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Study Program Handbook

# Supply Chain Engineering & Management

Master of Science

Valid for all students starting their studies in fall 2017

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# 1. Program Overview

## 1.1. Concept

The worldwide exchange of goods, the mobility of people and the constant flow of information and ideas requires expertise about transport chains and how exchange processes work, what design options are available and the ability to develop new methods to meet future challenges. The primary goal of Supply Chain Management (SCM) is to achieve constant gains in competitive advantage and to organize the entire chain from strategy to implementation in the best possible way.

Within the last two decades, supply chain management has grown from an important instrument of operative optimization towards a strategic distinguishing feature in competition. Therefore, SCM is a key component in the performance of highly successful enterprises. It adds value for the company and its clients. Constant development, re-configuration and optimization of companies' supply chains are necessary to adapt to changing supply chain environments. However, this requires the consideration and interpretation of a high number of technological, product, process, geographical and structural frame conditions and to derive situation-specific activities. Hence, well-trained leaders are needed who possess the ability to accurately position supply chain management as a strategic business function.

Developing and implementing such strategies calls for leaders who take on these challenges with a strong desire and ability to master them. Executives and project leaders require suitable methods to reduce and handle this complexity. Therefore, they need a concrete understanding of the interdependencies between the supply chain elements. This is a prerequisite to the application of methods and tools that help analyze and optimize cross-company coordination, processes and communication.

It is to be expected that the demand for leaders capable of dealing with this challenge will further increase in the future. Jacobs University's program *Supply Chain Engineering & Management* (SCEM) aims to satisfy this demand through a holistic educational approach focusing on interdisciplinary and practical knowledge that prepares its students for the complex challenges facing both industry and logistics research. It does so by encompassing the above mentioned core points in different ways and appropriately roots them into various modules of the curriculum.

The course of study integrates business and engineering approaches. It focuses on a company's internal organization and the alignment of SCM according to the company's operational strategy. It takes into account external company structures and explores supplier relationships as well as the management of relevant company networks.

Aside from professional qualifications, the development of social competences is necessary for a successful career in the field of SCM. Therefore, a core emphasis of the program is placed upon leadership and supporting the participants' personal development. Students are introduced to models, instruments and methods which can be transferred to all fields related to logistics, supply chain management and production. Lecturers help students apply theoretical knowledge to practice through the use of exercises, case studies, simulations and business games.

The program's educational approach is characterized by its strong practical relevance and strong involvement of participants. Lecturers enthusiastically apply the latest instruction techniques and interactive teaching strategies. Elements of direct response and group work are accompanied by exercises and labs. Moreover, critical discussions are encouraged in order to inspire and improve the students' understanding of course content. Occasionally, online courses may be included, which adds flexibility to the participant's learning process.

The program's directors believe in the efficiency of 'experiential' learning. Hence, faculty, lecturers and tutors intensively use case studies, business games and simulations as active teaching methods. Furthermore, students learn and work successfully in interdisciplinary and intercultural teams.

Intensive communication and discussion between lecturers and participants are central elements of the program. The personal support of each student by an assigned Academic Advisor as well as regular meetings with the program coordinators foster the successful completion of the program despite different learning rates and entry knowledge levels.

The successful completion of the studies leads to the obtainment of an internationally acknowledged Master of Science (MSc) degree and enables a quick career entry in the area of Supply Chain Management, be it in a national or an international context.

## **1.2. Qualification Aims**

Skilled employees are necessary for companies to become trend and agenda-setters in terms of the latest production and logistics technologies, control and optimization approaches and customer and employee-oriented management.

The Supply Chain Engineering & Management program aims to provide an in-depth understanding of the essential aspects in designing, maintaining and analyzing supply chains as well as teach the skills necessary to apply methods and tools to successfully and responsibly work on/in supply chain networks. The program seeks to expand the participants' competencies and capabilities to be prepared for all upcoming tasks and developments within the field of SCM. The curriculum aims to teach modern

leadership and management competencies. This includes the analysis of business processes, the ability and the readiness to recognize the potential for change, the initiation of change processes and the successful design of those change processes. The students are introduced to working with and within companies and very quickly develop personality and professionalism through frequent, individual feedback sessions and personal attention. This facilitates and speeds up their career development and helps them to quickly become valuable assets in the workforce.

Studying at Jacobs University takes place in a highly intercultural environment. Students acquire intercultural competences as part of their education at Jacobs University through everyday group work, class participation, and extra-curricular activities. In this way, the students gain practical intercultural competences and build up their confidence in an English speaking work and study environment. One of the core abilities of internationally successful executives in any business area is a strong, confident appearance and communication ability in various cultural contexts. Particularly, the graduates of the program Supply Chain Engineering & Management:

- understand the strategic importance of Supply Chain Engineering & Management in a global context;
- have knowledge of the most important theories of supply management, supplier relations and value creation;
- have strong analytical skills and understand both qualitative and quantitative methods of decision making;
- apply relevant methods to manage logistics processes and network relationships;
- identify opportunities and risks in global supply networks;
- are able to communicate clearly with experts from different disciplines and to moderate in interdisciplinary interaction;
- develop and mature within their studies using individual feedback on a continuous basis;
- can manage multicultural and diverse environments and easily participate in mixed teams because of Jacobs University's international character;
- are able to speak three languages on average at an advanced level (English, German, and another language);
- act responsibly and ethically towards internal and external partners;
- understand the value, challenges and practice of interdisciplinary approaches;
- demonstrate strong communication skills and well-developed soft skills;
- quickly become acquainted with their work and hence start their career more easily because of the integration of theory and practice during their education;
- experience how to develop their personal career objectives;
- are able to discuss financial issues of a project with financial controllers;
- make operational and strategic decisions involving complex and conflicting objectives;
- provide structured management reports.

### **1.3. Target Audience**

The program is designed for students of different cultural, geographical and professional origins. Candidates who are dedicated and interested in gaining theoretical and application-oriented knowledge are particularly addressed by the program.

Ideally, applicants have already completed their first degree or equivalent training in the disciplines of logistics, economics, engineering or information technology. Other applicants with a proven special affinity or strong interest for the topic and the desire for further Master-level practical education are also welcome to apply.

In particular, the program addresses young professionals with a few years of work experience who would like to focus or deepen their knowledge in the field of SCEM and who are interested in an application-oriented course of study. The program prepares students for a career in industry - graduating students usually enter the job market after graduation. Non-Germans who are interested in starting a career in Germany or at a German enterprise will gain the insights and preparation necessary to enter the German labor market.

The program especially aims to motivate students to add their own input into the design of the program. The educational approach supports exchange and discussion within the student community. Hence, the willingness to interact, to appreciate different teaching and learning formats, to accept challenges, and to develop professionally during the studies are important requirements for successful participation in the program.

Studying at Jacobs University takes place in a highly intercultural environment. Therefore, the willingness to join such a multicultural-international community and work together with students and faculty across various fields of interest is absolutely necessary.

### **1.4. Career Options**

Supply Chain Management is a growing profession in high-demand throughout the world. Survey results of company representatives throughout various industries and company sizes, especially from logistics, show the high demand for flexible young executives with excellent interdisciplinary academic backgrounds.

The program prepares its participants to become decision makers in an increasingly interconnected world: true managers of globalization. SCEM opens the door to a wide range of careers in Germany, Europe and across the globe. The profiles of the MSc Supply Chain Engineering & Management graduates are of great interest to companies

operating in national and international, medium and large-sized, trade and service as well as production industries. Graduates are particularly qualified for tasks in the fields of supply chain management, logistics, procurement, retail, process optimization and beyond.

The career paths that open up for the graduates of SCEM are manifold. They range from specialists in supply chain fields to project management careers in different fields, and from operational to strategic and corporate management positions. After graduation, the students excel at fulfilling various project responsibilities by applying their gained knowledge in the areas of supply chain management, logistics systems, project management, leadership and team management.

Previous graduates of this major have found employment at renowned international companies with ease. Those continuing to PhD studies have been accepted to top-ranking universities. Far more than 50% of the program's graduates start their careers in Germany, most of them in industry (according to an alumni-survey conducted in November 2015). Others work in The Netherlands, Denmark, the United States, Switzerland, India, the United Kingdom, Singapore, Belgium, Thailand, China and elsewhere. Today, graduates work in diverse industries such as automotive, aerospace, consulting, manufacturing, transportation, railway, food & beverage, retail, purchasing, wholesale, information technology as well as in NGOs.

The Career Services Center of Jacobs University as well as its Alumni Association help students in their career development. The Career Services Center provides students with high-quality training and coaching in preparing applications and interviews, in effective presenting, business etiquette and employer research as well as in many other career-aspects. The Career Services Center thus helps students identify and achieve rewarding careers after their graduation from Jacobs University. Furthermore, the Alumni Association helps students to establish a long-lasting and worldwide network that is useful when exploring career opportunities in industry, academia and elsewhere.

### **1.5. Logistics Advisory Board – Inputs from Industry**

The Supply Chain Engineering & Management program is supported by an advisory board whose members are representatives of various industrial companies and institutions. The Advisory Board provides advice to the faculty in designing and further developing the program which helps increase the practical relevance of the program. In addition, each year the board awards one student from the graduating class for outstanding academic achievements.



The members of the Advisory Board include:

- Chair: Mr. Hans-Ludger Körner, Chief Financial Officer of Röhlig & Co. Holding GmbH & Co. KG
- Mr. Jens Bieniek, Chief Financial Officer of BLG Logistics Group AG & Co. KG
- Mr. Christian-Hans Bültemeier, Chief Financial Officer of HansaFlex AG
- Mr. Robert Hempel, Executive Partner of Hanseatische Waren Handelsgesellschaft MBH & CO KG
- Prof. Dr. Stefan Lutz, Adjunct Professor and Director After Sales Market Qualification and Support at Dr. Ing. h.c. F. Porsche AG
- Mr. Dirk O. Rogge, Managing Director of D. Oltmann Reederei GmbH & Co. KG
- Mr. Jürn Schmidt, Management Consultant
- Mr. Christian Vollers, Managing Director of Berthold Vollers GmbH
- Prof. Dr.-Ing. Thomas Wimmer, CEO of Bundesvereinigung Logistik (BVL) e. V.
- Prof. Dr. Stefan Wolff, Adjunct Professor and Executive Partner of 4flow

## **1.6. Admission Requirements**

The Master's program Supply Chain Engineering & Management is designed for students who at minimum hold a Bachelor's degree in the areas of business administration, logistics, economics, industrial engineering and management, or in information technology. Applicants need to prove a strong interest in the contents of the study program.

Some work experience (one to three years) is recommended, but is not a prerequisite. Additionally, participants should possess elevated analytical, problem solving and verbal communication skills.

Studying at Jacobs University takes place in a highly intercultural environment. It is therefore necessary to be willing to join such a multicultural-international community and work together with students and faculty across various fields of interest at Jacobs University.

In general, applicants need to submit the following documents in order to be considered for admission:

- Letter of motivation
- Curriculum vitae (CV)
- University transcript in English or German
- Bachelor degree certificate
- Two letters of recommendation by either previous faculty or team leader
- English language proficiency test with a minimum score of 90 (TOEFL) or 6.5 (IELTS). Alternatively, students may submit a confirmation from their previous university that their education was conducted in English.

Please visit <http://jacobs-university.de/study/graduate/application-information> for more details on the application process.

## 2. The Curriculum

### 2.1. The Curriculum at a Glance

The Supply Chain Engineering & Management curriculum is divided into four semesters and takes two years. It consists of six modules which are composed of a mixture of foundational courses, specialized courses, industry seminars and applied project work, leading to a master's thesis that may be conducted in collaboration with an industry partner and/or a professor. Jacobs University reserves the right to substitute courses by replacements and/or reduce the number of mandatory courses offered.

The first semester is an introductory semester in which students are acquainted with general methods and knowledge about scientific work, language skills and mathematical-technical knowledge. They gain fundamental, interdisciplinary, and state-of-the-art knowledge that is essential for the further development of their studies. The second semester then specializes in supply chains and industrial engineering. The focus of the third semester is on introducing students to dealing with complex tasks in science and industry. Students are expected to demonstrate their capabilities to self-organize the preparation of solutions for current theoretical and practical scientific problems of an industrial partner. During the fourth (final) semester students write their master's thesis.

It is strongly recommended to complete a three-month internship between semesters two and three. It gives students the opportunity to practice and increase their acquired knowledge and abilities.

The courses are grouped into six modules (see figure 1). Each module consists of mandatory components as outlined below. Please check the course catalogue for detailed course descriptions and up-to-date course offerings (<https://campusnet.jacobs-university.de>).


The modules are:

- Module CORE 1 – Supply Chain Foundations: 22.5 credit points
- Module CORE 2 – Supply Chain Management: 15 credit points
- Module CORE 3 – Supply Chain Engineering: 15 credit points
- Module CAREER – Leadership, Skills and Languages: 17.5 credit points
- Module RESEARCH 1 – Methods and Projects: 25 credit points
- Module RESEARCH 2 – Master's Thesis: 25 credit points

In order to graduate, students need to obtain 120 ECTS credit points. The ECTS (European Credit Transfer System) is a system defining the student workload required to achieve the objectives of a study program. At Jacobs University, 1 credit point is

equivalent to 25 hours of student workload. In each module, students must obtain a minimum amount of credit points (with an average of 30 credit points per semester).

Figure 1: Modules of the study program Supply Chain Engineering & Management

 <b>MSC SUPPLY CHAIN ENGINEERING &amp; MANAGEMENT CURRICULUM</b>						
	SEMESTER I - Fall 1	SEMESTER II - Spring 1	SUMMER BREAK	SEMESTER III - Fall 2	SEMESTER IV - Spring 2	ECTS WEIGHT
CORE I: Supply Chain Foundations (22.5)	Introduction to Transportation, Logistics & SCM (5)	Law for Logistics (5)	Optional Internship		Ethics & Sustainable Business (2.5)	19%
	Advanced Business Mathematics (5)					
	International Purchasing and Business (2.5)					
	Econometrics (2.5)					
CORE II: Supply Chain Management (15)		Supply Chain Management (5)		Project Management Concepts (2.5)		13%
		Strategic & Innovation Management (2.5)		Management of Logistics Service Providers (2.5)		
		Advanced Quality & Risk Management (2.5)				
CORE III: Supply Chain Engineering (15)	Modelling & Simulation in SCMLEC (2.5)	Supply Chain Engineering (5)		The Big Data Challenge: Topics, Applications, Perspectives (5)		13%
	Modelling & Simulation in SCMLAB (2.5)					
CAREER: Leadership, Skills & Languages (17.5)	Communication & Presentation Skills (2.5)	Leading Teams and Groups (2.5)		Orientation Course SCEM III (0)	Decision Making (2.5)	15%
	Language Course (2.5)	Intercultural Competence & Management (2.5)			Orientation Course SCEM IV (0)	
	Orientation Course SCEM I (0)	Germany Today - Insights into German History, Politics, Economy, and Society (2.5)				
		Language Course (2.5)				
		Orientation Course SCEM II (0)				
RESEARCH I: Methods & Projects (25)	Introduction to Academic Writing in SCEM (5)			Research Project (10)		21%
				Industrial Project (10)		
RESEARCH II: Master's Thesis (25)					Master's Thesis (25)	21%
ECTS	30	30	0	30	30	120

## 2.2. Modules

### 2.2.1. CORE 1 – Supply Chain Foundations

Amount of credit points to be obtained in this module: 22.5

This module covers introductory information on supply chain management, logistics and transportation. Furthermore, it provides basic knowledge on concepts and techniques, methods and tools necessary to work with supply chains. Last but not least, the module offers insights into legal aspects and features of ethics in business.

The module aims at lifting all participants to a common level of basic knowledge and thus serves as the basis for the more specialized modules.

Course Title	Course No.	Semester	Mandatory	Credits
Advanced Business Mathematics	051461	1	yes	5
Introduction to Transportation, Logistics and Supply Chain Management	051433	1	yes	5
International Purchasing and Business	051432	1	yes	2.5
Econometrics	JTME-990222	1	yes	2.5
Law of Transportation, Forwarding and Logistics	930351	2	yes	5
Ethics and Sustainable Business	051522	4	yes	2.5

### 2.2.2. CORE 2 – Supply Chain Management

Amount of credit points to be obtained in this module: 15

This module provides knowledge on concepts and techniques of strategic management and organization. These topics are incorporated into the subject of supply chain management. Participants are intended to understand the strategic role of SCM for long-term organizational success. They will learn about the importance of quality and risk as well as business continuity management in case of supply chain disruptions and the importance of innovation management. In the courses of the module, students will develop a supply chain strategy based on a competitive strategy and will apply modeling and analysis techniques to optimize existing supply chain configurations.

Course Title	Course No.	Semester	Mandatory	Credits
Supply Chain Management	051404	2	yes	5
Strategic and Innovation Management	051423	2	yes	2.5
Advanced Quality and Risk Management	052101	2	yes	2.5
Management of Logistics Service Providers	051501	3	yes	2.5
Project Management Concepts	051412	3	yes	2.5

### 2.2.3. CORE 3 – Supply Chain Engineering

Amount of credit points to be obtained in this module: 15

Besides the *management* of supply chains, the program directors regard the students' understanding and application of key areas in supply chain engineering as essential for their future careers. This module therefore provides methods, technologies and knowledge regarding supply chain simulation and modelling. Additionally, students will apply the knowledge gained in practice-oriented labs. The module also introduces students to more advanced concepts, methods and technologies of supply chain engineering with an industrial perspective. Special attention is given to the field of 'Big Data'. Students are introduced to its topics and learn about specific areas related to this increasingly important and relevant field within industry.

Course Title	Course No.	Semester	Mandatory	Credits
Modelling & Simulation in Supply Chain Management (Lecture)	051441	1	yes	2.5
Modelling & Simulation in Supply Chain Management (Lab)	051431	1	yes	2.5
Supply Chain Engineering	051403	2	yes	5
The Big Data Challenge: Topics, Applications, Perspectives	340111	3	yes	5

### 2.2.4. CAREER – Leadership, Skills and Languages

Amount of credit points to be obtained in this module: 17.5

In this module students acquire skills preparing them for a career as supply chain engineers and managers in industry and beyond. The courses cover topics such as decision making and intercultural competence. The module teaches students leadership concepts and techniques. Courses deal with communication skills, both through verbal presentation of work results in front of a group and through written reports. These topics are incorporated into the subject of supply chain management.

Germany is an important logistics hub and many international companies are present in the German market. Due to this fact, a solid command of the German language prepares the program's participants for a career within Germany as well as for an international career dealing with German suppliers and customers. Therefore, German language courses are an integral part of the curriculum and provide ECTS credit points. To facilitate the attainment of high-level competence in the German language, intensive courses are offered during winter breaks. Students who are German native speakers or whose knowledge of the German language is at a very high level (C1, C2) must attend other language courses (e.g. Spanish or French). In addition, a course on

current topics in German society, politics, history and economic structure helps the students to orientate themselves in Germany and understand German culture.

Course Title	Course No.	Semester	Mandatory	Credits
Orientation Courses Supply Chain Engineering and Management I, II, III, IV	051451	1	yes	0
	051454	2	yes	0
	051453	3	yes	0
	051455	4	yes	0
Communication & Presentation Skills	051464	1	yes	2.5
Germany Today – Insights into German History, Politics, Economy, and Society	051443	2	yes	2.5
Leading Teams and Groups	051442	2	yes	2.5
Intercultural Competence & Management	051411	2	yes	2.5
Two German language courses (choose other language(s) when German language skills are at a high level (C1, C2))	depending on individual level of student	1	yes	2.5
		2	yes	2.5
Decision Making	051422	4	yes	2.5

### 2.2.5. RESEARCH 1 – Methods and Projects

Amount of credit points to be obtained in this module: 25

The module on methods and projects is meant to provide its participants with instruments and techniques of advanced scientific research, academic writing and presentation of research results. Further, the module features two advanced projects, each worth 10 credit points. These projects can be offered partially in close-collaboration between the faculty of Jacobs University and partner companies. Projects within the scope of Jacobs University's research groups are also admissible. These projects are guided research or development projects. The module aims at further improving the students' analytical competencies and to advance their understanding of problem solving. Therefore, the problem analysis, as well as the development of the solution, will be embedded into a deep theoretical framework intended to apply scientific research results into practical issues. The students will prepare presentations, scientific papers and reports about their work – partially in collaboration with representatives from companies.

Course Title	Course No.	Semester	Mandatory	Credits
Introduction to Academic Writing in SCEM	051481	1	yes	5

Research Project in SCEM	051502	3	yes	10
Industrial Project in SCEM	051532	3	yes	10

### 2.2.6. RESEARCH 2 - Master's Thesis

Amount of credit points to be obtained in this module: 25

The master's thesis is scheduled for the fourth semester. Upon agreement with the sponsoring supervisor, the thesis may be started earlier than the end of the third semester. The selected topic of the thesis, as well as the approach, must be related to a real SCM or logistics problem. The Program Chair has to approve the topic to ensure it is embedded within the program's overall topic, its aims and goals.

Students conduct research and write the thesis mainly on their own while being supported by their thesis supervisor. The thesis should demonstrate the student's ability to analyze and solve complex problems. It is an opportunity to apply and demonstrate scientific skills, the knowledge gained throughout the course of study and the ability to develop new insights.

Furthermore, the thesis should demonstrate the comprehensive understanding of the underlying field and it should be an original contribution to SCM theory and/or practice. Additionally, the student will be able to prove his/her skills in analyzing and solving a single problem based upon a target-oriented application of scientific instruments and critically reflect on current relevant scientific literature in the development phase. Thereby, compliance with necessary quality standards in addition to the requirements for scientific research, as outlined in the corresponding guidelines, is mandatory.

Usually, students choose to work with one of the research groups of the logistics faculty. They have at least one supervisor who takes responsibility for progress-tracking and mentoring of the thesis and provides guidance on good scientific practice. Supervision can be partially delegated or shared, especially if the thesis is associated with an existing project or is part of an interdisciplinary collaboration. In any case, the responsibilities for supervision need to be agreed upon at the start of the thesis. The thesis has a target size of about 60 pages and it presents the research results of the student.

The thesis will be jointly judged by a thesis committee which consists of the thesis supervisor and at least one other member. The other member(s) can be faculty members of Jacobs University or external members. All members need to hold a PhD and/or must be professors at a university institution. The thesis will be graded using the Jacobs University grading system ranging from 1.00 (excellent) to 5.00 (fail). If a thesis does not pass, the examination committee may agree that the thesis can be resubmitted within three months.



<b>Title</b>	<b>Course No.</b>	<b>Semester</b>	<b>Mandatory</b>	<b>Credits</b>
Master's Thesis	no number	4	yes	25

Additional regulations regarding the Master's thesis can be found in § 5.3 of the Policies for Master Studies ([www.jacobs-university.de/academic-policies](http://www.jacobs-university.de/academic-policies)).

## 3. Supply Chain Engineering & Management Graduate Program Regulations

### 3.1. Scope of these Regulations

The regulations in this handbook are valid for all students who entered the Supply Chain Engineering & Management graduate program at Jacobs University in fall 2017. In case of conflict between the regulations in this handbook and the general Policies for Master Studies, the latter apply (see <http://www.jacobs-university.de/academic-policies>).

### 3.2. Degree

Upon successful completion of the program, students are awarded a Master of Science (MSc) degree in Supply Chain Engineering & Management.

### 3.3. Graduation Requirements

In order to graduate, students need to obtain 120 ECTS credit points that were not used for the completion of a previous bachelor's degree. In addition, the following graduation requirements apply:

- In each module, students need to obtain a minimum amount of credit points as indicated in chapter 2 of this handbook.
- Students need to complete all mandatory components of the program as indicated in chapter 2 of this handbook.

### 3.4. Other Program-Specific Policies & Practices

Close contact and cooperation between program representatives and students is crucial. Therefore, regular meetings are held to continuously evaluate the program, its courses and workshops, supervision and opportunities. In doing so, the program directors gain important insights on students' experiences, demands and overall impressions of the program. On the course level, students are asked to perform course evaluations to ensure the high-quality of courses and to ensure necessary changes can be made by individual lecturers.

The program's head and coordinator intensively make use of this feedback and the feedback of industry partners to further improve the learning environment, the program's offering and its progress. The current program was highly shaped through such input from previous experiences and discussions with several stakeholders, including both students and industry.

Jacobs University Bremen reserves the right to substitute courses by replacements and/or reduce the number of mandatory/mandatory-elective courses offered.