st sem)	OM-OA (1st sem)	PDCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-SCD (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMIMT (2nd sem)	OM-SGS (3rd sem)	OM-PRO (2nd sem)	OM-RGR (3rd sem)	OM-1st (3rd sem)	OM-SCS (2nd sem)	OM-SP (4th sem)
Is able to design the whole value chain, from assessing market needs to launching the product onto the market.			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				
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
Can manage and transform complex supply chain development projects at a strategic, tactical and operational level.	X		X	X						X	X			X	X

GRADUATES SPECIALISED IN GLOBAL SUPPLY CHAIN DEVELOPMENT WILL HAVE ACQUIRED ...	OM-MSP (1st sem)	OM-OA (1st sem)	PDCMPD (1st sem)	OM-AQU (1st sem)	OM-OMM (1st sem)	OM-SCD (1st sem)	OM-IO (2nd sem)	OM-SU (2nd sem)	OM-AMMT (2nd sem)	OM-SGS (3rd sem)	OM-PRO (2nd sem)	OM-RGR (3rd sem)	OM-Isst (3rd sem)	OM-SCS (2nd sem)	OM-SP (4th sem)
Can manage and transform market and product knowledge to design focused supply chain solutions based on the global conditions.						X				X	X				X
Develop sourcing strategies supporting the corporate strategy.						X				X	X			X	
Develop total supply chain cost models.						X					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, fourth 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**

Semester	Modules																													
4	Master's Thesis OM-SP30 / OM-SP40																													
3 (a) or	Study abroad at a partner university ¹																													
3 (b)	Knowledge Management for Engineers PDCKM					Sustainability OM-SU					Strategic Global Sourcing OM-SGS					Elective course ² / In-company Period ³					Elective course ² / Master's Thesis ³ / In-company Period ⁴					Elective course ² / Master's Thesis ³ / In-company Period ⁴				
2	Information Systems and Support Technologies OM-ISST					From Innovation to Operation OM-IO					Advanced Materials and Manufacturing Technologies OM-AMMT					Supply Chain Simulation OM-SCS					Project OM-PRO									
1	Manufacturing Systems and Philosophies OM-MSP					Operations Analysis OM-OA					Modularization and platform design PDCMPD					Advanced Quality Management OM-AQU					Operations Management Methods OM-OMM					Supply Chain Design OM-SCD				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1) Students are encouraged to complete the 3rd semester at a foreign university. Please note that the courses must be approved by the Academic Study Board of the Faculty of Engineering.

2) The student 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 Period (OM-INCO).

Constituent courses, incl. thesis	Profile courses	Elective courses (if a 30 ECTS thesis)	Internationalisation Possibility for a study abroad stay on third semester
-----------------------------------	-----------------	--	---

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

Semester	Modules																													
4	Master's Thesis OM-SP30 / OM-SP40																													
3 (a) or	Study abroad at a partner university ¹																													
3 (b)	Knowledge Management for Engineers PDCKM					Sustainability OM-SU					Technology 3 OM-AU3					Electives ² : In-company Period (15 ECTS) Master's Thesis (10 ECTS) + 5 ECTS electives 15 ECTS electives														
2	Information Systems and Support Technologies OM-ISST					From Innovation to Operation OM-IO					Advanced Materials and Manufacturing Technologies OM-AMMT					Industrial Adaptable Automation OM-IAA					Project OM-PRO									
1	Manufacturing Systems and Philosophies OM-MSP					Operations Analysis OM-OA					Modularization and platform design PDCMPD					Advanced Quality Management OM-AQU					Operations Management Methods OM-OMM					Foundation of Automation OM-AU1				
ECTS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1) Students are encouraged to complete the 3rd semester at a foreign university. Please note that the courses must be approved by the Academic Study Board of the Faculty of Engineering.

2) The student 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 Period (OM-INCO).

Constituent courses, incl. thesis	Profile courses	Elective courses (if a 30 ECTS thesis)	Internationalisation Possibility for a study abroad stay on third semester
-----------------------------------	-----------------	--	---

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 “advanced 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.

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 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 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-OA – Operations Analysis (5 ECTS)

PDCMPD – Modularization and Platform Design (5 ECTS)

OM-AQM – Advanced Quality Management (5 ECTS)

OM-OMM – Operations Management Methods (5 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 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 Materials and Manufacturing Technologies the students will get insight in the fundamentals and advancement in advanced materials and advanced manufacturing technologies that are used in various industrial applications. Especially, there will be emphasis on the chosen criteria of materials and manufacturing technologies on site-specific functional requirement for multiple applications.

The fields of Operation Management, Manufacturing and Technology are often measured against their ability to be innovative. During this second semester, a dedicated course will cover this area. The course "From Innovation to Operation" introduces the students to the intersection and cross-over from product development and innovation efforts to the ramp-up and operations management efforts. At the end of the course, it is the aim that students understand how innovative efforts in companies can be managed and feed into current operations, and that they are aligned with competencies and capabilities of the organization and the needs and wants of the customers and markets.

Starting from the core foundation of manufacturing operations the course "Information Systems and Support Technologies" will develop broad understanding of both software and hardware systems in a complex operation environment. This course will enhance the student's understanding of how cyber physical systems alter hardware technologies supporting operations including investigating applications of Internet-of-Things and the management of information systems.

LEARNING OBJECTIVES for the 2nd semester are the following

KNOWLEDGE

- Be able to understand the use of selected materials and manufacturing processes.
- Understand the sustainability in relation to both manufacturing, technology and supply chain

SKILLS

- Analyse and select advanced manufacturing technologies with the respect of type of material being used for different site specific applications

COMPETENCES

- Can structure and design specific solutions with appropriate support technologies based on operation requirements for manufacturing and warehouse environments. Integrate a holistic and strategic approach concerning sustainability and innovation in relation to management of manufacturing, technology and supply chains.
- Develop existing manufacturing setup and further make use of advanced materials and manufacturing technology in an operation management perspective.

Modules

The 2nd semester contains the following modules:

Core modules:

OM-ISST – Information Systems and Support Technologies (5 ECTS)

OM-IO – From Innovation to Operation (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)

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 global perspective will be the main topic in both of the profile specific courses. Technology 3 and Strategic Global Sourcing, will enable the students to understand and analyse the complexity of global networks of both manufacturing and suppliers.

The fields of Operation Management, Manufacturing and Technology are often measured against their ability to be sustainable. On second semester, a dedicated course in Sustainability will address this important area. It will focus on product-life-cycle and CO₂ 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.

Besides the mandatory courses on the third semester, the students have 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 3rd semester are the following

KNOWLEDGE

Students will:

- Understand the computer integrated digital factory

SKILLS

Students will be able to:

- Acquire the operation management skills to optimally choosing (analyze, design, implement, test and evaluate) the more appropriate Information Systems and Supporting Technologies to drive the required Industrial Applications as within the scope of the company.
- 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:

- Apply expert knowledge in complex decision process in the field of OM, manufacturing, technology and supply chain

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

MODULES

The third semester contains the following modules:

Constituent modules, 10 ECTS, are:

OM-KM – Knowledge Management (5 ECTS)

OM-ISST – Information Systems and Support Technology (5 ECTS)

OM-SU – Sustainability (5 ECTS)

Manufacturing Technology profile specific modules:

OM-AU3 – Technology 3, for Manufacturing Technology (5 ECTS)

Global Supply Chain Development profile specific modules:

OM-SGS – Strategic Global Sourcing, for Global Supply Chain Development (5 ECTS)

Elective modules, 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.

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 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 ECTS to the overall grade.

MODULES

The fourth semester contains the following module:

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)

§10 Entry Requirements

10.0 English language skills

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

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

Applicants from a country outside the European Union or the EEA, however, must pass an IELTS or a TOEFL test with a minimum result of 6.5 in the IELTS test or a minimum result of 88 in the TOEFL test.

For further details, please refer to the University website.

10.1 Level and content of qualifying degrees

To be considered for admission applicants must have a relevant bachelor of science, bachelor of science in engineering, 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, provided that the degree covers:

<u>Subject knowledge</u>	<u>Extent</u>
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

10.2 Additional courses

Should the applicant's degree fail to meet the requirements mentioned in 10.1, 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.

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

10.3 Admission with a foreign degree

Applicants with a bachelor degree from a foreign university who meet the requirements of 10.1 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.

10.4 Qualifying degrees

The university has assessed that the below degrees qualify for admission to Master of Science in Engineering (Operations management). 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 Engineering (PDI) – University of Southern Denmark provided they meet the below requirements:
 - o Admitted to the bachelor programme up to and including September 2014.
 - o Completed one operations management module from Global Management and Manufacturing* or Manufacturing Engineering and Management **
 - o 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
 - o Final BSc project written within the field of operations management, supported by a OM supervisor

*Supply Chain Management 3

**Operations Management 3, ERP, Automation

10.5 Possible exemptions

Applicants whose bachelor degree fails to meet the above-stated terms are not eligible for admission.

Applicants who do not hold a 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 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. Curriculum 2017 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 1.0).
4. Curriculum 2018 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 21 November 2017 (Version 1.0).
5. 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 17 April 2018 (Version 1.1).
6. 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 17 May 2018 (Version 1.2).

Article 13 Transitional Curriculum Arrangements

This curriculum is effective from 1 February 2018. 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.