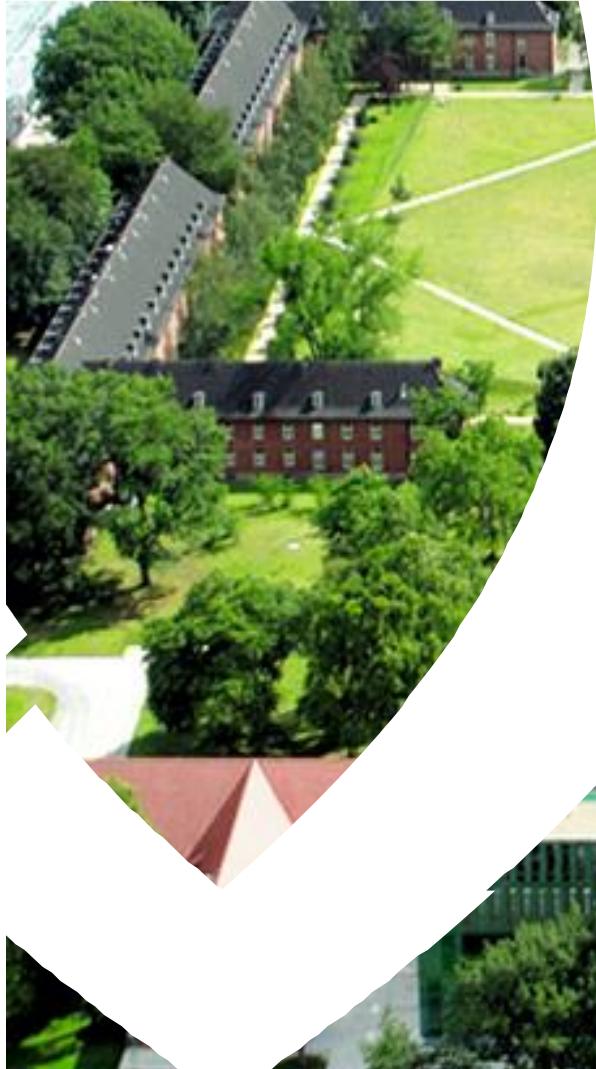




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Study Program Handbook

Supply Chain Management

Master of Science

Subject-specific Examination Regulations for Supply Chain Management (SCM)

The subject-specific examination regulations for SCM are defined by this program handbook and are valid only in combination with the General Examination Regulations for Master degree programs ("General Master Policies").

Upon graduation students in this program will receive a Master of Science (MSc) degree with a scope of 120 ECTS credit points (CP) (for specifics see chapter 3 of this handbook).

Valid for all students starting their studies in Fall 2019

Date: April 10.th, 2019

Study Program Chair: Prof. Dr. Yilmaz Uygun

<https://www.jacobs-university.de/study/graduate/programs/supply-chain-management>

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1 Program Overview

1.1 Backdrop

The worldwide exchange of goods, the mobility of people and the constant flow of information and ideas require 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 in an increasingly digitalized world. 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.

Supply chain management has constantly 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, reconfiguration and optimization of companies' supply chains are necessary to adapt to changing supply chain environments. However, this requires the consideration and interpretation of a large number of technological, product, process, geographical and structural data, information, and conditions and to derive situation-specific responses as well as anticipate future developments. 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 ever growing complexity. Therefore, they need a concrete understanding of the interdependencies between the supply chain elements and the growing amount of data exchanged between them. This is a prerequisite for the proper understanding of supply chains by means of data analytics and the application of methods and tools that help optimize cross-company coordination, processes and communication.

1.2 Concept

It is to be expected that the demand for leaders capable of dealing with challenges related to highly interconnected and digitalized supply chains will further increase in the future. Jacobs University's program *Supply Chain Management* (SCM) 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 initially mentioned core challenges in different ways and appropriately roots them into various modules of the curriculum.

The unique selling point of this program is the strong focus on data analytics and data engineering. In an increasingly interconnected and digitalized world, a vast amount of data is gathered along supply chains that need to be processed, analyzed and made accessible to decision-makers. Specially tailored modules in data analytics and programming equip our students with these skills, which are in high demand across industries.

Admitting students from different disciplines from different prestigious universities worldwide, the program aligns students' knowledge on SCM in the first semester and builds on this with specialist modules in the next semester. From the third semester, independent research and application

becomes more prominent, which eventually results in preparing a master's thesis on a challenging topic.

The program is application-oriented in its nature. This is reflected in the modules by aligning the contents with real-world issues, integrating practitioners from successful companies of various industries, collaborating with companies in terms of case studies, and field trips. With regard to content, the program focuses on companies' needs in today's world and takes into account external company structures. It explores supplier relationships as well as the management of relevant company networks.

The program's educational approach is characterized by its strong practical relevance and high involvement of participants. Lecturers enthusiastically apply the latest instruction techniques and interactive teaching strategies. Students are introduced to models, instruments and methods that can be transferred to all fields related to logistics, supply chain management and production. Lecturers help students apply theoretical knowledge through practice with exercises, case studies, simulations and business games. Moreover, critical discussions are encouraged in order to inspire and improve the students' understanding of module contents.

Apart from professional qualifications, the development of social competence is necessary for a successful career in the field of SCM. Therefore, a core emphasis of the program is placed upon supporting the participants' personal development in terms of soft skills and language skills. To account for the diversity in the student body and their tendency to work in Germany, we train students in (German) language proficiency and convey country-specific information to give them the best preparation for the national as well as the international job market.

The study program chair believes in the efficiency of experience-based 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 chair fosters the successful completion of the program despite different learning rates and entry knowledge levels.

The successful completion of the program leads to the conferral 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.

1.3 Qualification Aims

1.3.1 Educational 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 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 increasingly digitalized supply chains. The curriculum aims to teach modern leadership and management competencies with a strong emphasis on data analytics and engineering. This includes the analysis of data-driven 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.

Students are introduced to working with and within companies and very quickly develop professionally through frequent, individual feedback sessions and personal guidance. This facilitates and speeds up their career development and helps them to become valuable assets in the workforce within a short period of time.

Studying at Jacobs University takes place in a highly intercultural environment. Students acquire intercultural competence as part of their education at Jacobs University through everyday group work, class participation, and extra-curricular activities. In this way, students gain practical intercultural competencies 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.

1.3.2 Intended Learning Outcomes

By the end of this program, students will be able to:

- critically evaluate and apply the most important theories and methods of supply chain management, supplier relations and value creation to real life situations, organizations and industries;
- integrate new knowledge in complex supply chain contexts based on extensive data analytics;
- assess opportunities and risks in global supply networks;
- make scientifically substantiated and data-driven decisions in the context of SCM and logistics and critically reflect possible impacts on business, environment and society;
- independently investigate complex problems and develop new knowledge using both qualitative and quantitative methods;
- apply interdisciplinary approaches (esp. from data science and engineering as well as mathematics) to solve academic and professional problems;
- efficiently and effectively manage supply chain related projects in multicultural and diverse environments;
- detect conflict potentials and solve interpersonal issues in large projects;
- communicate clearly and professionally with experts from different disciplines in a variety of forms and moderate in interdisciplinary interaction;
- manage multicultural and diverse environments and effectively participate in and lead mixed teams;
- use individual feedback on a continuous basis to develop and mature within their studies and beyond;
- quickly become acquainted with their work and hence start their career more easily because of the integration of theory and practice during their education;
- develop a professional self-perception based on goals and standards of professional actions in SCM;
- justify their professional actions with methodical knowledge and develop alternative approaches for issues they face in managing supply chains;

- take responsibility for their own learning, personal development and role in society;
- adhere to and defend ethical, scientific and professional standards.

1.4 Target Audience

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

Prior to admission, applicants have already completed their first degree or equivalent training in the disciplines of logistics, economics, engineering or information technology. Applicants with first degrees in other subject areas with a proven special affinity or strong interest in the topic and the desire for further master-level practical education are also welcome to apply.

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 SCM 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 further gain the insights and preparation necessary to enter the German labor market.

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.

1.5 Career Options

Supply Chain Management combined with data analytics is a growing profession in high demand worldwide.

The program prepares its participants to become decision makers in an increasingly interconnected world: true managers of the digitalized economy. SCM opens the door to a wide range of careers in Germany, Europe and around the globe. The data analytics and engineering oriented profile of the MSc Supply Chain 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 SCM 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, students will be able to fulfil various project responsibilities by applying the knowledge gained in the areas of supply chain management, logistics systems, project management, leadership and team management.

Previous graduates of this program have found employment at renowned international companies with ease. Those continuing to PhD studies have been accepted to top-ranking universities. According to our alumni surveys, the majority of the program's graduates start their careers in Germany, most of them in the manufacturing industry. 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. Thus, it helps students identify and achieve rewarding careers after their graduation from Jacobs University. In addition to that, the Alumni Association helps students to establish a long-lasting worldwide network which is useful when exploring career opportunities in industry and academia.

1.6 Admission Requirements

The graduate program Supply Chain Management requires students to hold at least a good 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, to be explained in a motivation letter. The general "Admission and Enrollment Policies" of Jacobs University apply (<https://www.jacobs-university.de/admission-und-enrollment-policies>).

Social commitment as well as extracurricular and voluntary activities during undergraduate studies, e.g. university service, clubs, varsity, social work, etc. will be considered. 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 which must be substantiated in recommendation letters.

Study 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.

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's degree certificate or equivalent (may be handed in later)
- Two letters of recommendation
- English language proficiency test with a minimum score of 90 (TOEFL), 6.5 (IELTS) or 60 (Duolingo). Native speakers and applicants who completed their undergraduate studies in English may be exempt from this requirement

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 Management curriculum is divided into four semesters and takes two years to complete. Each semester is composed of a mixture of core, research & discovery, math & methods, and career modules, leading to a master's thesis that may be conducted in collaboration with an industry partner.

The first semester is a foundational semester in which students from different educational and cultural backgrounds get acquainted with general methods and knowledge about supply chain and logistics as well as data analytics, programming, language and soft skills that is essential for the further development of their studies. In the second semester, there is a strong focus on the different facets of supply chains, such as design, purchasing, distribution, etc. In the third semester, emphasis is put on introducing students to complex tasks in science and industry. Here, they can combine modules that best fit their abilities and interests. 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 and final semester students work on their master's thesis.

The modules are grouped into five areas as outlined in the Schematic Study Plan (figure 1). In the third semester, students have to choose 3 mandatory elective modules (out of 4 modules in the core area).

The areas are:

- Core Area: 45 CP
- Research & Discovery Area: 15 CP
- Math & Methods Area: 15 CP
- Career Area: 15 CP
- Master Thesis: 30 CP

Detailed module descriptions in their latest version are available in the catalogue on CampusNet (<https://campusnet.jacobs-university.de>).

3 Supply Chain 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 Management graduate program at Jacobs University in Fall 2019. 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 study program, students are awarded a Master of Science (MSc) degree in Supply Chain Management.

3.3. Graduation Requirements

In order to graduate, students need to obtain 120 credit points. In addition, the following graduation requirements apply:

- Students need to complete all mandatory components of the program as indicated in chapter 2 of this handbook.

1.4. 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 modules and workshops, supervision and opportunities. In doing so, the program director and involved faculty gain important insights on students' experiences, demands and overall impressions of the program. On the module component level, students are asked to perform module component evaluations to ensure the high-quality of modules and to ensure necessary changes can be made by individual lecturers.

The study program chair makes intensive 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 modules by replacements and/or reduce the number of mandatory/mandatory-elective modules offered.

4 Schematic Study Plan for Supply Chain Management

Semester

MSc Degree in **Supply Chain Management** (120 CP)

	Master Thesis (30 CP)						
4	Mandatory Electives* (15 CP)						
3	Data Analytics in SCM	Principles of Consulting	Supply Chain Finance	Smart Cities and Transport. Concepts	Research Project (5 CP)	Programming in R (5 CP)	Sustainable Business in Germany (5 CP)
2	Trends & Challenges in SCM (5 CP)	Adv. Supply Chain Management (5 CP)	Purchasing & Distribution (5 CP)	Supply Chain Engineering (5 CP)	Research Methods (5 CP)	Language (2.5 CP)	Communicating and Presenting (5 CP)
1	Adv. Project, Quality & Risk Management (5 CP)	SCM and Logistics (5 CP)	Big Data Challenge (5 CP)	Applied Modeling & Simulation (5 CP)	Programming in Python (5 CP)	Language (2.5 CP)	
Area	CORE 45 CP			RESEARCH AND DISCOVERY 15 CP	MATH & METHODS 15 CP	CAREER 15 CP	

* Choose 3 out of 4 modules with each 5 CP.

Figure 1: Schematic Study Plan for Supply Chain Management

5 Study and Examination Plan

Supply Chain Management (SCM)						
Matriculation Fall 2019						
Module Component		Status ¹	Assessment type	Examination period ²	Semester	CP
First Semester						30
Core Area						15
MCO001-ProjQualRis	<i>Advanced Project, Quality and Risk Management</i>					5
MCO001-052101	Risk Management	m	Written examination	8-14	1	2.5
MCO001-051412	Project Management Concepts	m	Oral examination	15/16	1	2.5
MCO002-051002	Supply Chain Management and Logistics	m	Written examination	15/16	1	5
MCO003-051003	Big Data Challenge	m	Term paper	8-14	1	5
Math & Methods Area						5
XXXXXX-XXXXXX	Programming in Python	m	Written examination	15/16	1	5
Research & Discovery Area						5
MRD001-051011	Applied Modeling & Simulation	m	Project report	8-14	1	5
Career Area						5
MCA002	Language Skills	m	Written examination	15/16	1	2.5
MCA001-CommPres	<i>Communicating and Presenting³ (to be continued in semester 2)</i>					5
MCA001-051464	Communication and Presentation Skills for Executives	m	Oral presentation	8-14	1	2.5

Second Semester						30
Core Area						15
MCO004-051004	Trends & Challenges in SCM	m	Project report	8-14	2	5
MCO005-051005	Advanced Supply Chain Management	m	Project report	8-14	2	5
<i>MCO006-PurchDist</i>	<i>Purchasing & Distribution</i>					5
MCO006-051432	International Purchasing	m	Term paper	8-14	2	2.5
MCO006-XXXXXX	Distribution Logistics	m			2	2.5
Math & Methods Area						5
MMM002-ResMeth	<i>Research Methods</i>					5
MMM002-XXXXXX	Quantitative Research: Econometrics in SCM	m	Term paper	8-14	2	2.5
MMM002-XXXXXX	Qualitative Research: Methods and Methodology	m			2	2.5
Module Component		Status ¹	Examination type	Examination period ²	Semester	Credits
Research & Discovery Area						5
MRD002-051012	Supply Chain Engineering	m	Group project + Written examination	8-14 + 15/16	2	5
Career Area						5
MCA002	Language Skills	m	Written examination	15/16	2	2.5
<i>MCA001-CommPres</i>	<i>Communicating and Presenting³ (continuation from semester 1)</i>					5
MCA001-051016	Academic Writing	m	Writing assignment	8-14	2	2.5
Third Semester						30

Core Area (choose 3 modules)							15
MCO007-051007	Supply Chain Finance	me	Written examination	15/16	3	5	
MCO008-051008	Data Analytics in Supply Chain Management	me	Project report	8-14	3	5	
MCO009-051009	Smart Cities and Transportation Concepts	me	Project report	8-14	3	5	
MCO010-051010	Principles of Consulting	me	Group project	8-14	3	5	
Math & Methods Area							5
MMM003-XXXXXX	Programming in R	m	Written examination	8-14	3	5	
Research & Discovery Area							5
MRD003-051013	Research Project	m	Term paper	8-14	3	5	
Career Area							5
MCA003-Business	Sustainable Business in Germany	m	Written examination	15/16	3	5	
Fourth Semester							30
MMT002-051019	Master Thesis	m	Thesis	individual	4	30	
Total CP							120

¹ Status (m = mandatory, me = mandatory elective)

Figure 2: Study and Examination Plan

² Each lecture period lasts 14 semester weeks and is followed by reading and examination days. Written examinations are centrally scheduled during weeks 15 and 16. For all other assessment types, the timeframes indicated in the above table stipulate during which period module work has to be handed in or presented. Specific information on dates of topic

announcement as well as submission deadlines is communicated in the syllabus which is made available to the students at the beginning of each semester. Academic dates are published in the university-wide Academic Calendar (www.jacobs-university.de/academic-calendar).

³ Module consists of two mandatory module components, which are offered in semester 1 and semester 2 respectively.

6 Modules

6.1 Core Area

6.1.1 Advanced Project, Quality and Risk Management

MCO001 – ProjQualRisk		5 CP
<ul style="list-style-type: none">▪ MCO001-052101 Risk Management▪ MCO001-051412 Project Management Concepts		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Instructors of Record	Prof. Dr. Werner Bergholz; Dr. Christopher Hausmann	
Content Educational Aims	<p>and</p> <p>Managing supply chains requires the handling of numerous projects as to scope, time, resources, costs, quality and risks. This module addresses all project management issues holistically; dealing with quality and risk management in detail. All of these areas include the transfer of specialist knowledge as well as soft skills.</p> <p>Project Management contains the application of appropriate knowledge, processes, skills, tools and techniques to contribute to the success of temporary endeavors undertaken to create a unique product, service, or result. Project Management is of overwhelming relevance for global supply chains, esp. those which develop rapidly by innovative processes. In research and practice, project management is of increasing importance and it is correspondingly accepted to balance the competing project constraints of scope, quality, schedule, budget, resources and risk. On the individual level, project management knowledge can be considered a basic skill today.</p> <p>Quality Management is a generic engineering/management tool, which can be applied to any production or service industry. This part of the module is structured according to the ISO9001:2000 quality management standard and will focus on specific methods and techniques as well as application</p>	

	<p>examples in industry. Topics include Quality Function Deployment (QFD), Statistical Process Control, 8 D Process, and lean management methods.</p> <p>Risk Management comprises all coordinated activities that help organizations understand, evaluate and take action on their risks in order to minimize the effect of uncertainty on objectives. Multilayer supply chains face certain threats: natural disasters, terrorist attacks or the loss of important suppliers and service providers, all of which can disable an organization for days or weeks. Thus, effective risk management can make the difference between survival and collapse of an organization. This part of the module presents the foundations for the general field of risk management before continuing to supply chain risk management. Topics include Failure Mode and Effects Analysis (FMEA), supply chain risk classifications, as well as supply chain risk management strategies and case studies.</p>
Intended Outcomes	<p>Learning By the end of this module, students will be able to:</p> <p><i>Project Management:</i></p> <ul style="list-style-type: none"> ▪ apply important tools and methods of project management, quality management, risk management; ▪ efficiently and effectively manage projects in the context of SCM ▪ communicate clearly with project team members throughout the project life cycle; ▪ interact with stakeholders by continuously tracking and learning; ▪ take responsibility for their own actions in project teams; <p><i>Quality Management:</i></p> <ul style="list-style-type: none"> ▪ apply and integrate quality tools in order to identify and evaluate causes for quality problems and suggest appropriate actions; ▪ apply tools to relate customer requirements to technical specifications for products, thus ensuring high customer satisfaction; ▪ critically evaluate quality problems based on data analysis (Pareto analysis, histograms, scatter diagrams, stratification); ▪ develop an overall philosophy for continuous improvement and total quality management <p><i>Risk Management:</i></p> <ul style="list-style-type: none"> ▪ apply methods to assess and categorize risks based on their severity, likelihood of occurrence and likelihood of detection;

	<ul style="list-style-type: none"> ▪ design an appropriate supply chain risk management approach based on proactive and reactive strategies; ▪ make scientifically substantiated decision related to risk categories.
Assessment	<p>Separate module component assessments both of which have to be passed:</p> <p>Type I: Written examination</p> <p>Duration: 60 minutes</p> <p>Weight: 50%</p> <p>Scope: All intended learning outcomes of Quality Management & Risk Management</p> <p>Type II: Oral examination</p> <p>Duration: 1 hour per student</p> <p>Weight: 50%</p> <p>Scope: All intended learning outcomes of Project Management</p>
	The educational aims and intended learning outcomes of this module require two assessment types to evaluate both specialist knowledge in Quality & Risk Management and soft skills (communication and interpersonal skills) in Project Management.
Entry Requirements	Pre-requisites
	Co-requisites
	Knowledge, Skills and Competencies
Recommendations for Preparation	Project Management Institute (2017): A Guide to the Project Management Body of Knowledge (PMBOK® Guide). 6 th edition.
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Seminars (17.5 hours) ▪ Private study (90 hours)

Relationship to other Modules	<p>This module is foundational and its contents will be applied in several modules, such as MCO002 – SCMLog, MCO003 – BigData, MCO004 – TrendChalSCM, MCO006 – PurchDist, MCO008 – DataAnaSCM, MCO009 – SmartCit, MCO010 – PrincCons, MRD001 – ModSim, MRD002 – SCEng, MMM003 – AdvProgAppr, MCA003 – Business, and MMT002 – MasterThesis</p> <p>Communication skills and training taught in MCA001 – CommPres facilitate the completion of tasks in this module.</p>
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Module Components				
No.	Title	Type	CP	Mandatory
MCO001-052101	Risk Management	Lecture	2.5	yes
MCO001-051412	Project Management Concepts	Seminar	2.5	yes

6.1.2 Supply Chain Management and Logistics

MCO002 – SCMLog		5 CP
▪ MCO002-051002 Supply Chain Management and Logistics		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students Optional for students of other programs	
Module Coordinator	Dr. Stanislav Chankov	
Content and Educational Aims	<p>The focus of this module is to provide a holistic perspective on logistics and supply chain management in terms of processes, function, conflicting targets, key terms and definitions, and main methods.</p> <p>The module is structured in three main parts:</p> <ul style="list-style-type: none"> ▪ Logistics Processes – covers the procurement, production, and distribution processes. ▪ Logistics Management - covers inventory management, logistics service providers and lean management. ▪ Supply Chain Management – covers cross-company management aspects and supply chain strategies. 	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ discuss different definitions and terms commonly used in the logistics and supply chain management realm; ▪ evaluate in what way logistics and supply chain operations impact the economic success of a company; ▪ analyze processes and strategies of procurement, production and distribution logistics; ▪ develop solutions to logistics problems by applying different methods and tools for analyzing and improving logistics/ supply chain processes ▪ evaluate how the economic and industry trends impact the logistics and supply chain performance of production and service provider companies; 	

	<ul style="list-style-type: none"> ▪ compare and contrast different supply chain strategies and their applicability to different settings; ▪ integrate knowledge in logistics and SCM to solve different case studies and real-world problems. 	
Assessment	<p>Type: Written Examination</p> <p>Duration: 120 minutes</p> <p>Weight: 100%</p> <p>Scope: All intended learning outcomes of the module</p>	
Entry Requirements	Pre-requisites	--
	Co-requisites	--
	Knowledge, Skills and Competencies	Logical and analytical skills
Recommendations for Preparation	Christopher, M (2016): Logistics & Supply Chain Management. 5 th edition. Financial Times Publishing.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (35 hours) ▪ Private study (90 hours) 	
Relationship to other Modules	This module is the pre-requisite for several other modules, i.e. <i>MCO004 Trends & Challenges in SCM</i> , <i>MCO005 Advanced Supply Chain Management</i> , <i>MCO006 Purchasing & Distribution</i> , <i>MRD002 Supply Chain Engineering</i> . Project management concepts taught in MCO001 ProjQualRisk will be applied.	

6.1.3 Big Data Challenge

MCO003 – BigData		5 CP
▪ MCO003-051003 Big Data Challenge		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	<ul style="list-style-type: none"> ▪ MSc Data Engineering ▪ MSc Supply Chain Management ▪ MSc Psychologie 	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Adalbert F.X. Wilhelm	
Content and Educational Aims	<p>Big data is one of the buzz words of recent times and refers to the collection and exploration of complex data sets. This complexity of big data is typically described by the four V's: Volume, Velocity, Variety, and Veracity. From a business perspective, big data is often portrayed as a sea of big opportunities. The public debate is torn between the two poles portrayed by the writers George Orwell and Aldous Huxley: complete surveillance resulting in oppression on the one end, and irrelevance and narcissism on the other. The technological research quite naturally is mostly concerned with the technical feasibility of the approaches, the continuously increasing challenges with respect to the four V's, and the creative solutions needed to tackle them. In this module you will get an overview on big data by looking at it from various aspects, primarily the business and societal point of view. The focus is not on the technical methods and skills, but on case studies that show big data and data engineering in a cross-section.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ communicate clearly to stakeholders in SCM about topics such as big data, digitalization and industry 4.0; ▪ explain and discuss pros and cons of digitalization from a business perspective as well as a societal perspective; ▪ investigate independently problems related to big data issues by performing a SWOT analysis on current big data initiatives; 	

	<ul style="list-style-type: none"> ▪ evaluate technological possibilities and innovations driven by big data; ▪ assess the business opportunities of current big data developments.
Assessment	<p>Type: Term paper</p> <p>Length: 2.500 words</p> <p>Weight: 100%</p> <p>Scope: All intended learning outcomes of the module</p>
Entry Requirements	Pre-requisites
	Co-requisites
	Knowledge, Skills and Competencies
Recommendations for Preparation	None.
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lecture (17.5 hours) ▪ Project work (90 hours) ▪ Private study (17.5 hours)
Relationship to other Modules	Concepts are applied in <i>MCO004 Trends & Challenges in Supply Chain Management</i> . Project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of tasks in this module.

6.1.4 Trends & Challenges in Supply Chain Management

MCO004 – TrendChalSCM		5 CP
▪ MCO004-051004 Trends & Challenges in Supply Chain Management		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content Educational Aims and	<p>Manufacturing and logistics systems are subject to permanent technological advancements. Progress in manufacturing and logistics technologies for processing, handling, transport and warehousing reshape processes and structures.</p> <p>This module deals with current and near-future technologies to be used in manufacturing and logistics systems. These are cross-cutting technologies that touch upon different skills, departments, and disciplines that show a high degree of complexity to be managed. This module also looks at select technologies under development and in early stage of application in laboratories and in industrial innovation centers by analyzing their potentials and limitations and effects on current supply chain and manufacturing systems.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ assess the effects of complex technologies in manufacturing and logistics systems; ▪ integrate the knowledge on trends in supply chain and logistics issues; ▪ independently and holistically investigate new trends in SCM; ▪ develop alternative approaches to SCM issues; ▪ derive costs and benefits of these technologies; ▪ analyze the potentials of new cross-cutting technologies and communicate them clearly to stakeholders; ▪ manage the change requirements posed by new technologies; 	

	<ul style="list-style-type: none"> ▪ apply project management tools to effectively work in teams in order to perform the group project task. 	
Assessment	Type: Project report Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module	
Entry Requirements	Pre-requisites	MCO003-051003 Big Data Challenge MCO002-051002 Supply Chain Management and Logistics
	Co-requisites	--
	Knowledge, Skills and Competencies	Researching information, assessing sources, verbal communication skills
Recommendations for Preparation	DHL (2018): Logistics Trend Radar: Delivering insight today, creating value tomorrow. Version 2018/2019.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Seminars (35 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 	
Relationship to other Modules	Aspects taught in both <i>MCO003-051003 Big Data Challenge</i> and <i>MCO002-051002 Supply Chain Management and Logistics</i> as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills in MCA001 – CommPres facilitate the completion of tasks in this module.	

6.1.5 Advanced Supply Chain Management

MCO005 – AdvSCM		5 CP
▪ MCO005-051005 Advanced Supply Chain Management		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content Educational Aims and	<p>Ensuring seamless material flows along globalized and digitalized supply chains is becoming more and more challenging. Supply chain managers require information and planning systems that are capable of properly planning, scheduling and controlling material flows across different locations. Thus, such planning systems (e.g. SAP Integrated Business Planning) are an important asset in today's supply chains.</p> <p>In this module, students will deal with challenges imposed by such global and digitalized supply chains by using such kind of software. In using this software, students will learn how best to plan, monitor and control processes in operations, demand and inventory planning by considering planning models and user roles. Thus, they will understand the possibilities and also limits of such software by means of hands-on exercises and case studies to be solved with such software.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ work with supply chain-related advanced planning systems to efficiently manage supply chains; ▪ configure and use different applications, such as operations, demand, supply, and inventory planning ▪ measure progress with specified control tools; ▪ set up and deploy such software in a company's IT landscape. 	
Assessment	Type: Project report	

	Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module	
Entry Requirements	Pre-requisites	MCO002-051002 Supply Chain Management and Logistics
	Co-requisites	--
	Knowledge, Skills and Competencies	Researching information, assessing sources, written communication skills
Recommendations for Preparation	Markin, S & Sinha, A. (2018): SAP Integrated Business Planning - Functionality and Implementation. Rheinwerk Publishing / SAP Press.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (35 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 	
Relationship to other Modules	This module complements <i>MCO002-051002 Supply Chain Management and Logistics</i> by using a complex planning system in supply chains	

6.1.6 Purchasing and Distribution

MCO006 – PurchDist		5 CP
<ul style="list-style-type: none"> ▪ MCO006-051432 International Purchasing ▪ MCO006-050231 Distribution Logistics 		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Florian Schupp	
Instructors of Record	Prof. Dr. Florian Schupp,	
Content and Educational Aims	<p>This module covers two main aspects of supply chain management: purchasing and distribution.</p> <p>The first part of the module deals with purchasing as a part of the entire business as well as with prerequisites for profitable business overall. This part is based on group work and discussions with a focus on collaborative approaches and on understanding and developing these approaches in future doings of students. The aim here is to gain a deep understanding of possibilities and challenges procurement offers and faces in an organization. Another aim is to improve economical thinking skills and understanding how the key elements influence a business and its financial standing.</p> <p>A major objective of the second part of the module is to equip students with a sound knowledge and understanding of processes and key business challenges within the field of distribution. Here, the evolution of distribution logistics from direct to store deliveries in the early 1970s up to same day deliveries and omnichannel supply chains developed by companies presently will be outlined. Based on that, new operational challenges imposed by e-commerce on the warehousing aspect of distribution logistics, namely the emergence of e-fulfillment centers and the increasing importance of parcel and sorting delivery centers will be</p>	

	addressed. Eventually, concepts in last mile delivery with a focus on different business models (e.g. online retailers, sharing economy, etc.) will be covered alongside the associated challenges for traditional transport and distribution strategies and novel solution approaches.	
Intended Outcomes	<p>Learning After successful completion of the module, students should be able to</p> <p><i>Purchasing:</i></p> <ul style="list-style-type: none"> ▪ critically assess and apply different purchasing models for an efficient supply of goods; ▪ develop purchasing strategies, plans and related processes in a global environment; ▪ develop team working skills and ability to cooperate with different people involved in purchasing; ▪ think economically and understand how the key elements in purchasing influence a business and its financial standing; <p><i>Distribution:</i></p> <ul style="list-style-type: none"> ▪ design distribution systems by considering and combining different modes of transportation and warehouses; ▪ critically evaluate and apply methods related to efficiently running distribution processes; ▪ evaluate challenges and opportunities warehouses and distribution centers face to fulfill specific requirements; ▪ deal with the rising importance and complexity of last-mile deliveries and novel methods to tackle associated delivery problems; ▪ independently investigate solutions for complex delivery systems and develop alternative approaches. 	
Assessment	<p>Term paper</p> <p>Weight: 100%</p> <p>Length: 2.500 words</p> <p>Scope: All intended learning outcomes of the module</p>	
Entry Requirements	Pre-requisites	MCO002-051002 Supply Chain Management and Logistics
	Co-requisites	--

	Knowledge, Skills and Competencies	Logical thinking
Recommendations for Preparation	Van Weele, A. (2018): Purchasing and Supply Chain Management. 7 th edition. Cengage Learning EMEA Publishing.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Seminars (35 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 	
Relationship to other Modules	<p>This module deals in detail with purchasing and distribution concepts introduced in <i>MCO002-051002 Supply Chain Management and Logistics</i> and <i>MCO005-051005 Advanced Supply Chain Management</i> and concepts taught in <i>MCO001 – ProjQualRisk</i> will be applied. Academic writing skills in MCA001 – CommPres facilitate the completion of tasks in this module.</p>	

Module Components				
No.	Title	Type	CP	Mandatory
MCO006-051432	International Purchasing	Seminar	2.5	yes
MCO006-050231	Distribution Logistics	Seminar	2.5	yes

6.1.7 Supply Chain Finance

MCO007 – SCFinance		5 CP
▪ MCO007-051007 Supply Chain Finance		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory elective for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content Educational Aims and	<p>Supply chains do not only involve material and information flows between companies but also money flows to finance such core activities. This module explains the relations between supply chain management and corporate finance by emphasizing how a supply chain and the materials/products delivered can be financed and how this creates value for both the shareholders of the company and for the stakeholders.</p> <p>This module will use case studies from manufacturers, distributors and retailers to understand the financial needs and means. The module will give students a comprehensive and thorough overview and understanding of different strategies and applications of supply chain finance.</p> <p>Main topics include shareholder value creation, cash-flow maximization, financial risk mitigation, supply chain finance decision-making, accounting methods, financial analysis, working capital management, capital budgeting, and sustainability.</p>	
Intended Learning Outcomes	<p>After successful completion of the module, students will be able to</p> <ul style="list-style-type: none"> ▪ apply finance and investment theories and methods to measure the impact of supply chain activities on the financial performance of the company; ▪ integrate appropriate financing and accounting methods for specific cases by considering the complex relations between value creation methods and supply chain value drivers; ▪ develop alternative strategies to finance supply chain activities in global markets and make informed decisions; 	

	<ul style="list-style-type: none"> ▪ independently investigate financing issues in SCM activities by using quantitative methods; ▪ develop strategies to satisfy stakeholders' and shareholders' expectations in the best way and clearly communicate to them. 	
Assessment	Type: Written Examination Weight: 100% Duration: 120 minutes Scope: All intended learning outcomes of the module	
Entry Requirements	Pre-requisites	MCO002-051002 Supply Chain Management and Logistics MCO005-051005 Advanced Supply Chain Management
	Co-requisites	--
	Knowledge, Skills and Competencies	--
Recommendations for Preparation	Templar et al. (2016): Financing the End-to-end Supply Chain: A Reference Guide to Supply Chain Finance. Kogan Page Publishing.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Seminars (17.5 hours) ▪ Private study (90 hours) 	
Relationship to other Modules	This module complements <i>MCO002-051002 Supply Chain Management and Logistics</i> and <i>MCO005-051005 Advanced Supply Chain Management</i> by looking at financial aspects	

6.1.8 Data Analytics in Supply Chain Management

MCO008 – DataAnaSCM		5 CP
▪ MCO008-051008 Data Analytics in Supply Chain Management		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	<ul style="list-style-type: none"> • MSc Supply Chain Management • MSc Data Engineering 	
Mandatory Status	Mandatory elective for SCM students	
Module Representative	Prof. Dr.-Ing. Hendro Wicaksono	
Content and Educational Aims	<p>In recent years, big data has become a significant topic in supply chain management as the amount of generated data in supply chain management practices has grown exponentially. Data analytics refer to techniques that apply data mining, statistical analysis, predictive analytics, machine learning, etc. to uncover hidden patterns, correlations, trends, and other business valuable information and knowledge from data.</p> <p>The module focuses on the supply chain management scenarios that generate and consume data intensively and require data analytics to improve the decision making process through descriptive, predictive, and prescriptive analytics. These include, for example:</p> <ul style="list-style-type: none"> ▪ Descriptive statistics and historical insight of companies' production, financial, operations, sales, customers, etc. ▪ Forecasting customer behavior, purchasing patterns, production performance, energy consumption, etc. ▪ Prescriptive analytics to assess the offer that should be made to a certain customer, to decide on the shipment strategy for each location, to determine the most efficient material flow in a factory, etc. 	

Intended Learning Outcomes	By the end of this module, students will be able to <ul style="list-style-type: none"> ▪ identify scenarios in supply chain management and evaluate the opportunities and challenges of data analytics applications; ▪ determine the objective of data analytics in different scenarios and the data sources required to achieve the objectives; ▪ apply methods and tools to collect and to integrate data from different sources in the context of supply chain management; ▪ apply machine learning and statistical analytics methods and tools to uncover hidden patterns, correlations, trends, and knowledge that are useful to improve supply chain management processes; ▪ evaluate data analytics results in different scenarios and solve the problems that might occur during the whole data analytics processes from data collection to analytics; ▪ develop deployment architecture concepts by integrating existing tools/software; ▪ develop business model and ecosystem concepts. 						
Assessment	Type: Project report Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module						
Entry Requirements	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Pre-requisites</td> <td style="padding: 5px;">MMM001-XXXXX – Programming in Python</td> </tr> <tr> <td style="padding: 5px;">Co-requisites</td> <td style="padding: 5px;">MMM003-051020 - Programming in R</td> </tr> <tr> <td style="padding: 5px; vertical-align: top;">Knowledge, Skills And Competencies</td> <td style="padding: 5px; vertical-align: top;"> Basics of statistical analytics and machine learning Basics of database and SQL Basics of programming skills such as R, Python, or Java </td> </tr> </table>	Pre-requisites	MMM001-XXXXX – Programming in Python	Co-requisites	MMM003-051020 - Programming in R	Knowledge, Skills And Competencies	Basics of statistical analytics and machine learning Basics of database and SQL Basics of programming skills such as R, Python, or Java
Pre-requisites	MMM001-XXXXX – Programming in Python						
Co-requisites	MMM003-051020 - Programming in R						
Knowledge, Skills And Competencies	Basics of statistical analytics and machine learning Basics of database and SQL Basics of programming skills such as R, Python, or Java						
Recommendations for Preparation	Sanders, N. Big data driven supply chain management: a framework for implementing analytics and turning information into intelligence, Pearson Education, 2014						
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures and feedback sessions (35 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 						
Relationship to other Modules	Programming methods, such as R and Python, taught in <i>MMM001 Programming in Python</i> and <i>MMM003-051020 Programming in R</i> as well as project management concepts taught in MCO001 ProjQualRisk will be						

	applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of tasks in this module.
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6.1.9 Smart Cities and Transportation Concepts

MCO009 – SmartCit		5 CP
▪ MCO009-051009 Smart Cities and Transportation Concepts		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory elective for SCM students	
Module Representative	Prof. Dr.-Ing. Hendro Wicaksono	
Content and Educational Aims	<p>In recent years, cities around the world have been initiating and developing ideas and projects that use the word “smart”. The projects and ideas are characterized by technologies, such as green energy, artificial intelligence, internet-of-things or self-driving vehicles, which require large amounts of data. This module focuses on the main considerations of smart city projects which include intelligent transportation (public transportation, urban logistics, smart vehicle) and environmental infrastructure (energy, water, and waste), as well as the technological backbone such as internet of things, cloud computing and data analytics.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to</p> <ul style="list-style-type: none"> ▪ identify typical scenarios of smart city projects and evaluate the opportunities and challenges; ▪ discover backbone technologies required for intelligent transportation and environmental infrastructure and analyze the economics, ecological and social impacts; ▪ develop technological architecture concepts for typical smart city scenarios; ▪ work with smart city data set and analyze the data to improve decision making in smart city context. 	
Assessment	Type: Project report	

	Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module		
Entry Requirements	Pre-requisites	MCO003-051003	Big Data Challenge
	Co-requisites	--	
	Knowledge, Skills And Competencies	--	
Recommendations for Preparation	McClellan,S; Jimenez, J.A.; Koutitas, G.: Smart Cities Applications, Technologies, Standards, and Driving Factors, Springer, 2018		
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures and feedback sessions (35 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 		
Relationship to other Modules	Concepts of <i>MCO003-051003 Big Data Challenge</i> as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of tasks in this module.		

6.1.10 Principles of Consulting

MCO010 – PrincCons		5 CP
▪ MCO010-051010 Principles of Consulting		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory elective for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content and Educational Aims	<p>Managing supply chains involves many activities and projects that require expert skills, which may not be available in the company. Thus, support by experienced consultants from outside the company is crucial. Graduates of SCM may not only end up in supply chain related departments in companies but also may work with consultancies focusing on supply chain issues. This module gives a deep understanding in how consulting companies are run and what cross-cutting skills of consultants look like. Here, consulting processes are analyzed in detail. Additionally, the complex and intertwined roles and responsibilities of consultants and their interactions with clients are addressed. Furthermore, the different goals of internal and external consultancies are covered. Students are introduced to typical approaches and analytical tools for consultants. Case studies help students understand the phases of consultancy projects, organizational set-ups and interface to client, as well as assessment of project results.</p>	
Intended Learning Outcomes	<p>After successful completion of the module, students will be able to</p> <ul style="list-style-type: none"> ▪ apply different interdisciplinary concepts and methods of supply chain consulting; ▪ independently investigate complex problems and develop creative solutions; ▪ use the advanced analytical tools and decide which tools and methods are optimal for respective situations; ▪ communicate professionally with experts in companies and use their feedback to further improve solutions; ▪ detect conflict potentials in consultancy projects; 	

	<ul style="list-style-type: none"> ▪ gain a deep understanding of and apply quantitative decisions-making tools for the improvement of supply chain processes; ▪ make systematical and data-driven decisions for the issues at hand and assess their impact on business processes; ▪ develop a professional self-perception as consultant based on standards in consultancy. 	
Assessment	Type: Group project Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module	
Entry Requirements	Pre-requisites	MCA001 Communicating & Presenting
	Co-requisites	--
	Knowledge, Skills and Competencies	--
Recommendations for Preparation	Newton, R. (2012): <i>The Management Consultant: Mastering the Art of Consultancy</i> . 1 st edition. FT / Prentice Hall Publishing.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Seminars (17.5 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 	
Relationship to other Modules	Concepts of <i>MCA001 – Communicating & Presenting</i> as well as project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing and communication skills taught in MCA001 – CommPres facilitate the completion of tasks in this module.	

6.2 Research & Discovery Area

6.2.1 Applied Modeling & Simulation

MRD001 – ModSim		5 CP
▪ MRD001-051011 Applied Modeling & Simulation		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content and Educational Aims	<p>Decisions on the design and operation of logistics systems require a thorough understanding of the system's behavior. In many cases logistics systems are too complex to develop analytical methods that can be used to predict the system's behavior and any implementation of changes bears a great risk on the overall performance of the system. Simulations can be used to derive insight about the behavior of complex systems before changes are implemented. In this module, students will learn how to develop and conduct simulation experiments especially to analyze the behavior of complex supply chain systems.</p> <p>Throughout the module, different aspects of supply chains, such as production and material flow along the supply chain, distribution networks, market diffusion, etc., will be modeled and simulated by applying discrete-event and agent-based modeling techniques.</p> <p>Students will prepare assignments based on the created models and they will work on a final group project by dealing with a complex problem.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ model highly dynamic supply chain systems; ▪ apply different simulation methods (esp. discrete-event and agent-based) to design and analyze processes; 	

	<ul style="list-style-type: none"> ▪ independently investigate bottlenecks and inefficiencies in such complex systems; ▪ analyze results of simulation runs and clearly communicate them to stakeholders; ▪ independently find and evaluate alternative solution to bottlenecks and other issues in complex logistics systems by changing parameters and the overall system design; ▪ make substantiated and data-based decisions by overseeing the impacts on the overall logistics system thanks to detailed simulation results; ▪ justify their found solutions by using and communicating the optimal simulation result; ▪ apply project management tools to effectively work in teams in order to solve complex problems in a group.
Assessment	<p>Type: Project report</p> <p>Weight: 100%</p> <p>Length: 2.500 words</p> <p>Scope: All intended learning outcomes of the module</p>
Entry Requirements	Pre-requisites
	Co-requisites
	Knowledge, Skills and Competencies
Recommendations for Preparation	Law M., Kelton W. (2000): Simulation Modeling and Analysis. McGraw-Hill.
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Lab (17.5 hours) ▪ Group work (45 hours) ▪ Private study (45 hours)
Relationship to other Modules	Aspects of <i>MCO002-051002 Supply Chain Management and Logistics</i> are foundational for modeling purposes and project management concepts taught in <i>MCO001 ProjQualRisk</i> will be applied. Academic writing and communication skills taught in <i>MCA001 – CommPres</i> facilitate the completion of tasks in this module.

6.2.2 Supply Chain Engineering

MRD002 – SCEng		5 CP
▪ MRD002-051012 Supply Chain Engineering		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Dr. Stanislav Chankov	
Content and Educational Aims	<p>Supply Chain Engineering is concerned with the design of the supply chain network and the use of mathematical models and methods to determine the optimal strategies for managing the supply chain. Accordingly, this module has two components: application of mathematical models from operations research and integrated decision making in supply chain management.</p> <p>In the first part of the module, students will learn how to find optimal or near-optimal solutions to complex decision-making problems in supply chain management by employing techniques such as mathematical modeling, statistical analysis, and mathematical optimization from the field of operations research. This part of the module introduces students to modeling of decision problems and the use of quantitative methods and techniques for effective decision-making in supply chain management on topics such as: supplier selection, development, demand forecasting, production planning, transportation problems and vehicle routing.</p> <p>In the second part of the module students play the Fresh Connection game. The Fresh Connection is an innovative web-based business simulation that delivers the ultimate supply chain learning experience. It engages participants in making strategic decisions in the management of a manufacturing company of fruit juices. Working in teams of four, participants represent the functional roles of sales, purchasing, supply chain and operations. They are confronted with various real-life, real-time dilemmas and render typical supply chain management decisions (e.g. supplier selection, production capacity planning, inventory management, supply chain risk management, supply chain sustainability, etc.). Thereby, students learn how to use information in decision-making and how to handle risk and uncertainty. Thus, they experience the power of true</p>	

	alignment and a well-articulated supply chain strategy, supported by tactical skills and knowledge.
Intended Learning Outcomes	<p>After successful completion of the module, students should be able to:</p> <p><i>Mathematical Modeling in SCM</i></p> <ul style="list-style-type: none"> ▪ develop mathematical models for supply chain management problems and derive optimal or near-optimal solutions to them using operations research methods; ▪ apply common network optimization problems such as transportation, shortest path, minimum spanning tree, and maximum flow problems to supply chain situations; <p><i>Integrated Decision-making in SCM</i></p> <ul style="list-style-type: none"> ▪ make decisions in a high-pressure environment as part of a team; ▪ formulate and explain supply chain strategy and evaluate different suppliers and defend appropriate contract terms in a global supply chain environment; ▪ design appropriate techniques for capacity planning in warehouses and production, inventory management and demand forecasting; ▪ create supply chain risk management strategy to mitigate global supply chain risks; ▪ construct a sustainable supply chain considering both economic and environmental factors; ▪ develop project management tools to effectively work in teams in order to perform a task.
Assessment	<p>Two assessment components:</p> <p>Type 1: Group project</p> <p>Weight: 50%</p> <p>Scope: Intended learning outcomes of Integrated Decision-making</p> <p>Type 2: Written examination</p> <p>Weight: 50%</p> <p>Duration: 120 minutes</p> <p>Scope: Intended learning outcomes of Mathematical Modeling in SCM</p>

	The educational aims and intended learning outcomes of this module require two assessment types to evaluate both specialist knowledge (e.g. pure mathematical skills) as well as the application thereof in the business simulation.	
Entry Requirements	Pre-requisites	MCO002-051002 Supply Chain Management and Logistics
	Co-requisites	--
	Knowledge, Skills and Competencies	Basic knowledge in spreadsheet software
Recommendations for Preparation	Ravindra, A. R. & Warsing Jr., D. (2012): Supply Chain Engineering – Models and Applications. CRC Press.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Seminars (17.5 hours) ▪ Group work (45 hours) ▪ Private study (45 hours) 	
Relationship to other Modules	Extends <i>MCO002-051002 Supply Chain Management and Logistics</i> by explicitly looking at design and control aspects of SCM and project management concepts taught in MCO001 ProjQualRisk will be applied. Academic writing skills taught in MCA001 – CommPres facilitate the completion of tasks in this module.	

6.2.3 Research Project

MRD003 - ResProj		5 CP
▪ MRD003-051013 Research Project		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Gert Brunekreeft	
Instructors of Record	Prof. Dr. Gert Brunekreeft	
Content and Educational Aims	<p>Supply Chain Management graduates need to develop research skills as well, not only to prepare for their master thesis but also due to the fact that many graduates pursue an academic career. Thus, profound research skills as of utmost importance.</p> <p>Content-wise, many industries are characterized by complex and highly interdependent supply stages. This raises issues of vertical and horizontal coordination, competition and market design as well as regulation. Picking up a specific example of such a complex industry, this module aims to step into the specific issues of value chain management, analyzing theoretical and practical issues from the viewpoint of economics and business administration.</p> <p>Typical research questions refer to the general market structure of the industry. What are the issues of competition and regulation of the industry? How critical is vertical and/or horizontal coordination, and how are information flows and coordination handled along the supply chain? What are possible problems of vertical integration or fragmentation in the sector? Are there problems of risks and cost structures, ownership, or investments or innovation?</p> <p>This seminar requires the students to prepare in small groups a research paper on value chain management and analyze specific economic issues of the selected industry based on applied scientific literature and methods. The main aim is to learn to think independently and critically.</p>	

Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ write and review a research paper with an applied scientific background; ▪ select and evaluate relevant literature; ▪ assess the key arguments in the debate critically and independently; ▪ develop an ability for a reasonable, reflecting, and stringent argumentation; ▪ precisely communicate their ideas and views in a concise and clear manner on academic level; ▪ precisely communicate ideas in discussions and presentations in class. 						
Assessment	<p>Type: Term paper</p> <p>Weight: 100%</p> <p>Length: 2.500 words</p> <p>Scope: All intended learning outcomes of the module</p>						
Entry Requirements	<table border="1"> <tr> <td>Pre-requisites</td> <td>MCA001 – Communication & Presenting</td> </tr> <tr> <td>Co-requisites</td> <td>--</td> </tr> <tr> <td>Knowledge, Skills and Competencies</td> <td>Good verbal and written communication skills</td> </tr> </table>	Pre-requisites	MCA001 – Communication & Presenting	Co-requisites	--	Knowledge, Skills and Competencies	Good verbal and written communication skills
Pre-requisites	MCA001 – Communication & Presenting						
Co-requisites	--						
Knowledge, Skills and Competencies	Good verbal and written communication skills						
Recommendations for Preparation	Saunders, M. et al. (2015): Research Methods for Business Students. 7 th edition. Pearson.						
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Seminars (35 hours) ▪ Private study (90 hours) 						
Relationship to other Modules	Extends the academic writing skills taught in MCA001 – CommPres with a focus on the preparation of <i>MMT002 Master Thesis</i>						

6.3 Math & Methods Area

6.3.1 Programming in Python

MMM012 – ProgrPyth		5 CP
▪ MMM012-350111 Programming in Python		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	▪ Mandatory for SCM students	
Module Coordinator	Prof. Dr. Adalbert F.X. Wilhelm	
Instructors of Record	Dr. Kinga Lipskoch	
Content and Educational Aims	Data analysis has become a central part of jobs in the supply chain industry. While routine tasks are often accomplished with standard spreadsheet software, more advanced analytical procedures require the use of programming languages. Python is one the most popular programming languages nowadays used by data analysts and data scientists. It has a broad spectrum of applicability, since Python has been designed as a general-purpose programming language. As open-source projects Python builds on a huge worldwide user and developer community, which has extended its capabilities. In this module, students will receive a solid introduction into this popular programming languages. SCM and logistics-related examples will be used throughout the module.	
Intended Learning Outcomes	By the end of this module, students will be able to: <ul style="list-style-type: none">▪ apply and perform data handling and data manipulation tasks in Python;▪ apply their knowledge to implement code in Python;▪ know about typical applications of Python in data science.	
Assessment	Type: Written examination	

	Weight: 100%	
	Duration: 120 minutes	
	Scope: All intended learning outcomes of the module	
Entry Requirements	Pre-requisites	--
	Co-requisites	--
	Knowledge, Skills and Competencies	Logical thinking, analytical skills
Recommendations for Preparation	Severance, C.R.; Blumberg, S.; Hauser, E. (2016): Python for Everybody: Exploring Data in Python 3. Create Space Independent Publishing Platform.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (35 hours) ▪ Private study (90 hours) 	
Relationship to other Modules	Pre-requisite for	<i>MMM003-XXXXX Programming in R</i>

6.3.2 Research Methods

MMM002 – ResMeth	5 CP
<ul style="list-style-type: none"> ▪ MMM002-990222 Quantitative Research: Econometrics in SCM ▪ MMM002-990202 Qualitative Research: Methods and Methodology 	
Workload	125 hours
Duration	1 semester
Frequency of Module Offer	Annually
Program Affiliation	MSc Supply Chain Management
Mandatory Status	Mandatory for SCM students Optional for students of other programs
Module Coordinator	Prof. Dr. Margrit Schreier
Instructors of Record	Prof. Dr. Margrit Schreier
Content and Educational Aims	<p>This module consists of both qualitative and quantitative research methods. The latter provides students with essential background in concepts and methods of econometrics beyond the introductory level. The module component will cover linear regression, regression for limited dependent variables, time series and panel data modelling. Given the widespread access to user-friendly and oftentimes open-source statistical software in present days, the course will provide a stronger emphasis on the underlying logic and limitations of the methods rather than their formal mathematical-statistical technicalities. It will thereby facilitate students in acquiring the background knowledge, skills, and intuitive understanding necessary for implementing and interpreting correctly quantitative research, particularly in the field of supply chain management.</p> <p>Qualitative research, as the second component of this module, is concerned with meaning – for instance, the meaning that events have for people, or the meaning of written texts or works of art. By applying qualitative methods, researchers seek to obtain an in-depth understanding of these meanings. This module component examines the methodological foundations of qualitative research, introduces purposive sampling strategies that are especially suitable for an in-depth discovery of meaning, discusses how researchers acquire their data (for instance through</p>

	<p>interviews, focus groups, or observation), and reviews methods for the analysis of qualitative data (such as: various types of coding, content analysis, discourse analysis, visual analysis). Special emphasis is placed on examining the ‘quality of qualitative research’, including the extent to which the traditional criteria of objectivity, reliability, and validity can be applied. This component of the module is held in part as a seminar and in part as a lab where students apply the methods to data from their own fields of study. During the lab sessions, students are required to participate in and report on activities involving the application and trying out of selected methods. Also, students will develop, carry out, and report on small group research projects, fostering the integration of methodological knowledge about methods and designs with practical expertise in applying these methods. Lab sessions are run with small groups to ensure optimal supervision of research projects.</p>						
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ model and formulate complex logistics problems as mathematical equations; ▪ apply operations research methods, i.e. mathematical models, to solve complex problems; ▪ prepare and conduct qualitative research, such as interviews; ▪ analyze and contextualize the findings of qualitative research. 						
Assessment	<p>Type: Term paper Weight: 100% Length: 2.500 words Scope: All intended learning outcomes of the module</p>						
Entry Requirements	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Pre-requisites</td> <td style="padding: 5px;">--</td> </tr> <tr> <td style="padding: 5px;">Co-requisites</td> <td style="padding: 5px;">--</td> </tr> <tr> <td style="padding: 5px;">Knowledge, Skills and Competencies</td> <td style="padding: 5px;">Analytical skills</td> </tr> </table>	Pre-requisites	--	Co-requisites	--	Knowledge, Skills and Competencies	Analytical skills
Pre-requisites	--						
Co-requisites	--						
Knowledge, Skills and Competencies	Analytical skills						
Recommendations for Preparation	<p>MacKinnon, J.G. (2008): Econometric Theory and Methods. International Edition. Oxford University Press.</p>						
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (35 hours) ▪ Private Study (90 hours) 						

Relationship to other Modules	Academic writing skills taught in MCA001 – CommPres facilitate the completion of tasks in this module. Methods taught may be used in <i>MMT002 Master Thesis</i> depending on the thesis topic.
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Module Components				
No.	Title	Type	CP	Mandatory
MMM002-990222	Econometrics in SCM	lecture	2.5	yes
MMM002-990202	Qualitative Research: Methods and Methodology	lecture	2.5	yes

6.3.3 Programming in R

MMM013 – ProgrR		5 CP
▪ MMM013-990203 Programming in R		
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Adalbert F.X. Wilhelm	
Content and Educational Aims	<p>R is one of the trendy statistical software and programming environments for data analytics. In this course students will learn to work with R, to explore the various features and learn all essential steps and commands for reading data, converting, cleaning, storing and transforming it in order to prepare data for statistical analyses. Moreover, students will be guided through exploratory data analysis cases. They will also get an overview on different machine learning techniques that are available in R packages and how to access them.</p>	
Intended Learning Outcomes	<p>By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ perform data handling and data manipulation tasks in R; ▪ apply their knowledge to implement their own functions in R; ▪ effectively use core packages and libraries of R for data analytic purposes ▪ use typical applications of R in data science. 	
Assessment	<p>Type: Written examination Weight: 100% Duration: 120 minutes Scope: All intended learning outcomes of the module</p>	

	The educational aims and intended learning outcomes of this module require both a project and a written assessment.	
Entry Requirements	Pre-requisites	② MMM012-350112 Programming in Python
	Co-requisites	--
	Knowledge, Skills and Competencies	Logical thinking, analytical skills
Recommendations for Preparation	Dalgaard, P. (2008): Introductory Statistics with R. 2 nd edition. Springer.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (17.5 hours) ▪ Project work (35 hours) ▪ Private study (72.5 hours) 	
Relationship to other Modules	Co-requisite of <i>MCO008 – DataAnaSCM</i> . Project management concepts taught in MCO001 ProjQualRisk will be applied.	

6.4 Career Area

6.4.1 Communicating and Presenting

MCA001 – CommPres		5 CP
<ul style="list-style-type: none"> ▪ MCA001-051464 Communication & Presentation Skills for Executives ▪ MCA001-051016 Academic Writing 		
Workload	125 hours	
Duration	2 semesters	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Instructors of Record	Irene Bejenke Walsh, Meron Beshewamyeleh	
Content and Educational Aims	<p>Successful managers in the field of logistics and supply chain have to have good skills in both written and verbal communication. This module accounts for that need.</p> <p><i>Communication & Presentation Skills for Executives</i></p> <p>An executive career in an international business environment requires excellent communication and academic writing skills. Managers have to communicate effectively with a large variety of target audiences, often in different languages and with different cultural backgrounds. This is true for employees and/or direct reports, business partners as well as customers. The ability to present and communicate succinctly and confidently while being culturally aware building rapport and trust with different audiences is crucial. In this interactive module, students will be introduced to the basics of effective presentation and communication techniques. They will learn how to present themselves, their business project, or academic work, with impact, tailoring both the content and their delivery style to different types of audiences.</p>	

	<p><i>Academic Writing</i></p> <p>The academically rigorous nature of graduate studies requires students to master academic writing skills and techniques. In this introductory module component, students in SCM master's program will learn the foundations of academic writing at a graduate level, with special focus on writing academic essays, identifying organizational patterns of academic texts, and formulating arguments to produce cohesive and coherent academic papers. Through the process of drafting, continuous feedback and editing, students will improve their writing skills. This module component will also help students develop their research skills by highlighting techniques of finding and evaluating sources, and utilizing citation and referencing styles. As graduate students, adhering to The Code of Academic Integrity is a requirement. Hence, this module component will incorporate a session on scholarly and intellectual standards set by Jacobs University.</p> <p>The two components in this module complement each other, with one part placing strong emphasis on communication and presenting information orally, while the second is focusing on presenting and communicating academic information in a written form.</p>
Intended Outcomes	<p>Learning After successful completion of the module, students will be able to</p> <p><i>Communication & Presentation Skills for Executives</i></p> <ul style="list-style-type: none"> ▪ apply methods to act as effective communicators – in both group and individual situations; ▪ integrate interpersonal communication models and group dynamics in presentations; ▪ build rapport and trust with audiences; ▪ use presentation software (Powerpoint, Prezi) confidently and in a visually pleasant way; ▪ structure presentations in a coherent manner and develop captivating narratives; ▪ work with different presentation formats (Ignite, Pecha Kucha, Pitching etc.); ▪ apply the basics of logical reasoning in oratory (deductive/inductive) presentations; ▪ develop oratory and rhetorical skills drawing on Aristotle's teaching of logos, ethos and pathos; ▪ apply the basics of interpersonal communication (Johari Window, 4-Ears model etc.); ▪ give and receive constructive feedback; ▪ present themselves in different business situations; ▪ collaborate effectively in intercultural teams.

	<p><i>Academic Writing</i></p> <ul style="list-style-type: none"> ▪ structure their ideas to write clear summaries, coherent paragraphs and cohesive literature reviews; ▪ write different segments of an academic paper employing writing styles that display advanced grammar and precise and concise language use; ▪ successfully find and evaluate sources for research; ▪ use citation and referencing styles applicable for their discipline; ▪ avoid unintentional plagiarism and adhere to the code of academic integrity. 						
Assessment	<p>Two separate module component assessments of which both have to be passed:</p> <p>Type 1: Oral presentation</p> <p>Weight: 50%</p> <p>Duration: 30 minutes</p> <p>Scope: All intended learning outcomes of the module component <i>Communication & Presentation Skills for Executives</i></p> <p>Type 2: Writing assignment</p> <p>Weight: 50%</p> <p>Length: 2.500 words</p> <p>Scope: All intended learning outcomes of the module component <i>Academic writing</i></p> <p>The educational aims and intended learning outcomes of this module require both an oral and a written assessment.</p>						
Entry Requirements	<table border="1" style="width: 100%;"> <tr> <td style="width: 30%;">Pre-requisites</td> <td>--</td> </tr> <tr> <td>Co-requisites</td> <td>--</td> </tr> <tr> <td>Knowledge, Skills and Competencies</td> <td>Verbal and written communication skills</td> </tr> </table>	Pre-requisites	--	Co-requisites	--	Knowledge, Skills and Competencies	Verbal and written communication skills
Pre-requisites	--						
Co-requisites	--						
Knowledge, Skills and Competencies	Verbal and written communication skills						

Recommendations for Preparation	Zemach, D.E. & Rumisek, L.A. (2005): Academic Writing – From Paragraph to Essay. Edumond.
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lectures (35 hours) ▪ Private study (90 hours)
Relationship to other Modules	This module is foundational to several modules where presentations and term papers are expected, such as MCO001 – ProjQualRisk, MCO003 – BigData, MCO004 – TrendChalSCM, MCO006 – PurchDist, MCO008 – DataAnaSCM, MCO009 – SmartCit, MCO010 – PrincCons, MRD001 – ModSim, MRD002 – SCEng and of course MMT002 - MasterThesis. The general foundations will be specified in MRD003 - ResProj to prepare for the MMT002 – MasterThesis.

Module Components				
No.	Title	Type	CP	Mandatory
MCA001-051464	Communication & Presentation Skills for Executives	Seminar	2.5	yes
MCA001-051016	Academic Writing	Lecture	2.5	yes

6.4.2 Language Skills

The descriptions of the language modules are provided in a separate document, the “Language Module Handbook” that can be accessed from here: <https://www.jacobs-university.de/study/learning-languages>

6.4.3 Sustainable Business in Germany

MCA003 – SustainableBusiness		5 CP
Workload	125 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	<ul style="list-style-type: none"> ▪ MSc Supply Chain Management 	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Dr. Silke Cramer	
Instructors of Record	Dr. Silke Cramer, Michael Rüdiger	
Content and Educational Aims	<p>This module focuses on special aspects of business, preparing students for leading positions in the business world by establishing and navigating businesses especially in the German business landscape by also considering ethical and sustainability issues in the German business context.</p> <p>First, there will a focus on current topics in the German economic ecosystem. It helps students orientate themselves within Germany and understand the German business culture and landscape. Germany is an important logistics hub and many international companies are present in the German market. Therefore, besides a solid command of the German language good knowledge about its economy and institutions will prepare students of SCM both for a career within Germany as well as for an international career dealing with German suppliers and customers. Content-wise, the evolution and the historical backdrop of the German economy, starting with the German “Wirtschaftswunder” to the European integration with the implications for the economy and business life will be taught. Additionally, the current complex business landscape in Germany with the major institutions and their relationships will be addressed. Then, on a corporate level, company-related structural aspects, such as legal forms and their pros and cons will be discussed. This is also important for starting a business in Germany. All information is intended to embed students' and graduates' lives in Germany into contexts specific to the country. If feasible, parts of the component are conducted in German.</p> <p>Moreover, the module will also address ethics and sustainability issues, norms and values in Germany. Ethics or morality have to do with the</p>	

	<p>principles, standards, rules and norms of conduct that enable business cooperation and that allow companies to flourish; it provides a philosophically based touchstone for an ideal of justice, right relationship, and the proper use of power and authority. So, ethical principles, rules and regulations as well as sustainable business practices in Germany will be dealt with. Specific topics are: economic aspects of sustainability as well as legal and ecological aspects of sustainability as they relate to business operations in Germany. Ethical principles concerning sustainability and digitalization, i.e. data security and privacy, etc., as they relate to supply chain management in a global setting are a useful and potentially critical component to prepare future professionals to be effective contributors to a company or society.</p>				
Intended Outcomes	<p>Learning By the end of this module, students will be able to:</p> <ul style="list-style-type: none"> ▪ analyze and interpret economic developments in Germany and their effects on business operations. ▪ Analyze and, in the case of starting a business, find the proper legal form for a company; ▪ proactively deal with a number of different topics as they relate to the ethics and sustainability dimensions of supply chain management in Germany; ▪ assess the economic implications of ethical/unethical as well as sustainable/unsustainable behavior on the success and growth of a business; ▪ deal with legal aspects of ethics and sustainability by applying means to prevent and deal with corruption and accountability, especially in Germany; ▪ apply actions to contribute to the transition to a more sustainable business and society as part of their job ▪ implement and defend justice and social equality as dimensions of Ethics and Sustainability; 				
Assessment	<p>Type: written examination</p> <p>Weight: 100%</p> <p>Duration: 120 min</p> <p>Scope: All intended learning outcomes of the module</p> <p>The educational aims and intended learning outcomes of this module require separate assessments.</p>				
Entry Requirements	<table border="1"> <tr> <td>Pre-requisites</td> <td>--</td> </tr> <tr> <td>Co-requisites</td> <td>--</td> </tr> </table>	Pre-requisites	--	Co-requisites	--
Pre-requisites	--				
Co-requisites	--				

	Knowledge, Skills and Competencies	Basic knowledge in German
Recommendations for Preparation	Fraedrich, J. & Ferrell, O.C. (2014): Business Ethics: Ethical Decision Making & Cases. Cengage Learning.	
Forms of Learning and Teaching	<ul style="list-style-type: none"> ▪ Lecture (17.5 hours) ▪ Seminar (17.5 hours) ▪ Group work (17.5 hours) ▪ Private study (72.5 hours) 	
Relationship to other Modules	The German classes in MCA002 – LanguageMa help to better understand specific contents in this module. Project management concepts taught in MCO001 ProjQualRisk will be applied.	

Module Components				
No.	Title	Type	CP	Mandatory
MCA003-051017	Business in Germany	Lecture	2.5	yes
051522	Ethics & Sustainable Business	Lecture	2.5	yes

6.5 Master Thesis

MMT002 - MasterThesis		30 CP
▪ MMT002-051019 Master Thesis		
Workload	750 hours	
Duration	1 semester	
Frequency of Module Offer	Annually	
Program Affiliation	MSc Supply Chain Management	
Mandatory Status	Mandatory for SCM students	
Module Coordinator	Prof. Dr. Yilmaz Uygun	
Content and Educational Aims	<p>The Master thesis provides an opportunity for students to develop their interests in a specific subject area or specialization, and to demonstrate their ability to undertake independent research. The thesis constitutes a scientific exposition featuring their own research results. Students are required to independently use and apply the knowledge, methods, skills and competences acquired during their studies. Students are in regular contact with their thesis supervisor to ensure that the work progresses and meets the expectations and standards of an independent research work, and that it adheres to good scientific practice.</p> <p>The selected topic of the thesis, as well as the approach must be related to a real supply chain management or logistics problem. The Study Program Chair has to approve the topic to ensure it is embedded in the program's overall topic, its aims and goals.</p> <p>The thesis will be accompanied by a <i>research colloquium</i> where students have to present their thesis projects in an appropriate form, e.g. on posters, to other fellow students as well as to the thesis supervisors to get feedback and further impulses. This presentation represents a module achievement in a group setting and will hence train oral presentation skills.</p>	

Intended Outcomes	Learning	By the end of this module, students will be able to: <ul style="list-style-type: none"> ▪ independently develop research questions guided by gaps in existing knowledge and determine appropriate research strategies and plans; ▪ independently choose and justify appropriate research methods to new unsolved problems or issues; ▪ critically assess scientific results and literature; ▪ summarize the current state of knowledge in their chosen specialization area; ▪ independently apply appropriate knowledge, methods and competencies acquired during their studies; ▪ develop conclusions based on their own analysis; ▪ use individual feedback to develop and mature within the field of their specialization; ▪ effectively communicate and discuss their research results to various audiences; ▪ take into consideration social and ethical consequences of their activities.
Assessment		Type: Master thesis Weight: 100% Length: 25.000 words Scope: All intended learning outcomes of the module
Entry Requirements	Pre-requisites	Successful completion of at least 85 CP
	Co-requisites	--
	Knowledge, Skills and Competencies	Proficiency in the area of the chosen thesis topic
Recommendations for Preparation		<ul style="list-style-type: none"> ▪ Identify an area or a topic of interest. ▪ Create a research proposal including a research plan to ensure timely submission. ▪ Ensure you possess all required technical research skills or are able to acquire them on time. ▪ Review again the University's Code of Academic Integrity and Guidelines to Ensure Good Academic Practice.
Forms of Learning and Teaching		<ul style="list-style-type: none"> ▪ Private study (732.5 hours) ▪ Groups sessions (17.5 hours)
Relationship to other Modules		Depending on the topic, methods taught in <i>MMM002 Research Methods</i> may be used; Academic writing skills taught in <i>MCA001 Communicating & Presenting</i> (within the module MCA001 – CommPres) as well as project

	management concepts (esp. time management) taught in MCO001 ProjQualRisk will be applied
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Module Components				
No.	Title	Type	CP	Mandatory
MMT002-051019	Master Thesis	Thesis	30	yes

Note: The category "Assessment" describes the requirements for the award of ECTS credit points for the respective module.

7 Appendix –

7.1 Intended Learning Outcomes Assessment Matrix

MSc Supply Chain Management				MCO001 – ProjQualRisk	MCO002 – SCMLog	MCO003 – BigData	MCO004 – TrendChalSCM	MCO005 – AdvSCM	MCO006 – PurchDist	MCO007 – SCFinance	MCO008 – DataAnalSCM	MCO009 – SmartCit	MCO010 – PrinceCons	MRD001 – ApplModSim	MRD002 – SCEng	MRD003 - ResProj	MMW001 – ProgrPyth	MMW002 – ResMeth	MMW003 – ProgrR	MCA001 – CommPres	MCA002 – LanguageMa	MCA003 – Business	MMT002 - MasterThesis
Semester		1 1 1 2 2	2 2 3 3 3	3 3 3 3 3	1 2 3	1 2 3	1 2 3	1-2 1-2 3															
Mandatory/ optional		m m m m m	m m me me me	m m m m m	m m m	m m m	m m m	m m m															
ECTS Credits		5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	5 5 5 5 5	30	
Program Learning Outcomes	A	E	P	S	Competencies*																		
critically evaluate and apply the most important theories and methods of supply chain management, supplier relations and value creation to real life situations, organizations and industries;	x				x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	
integrate new knowledge in complex supply chain contexts based on extensive data analytics;	x					x x x x		x x x x									x x x					x	
assess opportunities and risks in global supply networks;	x x				x x x x			x x														x	
Make scientifically substantiated and data-driven decisions in the context of SCM and logistics and critically reflect possible impacts on business, environment and society;	x x	x				x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
independently investigate complex problems and develop new knowledge using both qualitative and quantitative methods;	x x					x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	
apply interdisciplinary approaches to solve academic and professional problems;	x x				x x x x		x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
efficiently and effectively manage supply chain related projects in multicultural and diverse environments;	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
detect conflict potentials and solve interpersonal issues in large projects;	x x x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
communicate clearly and professionally with experts from different disciplines in a variety of forms and moderate in interdisciplinary interaction;	x x				x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
manage multicultural and diverse environments and effectively participate in and lead mixed teams;	x					x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	
use individual feedback on a continuous basis to develop and mature within their studies and beyond;	x					x		x		x		x		x	x	x	x	x	x	x	x	x	x
quickly become acquainted with their work and hence start their career more easily because of the integration of theory and practice during their education;	x x				x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
develop a professional self-perception based on goals and standards of professional actions in SCM;	x x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
justify their professional actions with methodical knowledge und develop alternative approaches for issues they face in managing supply chains;	x x x x	x			x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
take responsibility for their own learning, personal development and role in society;	x x x x	x			x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	
adhere to and defend ethical, scientific and professional standards.	x x x x x	x											x	x	x	x	x	x	x	x	x	x	
Assessment Type																							
oral examination			x																				
final written exam			x x						x						x	x	x	x	x	x	x	x	x
project report					x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x	x x x x x
poster presentation																							
presentation																				x			

*Competencies: A-scientific/academic proficiency; E-competence for qualified employment; P-development of personality; S-competence for engagement in society

Figure 3: Intended Learning Outcomes Assessment Matrix